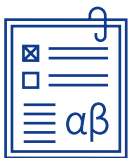


Export Market Share Decomposition, Export Performance, and Investment Activity



Ville Kaitila

ETLA Economic Research, Finland
ville.kaitila@etla.fi

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Abstract

We use goods export data at the SITC 3-digit level to analyse countries' world market-share developments in 2002–2024. We divide the data into technological categories and use an existing econometric method with annual weighted-OLS to divide the market-share changes into estimated structural composition effects (export destinations and exported products) and performance effects. Typically, emerging economies have grown stronger through performance, but older industrialised countries have partly compensated their performance-induced market-share losses with a better product composition of exports. Finland and Italy are exceptions as countries that have also had a weak export product composition. We further analyse the performance changes of European countries' exports using an econometric panel data analysis with data for GDP variables, nominal unit labour costs and effective exchange rates, investment, and statistics on the activities of multinational corporations. We find that investment and FDI activity are positively associated with performance.

Tiivistelmä

Vientimarkkinaosuuden hajotelma, viennin suorituskyky ja investointiaktiivisuus

Käytämme tavaraviennin aineistoa SITC-luokituksen 3-numerotasolla analysoidaksemme maiden maailmanmarkkinaosuuksien kehitystä vuosina 2002–2024. Jaamme aineiston teknologia- ja käytämme olemassa olevaa ekonometristä menetelmää estimoidaksemme markkinaosuuksien muutoksia jakamalla ne rakenteellisiin tekijöihin (vientikohdemaat ja vientituotteet) sekä suorituskykyyn. Kehittyvät taloudet ovat yleisesti vahvistuneet parantuneen suorituskyvyn kautta, mutta vanhat teollisuusmaat ovat osittain kompensoineet heikon suorituskyvyn aiheuttamia markkinaosuuksien menetyksiä paremmalla viennin tuoterakenteella. Suomi ja Italia ovat poikkeuksia, joilla on ollut myös heikko viennin tuoterakenne. Analysoimme lisäksi Euroopan maiden viennin suorituskyvyn muutoksia ekonometrisella paneeliaineistoanalyysillä, jossa hyödynnetään bkt-muuttujia, nimellisiä yksikkötyökustannuksia ja efektiivisiä valuuttakursseja, investointeja sekä tilastoja monikansallisten yritysten toiminnasta. Havaitsemme, että investoinnit ja suorat ulkomaiset sijoitukset ovat positiivisessa yhteydessä suorituskykyyn.

Lic. (Econ.) **Ville Kaitila** is a Senior Researcher at ETLA Economic Research.

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Keywords: Goods exports, Market shares, Export performance, Competitiveness, Investments, European Union

Asiasanat: Tavaravienti, Markkinaosuudet, Viennin Suorituskyky, Kilpailukyky, Investoinnit, Euroopan unioni

JEL: F10, F14, F15, F43

1 Introduction

Much has changed in the geographic structure of global goods trade in recent decades. Many factors have affected trade flows beyond the product and country composition of exports. World trade has been liberalised, technology has developed, shipping costs have declined in real terms, globalisation has advanced, global value chains have deepened, and emerging economies have entered the larger economic scene and started to dominate trade in many manufactured products. More recently, some of these developments have taken new directions and steps backward, among other things due to rising geopolitical tensions.

We first use the econometric constant market share (CMS) method constructed in Cheptea, Fontagné, and Zignago (2014) to estimate and analyse the development of market shares in world goods exports with 231 product groups and 50 countries and regions in 2002–2024. The method attributes the changes in world market shares to structural composition effects—export destination (geography) and exported products—and performance (competitiveness) effects. As an extension, we use econometric methods with a panel data to shed some light on the developments in the performance effect of EU countries' exports.

Market shares can increase through successful investment and expansion in the production infrastructure to meet foreign demand, but also for example simply because the country becomes more integrated into major markets for example through WTO accession, free trade agreements, or participation in regional value chains. Declines can follow, among other things, from failed policy and investment decisions, rising shipping costs, supply-chain reconfigurations, or new trade and geopolitical barriers.

The big story in recent decades is of course the integration of China into global value chains and large improvements in its manufacturing output and productivity following huge inflows of FDI, technology transfers, active industrial policies, and scale economies. China's WTO accession in 2001 and a reduction in global trade costs have boosted the development. As a result, China's share in world exports has risen significantly. Later, this rise has spread into other emerging Asian economies as labour costs in China have risen. During the past decade, the global trade system has faced numerous adverse shocks and a gradual resurgence in geoeconomics that have affected trade flows: higher tariffs in US–China trade, the Covid-19 supply-chain shock, and Russia's invasion of Ukraine.

According to our analysis, countries' overall market shares tended to change more during the first half of our research period with especially China's but also other emerging economies' shares increasing and those of Western industrialised countries decreasing. This development slowed down during the latter half of the period. Meanwhile, the structure of world trade has remained relatively unchanged by broad technological categories (Lall, 2000) in 2002–2024. Individual countries have of course experienced more diverging market-share developments in terms of their export products' technological categories.

Our CMS estimations show that the increase in emerging economies' global market shares has arisen from strong performance, not the geographic or product composition of their exports. Typically, performance and product composition have been negatively associated with each other so that while post-industrialised economies' market shares have suffered from a loss in performance they have benefited from the product composition of their exports. In the EU this has not been the case for Finland or Italy whose performance and product composition have both been a drag on their market shares.

Our macroeconomic panel data estimations of the annual changes in countries' performance are based on the microeconomic heterogeneous-firms trade theories constructed by Melitz (2003) and Helpman, Melitz, and Yeaple (2004). According to our results for European countries, a higher

lagged GDP per capita has mostly been positively or neutrally associated with changes in relative performance, while the association with lagged GDP itself has mostly been negative. The former corresponds with catching-up economies' performance-induced trade success. The latter implies that economies have not benefited from larger domestic markets. We also find that performance has been negatively associated with a rise in relative nominal unit labour costs, which is a measure of cost competitiveness, and positively with an appreciation in nominal effective exchange rates. These cancel each other out if we consider unit labour costs in a common currency.

Furthermore, the turnover abroad relative to total output in home country manufacturing has been positively associated with performance. Consequently, significant investment abroad by highly productive firms may support the market share performance of the home country. These results are driven more by euro area countries than those with flexible exchange rates vis-à-vis the euro. We also find a positive association between different investment variables and performance. These latter are dominated by investment in intellectual property products or IPP (software and databases, and research and development) in the euro area, but machinery and equipment in the other countries. The latter group is more heterogenous in both their levels of economic development and changes in exchange rate than the former.

In the effort to defend and gain market shares, we emphasise continuous structural adaptation, innovation, market knowledge, and productivity enhancements. An economic and policy regime that actively supports tangible and intangible investments, while remaining open to both inward and outward FDI, is essential for maintaining robust export performance in an increasingly competitive global goods market.

2 Literature

Shift-share decompositions—or constant-market-share (CMS) analyses—are a core descriptive tool in trade economics for attributing changes in aggregate exports or changes in world market shares to composition (geography and products) and performance (competitiveness etc.) effects. Early contributions are Tyszynski (1951), Leamer and Stern (1970), and Richardson (1971).

According to CMS, a change in export market shares can be divided into three components: commodity composition (products exported), market distribution effects (export destination countries), and overall performance (residual). Leamer and Stern (1970) introduced the market distribution effect. It should be noted, as already done by these early authors, that the order in which the composition (products vs. markets) is calculated in the traditional CMS analysis affects the results. The selection of the base year also affects the results as pointed out by Richardson (1971).

A positive commodity composition indicates exports are in fast-growing markets in terms of the product variety, while negative ones indicate that exports are in goods whose demand grows slowly or even declines. Market distribution effects consider the geographical allocation of exports. Positive destination market distribution indicates exports are going to countries whose overall import growth is rapid. On the other hand, a positive structural allocation does not automatically mean that the country is successful in its exports. If it is not, we will see negative performance development.

Performance is a residual and covers everything else. As such it is a complex factor and is affected by demand and supply interactions. Generally, a negative performance effect suggests higher price increases (or levels) than in competitor countries given product quality. Performance is also affected by, among other things, technological shocks, successful marketing and design, consumer trends, geoeconomics, as well as trade and other policies. Other things that affect the developments are exchange rate changes, global supply chain shocks, and country-specific shocks.

Fagerberg and Sollie (1987) add two additional effects into the calculation.¹ These reflect a country's (i.e. firms') ability to adapt their export structure to changes in the commodity and market composition of world imports. Thus, a distinction is made between the initial commodity/importer composition of a country's exports and the way these are adapting to changes in market demand. Consequently, the selection of the initial year is quite important and affects the results.

Fagerberg and Sollie (1987) also argued that the initial year's weights (Laspeyres indices) should be used throughout the calculations. According to their results, adaption had a smaller role than the other factors in OECD countries before 1983. They show that structural changes contributed positively to the export performance of the most advanced OECD countries, and negatively to that of less developed ones. On the other hand, the former group adapted less well than the latter.

More recent analyses following the formulation by Nyssens and Pouillet (1990) include: Amador and Cabral (2008) for Portugal; Pina (2011) for Ireland; de Munnik, Jacob, and Sze (2012) for Canada; Pandiella (2015) for Spain; Fontoura and Serôdio (2017) for the countries that joined the EU in 2004; and Backinezos, Panagiotou, and Rentifi (2019) for Greece. Furthermore, Gilbert and Muchová (2018) analyse the EU enlargement countries' exports using a CMS analysis with adaptation effects included. Skriner (2009) analyses Austrian performance without the adaptation effects and with a very aggregated destination country and product division.

Beltramello, De Backer, and Moussiégt (2012) analyse the export performance of countries in the context of global value chains. Global value chains are important, because produced goods incorporate more imported intermediate goods than before. Countries may be positioned more as downstream or upstream producers in these value chains. Global value chains result in gross export flows overstating the domestic value-added embodied in exports. Within the CMS framework, we do not discuss this issue, but we will discuss the technology level of exports. Also, re-exports may inflate some countries' export data.

Using the econometric CMS analysis developed by Chepeta, Gaulier, and Zignago (2005) and Chepeta, Fontagné, and Zignago (2014)², Beltramello et al. (2012) find that performance was the main driver of trade growth in the period 1995–2007, and that structural factors were less important. A positive performance effect was the main contributing factor to growth for emerging countries. As we will later see, this is the general result also in our analysis that covers the years 2002–2024.

