ESTONIAN COMPETITIVENESS REPORT

2017

CONTENTS

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The Estonian Competitiveness Report has been published once a year by Eesti Pank since 2013. Competitiveness can be analysed in various ways and so each report considers multiple groups of competitiveness indicators.

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SUMMARY

The Competitiveness Report, which was reformatted in 2016, assesses the international competitiveness of the Estonian economy and the developments of methodologies for analysis. It is hard to find single clear answers when analysing competitiveness, as competitiveness cannot be measured directly. The method that is most widely used globally, that of the World Economic Forum (WEF), has its strong points, but an approach that is built on only one source cannot be considered comprehensive.

The problem is made worse by contradictions between the estimates. The global WEF index puts Estonia in 30th place in the world for competitiveness, and first among central and eastern European countries, but opinions can equally be found that the competitiveness of the Estonian economy has declined in recent years and almost all of the gains from the internal devaluation of 2009 during the Great Recession have been lost. For this reason, this report aims to clarify what the actual situation is.

Competitiveness analysis has been through several stages over time, from a purely exchange-rate based approach to estimation of the long-term productivity growth. To this can be added questions of market efficiency, protectionism and in recent years sanctions and counter-sanctions between countries, which together make it harder to assess international competitiveness.

On top of all this come changes to the earlier understanding wrought by globalisation and European integration. It has become clear from this that prices alone, indicating only price competitiveness have become less and less informative for explaining the trade flows within Europe since the end of the 1990s. For this reason new approaches have been added, such as the division of competitiveness into price and non-price competitiveness. Non-price competitiveness is particularly a focus on quality indicators which undermine the foundations of traditional understandings of competitiveness based only on cheap production.

Changes in conditions require alternative approaches to international competitiveness. The main changes are a reduction in the importance of exchange rates and a significant increase in the importance of non-price factors and productivity in the economy. The saying that “for competitiveness, productivity is not everything, but in the long run it is almost everything” is oft-repeated today. What this means is that monetary and exchange-rate policies can bring temporary success to an economy, but not long-term success. In other words the international competitiveness of an economy in the long term depends structurally more on supply-side factors, and less on short-term demand-side ones. Changing the complexity of exported goods and services and their quality is a long-term process. This means the internal devaluation of 2009 only helped price competitiveness increase in the short term, and no long-term consequences were anticipated from it.

As non-price competitiveness is quite a new concept and is still in quite an experimental stage, this competitiveness report is also a work in progress in developmental terms. The main change from the earlier editions of the report is that the concepts of price and non-price competitiveness have been introduced and developed further for the Estonian case. As non-price competitiveness is even harder to analyse than price competitiveness, the main focus of the report is on separating price-based factors out from the other, non-price, factors that affect competitiveness.

It is probable that the structure of the report will change again in the future as it is intended both to analyse international competitiveness and to develop the methodology.

The report firstly considers the traditional indicators of competitiveness, which are estimates of conditions for exports, terms of trade and the dynamics of the currency exchange rates of foreign trading partners. This is

followed by an analysis of the effective exchange rate as a synthetic indicator that relates to the turnover and balance of foreign trade. The first part of the report assesses traditional price-based competitiveness and describes the changes of the past year, laying the groundwork for the subsequent parts.

The second part considers price and non-price competitiveness using the logic described earlier. The dynamics of price and non-price competitiveness do not necessarily move in the same direction, as they partly depend on different factors. It is also important to remember the circumstances of Estonia as a converging economy, where wage growth is faster than in Western Europe, which can be compensated for in maintaining competitiveness by increased quality of the goods and services exported.

The third part of the report links competitiveness to productivity, presenting the OECD's view of the modest growth of productivity in recent years through analysis of the figures for OECD member countries and associated countries, and the IMF estimate of the development of productivity in Estonia since joining the European Union.

The main findings of the report confirm that Estonia's international competitiveness has declined a little since 2013, though noting that this affects price competitiveness and not overall competitiveness, and the decline has not been broadly based. Even so, goods exports were down a cumulative 8% at current prices in 2013–2015 before growth returned in the second half of 2016. These findings are next presented in more detail.

The deterioration in terms of trade that had lasted for some years ended in the second half of 2016, in the estimate of companies and according to the dynamics of export and import prices. This is confirmed by the return to growth of exports of goods in the second half of the year. There have been no major changes in the dynamics of exchange rates in Estonia since the fall in the Russian rouble and the appreciation of the US dollar in 2014, and the exchange rate environment has mainly been neutral. In line with this, the trade deficit has remained broadly the same.

If the balance of trade is divided into price-sensitive and non-price components, two contradictory trends are apparent in recent years, with the trade deficit increasing for the more price-sensitive part and simultaneously decreasing for the non-price part, with the two trends so far balancing each other out. This indicates that the international competitiveness of exporting companies is becoming more polarised as less productive companies face difficulties in price competitiveness while the more productive exporters succeed. This is also shown by the relative stability of the trade deficit.

In this economic context, domestic economic factors become more important than external conditions, at least temporarily and if it is assumed there are no new external shocks. Analysis of the effective exchange rate confirms that the rapid rise in labour costs will have a restraining effect on exports. This is reflected in the continuing slide in volumes of Estonian exports and the consequent loss of market share in 2013–2015 in the European Union and the rest of the world. On top of its negative impact on exports, the rise in labour costs has mainly come at the expense of profits and has exceeded the gains in productivity.

This all points to stagnation in productivity growth, which is a critical measure for converging countries as the risk arises of being left behind at a lower income level for a long time, in what is called the middle income trap. In the recent past only a few developing countries, such as South Korea, have succeeded in advancing from the middle income level to the top level. This means that weak productivity growth is one of the biggest risks to the future development of the economy.

The final section of this review looks at the relation between productivity and competitiveness over the longer

term. As it is quite difficult to explain the low growth levels of productivity across the developed world, the third part uses the OECD results to describe the reasons for global low productivity growth, covering both cyclical and structural reasons. An example of a cyclical reason is the slow and incomplete recovery from the Great Recession and the lack of investment, while the OECD emphasises the fall in economic dynamism as a structural reason, which is expressed in a rise in the average age of companies and a sharp increase in the difference in rates of productivity growth between top companies and those in the middle.

Like other countries in the European Union and the OECD, Estonia has not seen productivity growth recover fully since the Great Recession and this has affected international competitiveness. Using the OECD methodology to analyse the reasons productivity is low reveals that the same causes, with a few specific local features, are responsible for low productivity growth in the Estonian economy as elsewhere.

The specific Estonian features are covered in more depth by the IMF in Selected Issues 2016. The IMF argues that productivity has grown faster in Estonia in traditional branches of the economy, but start-ups have not played a significant part in the broader scheme, and the high-technology segment of the economy has not been the driver of productivity growth. Generalising, it can be said that the relatively low level of productivity growth in the Estonian economy is the net result of the faster growth in traditional branches of the economy and high-technology services, and the decline in productivity in general services, where the large share of services in GDP has amplified the downwards effect.

The second half of 2016 and the start of 2017 confirmed that although price competitiveness has declined in some sectors, no major deterioration in competitiveness is apparent. This is further shown by the recovery of growth in exports in line with the general improvement in the euro area economy and in the increase in market share in 2016. Risks to international competitiveness are rapid wage growth in the short term and slow productivity growth in the long term.

