



EUROSÜSTEEM

ESTONIAN COMPETITIVENESS REPORT

2020

The Estonian Competitiveness Report by experts from Eesti Pank is published once a year.

The report covers Estonian competitiveness in international comparison, the factors that affect competitiveness, and changes in those factors in recent years. Competitiveness is assessed in various ways, using the results of comparative tables put together by international organisations and think tanks, and analysing the exporting capacity of Estonian companies and the factors that affect it. The long-term impact of climate changes on the Estonian economy is also described in the report, together with the risks and opportunities of greening the economy.

The Estonian Competitiveness Report can be downloaded from the [Eesti Pank website](#).

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SUMMARY

- Estonia is relatively highly placed in various international comparative tables for competitiveness. Estonia's strengths are its high level of education, strong institutions, a flexible labour market and a favourable business environment. This favourable business environment is partly a result of Estonia's efficient and effective e-state solutions. Estonia's relative position deteriorated in 2019 in several of the indexes, even as the indicators for competitiveness improved over the year. This happened because development was even faster in other countries. In several cases the money laundering scandals concerning Estonia were mentioned as a negative factor, together with their impact on the financial sector.
- Estonia's GDP per capita in US dollars and corrected for purchasing power parity has grown rapidly over the years, and in 2018 Estonia was placed 39th in the world for wealth. Estonia's relative wealth against the average of the European Union was raised by the departure of the United Kingdom from the European Union on 1 February 2020, as the departure of a relatively rich country lowered the average GDP per capita of the European Union.
- The living standards of people around the world have started to be affected by climate change. Although the impact of climate change has not yet been felt in Estonia as much as in many other countries, Estonia's international cooperation still prioritises efforts to slow global warming and achieve climate neutrality. Achieving those goals in the short term will though require additional investment and many changes in priorities. This may have a negative impact on the Estonian economy in the years ahead, but in the longer perspective it should provide a flow of income.
- Consumer prices rose in Estonia by 0.2% in 2019 against the weighted indicator for trading partners. Given the current price and income levels in Estonia and their convergence with those of richer countries, this rise is still only modest. Broader indicators of price competitiveness weakened, as data from the first three quarters show the real exchange rate based on the GDP deflator strengthened by 1.8%, and the rate based on unit labour costs did so by 2.5%.
- The market share of Estonian exports in the global economy grew by a nominal 2.3% in 2018. This meant that exports of Estonian goods and services grew faster than foreign markets did. The market share of Estonian exports increased despite the rise in relative prices and costs, and this was contributed to very much by non-price factors. The market share of Estonian exports of goods increased by 0.9%, and that of services by 5.7%. The growth was exceptionally fast in exports of telecommunications services and computer and information services.
- The surplus from Estonia's net exports of goods and services was reduced in 2019 by the price sensitivity of the competitiveness of many goods. Net exports have been positive in recent years though for those goods and services where competitiveness is affected more by non-price factors. Net exports of services were in surplus in both the segment competing on price and the segment competing on non-price factors.
- Estonia placed higher in the rankings for the index of economic complexity, which measures the knowledge intensity and diversity of exports, than it did in terms of GDP. This means that the complexity of exports will allow Estonia to achieve faster economic growth than richer countries.
- Exporters of goods from Estonia are able to ask higher prices when the quantities sold in a particular target market are smaller. This is because high-quality products are often niche products.
- For the Estonian standard of living to rise, it is important in the longer term that the share of exports of higher quality that compete on non-price factors increase.

I. ESTONIA'S ECONOMY IN INTERNATIONAL COMPETITION

INTERNATIONAL COMPETITIVENESS INDEXES

One of the main aims of economic policy is to boost the competitiveness of a nation. Assessing whether this is achieved depends a lot on the definition of competitiveness used and the measuring system chosen. The European Commission for example describes the competitiveness of a country as the general capacity to ensure long-term growth in the welfare of residents in such a way that unwanted unemployment would be as low as possible. This is quite a general definition and can be measured using very different indicators, which raises various questions. How exactly should welfare be measured? Which should be preferred, sustainable welfare in the longer term, or rapid growth in selected indicators in the short term? Does a low level of unemployment ensure that labour resources are divided in the best way possible? What is the role of the state in this, and how can its effectiveness be measured? These and many other similar questions make it hard to define competitiveness.

Various organisations put together indexes of the international competitiveness of countries, using a wide range of indicators to do so. It is not possible to produce a single comprehensive indicator for competitiveness by comparing these indexes, but they help give a better picture of the competitiveness of the Estonian economy. Estonia has quite a high position in various rankings for international competitiveness. Estonia's strengths include its high level of education, strong institutions, a flexible labour market and a favourable business environment. This favourable business environment is partly a result of Estonia's efficient and effective e-state solutions. Some of the better-known indexes are listed below with a short description of the results for Estonia in 2019.

THE WORLD ECONOMIC FORUM (WEF) GLOBAL COMPETITIVENESS INDEX (GCI)¹

The Global Competitiveness Index 2019 compares the economic indicators for 141 countries that between them account for 99% of global GDP. It starts from the idea that economic growth is extremely important for improving living standards. It also finds connections between competitiveness, inclusive growth, and environmental sustainability. Its GCI 4.0 report on the past two years not only covers the indicators used earlier but also notes factors that affect productivity in what has now been called the fourth industrial revolution. In the broader scheme the indicators are chosen to reflect total factor productivity (TFP). TFP can be understood as the main drivers of long-term economic growth, which measure how effectively labour and capital are combined to produce output, or how intelligently those production factors are used. The index covers 103 indicators that are divided into 12 sub-indexes. Each indicator is measured on a scale from 0 to 100, which indicates how close the economy is to the ideal position of maximum competitiveness in comparison with the best performers among comparable countries. The main sub-indexes are institutions,



¹ World Economic Forum. The Global Competitiveness Report 2019.

infrastructure, ICT adoption, macroeconomic stability, health, skills, product market, labour market, financial system, market size, business dynamism, and innovation capability.

In 2019, Estonia rose one place in the GCI rankings to 31st, and was 14th among the 28 countries in the European Union. Estonia was the highest placed among the countries of Central and Eastern Europe (CEE) and got good marks for its macroeconomic stability, which takes in the low level of government debt, strong institutions, a flexible labour market, a good level of education, and a highly-developed digital society. Estonia's position was unfortunately pulled down by the small domestic market and the low level of capitalisation.

An improvement in the indicators over the years does not necessarily lead to a rise in the rankings if developments in other countries have been even faster. The assessment in 2019 of Estonia's physical and IT infrastructure showed an improvement, but did not lead to any rise up the table. The indicator for the financial sector deteriorated substantially in both the general assessment and in its international ranking. The relative position of the indicators for Estonia's human capital, labour market and ease of doing business improved though.

THE INTERNATIONAL COMPETITIVENESS RATING OF THE INTERNATIONAL INSTITUTE FOR MANAGEMENT DEVELOPMENT (IMD) OF LAUSANNE²

The IMD competitiveness centre has a rankings table for the competitiveness of 63 countries that uses up to 340 different indicators. The final score for each country is found by comparing four categories of indicators for economic performance, infrastructure, government efficiency and business efficiency. The IMD approach is affected remarkably by the size of a national economy in terms of GDP in billion dollars, millions of people in employment, size of the country in square kilometres and so forth, but there are also indicators for relative position and dynamics. The competitiveness of the country is affected by a stable legislative and administrative environment, transparent and responsible government, sustainable and clear government finances, a balanced and diverse economy, developed infrastructure and logistics, the development of new technology and high value-added export-oriented companies, a good education system including professional and higher education, involvement of youth in the economy, science and enterprise, and social interconnections and mobility. The competitiveness of the country is described mainly by comparing its progress, so there are no winners or losers. Where two countries are in

competition, there may be improvement in both countries but more so in one of them.

Estonia was in 35th place in the IMD listing in 2019. This was a fall of four places on the year before, because Saudi Arabia, Indonesia, Kazakhstan and Lithuania had improved their results relatively faster. Estonia was in 14th place among the countries of the European Union, and was fourth of the CEE countries. The report said Estonia's strengths were its simple business environment and the high level of education of its people.