The econometric implementations have three practical virtues. First, they produce estimates that are less dependent on an arbitrary base year. Second, they permit hypothesis testing and standard errors for component contributions. And third, they make explicit the role of different margins (product, destination, exporter) through normalization and fixed-effect identification. That said, the econometric approach relies on identification choices (fixed effects, normalization, weight definition) and on gross export measures.

3 Model and data

3.1 Econometric model

We use the econometric shift-share analysis modelled by Chepeta, Fontagné, and Zignago (2014). It is based on the weighted-OLS estimation results of

$$d \ln X_{ijk}^t = \alpha_i^t + \beta_j^t + \gamma_k^t + \varepsilon_{ijk}^t, \quad (1)$$

where on the left-hand side we have the log change in the value of goods exports X of product k from exporter country i to importer country j between years $t-1$ and t . On the right-hand side, the dummy variables β_j^t and γ_k^t are the contribution of the changes in global geographical and product

¹ See also Bonanno (2016).

² More exactly the 2010 working paper version in CEPII Document de travail No 2010 – 12.

trade structures in year t from the previous year to the annual growth rate of exports, while the α_i^t dummy approximates the remainder which can be thought of as the change in the export performance of country i . This decomposition is run for each year between 2002 and 2024, which gives us 22 annual changes for each i - j - k flow.

Since we calculate changes from the previous year, the analysis is based on existing trade flows, i.e. intensive margins. An analysis of the dataset—given our selection of countries, country groups and products as discussed below—reveals that the intensive margins cover almost the totality of exports. Only in the case of a few emerging Asian economies do we find that new destination markets (extensive margins) have some weight. But even this is the case only for a few random years in the beginning of the analysed time span. New products on the other hand have very, very little weight at the extensive margin. These results are heavily influenced by the level of aggregation used in the dataset. That we use the intensive margin at the aggregate level does not of course mean that the actual exporters are the same firms. So, at a firm-level we would witness more extensive margins with some firms also halting their exports to some destinations.

The growth rate of exports is calculated as an approximation using the log of the Törnqvist index of exports and is given by

$$d \ln X_i^t = \ln \left(\frac{X_i^t}{X_i^{t-1}} \right) \approx \sum_{jk} \frac{w_{ijk}^t}{w_i^t} \ln \left(\frac{X_{ijk}^t}{X_{ijk}^{t-1}} \right), \quad (2)$$

where $w_i^t = \frac{1}{2} \left(\frac{X_i^{t-1}}{X^{t-1}} + \frac{X_i^t}{X^t} \right)$ is the average weight of country i 's exports in total world exports over two consecutive years and $w_{ijk}^t = \frac{1}{2} \left(\frac{X_{ijk}^{t-1}}{X^{t-1}} + \frac{X_{ijk}^t}{X^t} \right)$ is the average weight of any i - j - k flow in total world exports over two consecutive years. Country i 's weight in world trade $w_i^t = \sum_{jk} w_{ijk}^t$ is the sum of the weights of its individual export flows. Combining equations (1) and (2) we get

$$d \ln X_{ijk}^t = \alpha_i^t + \sum_j \frac{w_{ij}^t}{w_i^t} \beta_j^t + \sum_k \frac{w_{ik}^t}{w_i^t} \gamma_k^t, \quad (3)$$

where w_{ij}^t is the average weight of country i 's exports to country j in total world exports over two years and w_{ik}^t is the average weight of country i 's exports of product k in total world exports over two years.

Hats above the variables indicate estimated coefficients. As one importer and one product fixed effect are dropped in the estimation due to collinearity, $\hat{\alpha}_i^t$ gives country i 's export growth relative to the omitted partner country and traded product. We can then calculate country i 's normalised performance independent of the choice of the omitted country as a least square mean given by

$$\tilde{\alpha}_i^t = \hat{\alpha}_i^t + \sum_j w_j^t \hat{\beta}_j^t + \sum_k w_k^t \hat{\gamma}_k^t \quad (4)$$

which is the sum of the estimated coefficient $\hat{\alpha}_i^t$ and the weighted means of partner and product effects of the OLS estimated coefficients. Here w_j^t is the weight of country j in total world imports and w_k^t is the weight of product k in total world exports (or imports), again averages over two consecutive years.

The estimated importer and product effects are also normalised and given by $\tilde{\beta}_j^t = \hat{\beta}_j^t - \sum_j w_j^t \hat{\beta}_j^t$ and $\tilde{\gamma}_k^t = \hat{\gamma}_k^t - \sum_k w_k^t \hat{\gamma}_k^t$. Consequently, equation (1) becomes $d \ln X_{ijk}^t = \tilde{\alpha}_i^t + \tilde{\beta}_j^t + \tilde{\gamma}_k^t + \varepsilon_{ijk}^t$. We rewrite equation (3) as

$$d \ln X_i^t = \tilde{\alpha}_i^t + \sum_j \frac{w_{ij}^t}{w_i^t} \tilde{\beta}_j^t + \sum_k \frac{w_{ik}^t}{w_i^t} \tilde{\gamma}_k^t, \quad (5)$$

where $\tilde{\alpha}_i^t$ is the export performance of country i , and the other two terms on the right-hand side are the contribution of i 's trade partner and product structure on the development of its total goods exports. The change in country i 's world market share is therefore estimated. It will be somewhat different from the actual observed change in market shares.

The decomposition of export performance is calculated separately for each year. The results are then summed over the analysed years to get an approximation of the aggregate change in country i 's market share and its decomposition during that period.

3.2 Data and sample construction

We use UN Comtrade data as published by CEPII in their BACI database³ (see Gaulier and Zignago, 2010). The database has 226 countries with goods trade data at the HS 6-digit product level. We aggregate these dimensions into fifty countries and regions and use the SITC 3-digit level for products. These choices affect the results. It would not be beneficial for the analysis to use a very disaggregated product level. If a given product starts to be less in demand in the global markets, but a technologically relatively close product is more in demand, companies will have a good chance of starting to produce for the expanding market. On the other hand, if companies are in an entirely different field, it will more difficult. Consequently, it is advisable to make the analysis at an industry level. Cheptea et al. (2014) use the HS 2-digit level. We will use a little more disaggregated data at the SITC 3-digit level which includes 231 different products. As in Cheptea et al. (2014), we exclude some SITC 3-digit products, 30 in all, especially crude energy and metalliferous products.⁴ World market price volatility affects the value of these trade flows considerably which may affect the results needlessly. Fagerberg and Sollie (1987), too, remove these types of commodities. Cheptea et al. (2014) also exclude individual export flows that are less than USD 10,000, but we refrain from doing this. Excluding them does not affect the results, according to our test run.

As for the geographical dimension, we remove 38 very small (island) countries. We then keep 42 countries⁵ individually based on their more prominent role in world trade, and aggregate the remaining 146 countries into eight geographic groups: other European Union (12 countries), other former Soviet Union (11), other Europe (8), other Latin America (30), other Middle East and North Africa (15), other Oceania (7), other Africa (44), and other Asia (19). The analysis includes the intra-group trade flows.

³ The BACI database uses a harmonisation procedure where CIF costs are estimated and removed from import values to compute FOB import values, and the reliability of each country as a reporter of trade data is assessed separately. We use the export data.

⁴ The excluded products are the following SITC codes: crude fertilisers and minerals (272–274, 277, 278), metalliferous ores and metal scrap (281–289), coal, coke and briquettes (321, 322, 325), petroleum, petroleum products and related materials (333–335), gas (343–345), electric current (351), lime and cement (661), works of art (896), and coins, gold and miscellaneous (931, 961, 971, 972).

⁵ Based on their relative importance in total world trade the 42 individual countries included in the analysis are Australia, Austria, Belgium, Brazil, Canada, China, Czechia, Denmark, Finland, France, Germany, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, Norway, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovakia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, United Kingdom, United States, and Vietnam. Although some of these countries export predominantly crude energy products which are omitted from the analysis they are included individually.

Cheptea et al. (2014) exclude intra-EU trade, as do Beltramello et al. (2012). We analyse overall national export developments and their composition and therefore we include intra-EU trade for individual countries. The EU countries are part of the EU internal market and many of them also share the common euro currency. Despite progress in integration, the internal market remains fragmented by persistent non-tariff barriers and national regulatory idiosyncrasies, meaning it does not yet function as a perfectly unified domestic market. This way we can also review how different EU countries have fared globally despite being members of the same internal market. Our data includes about 10.5 million observations.

4 Aggregate level evidence

4.1 Developments in export market shares

The structure of world goods trade undergoes changes over time. After the end of the Cold War the principal change has been the major increase of production in and exports from emerging markets, notably China. Our data spans the years 2002–2024, but the changes of course started building up already before that. China’s share in world trade grew rapidly up until 2015 and then stalled, according to our data. New rapidly expanding exporter countries have emerged since then, especially in Southeast Asia, among others Vietnam.