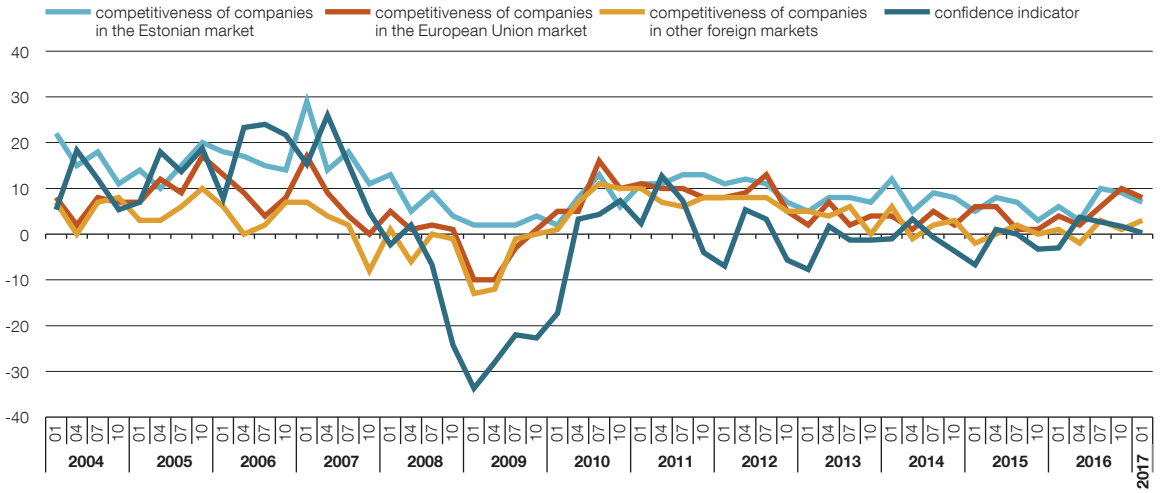
PRICE COMPETITIVENESS

Following the format introduced in 2016 for this report, the first part looks at price competitiveness. This is done in two sections, with section I.A. analysing nominal indicators, covering the exchange rate dynamics and terms of trade, and the effective exchange rates for the main trading partners. Section I.B. analyses the connection between the effective exchange rate and the indicators for foreign trade.

The state of the economy and effective exchange rates

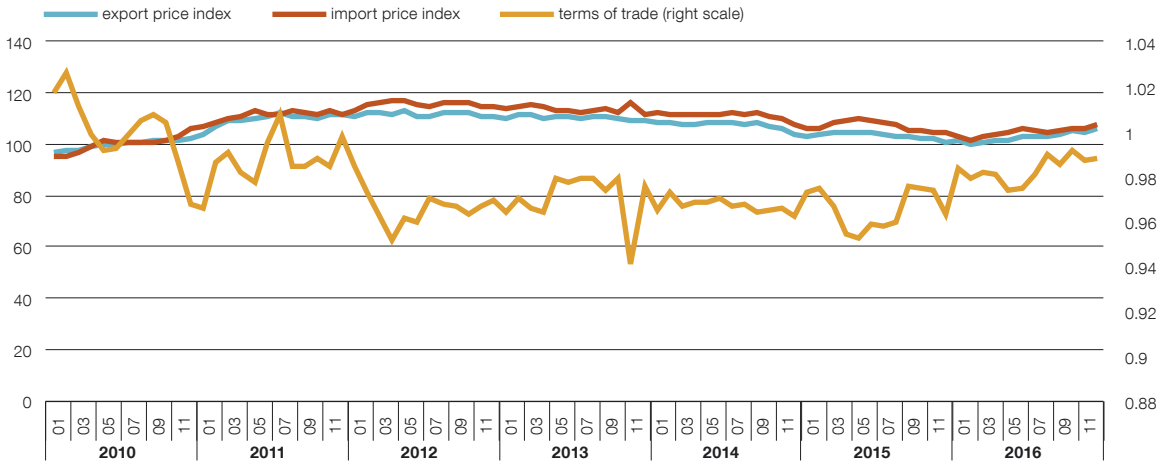
There is a substantive reason for starting from nominal indicators as well as the formal consideration, as the relatively long period of low inflation in 2014–2016 has increased the relevance of nominal indicators. Starting with raw data, we can first consider the sentiment companies reveal in surveys about competitiveness and terms of trade.

Figure 1. Estimates of competitiveness of industrial companies in the past three months



Source: The Estonian Institute of Economic Research

Figure 2. Terms of trade



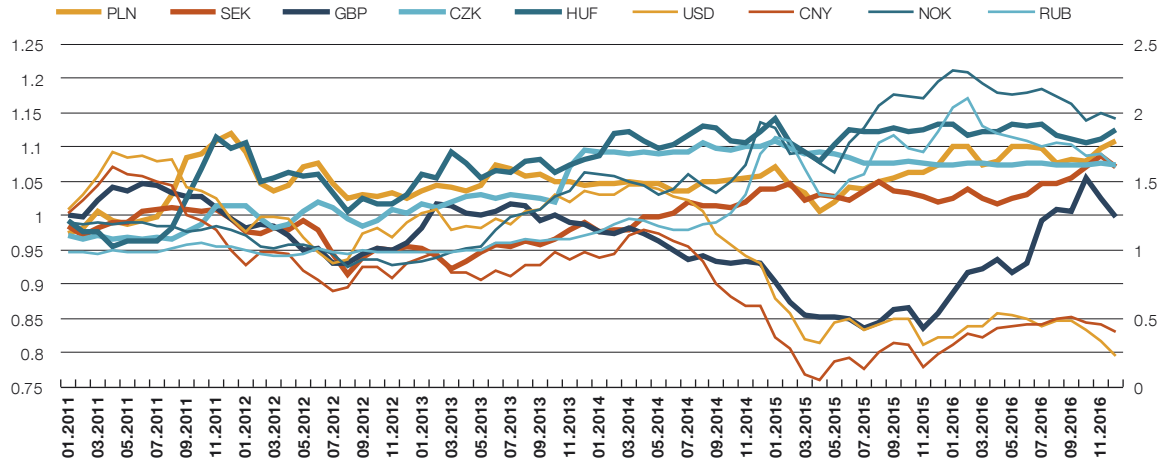
Source: Statistics Estonia

Both figures indicate some improvement during 2016. The improvement in the terms of trade, which is technically expressed through the ratio of export and import prices, is interpreted here as the ability to get more imports for each unit of exports. The default assumption here is the status of the exporter as a price taker.

In a longer retrospective view, the estimates by companies of their competitiveness, which are by their nature backwards looking, are well aligned with the business cycle, and so the optimism in the second half of 2016 may be a short-term fluctuation stemming from volatility in export orders, which are by nature forward looking. Given the improvement in 2016 in the terms of trade, which had been poor for a long time, the data point more towards an improvement in the economic climate. The relatively good outlook for growth in the European Union and in the euro area, with Finland exiting its long stagnation, may give some justification for the improvement in sentiment.

Next we should consider exchange rates.

Figure 3. The dynamics of the exchange rates of the main trading partners



*right scale
Source: European Central Bank

With current trading partners, 41% of Estonia's foreign trade, covering 90% of trading partners, is subject to floating exchange rates. The long-term trend since 2014 has been a substantial depreciation of the Russian rouble and a simultaneous appreciation of the US dollar, the British pound and the Chinese yuan. The currencies of other countries have weakened slightly against the euro since 2014, the Swedish krona doing so by less because of the strength of the economy, and the Norwegian krona by more because of the fall in commodities prices. An exception is the British pound sterling, which dropped sharply and has since moved erratically, most probably in consequence of the Brexit vote. Without Russia, the combined effect of the appreciations and depreciations of the currencies of foreign trade partners has been relatively balanced for Estonia (see Figure 4). The United Kingdom has a market share in Estonian trade of around 3%, so the movements of the British pound do not have a significant impact.

The weakness of global trade does not especially affect Estonia as the trading partners with floating exchange rates are mainly European countries, with non-European countries taking only a 5.5% share of trade, or 13% in an extreme case where Russia is taken as a potential source of instability. This makes events in Europe of primary importance, while the weakness of global trade, which recorded preliminary growth of only 1.7% in 2016[1], affects Estonia only indirectly. Data from the WTO put growth in global trade at its lowest level since the Great Recession.