Alongside the general ranking table for competitiveness, the IMD also publishes several more detailed assessments.



2 IMD. World Competitiveness Yearbook 2019.

THE IMD WORLD DIGITAL COMPETITIVENESS RANKING³

Estonia was 29th out of 63 countries in this table in 2019, which is four places down on the previous year. In a separate comparison of smaller countries with populations of below 20 million, Estonia was in 17th position out of 34 in 2019. It was in 13th place among the countries of the European Union, and was the best among the CEE countries. Estonia's strengths were its PISA test results for mathematics and the availability of education, the ease of starting a business, access to wireless internet and use of it, and the widespread use of smart devices. Assessments of Estonia were less good for R&D activities and the overall number of academic publications, use of robots, and a restrictive migration policy.

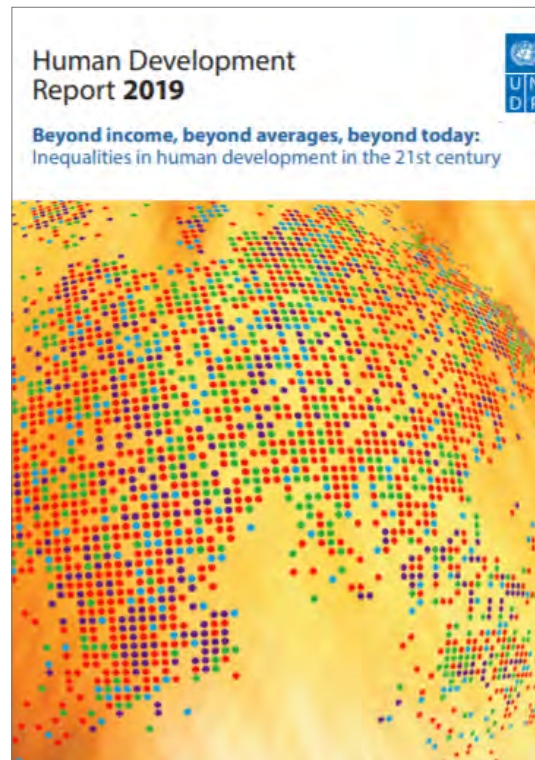
THE IMD WORLD TALENT RANKING⁴

Estonia was 27th of 63 countries and had improved its position by one place over the year. It was in 13th place among the countries of the European Union, and was the best among the CEE countries. This ranking looks at how attractive an economy is for workers, and its ability to hold onto highly qualified specialists. Promoting qualified and educated staff strengthens competitiveness and encourages long-term welfare, especially in a dynamic environment where artificial intelligence, robotics and other new technologies are posing new challenges to businesses, policy makers and educational institutions.

THE UNITED NATIONS HUMAN DEVELOPMENT INDEX (HDI)⁵

The design of the UN Human Development Index (HDI) is different in that it considers the main goal to be sustainable development and the main tool for achieving it to be extending human freedom and inclusion. Policy choices, coping with the impact of climate change and technological development are shaping the global inequalities that the HDI tries to address. As inequality does not only mean differences in incomes or levels of wealth, the index uses broader indicators of well-being, and looks at the distribution behind the averages and assesses the sustainability of the indicators. The HDI covers 189 countries and uses three long-term key indicators of human development, which are a long and healthy life, access to knowledge, and standard of living.

The HDI puts Estonia in the group of countries with very high levels of human development, and it comes in 30th place. Estonia's HDI rating has increased by 20.8% since 1990. Over these years life expectancy in Estonia has risen by 9.2 years and the average number of years spent in school has risen by 3.7. The total income per resident in the Estonian national accounts rose by 102.3% meanwhile. Estonia was in 17th place among the countries of the European Union in this ranking, and was third among the CEE countries.



THE INTERNATIONAL INDEX OF ECONOMIC FREEDOM OF THE HERITAGE FOUNDATION⁶

This index starts from the assumption that the primary requirements for growth in a national economy and the wealth of residents are a free market economy and freedom of choice for the population. Sus-

³ IMD. World Digital Competitiveness Ranking 2019.

⁴ IMD. World Talent Ranking 2019.

⁵ United Nations Development Programme (UNDP). Human Development Report. 2019.

⁶ The Heritage Foundation. 2019 Index of Economic Freedom.

tainable increases in welfare are driven in this view by economic policy choices such as low tax rates and monetary policy stability, minimal interference by government and a very limited role for it, strong private property rights and defence of them, a very small shadow economy, and openness to global flows of trade, services and finance.

Estonia was in 15th position in the comparison of 180 countries in 2019. It was in 5th place among the countries of the European Union, and was the best among the CEE countries. There was a lot of praise for Estonia's economic freedom. The index found that Estonia continues to follow an economic policy that supports the free market and enterprise and a credible fiscal policy, has resilient and efficient economic development that supports foreign investment and a liberal market economy, has an independent and effective court system based on the principles of the rule of law and more besides. The assessment for Estonia came down over the year though because the money laundering scandals have reduced confidence in the banking sector. The Heritage Foundation also considers economic freedom to have been reduced in Estonia by the tighter regulation of the financial sector.

THE CORRUPTION PERCEPTION INDEX (CPI) OF TRANSPARENCY INTERNATIONAL⁷

In the table where the countries with the lowest corruption come top, Estonia came in joint 18th with Ireland among 180 countries in 2019. It was in 10th place among the countries of the European Union, and was the best among the CEE countries. Estonia was noted particularly in the 2019 report as a country where the CPI rating has been stable across the past decade and has risen a long way. A comprehensive legislative framework, independent institutions and efficient digital solutions reduce the chances for corruption to build up and make governance transparent. Although the CPI does not report corruption in the private sector, the report noted that the recent money-laundering scandal surrounding Danske Bank illuminated the need for increased reporting in the banking and business sector in Estonia.

THE WORLD BANK EASE OF DOING BUSINESS INDEX⁸

The ease of doing business index describes the multifaceted regulatory environment that companies doing business in the country must face. Largely because of its many various and effective e-services,



⁷ Transparency International. Corruption Perception Index 2019.

⁸ The World Bank. The Ease of Doing Business Score 2019.

Estonia was highly placed at 16th out of 190 countries in the league table. It was in 5th place among the countries of the European Union, and was second among the CEE countries. It is simple and quick to start a business, pay taxes, register real estate and get a construction permit in Estonia. The rating was much worse for protection of small investors in Estonia and for bankruptcy resolution. Estonia was four places lower than in 2018, but the changes in Estonia's indicators were only small.

LONG-TERM INDICATORS OF THE COMPETITIVENESS OF THE ESTONIAN ECONOMY

Well-being is a difficult concept to define and so it cannot be measured using only economic indicators. Growth or decline in an economy does not necessarily adequately reflect changes in the well-being of the population. The relationship between economic growth and well-being is different for countries with different levels of development, as it is not direct and changes over time. Beside the goal of encouraging long-term economic growth, most countries focus today in their national development programmes on social inclusion and environmental sustainability.

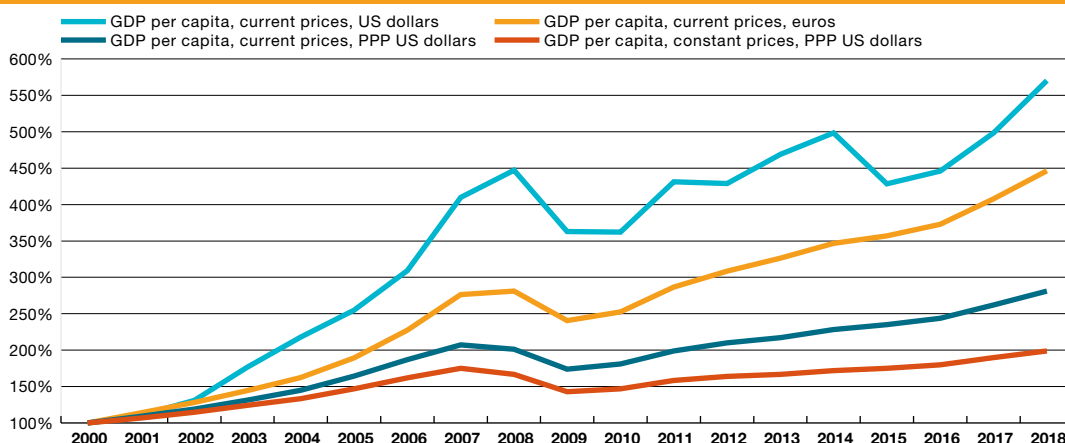
The well-being of the population is affected by slower growth in the global economy, protectionism, increasing inequality, and rapid growth in the population in vulnerable regions. To these can be added new challenges like interdependency and conflict between countries, migration, pandemics, and the dangers from climate change. The problems and opportunities offered by new technologies, digitalisation, robotics, artificial intelligence, biotechnology and the spread of the sharing economy also have an impact. Although economic growth does not automatically lead to increased welfare, is still considered that economic development is closely related to real improvements in the quality of life and the well-being of the population.