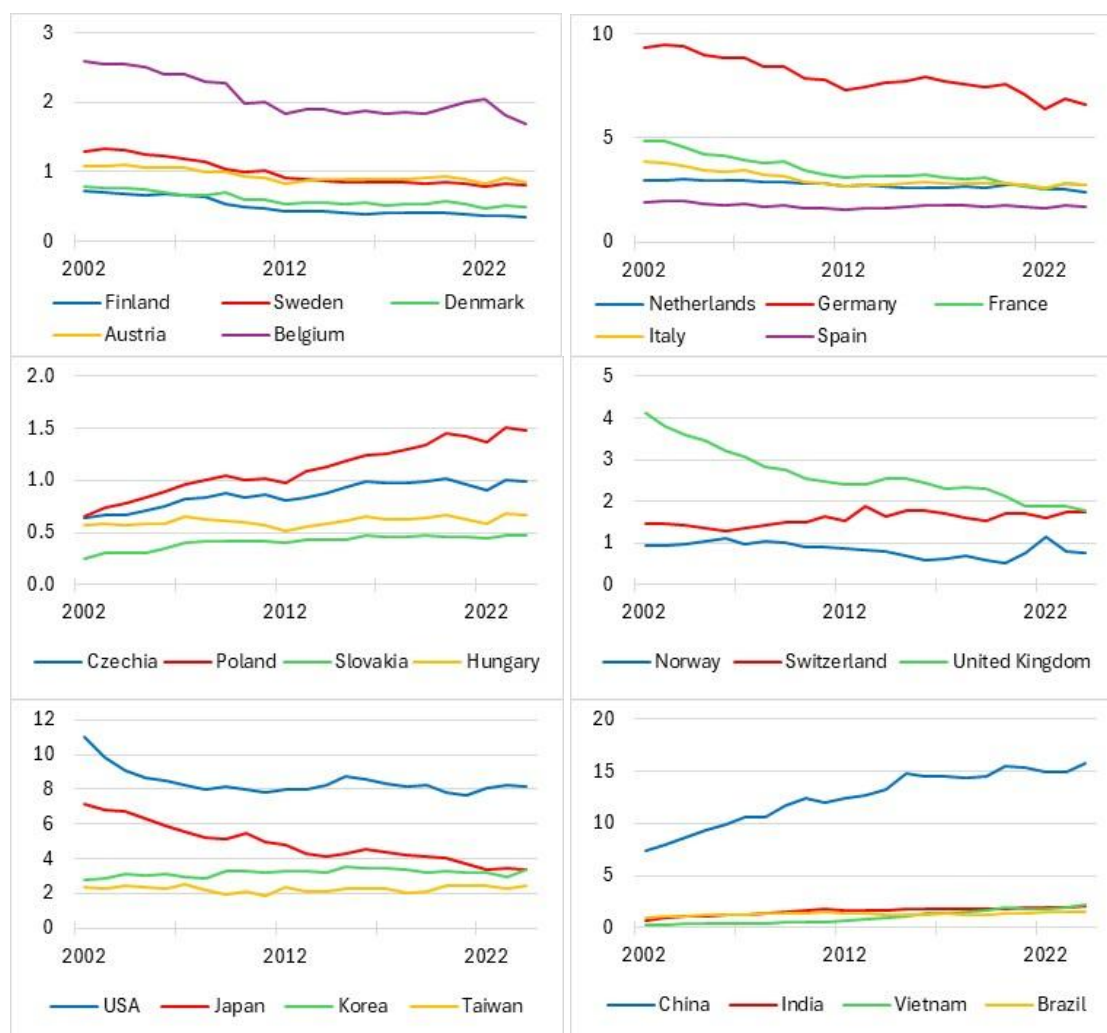
Figure 1 shows the global export market shares of selected countries. The first graph includes small, more advanced EU countries whose global market shares typically declined up until around 2012, but not so much after that. Note that these data include all products and intra-EU exports. By and large, the same development can be seen in larger EU countries in the second graph.

The third graph in Figure 1 includes some of the former transition countries in Central Europe. Especially Poland’s market share has grown and has continued to grow rapidly. On the other hand, Hungary’s share has been relatively stable since 2002. The larger non-EU European countries in the fourth graph show how Britain’s share has declined over time—already before Brexit which had a further negative impact.

Switzerland’s market share has been remarkably stable. The data are in nominal US dollar values, so Norway’s share is affected by the notable world market price volatility of its principal exports, i.e. crude oil and gas. In the fifth graph, we can see that the overall shares of the United States, South Korea, and Taiwan have been relatively stable over time, but Japan’s has declined. In the sixth graph we witness the increase in China’s share. The shares of India and Brazil have also increased, albeit it is slightly difficult to see from the graph. Meanwhile, Vietnam’s share increased from 0.2 per cent in 2002 to 2.2 per cent in 2024.

Finland’s global market share declined from 0.72 per cent in 2002 to 0.35 per cent in 2024. Figure 2 shows a decomposition of Finland’s aggregate market share loss in 2002–2024 with mobile phones and forest industry products separated from all other products. The loss in aggregate market share over these years is more or less evenly distributed between these three product groups. The impact from mobile phones halted in 2012 with the end in their production and exports. On the other hand, the decline in forest industry products has continued and may continue to do so into the future.

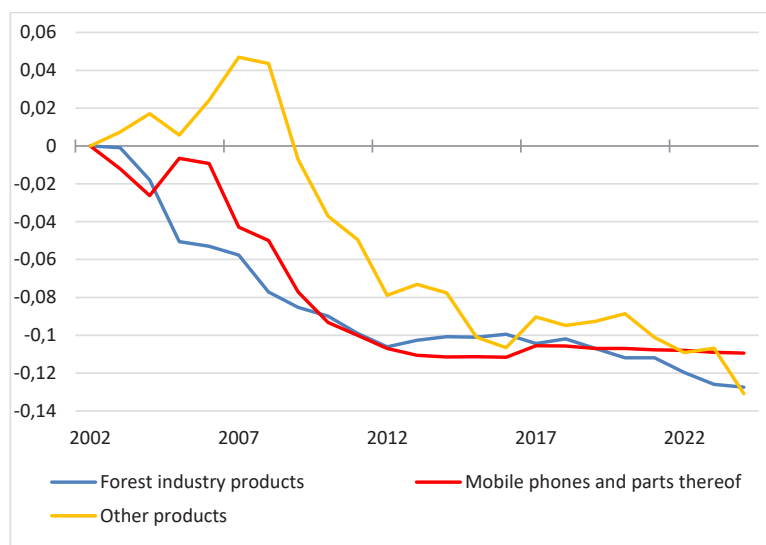
The negative contribution of ‘other products’ in Finland between 2008 and 2015 was largely due to a loss in cost competitiveness as measured by unit labour costs. At the product level the largest contributors to the aggregate loss in market shares during those years came from machinery and mechanical appliances (HS-code 84), mineral fuels, oils and products (27), iron and steel (72), ships and boats (89), vehicles other than for railways (87), articles of iron or steel (73), plastics (39), nickel and articles thereof (75), furniture etc. (94), and tanning or dyeing extracts (32).

Figure 1 Market shares of selected countries in total global goods exports, %


Sources: UN Comtrade, CEPII (BACI), own calculations.

The latest decline in ‘other products’ that has taken place in the 2020s is spearheaded by machinery and mechanical appliances (HS-code 84), vehicles other than for railways (87), iron and steel (72), plastics (39), electrical machinery and equipment (85), and optical, measuring, checking, precision etc. apparatus (90). The development has been affected by the loss of exports to Russia in 2022–2023, about 5 per cent of all pre-war exports, due to the war in Ukraine. Furthermore, there were some adverse transitory factors in 2024 that affected exports. Of course, in parallel with these declines there have been products that have raised Finland’s global market shares.

Figure 2 A cumulative disaggregation of Finland's global market share development by products in 2002–2024, percentage points



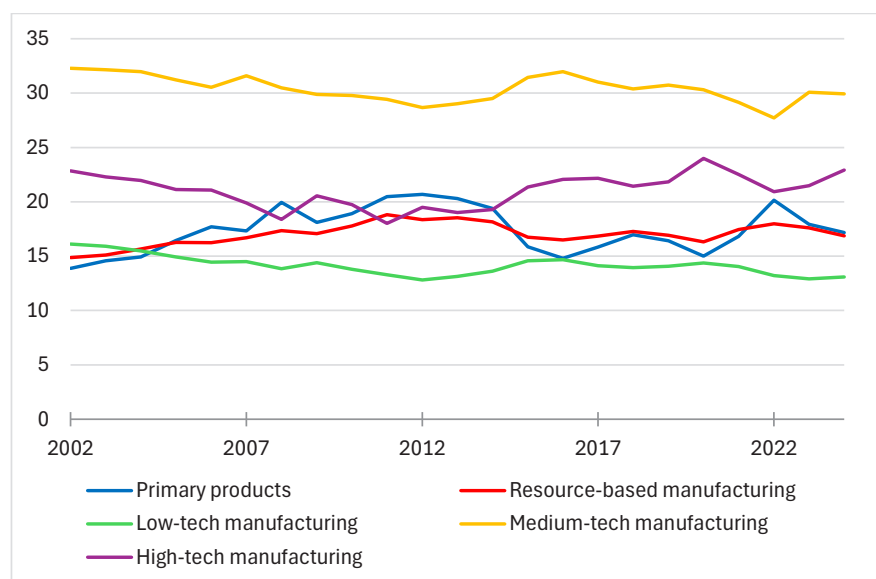
Note: Forest-industry products are all products in chapters 44, 47, and 48 of the combined nomenclature. Mobile phones are HS6 level codes 852520 and 852990. Sources: UN Comtrade, CEPII (BACI), own calculations.

4.2 Export market shares by technological categories

Next, we aggregate world goods trade into technological categories based on Lall's (2000) classification. Figure 3 shows the technological structure of total global exports in 2002–2024 using a division into five product categories: primary products, and resource-based, low-tech, medium-tech, and high-tech manufacturing. The data are again presented in nominal values, so developments are affected by both trade volumes and price changes.

Many products have evolved over time, and one might expect technologically more advanced products to be relatively speaking more in demand as prosperity has increased globally. However, even though there are some fluctuations, the overall shares of the five broad categories have been relatively stable over time. Especially the export value of primary products is affected by fluctuating world market prices, and their share in nominal global trade in the graph has been following the price of crude oil. Many other commodity prices, such as metals and minerals, are typically more or less in sync with oil prices. In our later econometric analysis, we will drop many primary products, namely crude energy and metalliferous products, as is typically done in similar research because of these price fluctuations.

The largest part, or about 30 per cent of world goods trade is in medium-tech manufactures. These include, among other things, motor and railway vehicles, ships, many chemical products, and engineered machinery and equipment. A little over 20 per cent is high-tech manufacturing whose share has been increasing after 2012 but was at the current level already in the beginning of the century. These products include electronics, pharmaceuticals, optical instruments, and aircraft, among other things. Electronics is a product group where technological development has been rapid, and prices have often declined given product quality and specifications. If we had a volume series that take technological development into account, the graph would therefore probably look different with an increase in the share of high-tech products.

Figure 3 Structure of world total goods exports by technological categories (Lall, 2000)

Sources: UN Comtrade, CEPII (BACI), Lall (2000), own calculations.