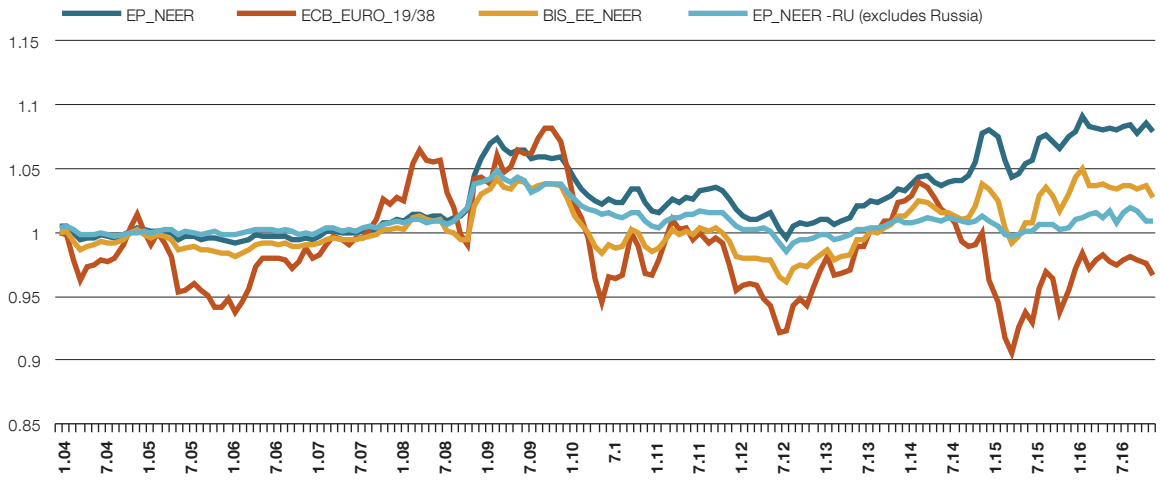
1 WTO data from September 2016.

Next we can use the nominal effective exchange rate, which is a weighted synthetic index, to describe the changes in the exchange rate environment in recent years.

Since 2016 the Competitiveness Report has used the nominal effective exchange rate (NEER) in its Estonia-centred form and in the versions used by the European Central Bank and the Bank for International Settlements. The methodological differences between the three ways of calculating lie in the way weights are assigned for countries and in the way internal and external euro area trade is treated. Alongside the technical differences are major differences in the structure of trading partners, which are quite large between the euro area as a whole and Estonia as a peripheral country in it.

The BIS methodology (BIS_EE_NEER) essentially uses the same weighting system as the European Central Bank but covers both euro area internal trade and external trade, while the European Central Bank methodology (EKP_EURO_19/38) uses only external trade. The weighting system for the ECB/BIS covers only exports and imports of manufacturing and export weights are counted double[2]. The notable feature of the nominal effective exchange rate of Eesti Pank (EP_NEER) is that it uses a moving 12-month window in calculating the weights, while the ECB and the BIS use three-year average weights, with the most recent ECB data using weights from 2010–2012 and the BIS using them from 2011–2013.

Figure 4. Estonian nominal effective exchange rates



Sources: calculations by the European Central Bank, the Bank for International Settlements and Eesti Pank

Figure 4 shows that the differences between the nominal effective exchange rates found using the methodologies of Eesti Pank and the European Central Bank are quite large, ranging between 10% and 15%. Figure 4 shows the difference in the Eesti Pank and BIS effective exchange rates comes from the differences in the weighting systems, but the difference between the ECB and BIS versions comes from asymmetry in the foreign trade structures for the euro area average and peripheral countries.

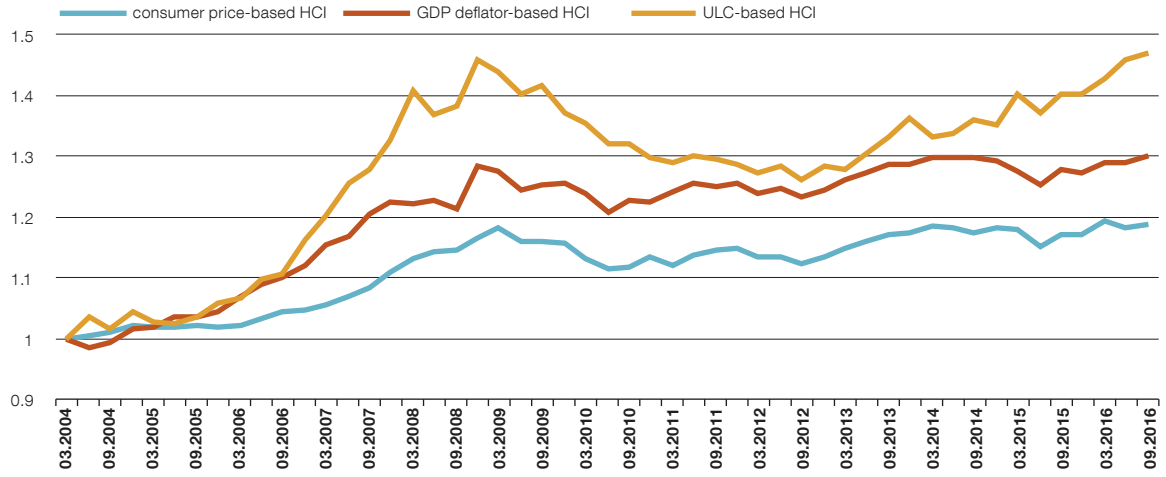
The fourth line on the figure is the Eesti Pank nominal effective exchange rate excluding Russia. This rate also confirms that the movement of the other exchange rates has been in balance in recent years, meaning the appreciation has come mainly, though not exclusively, from Russia. This again raises the question of the weight of Russia in macroeconomic analysis, which is often considered to be overestimated. Analysis of foreign trade does not give a definitive answer, as different models give different responses.

2 It does not automatically follow from the BIS methodology (BIS 2006) that the export weights are doubled in the calculation of effective exchange rates. It is permitted by the simplifying assumption that countries in the euro area compete among themselves in domestic markets and then in a second round in external markets. This assumes that no third countries export or produce industrial products and that all the supply of industrial products comes only from the euro area and countries competing with the euro area.

For the next step relative prices are added into the nominal effective exchange rates. This is done by adjusting the nominal effective exchange rate with various price indicators. The following figures are based on the harmonised competitiveness indicator (HCI) produced by the European Central Bank.

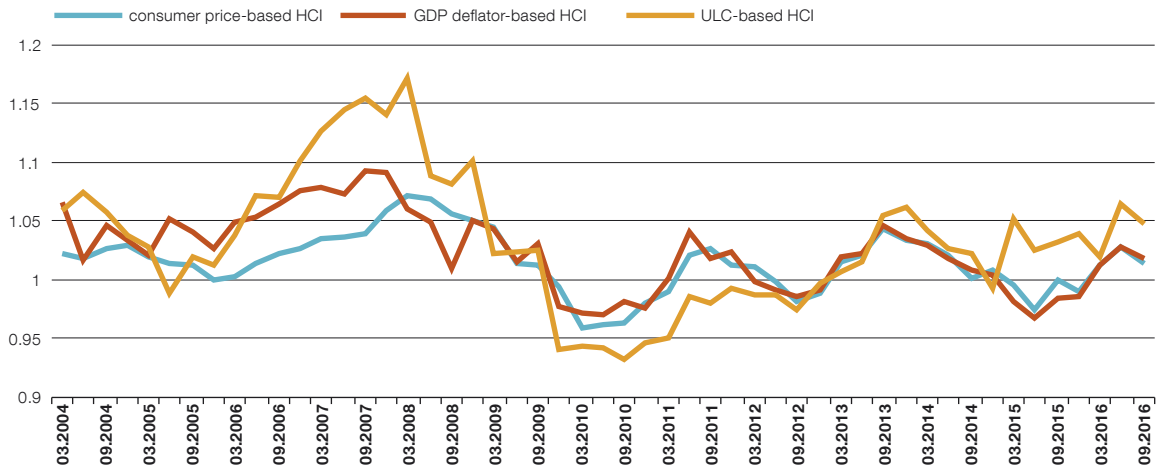
The harmonised competitiveness indicators published by the ECB for euro area countries are by their nature nominal effective exchange rates adjusted for relative prices, and are calculated separately for each member state. This means that the nominal effective exchange rate calculated for the whole euro area by the ECB and the harmonised competitiveness index are not directly comparable, since the nominal effective exchange rate for the euro is calculated only from extra-EU trade while the real effective exchange rate takes in both intra-EU and extra-EU trade.