Defining national competitiveness as the capacity to ensure sustainable improvement in living standards for the population leads the performance of national economies over a long time frame to be considered frequently in comparisons. The most commonly used indicator for the economic development of a country is GDP per capita, or the total value added of the domestic economy per person.

Estonia's GDP per person increased tenfold at current prices from 1995 to 2018. This is a very large change, especially given that the indicator for Finland, for example, only doubled over the same period. The indicator calculated at current prices does not give good grounds for comparison though because it does not reveal how much inflation and changes in the exchange rate contributed to the increase.

The GDP per capita indicators for Estonia in 2018 and in 2000 in current prices measured in US dollars show a rise of 5.7 times (see Figure 1), but in local currency, which is the Estonian kroon until 2011 and then the euro, the rise was only 4.5 times. This difference shows how the exchange rate of the euro against the US dollar has appreciated. Estonian GDP per capita at current prices measured in US dollars reached very close in 2018 to where Finland was in 2000.

Figure 1. Estonian GDP per capita indexes (2000=100%)



Source: IMF

To make exchange rates and price levels in different countries comparable internationally, the GDP per capita of countries is calculated at purchasing power parity (PPP). Purchasing power parity eliminates the differences in price levels in different countries and compares the purchasing power of different currencies. Converting a given amount of money in different currencies at PPP allows an equal shopping basket of goods and services to be compared in all countries. This indicator shows that Estonian GDP per capita in US dollars and adjusted using PPP for the differences in price levels increased 2.8 times over the 18 years at current prices and doubled at constant prices.

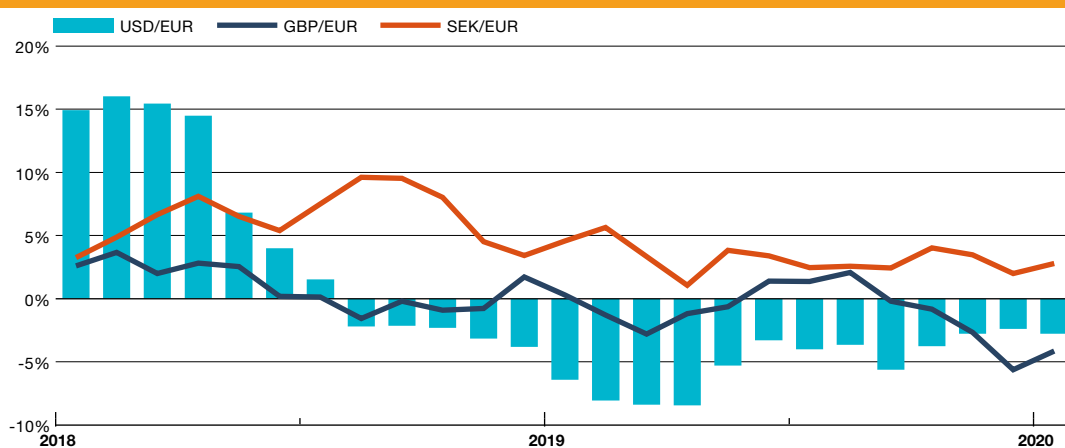
Taking GDP per capita at current prices measured in US dollars puts Estonia in 36th place in the world in 2018 for wealth, but adjusting for PPP moves it to 39th. The competitiveness of the Estonian economy measured in GDP per capita has improved substantially over the years. When comparing with the European Union average, it must be remembered that Estonia's relative indicator was affected by the departure of the United Kingdom from the European Union on 1 February 2020. Estonian GDP per capita at PPP was 81.6% of the European Union average in 2018. Removing the United Kingdom from the comparison base lifts that figure to 83.1%, as the departure of a relatively rich country lowered the average GDP per capita of the European Union.

PRICE-BASED INDICATORS – EFFECTIVE EXCHANGE RATES

There can be side-effects for an economy and increased risk of contagion from participating in global value chains and operating across borders, but it can also allow long-term convergence of economies and faster equalisation of levels of scientific and technological development. Having lower prices can be an important advantage for companies competing globally for market share. This makes countries pay serious attention to relative prices, exchange rates and production costs when analysing competition, as these may, especially in short-term, affect the ability of companies to compete in international markets.

The relative competitiveness of a country is measured against other countries. It is considered that countries where prices and costs are rising more slowly than in others are in a stronger competitive position for price-based indicators. This assumption is a simplification, because it only describes the situation with a perfect market and highly comparable products where demand is stronger for relatively cheaper products. If this was true in all cases, the ability of countries to earn more income than others in global markets would depend only on having the lowest prices, while rapid rises in wages and prices would hinder the long-term growth of domestic production. This assumption may or may not apply, because the economic success of a country is also affected by the structure of the economy, and the content, complexity and uniqueness of its output. Relative prices may have side effects though for terms of trade and can give a relative advantage in markets in the short term.

Figure 2. Exchange rates against the euro of selected currencies, yearly change



Source: Eesti Pank

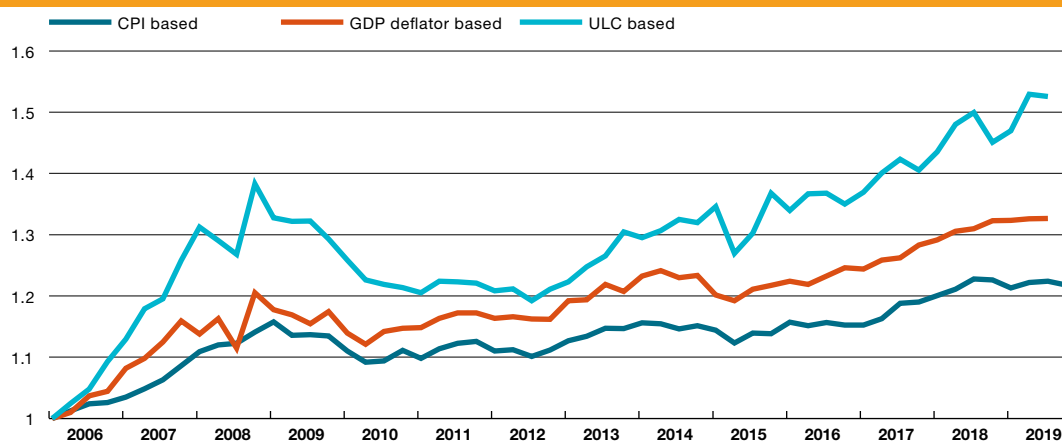
The exchange rate is the relative price of two currencies, for example the price of one euro in US dollars, which in January 2020 averaged 1.11 dollars. In total the euro depreciated against the US dollar by 5.2% in 2019, and against the pound sterling by 0.8% (see Figure 2). All else being equal, this would have given Estonian exporters a price advantage in those markets, as buyers using dollars and pounds could have been charged a lower price, or more income could have been earned from foreign markets if prices did not change. The opposite change occurred with the Swedish krona for example, as the euro exchange rate appreciated by 3.2% in 2019, and a total of 10% over the past two years. This means that Estonian products became relatively more expensive in the Swedish market for local consumers, making them harder to sell. In the markets of the euro area, where the same currency is used as in Estonia, and where Estonia sells the majority of its exports, changes in the exchange rate do not lead to any price advantage.

The dynamics of prices can vary between countries, and so assessments of changes in price-based competitiveness compare price rises in Estonia with those in other countries after changes in the exchange rate have already been taken into account. Changes in the real exchange rate reflect how the price levels in Estonia and in Estonia's trading partners have changed in relation to each other if they are all expressed in euros. The real exchange rate is calculated by adding a country's inflation rate or cost growth to the nominal exchange rate.