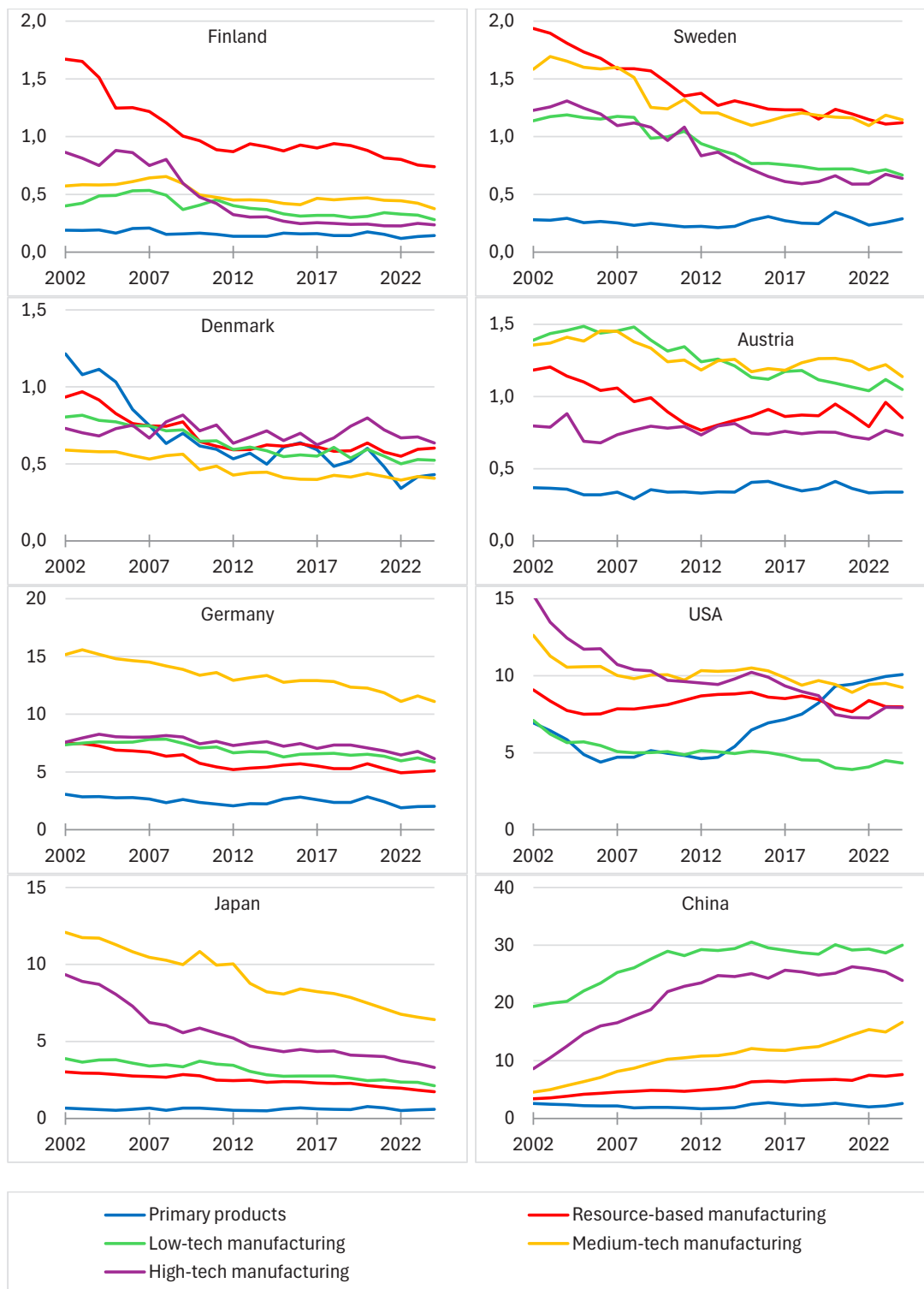
About 17 per cent of nominal world trade is in resource-based manufacturing and primary products each. The former includes food products, forest industry products, rubber products, and many basic products produced by metal, chemical, and mineral industries. Finally, low-tech manufacturing covers about 13 per cent of world trade and includes clothing and textiles, glassware, and basic metal products, among other things.

We will next glance at how some individual countries' market shares have developed in these five product categories. Figure 4 shows this development for five EU countries, the USA, Japan, and China. Finland's market share in resource-based and high-tech manufacturing goods has declined considerably reflecting weak development in (chemical) forest industry products and mobile telephones, respectively, as already seen above. The change occurred largely by 2012, but more recently the decline in resource-based manufactured goods has resumed. We can see a similar development, albeit less abrupt, in Sweden. Compared to the early 2000s, Sweden's share in low-tech and medium-tech manufacturing has also declined.

Denmark's export market share has mostly declined in primary products and less so in the other categories apart from high-tech manufacturing which has remained relatively stable. Austria's shares have remained more stable, apart from an earlier decline in resource-based manufacturing and a continued decline in low-tech manufacturing.

Germany's export market share has declined mostly in medium-tech manufacturing and that of the United States in high-tech manufacturing. A rare increase in market shares is primary products in the USA reflecting, among other things, exports of fossil energy. Japan's export share has decreased especially in medium-tech and high-tech manufacturing, but to a lesser extent also in other manufactured goods. China's export share increased up until about 2010 in low-tech manufacturing and 2013 in high-tech and have continued a slower and more stable rise in resource-based and medium-tech manufacturing.

Figure 4 Market shares by technological categories (Lall, 2000), %



Sources: UN Comtrade, CEPII (BACI), Lall (2000), own calculations.

5 Main results for the composition of market shares changes

Our analysis covers the years 2002–2024. Table 1 shows the analysis and CMS estimation results for the total time span with a selection of countries. Note that the data used in these tables does not include the SITC codes that we have omitted from the analysis, as have Chepeta et al. (2014), i.e. especially crude energy and metalliferous products. Consequently, these market shares are a little different from the graphs shown above. The differences are larger for the countries that specialise in the omitted products, which can be seen in Appendix A1 that shows the results for all 42 countries and eight regions (including their intra-regional trade).

The first three numerical columns in Table 1 show the countries' shares in goods exports in the first year, the last year, and the respective percentage point changes. For example, Finland's share in 2002 was 0.77 per cent and in 2024 it was 0.37 per cent. The change was -0.41 percentage points. The fourth numerical column shows our estimated change in the countries' market shares. We can see that for many countries, e.g. Finland, it matches the actual change, but when the countries are bigger players with bigger shifts in market shares, there is a discrepancy. Notably, the decline in the US and rise in China's market shares are overestimated. Other large discrepancies that can be found in Appendix A1 are for Vietnam, India, and the United Arab Emirates. If we sum over all estimated changes, we can see that the estimation exaggerates the overall change in market shares. About half of this comes from Chinese data.

There is indeed a positive correlation between the magnitude of the actual market share change and the model's estimation error, where large directional shifts are amplified by the estimation. However, this variance is almost entirely driven by extreme outliers undergoing massive structural transitions over the 22-year period suggesting the log-linear approximation struggles at the extreme tails of the distribution. Our main research interest and the second econometric panel data analysis below is with European economies and thus the estimation discrepancy is deemed less important.

The cumulative change presented in the fifth numerical column shows how many per cent the estimated market share has changed. For example, Finland's market share has approximately halved from 0.77 per cent to 0.37 per cent, i.e. a decline of 52 per cent to be exact. The column shows an estimated change of -50.8 per cent. Numerical columns 6–8 show the percentage-point decomposition of this change into an export performance component, a geographical component, and a sectoral component.

Generally, export performance is the main factor behind market share changes. We can see some exceptions in Table 1, notably the Netherlands where the geographical component dominates the descent, Spain where both the geographical and sectoral components are large but have different signs, Switzerland with a strong positive sectoral component, and South Korea with a strong positive geographical component. Appendix A1 shows also other countries where the geographical and sectoral components dominate over export performance.

For Finland, the geographical and sectoral components are practically insignificant, and export performance dominates the aggregate change. Among the EU15 countries, Italy is somewhat similar to Finland. Otherwise, we can see a positive impact arising from the sectoral component in the EU15. Finland and Italy, but also the newer member countries Czechia, Slovakia, and Hungary, have not specialised in products whose global markets have been growing more than average. The Central European countries' increase in global market shares has been based on performance, largely supported by their cost competitiveness as catching-up economies and an inclusion into global/European value chains. On the other hand, the geographical component has been a more positive factor for Finland than for the other EU countries. This means that Finland has exported to countries whose imports have been developing faster. On the other hand, this does not automatically mean that Finland itself has been successful in exporting to these countries. For example, growth in Russia's goods imports has outpaced that of global imports, but its share in Finnish exports has decreased. In the analysis this development can be seen as weak Finnish export performance.

Table 1 Actual and estimated changes in market shares 2002–2024

Country	Share in first year, %	Share in last year, %	Actual change, %p	Estimated change, %p	Cumulative change in share, %	Export performance, %p	Geographical component, %p	Sectoral component, %p
Finland	0.77	0.37	-0.41	-0.40	-50.8	-49.6	0.4	-2.8
Sweden	1.39	0.88	-0.51	-0.48	-34.9	-35.2	-6.0	6.9
Denmark	0.82	0.57	-0.24	-0.21	-28.9	-32.1	-8.6	14.4
Austria	1.17	0.98	-0.19	-0.18	-16.1	-17.7	-5.1	7.4
Belgium	2.74	1.71	-1.03	-0.93	-36.5	-38.8	-8.5	13.2
Netherlands	3.01	2.47	-0.54	-0.47	-16.4	-3.6	-18.7	6.7
Germany	10.22	7.74	-2.48	-2.04	-23.9	-31.8	-1.3	13.1
France	5.29	3.11	-2.17	-1.78	-40.6	-46.6	-8.2	21.2
Italy	4.18	3.21	-0.97	-0.90	-21.0	-18.4	-2.3	-0.9
Spain	2.11	1.94	-0.18	-0.12	-6.8	-2.5	-11.8	8.4
Czechia	0.69	1.17	0.47	0.59	78.1	92.7	-4.0	-3.7
Poland	0.68	1.74	1.06	1.32	186.2	197.9	-5.3	1.4
Slovakia	0.26	0.55	0.29	0.50	187.1	200.2	-1.1	-3.3
Hungary	0.63	0.79	0.16	0.22	33.7	36.6	-0.3	-1.8
Norway	0.44	0.31	-0.13	-0.11	-27.9	-32.5	-2.1	9.1
Switzerland	1.50	1.51	0.01	0.21	5.1	-17.8	-9.1	40.6
United Kingdom	4.14	1.83	-2.31	-1.92	-55.8	-61.3	-3.5	18.3
United States	11.94	7.94	-4.00	-5.86	-62.8	-69.1	0.2	19.8
Japan	7.92	3.88	-4.04	-3.09	-49.1	-57.1	14.7	3.5
China	8.05	18.87	10.81	20.75	158.4	293.9	-6.3	-30.0
South Korea	2.99	3.76	0.77	1.02	36.3	12.4	23.8	-2.1

Note: The total cumulative change in market share can be calculated from its components: $((1+Perf/100) * (1+Geo/100) * (1+Sect/100) - 1) * 100$. The data used in the table does not include the SITC codes omitted from the analysis following Chepeta et al. (2014), especially crude energy and metalliferous products.