Figure 5. Harmonised competitiveness core index



Source: European Central Bank

Figure 6. Harmonised competitiveness chain index in yearly comparison



Source: European Central Bank

In technical terms looking at consumer prices, the harmonised competitiveness index is essentially equivalent, but not identical, to the Eesti Pank real effective exchange rate (REER), with the difference lying in the ECB's use of the average for the three-year period for weighting while Eesti Pank uses a 12-month moving window weighting scheme.

The harmonised competitiveness indicators, to use the ECB term, or the real effective exchange rates, to use the European Commission term, did not experience any major change in 2016. Fluctuations can be explained by the movements in exchange rates, with the central change coming in the REER calculated based on unit labour costs (ULC), which has now passed its level of the pre-crisis boom times. This is reflected in the continuing rapid growth in wages, as the REER based on ULC is calculated from nominal unit labour costs. It also reflects the acceleration in the growth in real unit labour costs that means wages are growing at the expense of profits.

The effect of nominal and real unit labour costs on Estonian competitiveness is also covered by the IMF (2016). In essence nominal unit labour costs are not considered a particularly good indicator of competitiveness when compared with real unit labour costs, as they also include the convergence of the income level, in this case wages, and the interaction of the causes and consequences of higher production costs and competitiveness may be unclear[3]. Even if changes in competitiveness are shown better by real unit labour costs however, the rise in nominal unit labour costs is still a warning of possible problems. The relation between real exchange rates and exports is discussed at more length in the next section of this report.

Summary of the analysis of relative prices and exchange rate indicators.

- Primary indicators, such as sentiment about competitiveness and terms of trade show the economic climate in foreign markets to have improved in the second half of 2016.
- There were no major changes in 2016 in the exchange rates or in the nominal effective exchange rate. The main factor in the dynamics of the real effective exchange rates is the continuing rise in the real rate based on unit labour costs.
- No additional pressure on price competitiveness came from external factors in 2016, indicating an increase in the importance of domestic factors.

The relationship between the effective exchange rates and the indicators for foreign trade

The variety of different effective exchange rates described above raises the question of how they relate to the turnover and balance of foreign trade. This was tested using the relationships between the different effective exchange rates and various accounts for import turnover and the balance of trade. The method used is fundamentally similar to Hendry's approach, giving a quick test of possible connections rather than examining closely one specific hypothesis.

The indicators used are the nominal effective exchange rate (NEER), three different real effective exchange rates based on consumer prices, the GDP deflator and unit labour costs, and the export, import and balance of trade accounts using data from Statistics Estonia, Eesti Pank and the United Nations' Comtrade database[4]. The control variable used is external demand with ECB and Eesti Pank weights[5] and the Statistics Estonia and ECB versions of domestic demand[6]. As the figures in the Comtrade database arrive after about one year, the longest period of analysis possible is 2002–2015, with the start year arising because Comtrade did not have any data for Estonia before then.

Next, all the effective exchange rates were tested against all the indicators for foreign trade, with foreign

3 A rise in production costs does not automatically mean a decline in competitiveness. Higher nominal unit labour costs give no information about any rise in the quality of output. If there is a notable increase in quality, productivity and exports, a higher wage level may relate to higher competitiveness. If wage growth comes only from wage pressures in the labour market, it implies a decrease in competitiveness.

4 The differences are that the Comtrade figures are calculated by summing up the groups of goods, basing this on general trade and expressing it in US dollars, while the other indicators are based on core trade and expressed in euros. The main difference between Eesti Pank and Statistics Estonia is that Statistics Estonia uses CIF prices, which include the cost of transport and insurance up to the Estonian border, while Eesti Pank uses FOB prices that class the other costs under services; the difference with Eesti Pank export figures comes from goods under merchanting that do not cross the Estonian border.

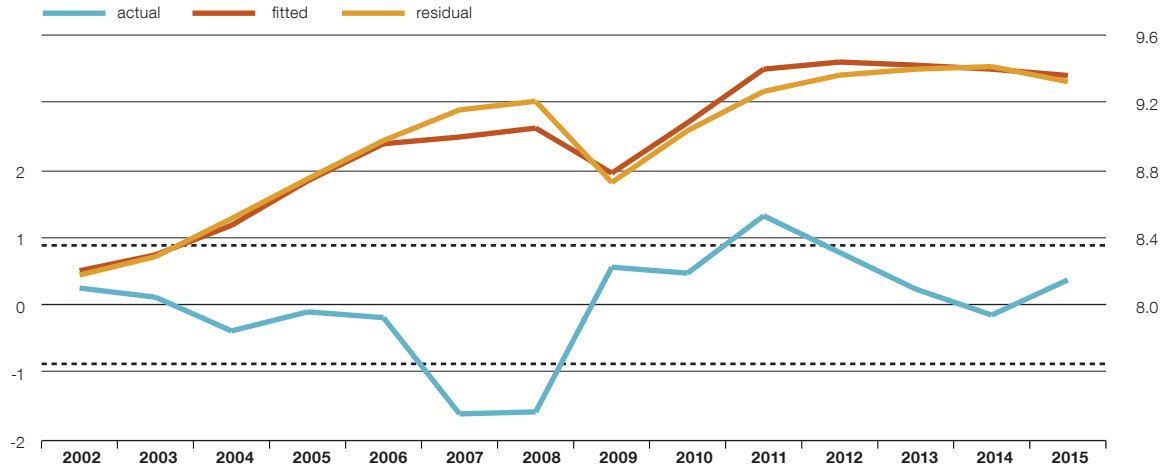
5 The difference is in the share for Russia, which is larger in the ECB weightings.

6 The ECB version treats gross capital formation without valuables and assets.

demand used as the control variable for exports, domestic demand for imports, and both domestic and foreign demand for the balance of trade. The result was affected by the use of only those groups of goods in the Comtrade data that include both imports and exports, and the exclusion of the group of Mineral Products, which is mainly fuels and energy.

The result for the turnover of foreign trade is that for exports, a connection was revealed with the real effective exchange rate based on unit labour costs. No reliable relationship was found for imports, with the best, but still statistically insignificant, result coming for the REER based on the GDP deflator.

Figure 7. The dependence of export turnover on foreign demand and the ULC-based REER (log scale)

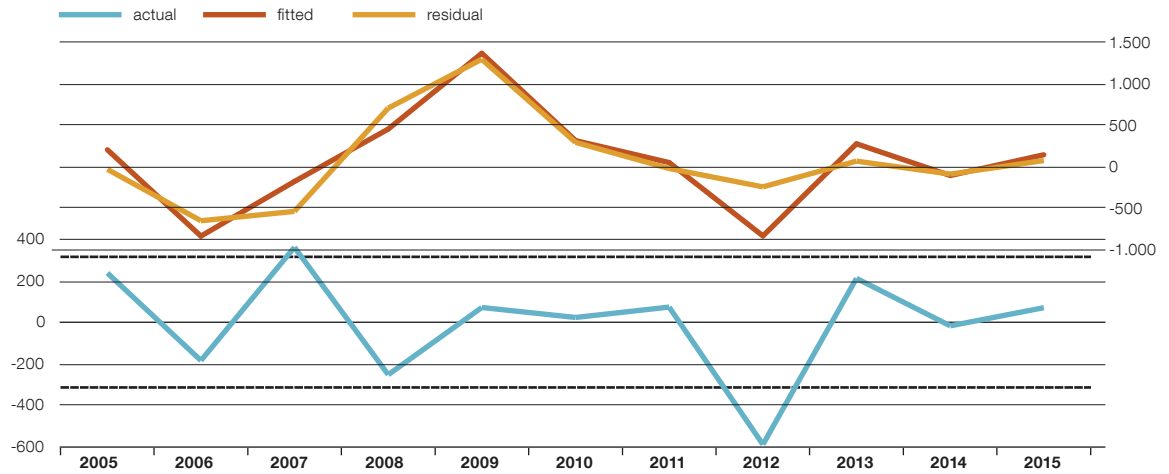


The test model for Figure 7:

LOG(X_ESA) = 2.387*LOG(XD_ECB) - 0.483*LOG(HCI_ULC) + 9.238 (1)

The dependent variable in this is exports according to Statistics Estonia, the control variable is foreign demand with the ECB weighting, and the real rate is the ULC-based REER. The other versions of the effective exchange rates did not give any satisfactory results.