The European Central Bank publishes real exchange rates for countries in the euro area, including Estonia, calculated using a single unified methodology under the name Harmonised Competitiveness Indicators (HCI), basing them on various figures for prices and costs. They are calculated for different baskets of currencies, meaning that they use different groups of partner countries. The most commonly used comparisons are based on consumer prices, the GDP deflator, and unit labour costs (ULC). Each of these has its advantages and disadvantages.

- The advantages of using the **consumer price index** (CPI) to measure price-based competition are the availability of monthly data covering a large number of foreign partners, the use of a similar methodology for compiling the data, and the inclusion of services. The disadvantages are that it focuses only on consumer products, as the CPI does not cover capital goods or ICT and business services, its sensitivity to taxes and other market distortions, its inclusion of imported products, and the weak relationship with the content of exports. The basket of consumer goods is largely filled with goods and services from sectors such as domestic transport, residential property, construction, education and health, and consumer service that are closed to international competition and do not compete in export markets. Furthermore, the content and weighting structure of the CPI can vary greatly between countries.

Figure 3. Dynamics of real effective exchange rates



Source: European Central Bank

- The **GDP deflator** is published with a longer lag and is quarterly or annual, and there are fewer countries that can be used for comparison. Using this indicator for comparing price-based competition allows all the sectors of the economy to be covered. The disadvantages though are the frequent recalculation of data, differences between the tax systems and economic structures of different countries, the large share of domestic services such as national government and defence, and differences in the components of exports.
- **Unit labour costs** also cover all the sectors of the economy and are less sensitive to tax measures, but on top of the disadvantages of the GDP deflator they cover only labour costs and not production costs, and are affected even more by changes in the structure of the economy.

Consumer prices rose in Estonia by only 0.2% in 2019 against the weighted indicator for trading partners. The convergence of the price and income levels of Estonia with those of countries where they are higher needs consumer prices in Estonia to rise faster than the average. The real exchange rate based on the GDP deflator strengthened by a little more at 1.8% in Estonia in the first three quarters of 2019. There were several causes of the differences between the two indicators. The consumer basket contains a lot of imported goods, which fell in price in 2019, while the GDP deflator was affected by changes in terms of trade, or the ratio of export prices to import prices.

The largest appreciation of 2.5% in the first three quarters of 2019 is found by the Estonian indicator based on ULC. The difference between this figure and that based on the GDP deflator reflects the earlier difficulty in passing rising labour costs into end prices, and a reduction in the share of profit. This means that labour costs in Estonia rose too quickly in comparison to those of other countries.

Although real exchange rates are not able to measure such features of competitiveness as reputation, quality, reliability or technological innovation, and do not show structural changes particularly well, they show the development of the relative prices of Estonian output in comparison to those of Estonia's main trading partners.

II. THE IMPACT OF CLIMATE REGULATIONS ON THE ESTONIAN ECONOMY

THE CONCEPT OF THE GREEN ECONOMY AND COMPETITIVENESS

The discussion of the impacts of climate change is not just a hypothetical one, as these impacts have started to have a real effect on the living standards of people in some countries. Increasingly fierce cyclones, prolonged droughts and frequent floods are causing changes in the living environment, leading to financial loss and forcing people to relocate. The total economic impact of climate change is not known precisely, because although the direct costs caused by natural disasters are relatively easy to calculate, there are many indirect impacts that lie outside the scope of normal economic analysis. The economic impact of climate change is likely to increase in future, but it will not happen smoothly and the final extent of the losses will depend a great deal on the political choices that are being made right now.

Long-term forecasts show that continuing with business as usual will seriously affect the climate, natural resources and ecosystems. This will put pressure on countries to choose routes for development where raising living standards goes together with environmental protection and sustainable use of natural resources. To ensure that living standards rise, states will have to make their production and consumption patterns more sustainable and redefine what we understand by development and how we measure it.

Global and interrelated changes such as economic development, demographic change and uneven growth, as well as climate change have made it necessary to reconsider the goals of economic activity that we have had, to make them more conservative in the use of natural resources for a socially responsible economy, or as it is now referred to the green economy. There is ever more talk that the goals set should not only be growth in the economy, but an improvement in the quality of life.

Green economic growth means promoting growth in the economy that would ensure the sustainable use of natural resources and preservation of the environment so that the well-being of the population and economic activity could be supported over the long term⁹. This approach handles the goals of economic activity holistically, taking in economic, environmental and social components. The competitiveness of countries in a green economy needs to consider not just economic growth, but also how the well-being of the population and social justice are improved, how far risks are reduced and the pressure that is put on natural resources, as the green economy should be low-carbon, resource-efficient, and socially inclusive.

Green economic growth strategies need to focus on promoting economic, social and environmentally sustainable development simultaneously, and on identifying weak points that could arise from greening the economy. Green growth can be achieved by improving efficiency and rethinking the links between economic growth and growth in energy and resource consumption, and by developing and deploying innovative solutions.

Although the effects of climate change in Estonia are not yet as great as in many other countries around the world and in the European Union, the European Commission forecasts that many changes can be expected in the coming decades, including a rise in the temperature, which is already happening faster in Estonia since the second half



⁹ From OECD and UN UNEP materials.

of the 20th century than on average around the world, and the consequent reduction in ice and snow coverage; heatwaves and droughts; changes in plants and agriculture; the spread of alien species, including new pests and pathogens; forest land failing to freeze and remaining too wet, which will restrict logging; changes in energy consumption; increases in some public health problems; floods caused by increased precipitation, and increased maintenance demands on drainage systems and dams; rising sea levels; coastal erosion and pressure to relocate housing and facilities; and more frequent storms and the consequent need for resilience in infrastructure and buildings and clean-up capacity after storms¹⁰. There may also be further impacts that come from the climate policy of the European Union.

Climate change mitigation and emission reduction are key objectives of the Paris Climate Agreement and the UN Agenda for Sustainable Development. To avoid catastrophic consequences from climate change, the average global temperature rise needs to be kept well below 2°C. The European Council approved last year the target of carbon neutrality for the European Union by 2050. The current target of the European Union is to reduce CO₂ emissions by 2030 to 40% of their 1990 level, but the pressure to set even more ambitious targets has increased substantially. The green economy action plan of the European Commission aims to promote sustainable economic growth by decoupling economic growth from growth of the same rate in the use of resources and accelerating the transition to a low-carbon economy.

The European Green Deal is an ambitious package of measures that should allow European citizens and companies to benefit from a sustainable transition to a green economy. The main policy directions in the initial action plan cover various measures from an ambitious reduction in emissions to investment in top-level scientific research and innovation and the preservation of Europe's natural environment.

HOW ESTONIA CAN ACHIEVE CLIMATE NEUTRALITY

Initial assessments suggest that it is possible for Estonia to achieve climate neutrality by 2050. Making smart strategic investments could in the long term even turn this into a source of revenue. However, moving towards climate neutrality will in the short-term require additional resources and a resetting of many priorities, and this may hurt the economy.

On 1 October 2019 the Stockholm Environment Institute Tallinn (SEI-T) presented a report¹¹ analysing how climate neutrality could be reached by 2050 and the measures and investment that would be needed to achieve it. The report finds that climate neutrality can be achieved in Estonia if the private, public and non-profit sectors contribute and the appropriate measures are taken. It could even be a potential source of revenues in the longer term if smart investments are made strategically. The report reached several conclusions.

The report put the total cost of achieving climate neutrality at around 17.3 billion euros over 30 years. This cost is not all an additional new investment requirement. The investments needed to achieve the current target of reducing greenhouse gas emissions by 80% account for the great majority of this amount. These are a wide range of investments in the energy sector, energy efficiency and the transport sector. The largest part of the total amount of activity required would be funded from private sector investments of around 12.7 billion euros. The amount to be funded from public sector institutions would be around 4.6 billion euros. Annual investment



¹⁰ Ministry of the Environment. Development programme for adapting to climate change up to 2030.