Table 2 shows the ten highest and ten lowest scoring countries in 2002–2024 in terms of each component. We can see that the top scorers in performance are emerging economies. This is largely due to their cost competitiveness, globalisation, and outsourcing and technological transfers from more developed countries. The weakest countries in this respect are more established post-industrialised countries. Russia is included in this group, despite its historical similarities with emerging economies, as it remains detached from global value chains and exports mostly raw materials. The geographical and sectoral components are more heterogenous in terms of country composition.

Appendix 2 with Tables A2.1 and A2.2 show the estimation results for the sub-periods 2002–2012 and 2012–2024, respectively. The data are thus divided into two equally long periods which are also loosely based on trends in actual market share developments as we saw above. Furthermore, Table A2.3 shows the results for 2019–2024 to catch the most recent developments. As can be expected from the above discussion, the largest shifts occurred during the first half.

In terms of export performance, the first half of our analysed period in particular—and starting already in the 1990s—was characterised by deepening globalisation and outsourcing to emerging economies that had lower labour and other production costs. As we will see below, the latter half from 2012 onwards is more balanced than the first.

More recently in the 2020s, we have started to see some indication of a partial reversal or readjustment through ‘friendshoring’ or ‘nearshoring’ in value chains due to a rise in geopolitical and geoeconomic tensions. Among other things, import tariffs have in some cases been raised after decades of active measures to lower them. The latest US tariff setting in 2025 is not yet included in the data, however. On the other hand, the EU has continued to sign free trade agreements with various countries across the world. These developments may have different effects on countries as discussed and modelled in for example Eaton and Kortum (2002).

Table 2 Top 10 highest and lowest-scoring countries in each component, % of estimated market share changes in 2002–2024

Country/region	Export performance	Country/region	Geographical component	Country/region	Sectoral component
Vietnam	3072.6	Other former Soviet Union	33.7	Ireland	49.7
Other Europe	583.7	Russia	32.4	Switzerland	40.6
China	293.9	Saudi Arabia	27.2	South Africa	30.6
India	288.4	South Korea	23.8	France	21.2
Slovakia	200.2	United Arab Emirates	15.9	United States	19.8
Poland	197.9	Taiwan	15.3	Other former Soviet Union	18.9
Romania	193.9	Japan	14.7	United Kingdom	18.3
United Arab Emirates	164.4	Other Asia	13.3	Other Latin America	17.9
Turkey	161.6	Brazil	10.5	Saudi Arabia	17.4
Other Africa	127.0	Other Latin America	9.7	Brazil	16.8
...		
Sweden	-35.2	China	-6.3	Other Africa	-13.7
Ireland	-37.1	Vietnam	-7.9	Romania	-15.9
Belgium	-38.8	France	-8.2	Thailand	-16.4
Canada	-40.7	Belgium	-8.5	Turkey	-16.9
France	-46.6	Denmark	-8.6	India	-17.0
Finland	-49.6	Switzerland	-9.1	Portugal	-18.8
Russia	-56.9	Spain	-11.8	Indonesia	-21.6
Japan	-57.1	Portugal	-14.0	China	-30.0
United Kingdom	-61.3	Netherlands	-18.7	Vietnam	-34.5
United States	-69.1	Ireland	-19.1	Other Asia	-35.2

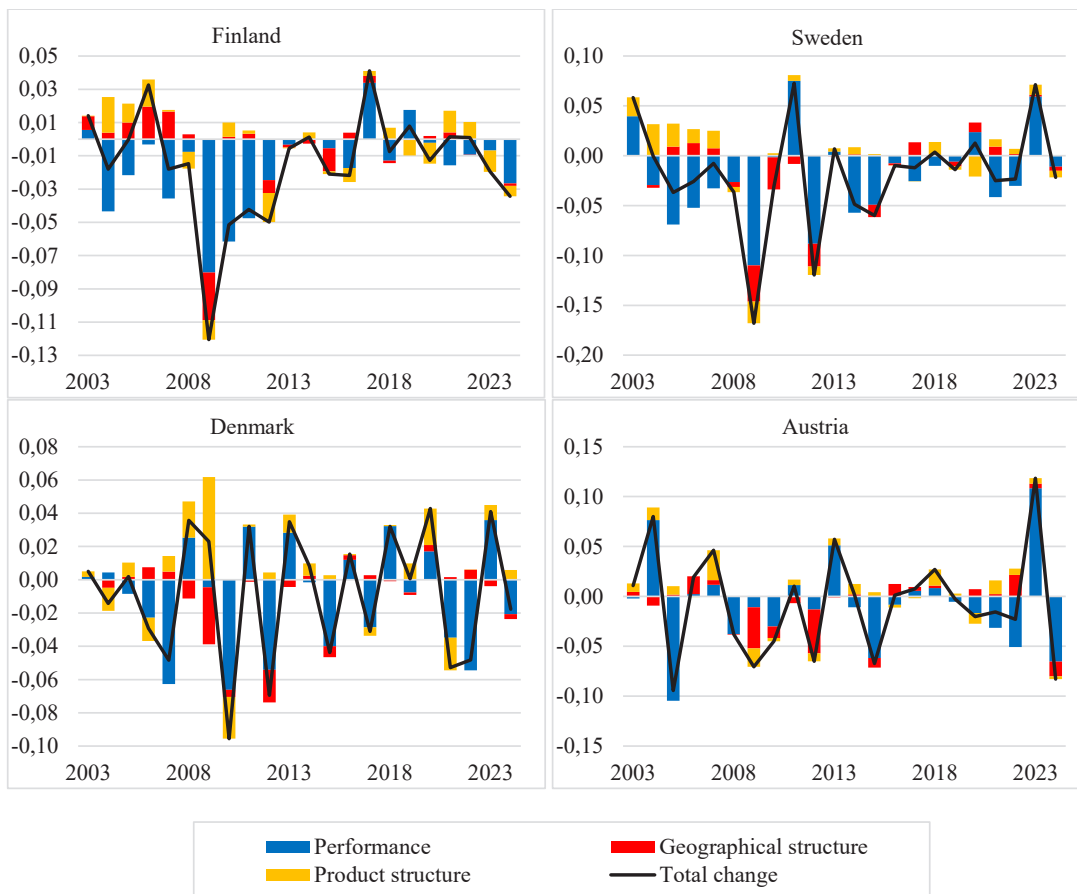
Note: Intra-regional trade is included (e.g. that between Kenya and Tanzania in ‘Other Africa’). See also Appendix A1. Source: Own calculations based on estimations made in this research.

The EU countries’ performance loss is still there even during the past five years, but milder than before. For example, Finland has continued to lose in terms of performance during the latter half of the full period and the last five years even though mobile phones have no longer played a role in exports. The sectoral component has also remained negative. Probably one major factor here has been forest industry products (see Figure 2). Other EU countries’ sectoral components have been more positive. Based on Table A2.3, the product structure of Finnish exports has been the major factor behind overall weakness vis-à-vis other developed countries.

To analyse how exporters’ world market shares have evolved over time year-by-year, we complement the cumulative decomposition with a Shapley-based annual decomposition. This approach ensures an internally consistent allocation of the total estimated market-share changes across the three structural factors—performance, geographical orientation, and product specialisation—for each individual year. Unlike a direct log-difference aggregation, which compounds non-linearly over time, the Shapley method distributes overlapping interaction effects symmetrically across components and periods. This yields annual contributions that are path-independent and additive over time, allowing the yearly changes to sum (approximately) to the overall long-run variation in market shares. The method therefore facilitates clearer year-by-year interpretation of export performance dynamics while remaining consistent with the underlying log-additive structure of the model.

Figure 5 shows the development of estimated market shares and decomposition in percentage points in four small EU countries. There are large annual swings. Of these countries, especially Denmark stands out with almost continuously alternating positive and negative annual swings arising from performance. Finland has had a steadier negative development especially in 2009–2012 which coincides with the steep decline in mobile phone and other products’ exports (see Figure 2).

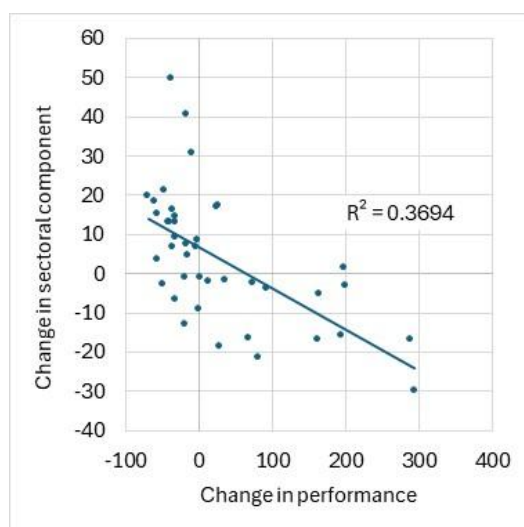
Figure 5 Annual development of estimated market shares and its decomposition 2002–2024, log percentage points



Source: Own calculations based on estimations made in this research.

We also find that countries’ performance and the sectoral component of exports may be negatively related. This means that the overall performance of the countries whose performance has decreased the most has been partly compensated by an improvement in the product composition of their exports in terms of market growth. We argue that wealthier countries may typically have outsourced the production of goods whose global market growth is slower to emerging markets because production costs there are lower. In Figure 6 we show this for the full dataset with a fitted linear trend and its R2 value. Meanwhile, there is no correlation between performance and the geographical component for market shares.

Figure 6 Changes in aggregate performance and sectoral component of exports 2002–2024,



Note: Individual countries only, except Vietnam was removed as an outlier. Source: Own calculations based on estimations made in this research.

6 Additional insights into export performance

6.1 Micro-foundations of export performance

Let us next review the development in the estimated annual performance effects for the EU countries as shown in our earlier calculations using a panel OLS with some macroeconomic variables. This is done for both the full dataset and the subset of medium-tech and high-tech products. The results are relatively similar for the two. We base the econometric analysis on the microeconomic foundations constructed in Melitz (2003) and Helpman, Melitz, and Yeaple (2004).