Figure 8. The dependence of the balance of trade on domestic and foreign demand and the NEER (in differences)



The base equation for Figure 8 is:

D(TB_CMT) = -0.7102*D(DD_ESA) + 5029.6*D(XD_ECB) - 18883.1*D(NEER(-1)) + 620.9 (2)

where the dependent variable is the trade balance from Comtrade data, the control variables are the Statistics Estonia data for domestic demand and the ECB data for foreign demand, and the real rate is the nominal effective exchange rate with a one-year lag. The relation in these is statistically more significant than that for exports from equation (1), which may be explained by the quite high import content of exports and the exclusion of fuel and energy from the Comtrade-based trade balance database.

Summary of the results of the tests presented in this section:

- The dependence of export turnover on the effective exchange rate based on unit labour costs can be proved. In addition, a much weaker connection can be detected between imports and the real effective exchange rate based on the GDP deflator. No connections were found for other combinations. The real rate based on consumer prices exhibited the least explanatory ability even though it is a very widely used indicator.
- The price competitiveness expressed in the dynamics of the balance of trade depends to a statistically significant extent on the nominal effective exchange rate. It should be noted here that some 40% of Estonia's foreign trade is with trading partners with floating exchange rates.

PRICE AND NON-PRICE COMPETITIVENESS

The macro level

The initial impetus for treating price and non-price competitiveness separately arose because from the end of the 1990s it became harder and harder to explain trade flows using only relative prices, especially for trade within Europe. The basis for defining non-price competitiveness is that the price of a good is not the only criterion for exporting and importing it, and sometimes not even the main criterion. As research into non-price competitiveness is only in its early stages, there is no generally accepted approach to it yet. The method used here is a development of the article "Competitiveness and External Imbalances within the Euro Area" (ECB 2012).

Starting from the method described in the Competitiveness Report 2016, the time coverage has been expanded to 2002–2015, and the analysis has also been broadened. The central idea is to restructure the balance of trade to separate out the price-sensitive component, the dynamics of which are then classed as changes in price competitiveness, while the remainder is then non-price competitiveness. The separation can allow for better analysis of the relation between the price-sensitive part of the trade balance and the effective exchange rates and other relative prices.

Non-price competitiveness is defined in the 2016 report by comparing the unit value of exports and imports, with the export and import value divided by the volume of each group of goods. If the unit value of exports, UVX, exceeds the unit value of imports, UVM, then there is non-price competitiveness, meaning the exported goods are of better quality than the imports of the same group of goods. In the opposite case, where the unit value of exports is lower than that of imports, the success of the exports depends on the competitive prices of that group of goods. Price competitiveness is illustrated in the following table in quadrants II (UVX<UVM , TB>0) and III (UVX>UVM, TB<0); where there is strong price competitiveness there is a surplus in that group and when price competitiveness is weak there is a deficit. Quadrant IV is worthy of note as the structural deficit is taken to mean goods that are not competitive on price or for their quality.

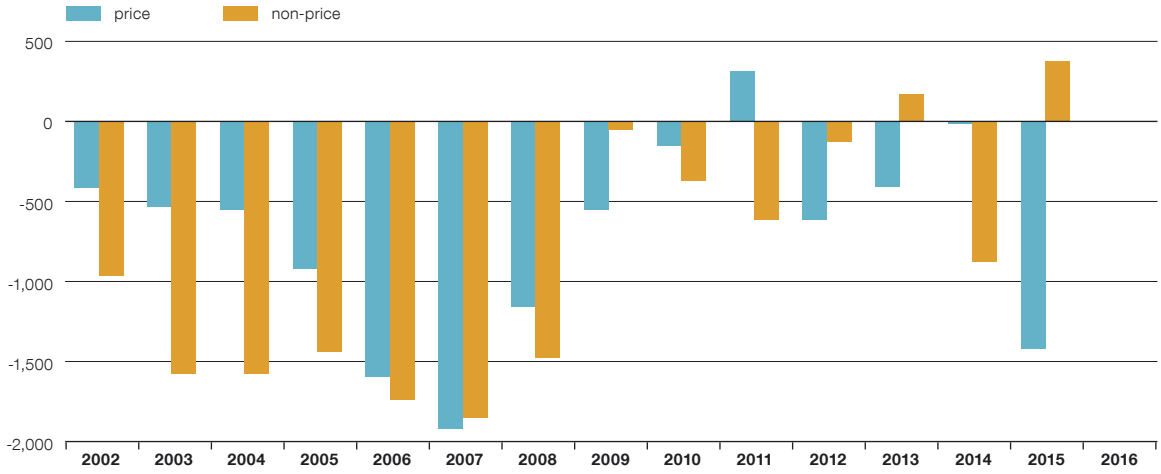
	Higher relative export value (UVX>UVM)	Lower relative export value (UVX<UVM)
TB>0	Strong non-price competitiveness Non-price+	Strong price competitiveness Price+
TB<0	Lack of price competitiveness Price-	Structural trade deficit Non-price-

In this way the balance of trade can be divided into two as price and non-price components, or into four by taking the surplus or deficit of each group of goods.

The whole algorithm works with balances and it cannot be used for the ratio of export turnover to import turnover. In technical terms the treatment is based on the Comtrade database, where the raw data for the four-digit codes of the Harmonised System (HS04[7]) are added up to two or four subtotals, with the balance of trade divided into price and non-price segments accordingly.

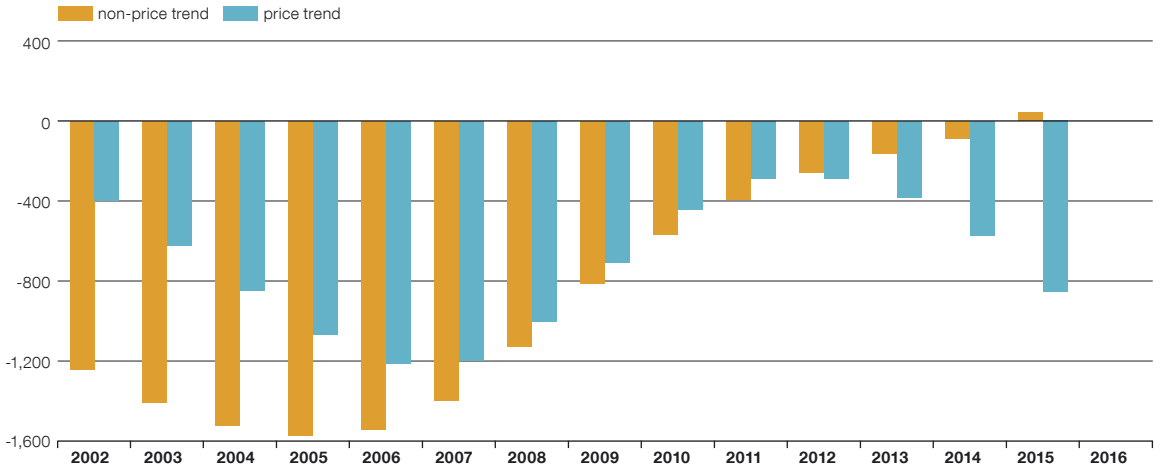
7 It should be noted here that the four-figure codes for goods in international trade statistics are the same all round the world, meaning the four-digit harmonised system (HS) codes used in the UN's Comtrade are the same as those for the KN combined system used by Statistics Estonia.