¹¹ Stockholm Environment Institute Tallinn. Reaching climate neutrality in Estonia, 2019.

would be around 4% of GDP over the next decade, around 2% in 2031-2040, and less than 1% of GDP in 2041-2050.

It should be considered that the longer the strategically important decisions are postponed and the later the measures are introduced, the more complex and expensive the pursuit of climate neutrality will turn out to be.

The SEI-T report finds that strategic investment will be supported by innovation and the creation of new jobs with high value added in low-carbon sectors. An ambitious transition to a climate-neutral model of the economy may in the short term mean weaker economic growth. The report accepts that investment would mean that costs would be higher than revenues in the first decade, but this would change in subsequent decades.

The conclusion of the SEI-T report is that achieving the goals will create new jobs while the measures are being introduced and in the longer term will make it possible to restructure and improve the competitiveness of the economy and make it readier to adapt to changes. Changing the structure of the economy is a natural process that can be shaped by the measures proposed and other supporting measures to have a positive impact over the long term in direct revenue expenditure terms and more broadly in terms of GDP and employment.

III. THE COMPETITIVENESS OF ESTONIAN EXPORTS

EXPORT GROWTH AND MARKET SHARE IN INTERNATIONAL MARKETS

The relative competitiveness of a country is its capacity to increase its income in international markets faster than other countries can, and is largely shown in the ability of the companies from that country to export. The dynamics of relative production costs and prices have a considerable influence on this, but they are not the only factor. As long as wages, prices and productivity in the converging economy all grow faster than those in advanced countries, there is no consequent decline in competitiveness. The performance of exports also depends on factors other than just the ability of companies to compete against foreign competitors by having the lowest prices. Products from different countries compete not only on price but also on other qualitative factors in each sector, such as extra functions, new models, recognition, taste, reputation, advertising, and exclusivity or niche export markets.

Exports of goods and services play a very important role for growth in the Estonian economy. The Estonian economy is very open and exports provide a large part of GDP. Exports of goods and services from Estonia made up around three quarters of GDP in 2018-2019, putting Estonia in 11th place among the countries of the European Union for openness.

The market share of Estonian exports in global markets grew by a nominal 2.3% in 2018, which meant that exports of Estonian goods and services grew faster than the total nominal volume of foreign markets did. The market share of Estonian exports increased despite the rise in relative prices and costs, and this was affected to a large extent by non-price factors. The market share of Estonian exports of goods increased by 0.9%, and that of services by 5.7% according to Eurostat.

Exports of services increased as a share of total exports by 0.4 percentage point in 2018 to 35%. While goods exports grew by 5.8%, exports of services increased by 8.9% over the year. The growth was exceptionally fast at 18.9% over the year in exports of telecommunications services and computer and information services¹².

The faster growth in prices for services than in prices for goods is a consequence of higher labour costs, which are generally a larger share of the costs in services. Equally the competition in international markets between service providers is different from that between sellers of goods. The competition in services is frequently for quality, which is a non-price factor.

Taste or a higher class of design of features or better quality often also mean higher prices. If consumers recognise that the product is of higher quality, they will be prepared to pay a higher price for it and will continue to buy it, meaning that demand may in fact increase despite the price. In economics this is called the outwards shift of the demand curve because of improved quality.

There is a strong correlation between the complexity of a country's exports and its productivity and wealth. Wealthy countries generally have higher wage levels, and so their ability to compete in the global marketplace is based not on having low costs but on having higher productivity and more complex products. Income growth in turn depends a lot on how necessary complex production methods and expertise are in making the products, how varied production activity is, how many similar products are available globally, and how fast progress can be made towards even more complex products. Buyers of complex products are wealthier than average and so rises in prices do not affect their consumption preferences so quickly.

The Harvard Growth Laboratory in the Centre for International Development of the university noted in its latest report that the complexity of Estonian exports has increased constantly. Estonia was 32nd by wealth among 133 countries in 2017, but was in 27th place by complexity of exports. It was concluded from this that Estonia is capable of somewhat faster growth in the economy than other wealthy countries. This though assumes a rapid move towards more complex export products.

¹² Eesti Pank. Balance of payments.

The increasing complexity of exports also helps to explain why faster rises in relative export prices do not reflect a build-up of imbalances or a direct threat to competitiveness, but rather increasing quality and more advanced features in the products exported.

The special topic in this report covers the development of Estonian exports of goods by product groups and target markets. The analysis explains that the relative market share of Estonian export products in target markets improved rapidly until 2011, but then declined in 2015-2017. This means that companies were not able to pass on increasing costs into end prices in full. This result may or may not indicate a deterioration in the relative quality of Estonian exports of goods. Structural changes in the economy and increased bargaining power for workers have meant that labour costs have been increasing for a long time as a share of corporate value added. The growth in corporate margins may have been further restricted because the scale effect that accompanies rapid growth in goods flows and makes it possible to hold costs down is smaller than it is in big economies (see special topic).

PRICE AND NON-PRICE COMPETITIVENESS

It is quite difficult to assess international competitiveness in converging economies, and comparing individual indicators may not give comprehensive results. The dynamics of prices and costs and changes in export market share are not necessarily enough to explain changes in international competitiveness. The effect of a relative rise in unit labour costs on international competitiveness may for example be overestimated, as wage and price levels are lower and so it is natural that they would rise faster in converging economies. Changes in the market share of exports may reflect not only economic factors but also the impact of current policies and various restrictions on free trade. For this reason the analysis of the competitiveness of Estonian exports is extended by dividing export products into two groups.

1. Products and services that are easily comparable and that compete mainly on price.
2. High quality products and services for which competitiveness is affected more by non-price factors such as uniqueness, taste, design or other features¹³.

The division into price-based and non-price is based on the unit value of exports and imports, which is the ratio of value to volume for exports and imports. The export capacity of each group of goods is classified as non-price if the unit value of exports is larger than the unit value for imports in the same group¹⁴.

Growth in net exports of high quality products and services is an indicator of success for a converging economy, indicating an improvement in non-price competitiveness while assuming the balance of payments is generally in balance.

The deficit in net exports of goods from Estonia, which is exports minus imports¹⁵, has mainly been caused by the price-sensitive part of net goods exports (see Figure 3). The deficit in net exports of price-sensitive goods declined in 2019 because of a structural shift and worse global economic conditions, as both exports and imports of price-sensitive goods declined, but imports did so by more. The non-price component has made a weakly positive contribution since 2014, which has averaged 0.7% of GDP over the past six years¹⁶.

Total net exports from Estonia have still remained in surplus, mainly because of services. The majority of Estonia's exports of services, on average 87% since 2014, are classified as knowledge intensive¹⁷, where competitiveness is affected by non-price factors. Transport services continue to compete on price though. Net exports of both price-based and non-price competing services remained positive in 2019.

13 The methodology has been described in earlier Competitiveness Reports in 2018 and 2019.

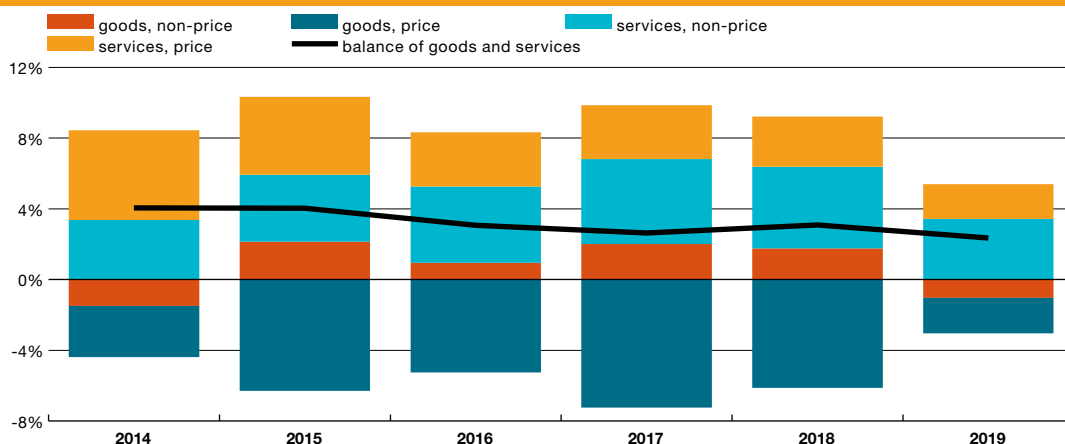
14 As an additional condition, groups of goods are only analysed if there are both exports and imports of them, and fuels are excluded to ensure equal conditions for importers and exporters of oil products.