While the above CMS decomposition isolates the aggregate performance effect of a country's exports, explaining the evolution of this residual requires a theoretical link to firm-level behaviour. Although we use national aggregate data, we base our empirical approach in the heterogeneous-firms framework developed by Melitz (2003), which demonstrates how trade exposure and market frictions drive intra-industry reallocations and aggregate productivity.

In the Melitz model, firms pay a sunk cost to enter an industry and draw a firm-specific productivity level from an exogenous distribution. Entry into export markets requires an additional fixed sunk cost, and therefore only the most productive firms find it profitable to export. Less productive firms serve only the domestic market, and the least productive ones exit the market entirely. Thus, changes in aggregate macro-level export performance—the estimated performance residual in our analysis—are driven not just by existing exporters selling more at the intensive margin, but also by the extensive margin of firm selection. Exogenous shocks that change the profitability thresholds move the distribution of surviving and exporting firms thereby driving aggregate market shares.

Our panel OLS specifications below capture the macroeconomic aggregates of these micro-level profitability shocks. In the theoretical microeconomic model, a firm's pricing and variable profit are governed by its marginal cost given by the ratio of the nominal wage to firm-specific productivity. This reflects the firm's unit labour costs. At the macroeconomic level, our nominal unit labour costs (NULC) is a proxy for exogenous shifts in this baseline aggregate cost. An increase in the domestic NULC relative to other countries is an upward shock in marginal costs across firms in the country and thus a decrease in overall cost competitiveness. This forces marginal exporters out of the global

market and has a negative impact on the aggregate performance residual. On the other hand, a competitive NULC level does not require low wages. Wages can be high, if productivity is high. Furthermore, nominal effective exchange rate (NEER) brings the development of the NULC variable to a common level to empirically capture differentials in relative wages and prices.

Finally, investment—machinery and equipment, intellectual property products or IPP (software and databases, and research and development), and ICT investment—and foreign affiliates statistics (FATS) capture endogenous productivity upgrading. Extensions of the heterogeneous firm framework demonstrate that the most productive firms self-select into foreign direct investment, see Helpman et al. (2004). Therefore, higher turnover abroad relative to domestically produced output signals a high concentration of very productive multinational firms within the domestic economy, which disproportionately drive aggregate home-country export competitiveness. Similarly, aggregate national investments in IPP and ICT represent the fixed sunk costs that domestic firms pay to endogenously upgrade their productivity, lowering firm-specific marginal costs and enabling entry into competitive export markets.

To account for a broader macroeconomic scale and the stage of economic development, our specifications also include real GDP and real GDP per capita. While the NULC variable isolates strict price-cost competitiveness, real GDP per capita captures non-price competitiveness, such as overall technological sophistication and product quality. Furthermore, absolute real GDP is included to control for domestic market size. In standard trade models, larger domestic markets increase internal competitive pressures but also shift the relative focus of aggregate production inward to serve domestic consumers. This helps explain our empirical finding that larger absolute economic size does not necessarily mean a dynamic advantage in capturing global export market shares. We also test whether dropping either or both of the GDP variables affects the results.

6.2 Econometric estimation of performance developments

The level of economic development (GDP per capita), foreign investment, and investment activity are factors that are expected to be associated with international market shares, especially within the EU internal market and the catching up mechanism that has supported economic development of the emerging economies of Central and Eastern Europe. The twenty European countries included in the panel data are Austria, Belgium, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, and the United Kingdom. We do not have data for the independent variables of all countries for the whole period. Especially missing data for foreign affiliates statistics (FATS) is to be ‘blamed’ for this, and the number of observations in those specifications that include FATS data is smaller than in the others. After experimenting with several lag structures, we decided to use rolling three-year periods and three-year lags. This decreases the number of observations further. On the other hand, we can expect there to be a lag between, say, investment activity and the development of exports. The results should be considered only in the context of the EU and the internal market.

According to the estimation results for the full dataset presented in Table 3 and for the sub-set of medium-tech and high-tech products shown in Table 4, a higher lagged GDP per capita has in most specifications been positively or neutrally associated with changes in relative performance. Meanwhile, lagged GDP itself has mostly been negatively associated, especially with performance in medium-tech and high-tech products. This implies that larger EU economies have not performed better thanks to their larger national economies and domestic markets. Especially lower GDP per capita might be considered a factor that would contribute to an increase in performance if production were outsourced to countries with lower wages.

If we omit GDP per capita and only include GDP, its coefficient is either statistically insignificant or negative and significant, so the results do thereby not change. On the other hand, if we omit GDP and only include GDP per capita, its coefficient becomes statistically insignificant. Omitting either or both GDP variables does not affect the other results.

Table 3 Three-year average change in performance, full dataset

	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP, bill. € (L3)	-0.00001 (-0.495)	-0.00021*** (-6.644)	0.00000 (0.076)	-0.00024*** (-7.285)	0.00019*** (5.165)	-0.00015*** (-3.205)
Real GDP per capita, 1000 € (L3)	0.00094 (1.407)	0.00096 (1.311)	0.00051 (0.534)	0.00245*** (2.615)	-0.00051 (-0.685)	0.00192** (2.454)
NULC, 3-year average %-change	-0.00414*** (-4.470)	-0.00263*** (-2.669)	-0.00371*** (-3.845)	-0.00281*** (-2.827)	-0.00372*** (-4.155)	-0.00365*** (-3.691)
NEER, 3-year average %-change	0.00353*** (3.325)	0.00484*** (4.188)	0.00321*** (2.870)	0.00422*** (3.537)	0.00376*** (3.687)	0.00445*** (4.346)
Share of foreign MNCs in domestic value added, manufacturing (L3)		0.00074 (1.227)		0.00086 (1.409)		-0.00027 (-0.460)
Turnover abroad relative to total output in home country, manuf. (L3)		0.00054** (2.330)		0.00057** (2.453)		0.00044** (2.141)
M&E investment rate (L3)			0.00022 (0.093)	0.00566** (2.021)		
IPP investment rate (L3)			0.00212* (1.765)	-0.00029 (-0.271)		
M&E investment, 3-year average %-change			-0.00014 (-0.318)	0.00011 (0.243)		
IPP investment, 3-year average %-change			0.00118*** (3.592)	0.00087** (2.406)		
M&E (excl. ICT) investment rate in manufacturing, % (L3)					0.140 (1.354)	0.219** (2.280)
ICT&IPP investment rate in manufacturing, % (L3)					0.110** (2.108)	0.00114 (0.025)
M&E (excl. ICT) investment in manufacturing, 3-year average %-change					0.00010 (0.520)	0.00009 (0.405)
ICT&IPP investment in manufacturing, 3-year average %-change					0.00109*** (5.154)	0.00066*** (2.896)
Constant	-0.0315 (-1.563)	0.0761** (2.490)	-0.0435 (-1.234)	0.00160 (0.037)	-0.139*** (-5.624)	0.00973 (0.276)
Observations	378	256	375	255	294	203
Adjusted R ²	0.014	0.174	0.047	0.208	0.195	0.178

Note: L3 means that the variable has been lagged by three years. MNC = Multinational corporation, NULC = nominal unit labour costs, NEER = nominal effective exchange rate, M&E = machinery and equipment, ICT = information and communication technology hardware, IPP = intellectual property products (software and databases, and research and development). Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Fixed effects.

We find strong evidence that performance has been negatively associated with a rise in relative nominal unit labour costs, a measure of cost competitiveness, after the overall income level (GDP per capita) has been controlled for. Looking at the tables in Appendix A2 we can see that the performance factor in the catching-up economies of Central Europe has weakened over time. This mirrors the decrease over time in the cost (wage) differential between the emerging market economies and the more advanced (post)-industrialised EU15 countries. Meanwhile, we find a positive association with an appreciation of the nominal effective exchange rate.⁶ The exchange rate is fixed within the Euro Area, and the development in its member countries' effective exchange rates is relatively similar, only affected by their different export-destination-country compositions. These two developments (nominal unit labour costs and nominal effective exchange rates) cancel each other out. If we were to use nominal unit labour costs in euros for all countries, its coefficient would be negative but statistically insignificant.

⁶ There have been very large differences in nominal effective exchange rate developments between 2002 and 2024 from an appreciation of 73% for Switzerland, 53% for Slovakia and 38% for Czechia to a depreciation of 27% for Norway and 30% for Hungary (BIS broad NEER index data).

Table 4 Three-year average change in performance, medium-tech and high-tech products

	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP, bill. € (L3)	-0.00007** (-2.231)	-0.00024*** (-5.835)	-0.00006* (-1.651)	-0.00027*** (-6.260)	0.00015*** (3.536)	-0.00017*** (-2.928)
Real GDP per capita, 1000 € (L3)	0.00181** (2.285)	0.00168* (1.821)	0.00165 (1.459)	0.00339*** (2.848)	0.00021 (0.239)	0.00312*** (3.207)
NULC, 3-year average %-change	-0.00483*** (-4.389)	-0.00278** (-2.234)	-0.00439*** (-3.831)	-0.00296** (-2.348)	-0.00416*** (-3.922)	-0.00399*** (-3.246)
NEER, 3-year average %-change	0.00585*** (4.639)	0.00689*** (4.718)	0.00466*** (3.511)	0.00584*** (3.858)	0.00550*** (4.556)	0.00625*** (4.913)
Share of foreign MNCs in domestic value added, manufacturing (L3)		0.00040 (0.528)		0.00057 (0.742)		-0.00106 (-1.437)
Turnover abroad relative to total output in home country, manuf. (L3)		0.00061** (2.112)		0.00063** (2.146)		0.00044* (1.734)
M&E investment rate (L3)			0.00476* (1.660)	0.00830** (2.334)		
IPP investment rate (L3)			0.00255* (1.788)	-0.00026 (-0.196)		
M&E investment, 3-year average %-change			0.00052 (1.020)	0.00065 (1.099)		
IPP investment, 3-year average %-change			0.00132*** (3.389)	0.00088* (1.916)		
M&E (excl. ICT) investment rate in manufacturing, % (L3)					0.277** (2.261)	0.384*** (3.212)
ICT&IPP investment rate in manufacturing, % (L3)					0.142** (2.307)	0.00967 (0.174)
M&E (excl. ICT) investment in manufacturing, 3-year average %-change					0.00035 (1.518)	0.00034 (1.271)
ICT&IPP investment in manufacturing, 3-year average %-change					0.00139*** (5.560)	0.00084*** (2.955)
Constant	-0.0150 (-0.626)	0.0809** (2.098)	-0.0715* (-1.710)	-0.0231 (-0.424)	-0.152*** (-5.197)	0.00484 (0.110)
Observations	378	256	375	255	294	203
Adjusted R ²	0.049	0.133	0.090	0.160	0.204	0.189

Note: L3 means that the variable has been lagged by three years. MNC = Multinational corporation, NULC = nominal unit labour costs, NEER = nominal effective exchange rate, M&E = machinery and equipment, ICT = information and communication technology hardware, IPP = intellectual property products (software and databases, and research and development). Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Fixed effects.