Figure 9a. The decomposed balance of trade 2002–2015 (USD million)



Source: Comtrade

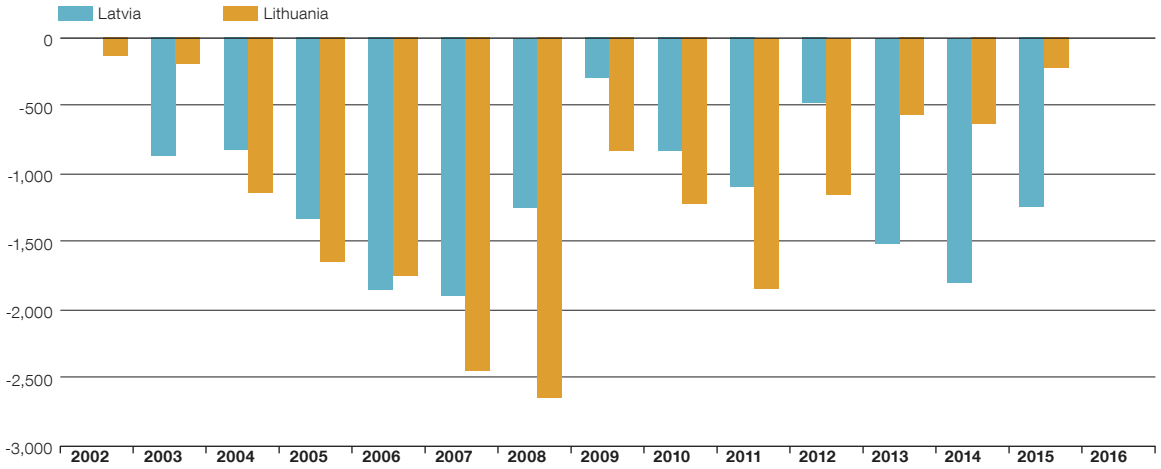
Figure 9b. The decomposed balance of trade trends 2002–2015 using a Hodrick-Prescott filter (USD million)



Source: Comtrade

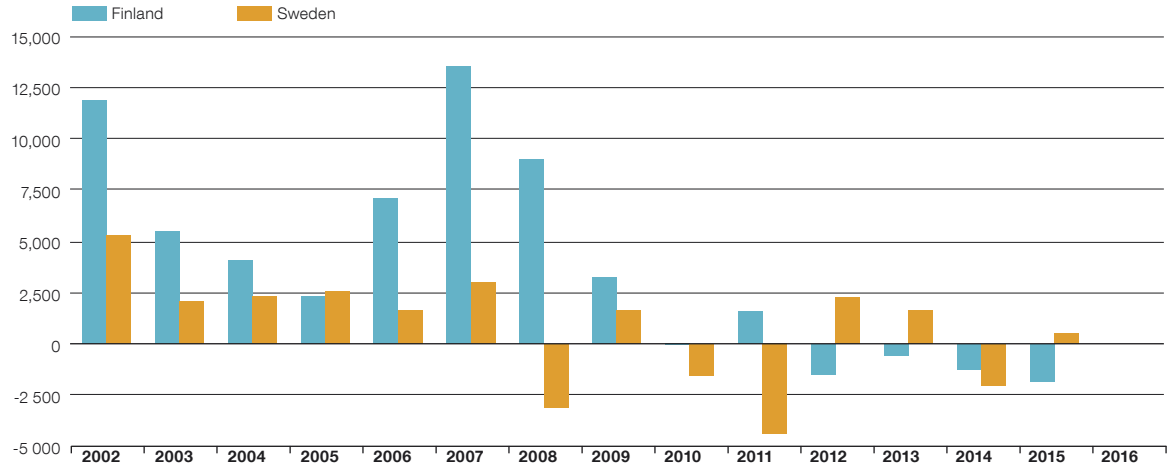
Figure 9 describes the dynamics of the price and non-price parts of the balance of trade in 2002–2015. Above all it illustrates the changes in price and non-price competitiveness over time if competitiveness is defined as the change in the trade balance without services. By this interpretation there has been simultaneously an improvement in non-price competitiveness and a decline in price competitiveness in recent years. Equally, Figure 9 indicates a significant cyclical component that is in line with the growth in the foreign deficit in the boom times and the sharp correction after 2009. There may be various causes of the cyclicality of the balance of trade, or more broadly the current account, as in Afonso and Silva (2016), who use Euribor, terms of trade, employment and unemployment, and financial integration and crisis as their factors. Figure 10 shows for comparison the price-sensitive part of the Estonian balance of trade with its main trading partners.

Figure 10a. The dynamics of the price-sensitive components of the balance of trade of trading partners (USD million)



Source: Comtrade

Figure 10b. The dynamics of the price-sensitive components of the balance of trade of trading partners (USD million)



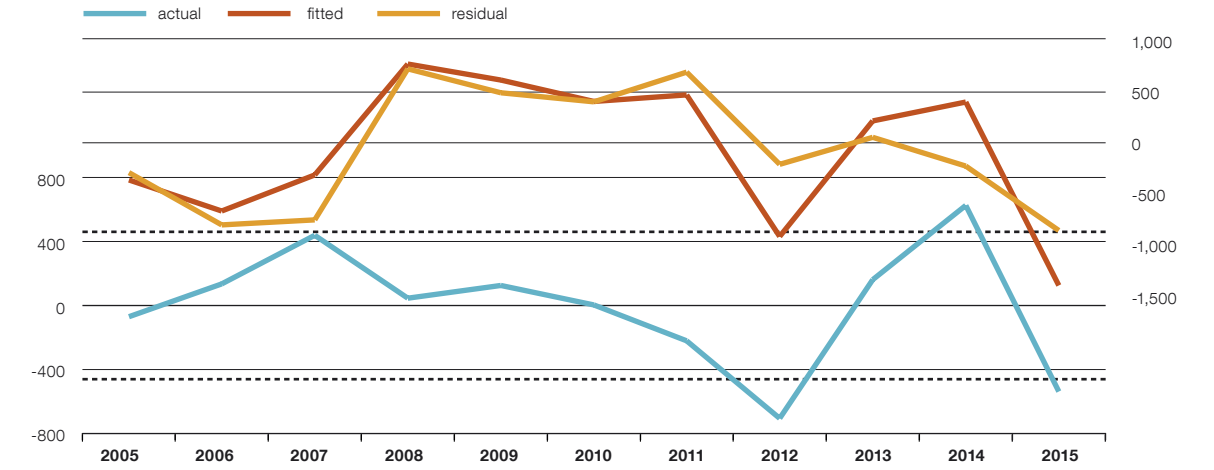
Source: Comtrade

The next step was to test the hypothesised connection of the price-sensitive part of the Estonian balance of trade to effective exchange rates, starting from the initial test results, which find the non-price component to have practically no connections, which is as expected. Using the same methodology and clarifying examples as in the first part of the report, it appears that like for the total balance of trade the strongest link was with the nominal effective exchange rate with a lag of one year:

$$D(PRICE) = -0.891*D(DD\_EP) + 12392.3D(XD\_EP) - 28486.3D(NEER(-1)) + 400.77 \quad (3)$$

where the price-sensitive part of the balance of trade is set to depend on the nominal effective exchange rate with a lag of one year, and the control variables are the Eesti Pank versions of both domestic and foreign demand.

Figure 11. The dependence of the price component on domestic and foreign demand and the NEER (in differences)



The results so far allow an estimate of the non-price component, or non-price competitiveness, to be derived. The relation of the decomposed balance of trade can be used for this:

$$NON\_PRICE = TB - PRICE \quad (4)$$

where PRICE and NON_PRICE are the price-sensitive and non-price components of the balance of trade[8]. As the equations for TB and PRICE already exist as (2) and (3), the non-price component can be derived.