15 Foreign trade statistics from Statistics Estonia are used here.

16 The non-price component has on average had zero effect on the foreign trade balance since Estonia joined the euro area in 2011. This essentially means that almost all of the trade deficit in 2011-2019 came from price-sensitive components.

17 The main divisions of knowledge intensive services are high-tech knowledge-intensive services, knowledge-intensive market services, knowledge-intensive financial services and other knowledge-intensive services. See [http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_\(KIS\)](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_(KIS)).

Figure 4. Decomposed balance of goods and services by price-based and non-price components, % of GDP



Source: Statistics Estonia

In a broad sense the rapid growth in wages in Estonia has not so far particularly hurt the export performance, but it has caused differences between the sales successes of higher and lower quality exports, while some export products have found problems competing on price in international markets. The positive balance of net exports of goods and services in 2019 narrowed because price-based competitiveness declined for several reasons, including slower economic growth in the European Union and elsewhere in the world and consequently slower growth in foreign demand for Estonian exports, increased uncertainty, a deterioration in the global economic climate because of trade conflicts, and more.

The special topic attached to this report describes how exporters of goods from Estonia are able to ask higher prices principally when the quantities sold in a particular target market are smaller. Demand and low price levels are more important for larger flows of goods. This confirms the general rule that higher quality products are often niche products, which have smaller market share. Looking at Estonian exports as a part of global supply chains, it is apparent that relatively larger mark-up is only possible for capital goods (see the special topic).

In the longer term, success in exporting needs the role of non-price factors to be increased. This depends on the strategic behaviour of the particular company, the diversity and complexity of products, the geographical location of the country, the economic conditions of its main trading partners and barriers to trade, its position in global value chains, and its integration in international production networks. Also important are access to high-level education and research and development work, the existence of resources, developed infrastructure, and a favourable regulatory, investment and tax environment.

SPECIAL TOPIC. FACTORS AFFECTING EXPORTS FROM ESTONIA

1. INTRODUCTION

The export performance of Estonia improved rapidly until the Great Recession, but the improvement has halted since then. The share of Estonian exports in the world increased from 0.04% in 1995 to 0.09% in 2011 and stayed broadly at that level until 2018.¹⁸

The obvious explanation for these dynamics is the catching-up process. It was easy to enter export markets when there was a strong comparative advantage in costs, especially wage and energy costs, but it is more difficult to improve market share when the comparative advantage in costs is being eroded. As the quality of exports becomes more and more important, improvements in quality are one way to maintain and improve market share while costs are rising. There is some conflicting evidence on the role of quality; Benkovskis and Wörz (2012) find that Estonia was the only CEE country where the quality of exports did not increase in 1999-2011, but Vandebussche (2014) finds that the quality of Estonian exports improved substantially in 2005-2011.

This section provides an overview¹⁹ of the factors behind Estonia's export performance in 2005-2017. It seeks to uncover the roles played by demand, relative prices and relative quality as proxied through markup, and to identify whether the roles of different factors vary over time, the amount of exports and the type of exports.

2. METHODOLOGY

We proceed from di Comite et al. (2014) and Vandebussche (2014), who create a variable for export quality based on quality rankings. The quality rankings are estimated using product markup, and they vary within the product category and with the destination of the exports. Conceptually markup can be related to quality by the assumption that consumers are typically more willing to pay for higher quality, which may result in higher markup. Evidence shows that industries with higher markup have more leeway for engaging in innovation and can invest more in technologies that enhance quality. However, a change in markup can also be caused by structural dynamics such as an increase in the labour share or an increase in competition between firms. Since labour share increased in Estonia during the period under observation, we use the term markup without making a direct inference about any change in quality.

Data on markup are not directly available and so we suggest a proxy based on unit values and the price-cost margin or Lerner index. Unit values are defined as the export turnover in euros divided by the quantity of exports. The unit values vary over the country of origin, products and time. Unit values can rise because of increases in markup, costs or both. The markups are obtained by multiplying the unit values by the Lerner index, which is a proxy for the variable costs per product. The Lerner index varies over industry of production and country of origin.²⁰

The markup varies with the product, country of destination and time. The different products that go from a particular country of origin to a given destination country are ranked by their markups. As the number of countries from which trade flows is different for different products, the markup ranks are normalised between 0 and 1. We call this final measure the markup ranking.

The data come in two parts. First, we employ the costs data for 28 EU countries plus the US, Japan and China. Second, the exports and markup data are derived for all the EU destination

¹⁸ The share of Estonian exports of services in world exports has been larger than the share of exports of goods, but the dynamics have been similar.

¹⁹ For a detailed analysis, see the forthcoming publication in the Eesti Pank working paper series.

²⁰ The Lerner index is a typical measure of the level of competition and is calculated as turnover minus the variable costs of materials.

markets that Estonia exports to, which total 27 countries. All the industries that trade goods are covered, meaning all the 2-digit NACE industries of the primary sector and manufacturing, except a few industries that mainly supply services.

Table 1 demonstrates the number of observations analysed and the size of the export flows covered. The number of observations more than doubled from 2005 to 2017 and the number of products exported and the number of products to each destination also increased. This implies that the trade flows of Estonian exports to EU destinations became more diversified over this timespan. The expansion in the extensive margin was similar to the growth in the product and destination margin, meaning the growth was similar in products exported and in the number of destinations for each product. As the number of observations in the dataset grew faster than total exports to the EU, the average export flow in the database declined from 0.53 million euros to 0.42 million euros. This implies that the extensive margin has been important for the growth in total Estonian exports to the EU, as seen in the expansion in exports over the number of products and the destinations for each product.

Table 1. Number of observations and amount of exports covered

| Year | No of destinations and products | No of products | No of destinations per product | Total exports, million euros | Exports per destination and product, million euros |
|------|---------------------------------|----------------|--------------------------------|------------------------------|--|
| 2005 | 9269 | 1911 | 4.9 | 4961.4 | 0.535 |
| 2006 | 9712 | 1874 | 5.2 | 5464.6 | 0.563 |
| 2007 | 9968 | 1873 | 5.3 | 5378.5 | 0.540 |
| 2008 | 10218 | 1909 | 5.4 | 5063.0 | 0.496 |
| 2009 | 9863 | 1825 | 5.4 | 3916.4 | 0.397 |
| 2010 | 13502 | 2394 | 5.6 | 5115.1 | 0.379 |
| 2011 | 14029 | 2433 | 5.8 | 7211.8 | 0.514 |
| 2012 | 14467 | 2414 | 6.0 | 6799.2 | 0.470 |
| 2013 | 15190 | 2441 | 6.2 | 7114.8 | 0.468 |
| 2014 | 15890 | 2576 | 6.2 | 8124.9 | 0.511 |
| 2015 | 16455 | 2569 | 6.4 | 7478.5 | 0.454 |
| 2016 | 18581 | 2686 | 6.9 | 7884.5 | 0.424 |
| 2017 | 19178 | 2690 | 7.1 | 8134.4 | 0.424 |

Sources: Eurostat COMEXT, Eurostat national accounts, EU Klems, authors' calculations

The determinants of export performance are estimated using a specification where the dependent variable is growth in real exports. Markup of exports, foreign demand and the real effective exchange rate based on HICP are used as determinants of export dynamics. Foreign demand is measured as the real GDP of the destination market. The real effective exchange rate is calculated by the authors as the relative growth of prices in Estonia over that of prices in the destination market expressed in euros. All the explanatory variables also enter in differences to ensure the stationarity of the series.