To capture medium-term structural trends and smooth out short-term volatility, we have used three-year average changes for NEER and NULC. The positive association between performance and NEER appreciation aligns with the Kaldor Paradox, where currency strength reflects underlying economic health and non-price competitiveness. We acknowledge the inherent simultaneity present in contemporaneous averages, as strong aggregate export performance can itself drive currency appreciation. Consequently, this dynamic is perhaps best understood as mutually reinforcing.

The share of foreign MNCs in domestic manufacturing value added was not statistically significant, perhaps unexpectedly. On the other hand, the turnover abroad relative to total output in home country manufacturing was positively associated with performance. This means that significant investment abroad by highly productive firms (see discussion above) may support the market share performance of the home country.

We have used separately two different sets of investment data: first, aggregate investment at the national level in machinery and equipment (including ICT) and intellectual property products (investment rates and investment volume growth rates); and second, investment in manufacturing industries in machinery and equipment (excluding ICT) and their combined ICT and IPP investment.

Both investment datasets and both the aggregate export data and medium-tech and high-tech products tell the same story. Better performance (overall competitiveness) is more likely to be associated with higher past investment rates and higher past growth in the volume of investment. In

medium-tech and high-tech products, the link is stronger with IPP and ICT+IPP investment than with machinery and equipment. With aggregate export data, both investment products appear to have an equally important association with performance.

Overall, the results using the aggregate dataset and with the more limited medium-tech and high-tech products are very similar. The relevance of the GDP data and investment results are slightly stronger with medium-tech and high-tech products, however.

Although the number of observations becomes relatively limited, we have further divided the full dataset into two parts in Table 5 and run specifications (2), (3), and (4) from the above tables first for the euro area and Denmark, and then for the other countries that have flexible exchange rates vis-à-vis the euro. Denmark is not a euro area country, but its exchange rate is fixed to the euro, so for all practical purposes in this research it can be counted as one. Slovakia joined the euro in 2009, but it is counted here as a euro country for the full period. In addition to not having a common exchange rate regime, the country group with flexible exchange rates is less uniform for example in terms of the level of economic development, because it includes very-high-income countries (Switzerland and Norway) as well as new EU member countries that during our time span were mostly catching-up emerging economies.

Table 5 Three-year average change in performance in two groups of countries, full dataset

	Euro area and Denmark			Countries with flexible exchange rates		
	(2)	(3)	(4)	(2)	(3)	(4)
Real GDP, bill. € (L3)	-0.00029*** (-7.063)	-0.00006* (-1.800)	-0.00031*** (-7.376)	-0.00005 (-0.910)	0.00028*** (5.810)	-0.00009 (-1.541)
Real GDP per capita, 1000 € (L3)	0.00171** (2.047)	0.00211* (1.953)	0.00327*** (2.997)	-0.00100 (-0.456)	-0.00516** (-2.512)	0.00168 (0.692)
NULC, 3-year average %-change	-0.00632*** (-3.996)	-0.00742*** (-4.644)	-0.00669*** (-4.117)	0.00050 (0.531)	-0.00042 (-0.430)	0.00035 (0.379)
NEER, 3-year average %-change	0.0128*** (5.784)	0.0104*** (4.552)	0.0132*** (5.606)	0.00155* (1.804)	0.00308*** (2.993)	0.00102 (1.093)
Share of foreign MNCs in domestic value added in manufacturing (L3)	0.00218*** (2.702)		0.00202** (2.521)	-0.00228*** (-3.922)		-0.00162** (-2.544)
Turnover abroad relative to total output in home country in manufacturing (L3)	0.00100** (2.451)		0.00092** (2.260)	0.00055*** (3.098)		0.00049*** (2.838)
M&E investment rate (L3)		-0.00990** (-2.534)	-0.00422 (-0.883)		0.00422* (1.688)	0.00603** (2.629)
IPP investment rate (L3)		0.00151 (1.126)	-0.00046 (-0.379)		-0.00354 (-0.568)	-0.0134** (-2.287)
M&E investment, 3-year average %-change		-0.00054 (-0.929)	-0.00020 (-0.298)		-0.00012 (-0.223)	0.00087** (2.088)
IPP investment, 3-year average %-change		0.00175*** (4.074)	0.00118** (2.351)		-0.00024 (-0.451)	-0.00007 (-0.166)
Constant	0.0806** (1.982)	0.0109 (0.232)	0.0764 (1.281)	0.155*** (3.565)	-0.0149 (-0.284)	0.0638 (1.258)
Observations	158	240	158	98	135	97
Adjusted R ²	0.337	0.168	0.356	0.222	0.188	0.291

Note: L3 means that the variable has been lagged by three years. MNC = Multinational corporation, NULC = nominal unit labour costs, NEER = nominal effective exchange rate, M&E = machinery and equipment, IPP = intellectual property products (software and databases, and research and development). Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Fixed effects.

The results indicate that the size of domestic GDP has been negatively associated with the change in export performance in the euro area, while we find a positive association vis-à-vis the income level. This is the same as above and would mean that euro area countries with a larger domestic economy have had a disadvantage (association) in terms of performance developments, but a higher GDP per capita has compensated for this. The results are different and much more modest for the non-euro area countries, where we only get statistically significant results when FATS data are not included. In this case the results are the opposite of the ones for the euro area countries.

The results for the cost competitiveness variables (NULC and NEER) are also stronger for the euro area countries than the other group. For the latter, NULC changes measured in domestic currencies, with nominal effective exchange rates controlled for, was not statistically significant. The FATS data are statistically significant in both country groups, but the sign is different for the share of foreign MNCs in domestic value added. It is positive in the euro area and negative in the other countries when income levels have been controlled for.

Finally, we find a more positive relationship between performance and IPP investment for the euro area countries, and performance and investment in machinery and equipment for the other countries. Overall, the results are driven more by euro area countries than those with flexible exchange rates vis-à-vis the euro.

7 Conclusions and discussion

Companies compete in world markets, and they participate in upstream and downstream value chains which contribute to changes in countries' global export market shares. We have analysed the development of market shares in 2002–2024, the development of exports by different technological categories, and used the econometric method presented in Cheptea, Fontagné, and Zignago (2014) to decompose market-share changes into structural composition effects—export destination countries and exported products—and performance (overall competitiveness) effects. Finally, we used macroeconomic panel data estimations to shed light on the annual changes in European countries' estimated export performance based on the microeconomic foundations constructed in Melitz (2003) and Helpman, Melitz, and Yeaple (2004).

While the aggregate global export product structure has been quite stable over time in value terms when divided into broad technological categories, individual countries have of course experienced more divergence in their market-shares in this respect. Among other things, trade liberalisation, activities of multinational corporations, and lower transportation costs have all contributed to changes in global market shares.

The increase in emerging economies' global market shares has arisen from better performance. Meanwhile, older industrialised countries have typically managed to partly compensate their performance losses with a better product composition of their exports in terms of global demand. We find evidence for European countries that the development of performance has been positively associated with investment activity, improved cost competitiveness—albeit neutralised by exchange rate appreciation—and strong activity by multinational corporations. Consequently, an economic regime that supports tangible and intangible investments, and openness to inward and outward FDI will likely also support export performance in global goods trade.

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Appendix A1

Table A1 Actual and estimated change in market shares for all countries and regions 2002–2024