The time series for the price and non-price components are volatile, but the largest moves are easy to explain, as the fall in the non-price component in 2014 can be explained by the large-scale imports of transport vehicles, and the large fall in the price component in 2015 came from the transfer of part of wood products from the price competitiveness group to the non-price group[9]. These are either one-off factors or structural changes. Overall, the more detailed treatment of the groups of goods in the next part of this report gives sufficient grounds for considering foreign trade in 2014 to have been anomalous.

The base method of the report excludes mineral products from its treatment of price and non-price competitiveness, so avoiding the direct impact of fuel and energy on the balance of trade and reducing the volatility of the whole database.

This report covers exports and imports of goods, which is traditionally the negative part of the external balance for Estonia. Historically the deficit in goods has been balanced by the surplus in services since the Great Recession. Services are not analysed in this report as the unit value of services has not yet been defined.

8 In principle the system of equations (2)–(4) makes it possible to give a nowcasting-type estimate for last year, which is missing as the Comtrade data arrive with a long delay. There is an estimate for 2016, but the time series are short and volatile and so a test period is needed.

9 The HP filter trend found from the short and volatile time series may suffer an HP filter end-point problem when new data are received, and so the trends are only illustrative.

Summary:

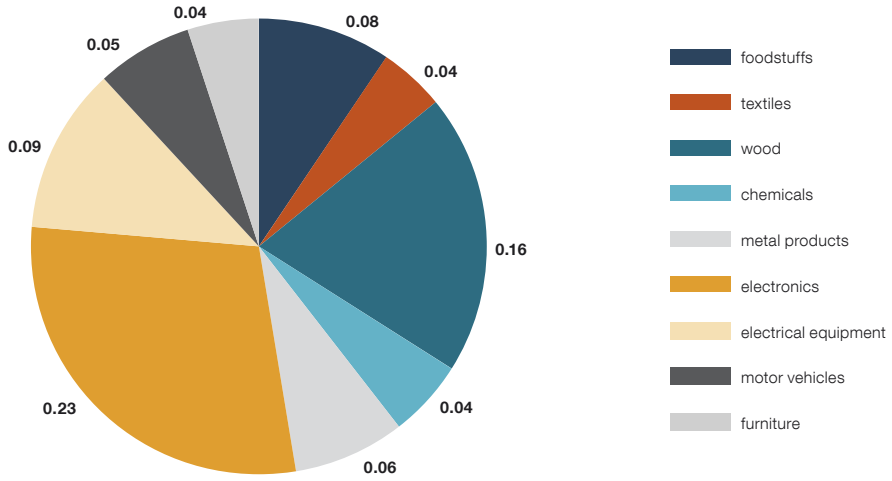
- Putting the indicators for price competitiveness covered in the first part of the report alongside the reflections in foreign trade described in the second part reveals that the tightening of the competitive position in the past two or three years is reflected in an increase in the deficit in the price component of the balance of trade.
- The hypothesis is that the tighter competitiveness position is not seen in the whole balance of trade, but only in the price-sensitive part of it, which might equally explain why the consolidated picture of the external balance does not yet show the effect of the rise in unit labour costs.

Descriptive analysis of the treatment of groups of goods

More thorough analysis of the price and non-price components of the balance of trade, or the price sensitivity of exports, needs to be linked to sources of exports by branches of the economy through the main groups of goods. Although this would justify a separate research project in its own right, an initial descriptive report can be written with what is already available.

First, it needs to be examined which branches of the economy Estonian exports come from. Taking 2015 as the start point, 59% of exports came from manufacturing, 22% from wholesale and retail trade, 10% from unspecified fields, 5% from transport and storage, and 2% from energy, altogether covering 95% of exports[10]. The main source of exports is manufacturing, ahead of trade and transport[11]. Next we can look at the main exporting branches of manufacturing except 'other', which together account for 80% of the sector's exports (see Figure 12).

Figure 12. Distribution of exports in manufacturing by branch within the sector



Source: Statistics Estonia 2015

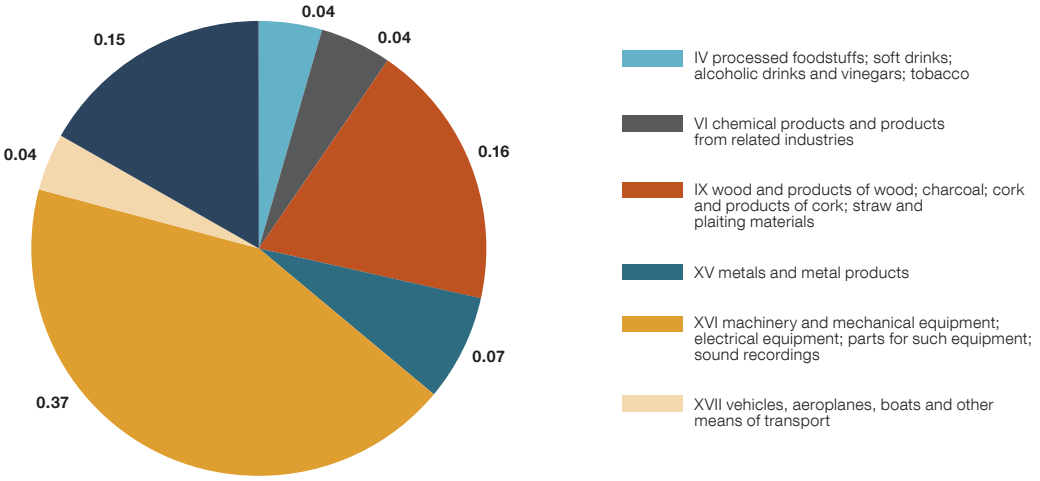
Using the exports of manufacturing as a proxy for total goods exports is acceptable, as the structure of Estonian goods exports by main groups of goods is very close to the structure for manufacturing exports, as shown in Figures 21–22 in the Appendix and confirmed by the IMF report (IMF 2015). After this, the seven main groups of goods by the HS Comtrade classification are used, covering some three quarters of all goods exports.

The next step is to connect the contribution of manufacturing from the same database with the four-digit HS or KN groups of goods. Of manufacturing exports, 80% can be divided into groups of goods as shown in Figure 13. The groups of goods shown in the figure account for the lion's share of 87% of manufacturing exports.

10 The data are from the Statistics Estonia table VK02 for foreign trade, which puts exports and imports into groups of goods using the EMTAK classifications for branches of the economy.

11 Exports in wholesale and retail trade have a similar structure to industry by major groups of goods, except for means of transport, where the share is larger for trade. One disadvantage is that the Statistics Estonia data table VK02 contains re-exports and imports, which are not included in the export and import statistics from Comtrade.

Figure 13. Exports in manufacturing by groups of goods



Source: Statistics Estonia 2015

The last step is to compare manufacturing exports by groups of goods from Statistics Estonia with the estimates found earlier for the price and non-price competitiveness of groups of goods from the Comtrade database; see Figure 14, which covers 74% of all exports, excluding the group of machinery and equipment.

Figure 14 shows the balance of exports and imports for Estonia as a member of the euro area, divided into the price and non-price components. The trends for such a short period can have only an illustrative value, but they do still give some information.