The following empirical specification is estimated:

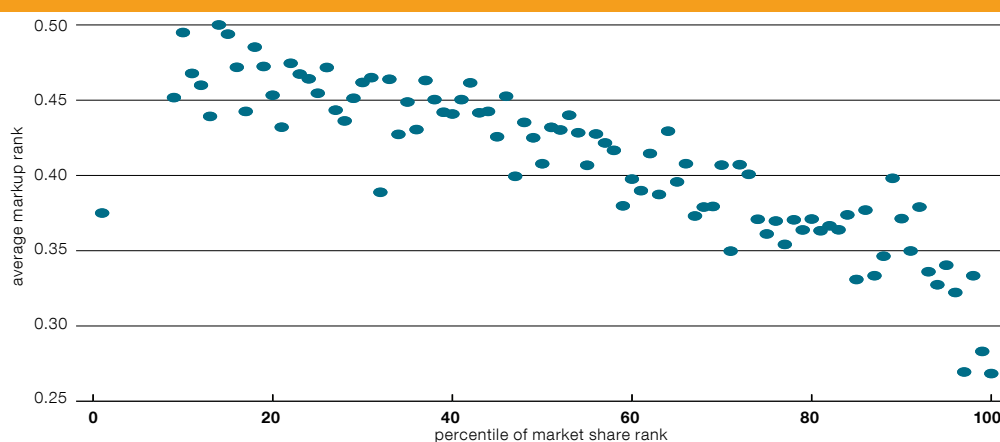
$$\Delta RealExports_{cpt} = \beta_0 + \alpha_{cp} + \beta_1 \Delta Markup_{cpt} + \beta_2 \Delta RealGDP_{ct} + \beta_3 \Delta REER_{ct} + \varepsilon_{cpt} \quad (1)$$

where c denotes the country of destination for the Estonian exports, p is the products in SITC times the NACE 2-digit sector and t is the time from 2006-2017. We lose the first year of the timespan because of taking differences. The dependent variable $RealExports_{cpt}$ denotes the real value of exports. The unit of observation is export flows from Estonia to a particular destination market in the EU for a particular product category at time t . α_{cp} denotes country*product fixed effects, which capture the usual gravity-style controls such as the physical and cultural distance between the home and destination countries. These fixed effects also capture the time-invariant, comparative-advantage factors that the home country has over the destination country, such as differences in endowments of natural resources, skills or time-invariant infrastructure. $Markup_{cpt}$ denotes the markup of the product in the destination market relative to other countries that export the same product to that destination market. The markup varies over destination country, product and time. $RealGDP_{ct}$ denotes the real GDP in the destination market and $REER_{ct}$ is the real effective exchange rate between Estonia and the destination market. These two variables vary only over the destination market and time, but not over product category. ε_{cpt} is the error term with conventional properties.

3. THE DYNAMICS OF MARKUPS: DESCRIPTIVE EVIDENCE

First we provide some descriptive evidence for how the market share and markup of Estonian exports developed in 2005-2017. For the market share, the exporting countries are ordered by value in euros and ranked. The ranks are then weighted to become normalised between 0 and 1. Figure 1 shows there to be a negative correlation between the product markup ranks and market share ranks in destination markets. The negative correlation between market share and markup is similar to that found by Vandebussche (2014), who claims that the products with the highest quality proxied by the markup rankings are often niche products with small market share. The markups of countries with comparable market share are usually similar though.

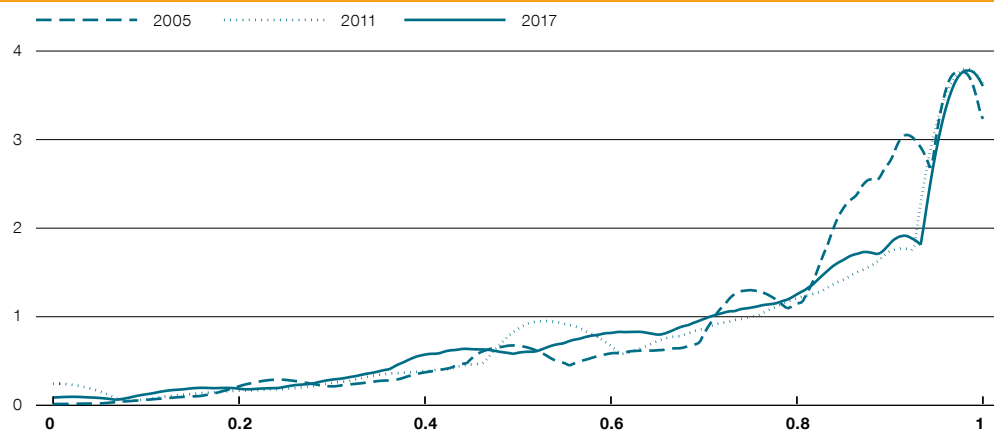
Figure 1. The relationship between market size and the markup of Estonian exports in 2005-2017



Note: The figure is calculated from average market share and markup ranks over the whole period for all the products in all the export destinations.
Sources: Eurostat COMEXT, Eurostat national accounts, EU Klems, authors' calculations

Figure 2 shows the distribution of the market share ranks of Estonian exports over all the products and destinations in 2005, 2011 and 2017. The distributions are weighted by the size of the flow of exports in euros. The distribution of market shares changes little over the timespan and the largest trade flows usually have the largest market share in the destination market. There is some evidence that the distribution was less smooth in 2005, with values concentrated in particular parts of the distribution, but the distributions have become smoother over time. One reason for that can

Figure 2. The distribution of the market share ranks of Estonian exports in 2005-2017

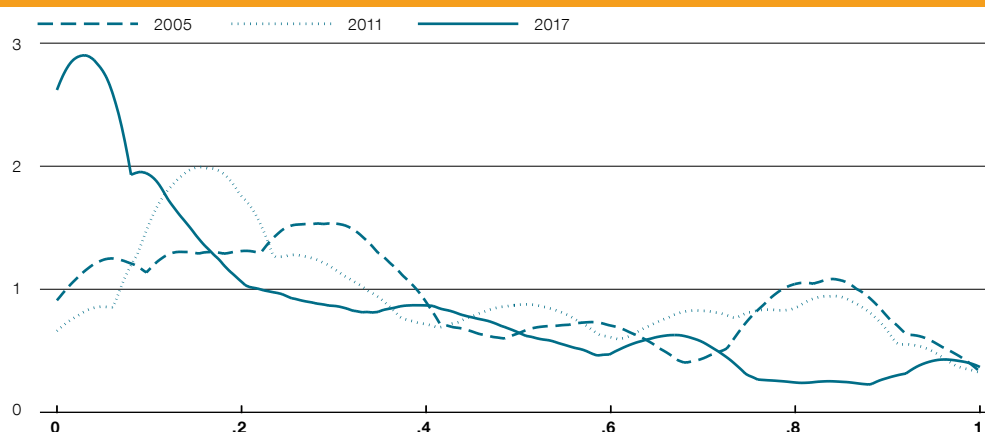


Notes: The figure is calculated from the market share ranks of all the products in all the EU export destinations. The trade flows of each country times SITC are weighted by the size of the flow of exports in euros.
Sources: Eurostat COMEXT, Eurostat national accounts, EU Klems, authors' calculations

be that the export flows have become less concentrated over time, meaning the number of export flows has increased and exports have become better diversified over destination markets and products (see also Table 1).

Figure 3 demonstrates the distribution of markup ranks in 2005, 2011 and 2017. The markup ranks have again been weighted by the size of the trade flow in euros. The large mass of the distribution has moved much more to the left in 2017 relative to 2005 and 2011, which implies that the share of low-markup products in Estonian exports increased between 2011 and 2017. A possible reason why markups declined is that unit labour costs rose over this period as wage growth exceeded the growth in productivity.

Figure 3. The distribution of the markup ranks of Estonian exports in 2005-2017



Note: The figure is calculated from the markup ranks of all the products in all the EU export destinations.
Sources: Eurostat COMEXT, Eurostat national accounts, EU Klems, authors' calculations

Another explanation for the deterioration of markup could be that the new trade flows had lower markup. As shown in Table 1, the number of products exported to the EU increased substantially after 2009. If the new products have lower markup, this could explain the adverse dynamics. To test this hypothesis, we split the distribution of markup ranks by the tenure of the flow of exports, splitting the flows into permanent exports, entries, exits and occasional exports. The results indicate that the markup of new flows entering in 2016 is lower than the markup in earlier years, and that the markup of exiting products was higher in 2016 than in 2011, but these differences are not large enough to explain the reduction in overall markup. The markup of permanent exporters also deteriorates.