Country or region	Share in first year, %	Share in last year, %	Actual change, %p	Estimated change, %p	Cumulative change in share, %	Export performance, %	Geographical component, %	Sectoral component, %
Australia	0.71	0.51	-0.21	-0.11	-22.2	-35.2	3.3	16.1
Austria	1.17	0.98	-0.19	-0.18	-16.1	-17.7	-5.1	7.4
Belgium	2.74	1.71	-1.03	-0.93	-36.5	-38.8	-8.5	13.2
Brazil	0.98	1.32	0.34	0.50	59.8	23.9	10.5	16.8
Canada	3.59	1.92	-1.67	-0.95	-32.2	-40.7	1.2	13.0
China	8.05	18.87	10.81	20.75	158.4	293.9	-6.3	-30.0
Czechia	0.69	1.17	0.47	0.59	78.1	92.7	-4.0	-3.7
Denmark	0.82	0.57	-0.24	-0.21	-28.9	-32.1	-8.6	14.4
Finland	0.77	0.37	-0.41	-0.40	-50.8	-49.6	0.4	-2.8
France	5.29	3.11	-2.17	-1.78	-40.6	-46.6	-8.2	21.2
Germany	10.22	7.74	-2.48	-2.04	-23.9	-31.8	-1.3	13.1
Hungary	0.63	0.79	0.16	0.22	33.7	36.6	-0.3	-1.8
India	0.74	2.12	1.38	2.04	241.3	288.4	5.9	-17.0
Indonesia	0.72	1.15	0.42	0.44	44.5	80.4	2.1	-21.6
Ireland	1.76	1.37	-0.39	-0.12	-23.9	-37.1	-19.1	49.7
Israel	0.51	0.33	-0.18	-0.16	-29.1	-19.4	1.1	-13.0
Italy	4.18	3.21	-0.97	-0.90	-21.0	-18.4	-2.3	-0.9
Japan	7.92	3.88	-4.04	-3.09	-49.1	-57.1	14.7	3.5
Malaysia	1.84	1.68	-0.16	0.00	-1.0	-0.7	9.7	-9.1
Mexico	2.54	3.19	0.65	1.80	69.0	73.6	-0.1	-2.6
Netherlands	3.01	2.47	-0.54	-0.47	-16.4	-3.6	-18.7	6.7
Norway	0.44	0.31	-0.13	-0.11	-27.9	-32.5	-2.1	9.1
Philippines	0.70	0.47	-0.22	-0.28	-37.9	-32.7	-1.2	-6.6
Poland	0.68	1.74	1.06	1.32	186.2	197.9	-5.3	1.4
Portugal	0.48	0.42	-0.06	-0.02	-10.7	27.9	-14.0	-18.8
Romania	0.25	0.52	0.27	0.43	132.8	193.9	-5.8	-15.9
Russia	0.86	0.64	-0.22	-0.08	-34.3	-56.9	32.4	15.3
Saudi Arabia	0.27	0.45	0.18	0.19	88.6	26.3	27.2	17.4
Singapore	1.51	1.42	-0.08	-0.06	-5.2	-15.3	7.0	4.6
Slovakia	0.26	0.55	0.29	0.50	187.1	200.2	-1.1	-3.3
South Africa	0.48	0.50	0.02	0.11	21.3	-9.1	2.1	30.6
South Korea	2.99	3.76	0.77	1.02	36.3	12.4	23.8	-2.1
Spain	2.11	1.94	-0.18	-0.12	-6.8	-2.5	-11.8	8.4
Sweden	1.39	0.88	-0.51	-0.48	-34.9	-35.2	-6.0	6.9
Switzerland	1.50	1.51	0.01	0.21	5.1	-17.8	-9.1	40.6
Taiwan	2.62	2.89	0.27	0.40	15.1	0.9	15.3	-1.0
Thailand	1.31	1.72	0.42	0.71	45.1	66.9	4.0	-16.4
Turkey	0.65	1.30	0.65	0.93	115.5	161.6	-0.9	-16.9
United Arab Emirates	0.15	0.44	0.29	0.26	190.6	164.4	15.9	-5.1
United Kingdom	4.14	1.83	-2.31	-1.92	-55.8	-61.3	-3.5	18.3
United States	11.94	7.94	-4.00	-5.86	-62.8	-69.1	0.2	19.8
Vietnam	0.21	2.66	2.45	6.37	1813.6	3072.6	-7.9	-34.5
Oceania	0.28	0.25	-0.04	-0.02	-10.4	-18.2	-0.1	9.8
Other Africa	0.43	0.76	0.34	0.52	113.4	127.0	8.9	-13.7
Other Asia	1.79	1.60	-0.20	0.42	6.7	45.2	13.3	-35.2
Other European Union	0.95	1.32	0.37	0.43	43.9	46.3	-0.9	-0.7
Other Europe	0.09	0.32	0.23	0.51	531.5	583.7	2.0	-9.4
Other former Soviet Union	0.41	0.61	0.20	0.20	53.9	-3.2	33.7	18.9
Other Latin America	1.64	1.75	0.11	0.25	13.3	-12.4	9.7	17.9
Other Middle East and N. Africa	0.62	1.05	0.44	0.47	76.5	75.3	7.5	-6.3

Note: The total cumulative change in market share can be calculated from its components: $((1+Perf/100) * (1+Geo/100) * (1+Sect/100) - 1) * 100$. The data used in the table does not include the SITC codes omitted from the analysis following Cheptea et al. (2014), especially crude energy and metalliferous products.

Appendix A2

Table A2.1 Actual and estimated changes in market shares 2002–2012

Country	Share in first year, %	Share in last year, %	Actual change, %p	Estimated change, %p	Cumulative change in share, %	Export performance, %p	Geographical component, %p	Sectoral component, %p
Finland	0.77	0.48	-0.29	-0.30	-40.2	-42.2	2.0	1.3
Sweden	1.39	1.03	-0.36	-0.35	-25.1	-22.9	-7.5	5.0
Denmark	0.82	0.61	-0.21	-0.19	-23.8	-22.3	-8.4	7.1
Austria	1.17	1.03	-0.14	-0.17	-14.0	-9.1	-7.9	2.6
Belgium	2.74	1.99	-0.75	-0.78	-28.6	-27.2	-9.0	7.8
Netherlands	3.01	2.62	-0.39	-0.41	-14.7	4.9	-19.0	0.5
Germany	10.22	9.00	-1.22	-1.17	-11.8	-11.9	-5.8	6.3
France	5.29	3.74	-1.55	-1.46	-29.2	-29.9	-9.8	12.1
Italy	4.18	3.19	-1.00	-1.00	-22.8	-18.5	-3.4	-2.0
Spain	2.11	1.78	-0.33	-0.34	-16.0	-7.2	-13.1	4.1
Czechia	0.69	0.99	0.29	0.37	47.4	62.5	-7.0	-2.5
Poland	0.68	1.18	0.51	0.62	88.3	95.2	-6.4	3.0
Slovakia	0.26	0.49	0.23	0.42	146.1	172.4	-7.6	-2.2
Hungary	0.63	0.64	0.02	0.04	5.5	15.9	-5.8	-3.4
Norway	0.44	0.38	-0.06	-0.05	-14.5	-22.0	-4.1	14.3
Switzerland	1.50	1.45	-0.04	-0.01	-2.7	-9.6	-7.4	16.4
United Kingdom	4.14	2.55	-1.59	-1.49	-36.9	-37.4	-6.8	8.1
USA	11.94	8.99	-2.95	-6.03	-56.2	-60.0	-0.1	9.6
Japan	7.92	6.04	-1.89	-1.43	-21.9	-30.9	11.7	1.1
China	8.05	15.82	7.77	13.17	114.9	190.1	-2.8	-23.8
South Korea	2.99	3.82	0.83	1.06	38.4	18.6	17.9	-1.0

Table A2.2 Actual and estimated changes in market shares 2012–2024

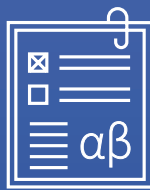
Country	Share in first year, %	Share in last year, %	Actual change, %p	Estimated change, %p	Cumulative change in share, %	Export performance, %p	Geographical component, %p	Sectoral component, %p
Finland	0.48	0.37	-0.12	-0.14	-26.2	-17.4	-3.3	-7.7
Sweden	1.03	0.88	-0.15	-0.24	-23.1	-23.2	-0.8	0.9
Denmark	0.61	0.57	-0.04	-0.10	-17.4	-20.4	-3.5	7.6
Austria	1.03	0.98	-0.05	-0.09	-8.7	-10.6	-1.5	3.8
Belgium	1.99	1.71	-0.29	-0.37	-18.6	-18.0	-3.1	2.6
Netherlands	2.62	2.47	-0.15	-0.21	-8.3	-8.9	-4.2	5.1
Germany	9.00	7.74	-1.26	-1.44	-18.2	-25.2	2.1	7.0
France	3.74	3.11	-0.62	-0.63	-19.5	-26.8	-1.1	11.1
Italy	3.19	3.21	0.02	-0.10	-3.0	-2.4	-1.2	0.5
Spain	1.78	1.94	0.15	0.09	4.8	4.1	-3.2	4.1
Czechia	0.99	1.17	0.18	0.16	15.9	18.0	-1.4	-0.4
Poland	1.18	1.74	0.55	0.60	47.3	55.9	-3.2	-2.3
Slovakia	0.49	0.55	0.06	0.08	17.3	17.7	1.7	-2.1
Hungary	0.64	0.79	0.14	0.09	14.8	10.4	1.7	2.2
Norway	0.38	0.31	-0.07	-0.09	-22.9	-16.7	-0.5	-7.0
Switzerland	1.45	1.51	0.06	0.00	-4.9	-19.8	-4.4	24.0
United Kingdom	2.55	1.83	-0.71	-0.69	-31.3	-38.6	1.8	9.9
USA	8.99	7.94	-1.05	-0.77	-11.6	-22.8	3.0	11.1
Japan	6.04	3.88	-2.15	-1.99	-36.2	-40.9	6.0	1.9
China	15.82	18.87	3.04	4.64	25.1	40.6	-3.3	-8.0
South Korea	3.82	3.76	-0.05	0.01	-0.5	-7.4	9.0	-1.5

Table A2.3 Actual and estimated changes in market shares 2019–2024

Country	Share in first year, %	Share in last year, %	Actual change, %p	Estimated change, %p	Cumulative change in share, %	Export performance, %p	Geographical component, %p	Sectoral component, %p
Finland	0.43	0.37	-0.07	-0.06	-14.4	-11.1	0.9	-4.5
Sweden	0.90	0.88	-0.02	-0.01	-0.8	-1.4	1.5	-0.9
Denmark	0.61	0.57	-0.04	-0.05	-7.9	-11.9	0.5	4.1
Austria	1.05	0.98	-0.07	-0.04	-4.3	-7.5	2.1	1.4
Belgium	1.93	1.71	-0.22	-0.20	-11.1	-14.3	1.1	2.7
Netherlands	2.65	2.47	-0.18	-0.13	-5.5	-10.3	0.3	5.0
Germany	8.71	7.74	-0.97	-1.08	-13.3	-17.6	3.5	1.6
France	3.53	3.11	-0.42	-0.33	-9.6	-12.0	0.8	1.8
Italy	3.25	3.21	-0.04	-0.03	-0.9	-2.2	2.0	-0.7
Spain	1.91	1.94	0.02	-0.02	-1.0	-3.8	2.1	0.8
Czechia	1.16	1.17	0.00	0.04	3.6	3.3	2.2	-1.9
Poland	1.56	1.74	0.18	0.27	17.4	17.2	2.2	-2.1
Slovakia	0.54	0.55	0.01	0.02	4.3	0.7	3.9	-0.3
Hungary	0.75	0.79	0.04	0.06	8.4	4.8	3.6	0.0
Norway	0.32	0.31	-0.01	0.01	2.8	3.4	2.2	-2.8
Switzerland	1.48	1.51	0.03	0.11	6.4	-5.7	-0.6	13.5
United Kingdom	2.29	1.83	-0.46	-0.44	-21.2	-26.8	2.5	5.1
USA	8.40	7.94	-0.46	-0.75	-9.7	-14.2	1.5	3.8
Japan	4.76	3.88	-0.88	-0.94	-19.9	-20.6	-0.4	1.2
China	17.08	18.87	1.78	2.22	11.7	20.0	-2.2	-4.8
South Korea	3.54	3.76	0.22	-0.01	-0.2	-0.5	-0.2	0.5

Note: The total cumulative change in market share can be calculated from its components: $((1+Perf/100) * (1+Geo/100) * (1+Sect/100) - 1) * 100$. The data used in the table does not include the SITC codes omitted from the analysis following Chepeta et al. (2014), especially crude energy and metalliferous products.

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Tel. +358-9-609 900
www.etla.fi
firstname.lastname@etla.fi

Arkadiankatu 23 B
FIN-00100 Helsinki