4. RESULTS OF MULTIVARIATE REGRESSIONS

4.1. Market share and the markup of Estonian exports in the EU

A descriptive regression is estimated to analyse whether product fixed effects can explain the deterioration in the markup of Estonian exports. The results indicate that the markup ranks of Estonian exporters declined in 2015-2017, but the market share was maintained because producers were able to keep the unit values unchanged. The unit values stayed the same despite the increase in wage and material costs. Explanations for these dynamics could be that the scale effect allowed companies to produce larger quantities at a lower price that compensated for the rise in costs, or that Estonian exporters became less profitable.

4.2. Determinants of Estonian export performance

This section presents the results of the conditional analysis of export performance specified by equation (1). The change in real demand for exports is regressed over the change in the markup of the product, the change in demand in the destination market, and the change in the REER between

Estonia and the destination market. Table 2 presents the results. Columns 1 and 2 show the results for all the destination-product export flows. The first column presents the results without weights and the second applies weights calculated as the average real flow of exports for each destination and product.

The calculations with and without weights give different results for the export determinants. If the size of the export flow is not taken into account, markup and demand are statistically significantly related to the performance of the exports. If the weights are taken into account by giving larger flows larger weights so that the relationship is more representative of the dynamics of total exports, markup becomes statistically insignificant and changes in relative prices become statistically significant. This is an intriguing finding as markup seems to matter for smaller trade flows but not for the trade flows that account for the majority of trade. We split the trade flows into five quintiles by size to observe this regularity in more detail. It is clearly evident that markup plays a declining role for export performance as the size of the flow increases, while demand and relative prices are relevant for the largest trade flows. The economic size of the effect also deserves attention. Demand and relative prices have strong effects on the largest trade flows in the fifth quintile, where an increase of one standard deviation in demand is related to an increase of 0.16pp in exports, and an increase of one standard deviation in relative prices is related to a decline of 0.06pp in exports. Markup has a strong effect on the smallest trade flows in the first quintile, where an increase of one standard deviation in markup is related to an increase of 0.10 pp in exports.

It is also illustrative that the share of residual variance explained by destination-product fixed effects is much larger for the largest trade flows at 0.43 than it is for the smallest trade flows, for which it is 0.30. This shows that the time-invariant factors of the gravity and endowment types that destination-product fixed effects control for are more important for larger trade flows. These are established trade flows based on long-run fundamentals, for which markup, which is higher for small niche products, does not have a role.

Table 2. Determinants of Estonian export performance at the destination*product level in 2006-2017

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---------------------|---------------------|--------------------------------|---|---|---|---|---|
| | dRea- lExports | dRea- lExports, weighted | dRea- lExports, 1st quan- tile | dRea- lExports, 2nd quan- tile | dRea- lExports, 3rd quan- tile | dRea- lExports, 4th quan- tile | dRea- lExports, 5th quan- tile |
| dMarkup | 0.043*** (0.006) | 0.027 (0.017) | 0.119*** (0.023) | 0.041*** (0.016) | 0.033*** (0.012) | 0.015 (0.012) | 0.027 (0.019) |
| dRealGDP | 1.109*** (0.222) | 4.098*** (0.679) | 0.980 (2.050) | 0.632 (0.915) | 0.105 (0.630) | 1.093** (0.432) | 4.216*** (0.707) |
| dREER | -0.318 (0.217) | -1.693*** (0.520) | 1.424 (1.088) | -1.204 (0.786) | -1.167* (0.609) | -0.246 (0.488) | -1.712*** (0.538) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Dest*product FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No of obs | 107174 | 107174 | 10347 | 16293 | 20715 | 26141 | 33678 |
| Group=Dest*products | 21831 | 21831 | 4367 | 4366 | 4366 | 4366 | 4366 |
| Min obs per group | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean obs per group | 4.909 | 4.909 | 2.369 | 3.732 | 4.745 | 5.987 | 7.714 |
| Max obs per group | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Variance from group | 0.356 | 0.535 | 0.305 | 0.307 | 0.339 | 0.357 | 0.430 |

Note: Standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01.

Sources: Eurostat COMEXT, Eurostat national accounts and prices, ECB statistics warehouse on exchange rates, EU Klems, authors' calculations

4.3. The role of global value chains in export performance

The link between demand in the destination country, relative prices and export performance has weakened in recent decades. One reason has been that production has become more integrated internationally through global value chains (GVCs). Export performance depends more on the prices of imports as the inputs for production are not all produced domestically but are also imported. In addition, the end-user of the products exported is often not in the destination country but is in some other country with which the destination country trades. Estonia has become very tightly integrated into global value chains and participation in GVCs is high among OECD countries in general (De Backer and Miroudot (2013)). We control for how GVC participation affects the performance of exports by dividing the exported products into end-use categories of raw materials, intermediate goods, consumer goods and capital goods, and we estimate equation (1) for these four end-use categories of products. Table 3 shows which factors explain the export performance by end-use categories. The results indicate that exports of raw materials are not related to any of the three factors of markup, demand or relative prices. Exports of intermediate goods are not dependent on markup or demand either, but relative prices are important for them. As the exports of intermediates are often produced in Estonia as outsourcing for foreign companies, it is not surprising that price competitiveness is very important for these exports. The export performance of traditional consumer goods is related to demand and relative prices, but surprisingly not to markup, while the export performance of capital goods depends on demand and weakly on markup as well.

Table 3. Determinants of the performance of Estonian exports at the destination*product level by end-use categories, 2006-2017

| | (1) | (2) | (3) | (4) | (5) |
|---------------------|-------------------------|--|--|--|---------------------------------------|
| | dReal-Exports, weighted | Raw materials: dReal-Exports, weighted | Intermediate goods: dRealExports, weighted | Consumer goods: dRealExports, weighted | Capital goods: dRealExports, weighted |
| dMarkup | 0.027 (0.017) | -0.002 (0.036) | 0.000 (0.026) | 0.009 (0.019) | 0.072* (0.040) |
| dRealGDP | 4.098*** (0.679) | 1.134 (0.906) | 1.617 (1.010) | 5.463*** (1.069) | 4.556*** (1.325) |
| dREER | -1.693*** (0.520) | -0.747 (1.168) | -2.231*** (0.777) | -1.346* (0.805) | -0.191 (1.256) |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Dest*product FE | Yes | Yes | Yes | Yes | Yes |
| No of obs | 107174 | 6546 | 24027 | 47019 | 26488 |
| Group=Dest*products | 21831 | 1590 | 5709 | 8814 | 5340 |
| Min obs per group | 1 | 1 | 1 | 1 | 1 |
| Mean obs per group | 4.909 | 4.117 | 4.209 | 5.335 | 4.960 |
| Max obs per group | 12 | 12 | 12 | 12 | 12 |
| Variance from group | 0.535 | 0.555 | 0.563 | 0.555 | 0.547 |

Note: Standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01.

Sources: Eurostat COMEXT, Eurostat national accounts and prices, ECB statistics warehouse on exchange rates, EU Klems, World Bank HS Standard Product Group definitions, authors' calculations

5. SUMMARY

This section takes a fresh look at the factors behind the performance of Estonian exports to EU countries in 2005-2017. The analysis is performed at the product level, which lets us distinguish between trade flows to 27 EU destination markets for close to 3000 products. Our examination is based on the methodology of di Comite et al. (2014). The analysis points to three main results. **(1)** The markup ranks of Estonian exports declined in 2011-2017, whereas the market share of Estonian exports in foreign markets has not declined in recent years. This could indicate a decrease in the relative quality of exports. However, other factors in Estonia such as an increase in the labour share might have played a more prominent role in the decrease in markups. Producers have been able

to keep prices unchanged despite rises in production costs. **(2)** The growth of smaller flows of exports depends on the markup of the product, while demand and price competitiveness are the key drivers for larger trade flows. The analysis confirms the regularity that the products with the highest markup are often niche products with small market share. **(3)** Different determinants of exports matter for different end-use product categories. Various demand proxies are related to the export performance of intermediate, consumer and capital goods, while real effective exchange rates are related to the export performance of intermediate and consumer goods. Markup is only related to the export performance of capital goods. None of the determinants covered plays a significant role for exports of raw materials.

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