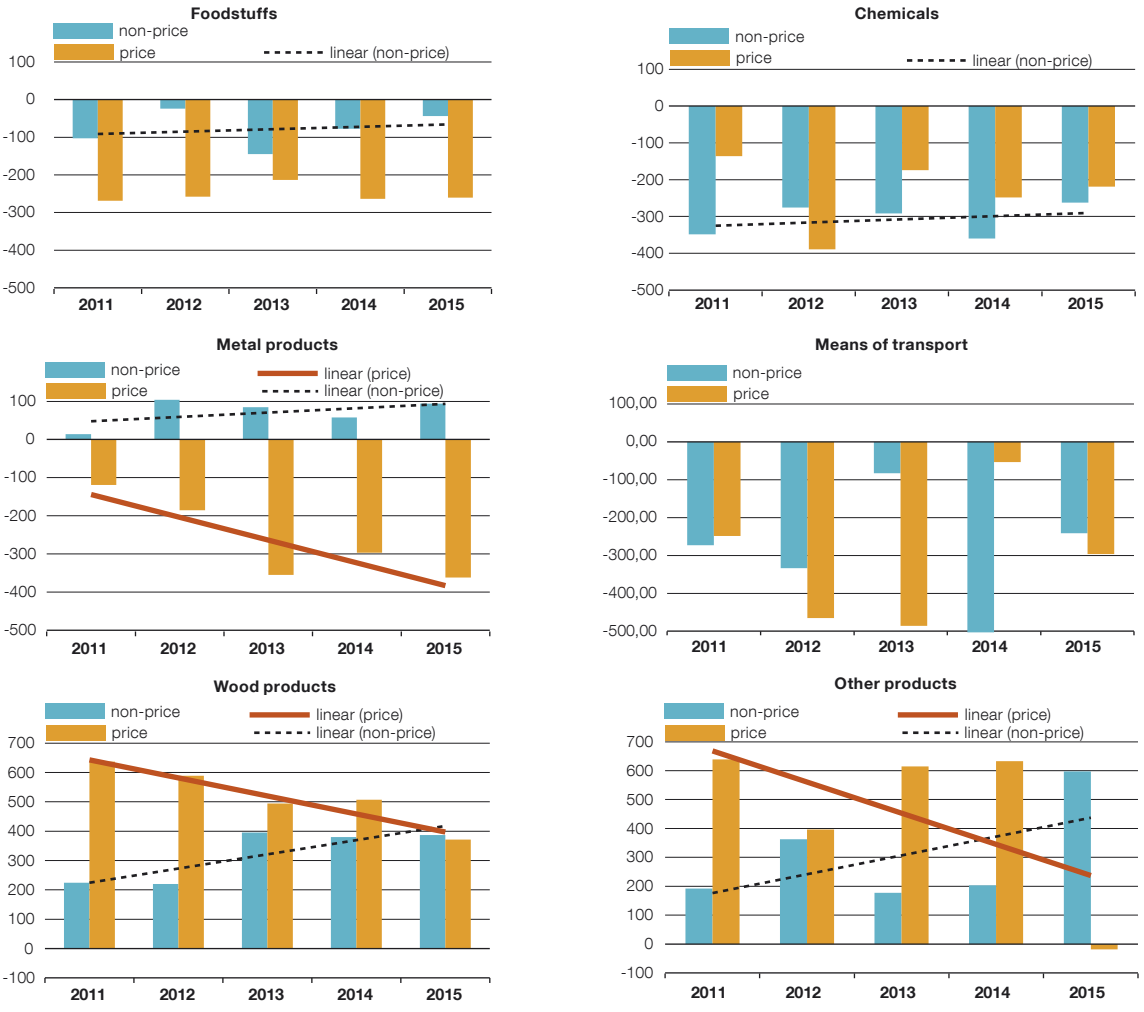
In terms of balance, there are two groups on the plus side, and five on the minus side. Machinery and equipment, the group of goods with the biggest turnover, is not shown in Figure 14 as it is estimated as much as 40% of the exports from this group are exports from the company Ericsson Eesti, and the intra-group transfer pricing is not published. For this reason it cannot be assumed that the machinery and equipment group describes the general trends of price and non-price competitiveness, as it is so dependent on the internal pricing policy of one international group. As a side note it may be pointed out that the ECB algorithm used in this report only partly addresses the question of cross-border groups as flows of goods in and out can be seen but how transfer prices are set remains opaque.

Another anomaly is the group of means of transport. This group in Estonia is mainly an importer and intermediary, except for the production of trailers, and so it is quite atypical though it does explain to some extent the slightly anomalous movements in the overall picture for 2013–2014. This group includes the import of trains made by Stadler and similar. These can be seen as a part of the improvement of the quality of infrastructure that is part of convergence, or long term cost recovery in the terminology of the IMF. The group of chemicals was a little weaker in 2014, but not the group of food goods where, somewhat surprisingly, there were no major consequences from the Russian sanctions in the turnover of imports and exports. There was a drop of half in vegetable products and animal products in 2013–2015, but this group is not one of the most important.

Within the other groups some trends are noticeable, with non-price competitiveness improving in five groups, though only minimally in foodstuffs, chemicals and metal products, and price competitiveness weakening in three groups. There were changes in the structure of the group of miscellaneous goods in 2015, which can probably be explained by the movement of some products from the price competitiveness group to the non-price category, meaning that the dynamics of the price component for this group are too uncertain.

- Overall the more detailed treatment of the major groups of goods shows that changes in competitiveness happen slowly. No fall in international competitiveness can be seen from these data, especially given the stable trade deficit of recent years.

Figure 14. Price and non-price components for the balances of the six main groups of goods (USD million)



Source: Comtrade

COMPETITIVENESS IN THE BROADER SENSE

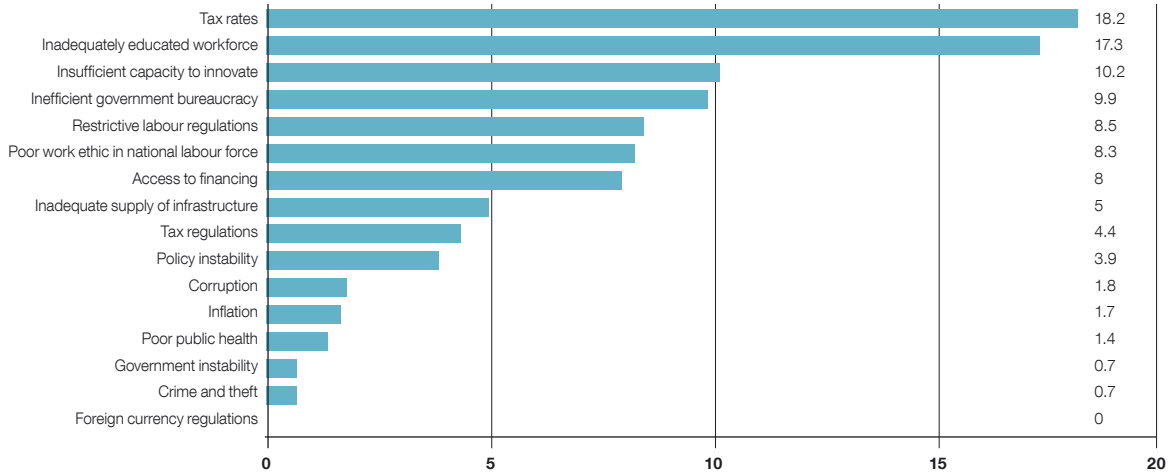
The domestic economy and the market share of exports

First a note on institutional indexes. They do not provide any absolute truth, but rather give an estimate of the economic environment. The most commonly used indexes are the competitiveness index of the World Economic Forum (WEF), see https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1 and the ease of doing business index of the World Bank, see http://www.doingbusiness.org/rankings.

The first of these, the WEF index, divides each economy by three main factors, which are basic requirements, efficiency enhancers, and innovation and sophistication factors[12]. By this index Estonia is in 30th place in the world between Saudi Arabia and the Czech Republic, and that position is the same as in 2015. The highest ranking factor for Estonia was basic requirements, and the highest score went to its sub-indexes for primary education, health and the macroeconomic environment, which scored more than six out of a maximum seven points. The weakest score was for the third factor, innovation and business sophistication, for both the sophistication of the business environment and innovation, which averaged a score of 4.2, while the lowest score was 3.0 for market size under efficiency enhancers. The size of the market is an inescapable fact of life, but the total score for market efficiency was only a little above the average at 4.8.

In the information on the country, the WEF report adds the results of surveys of the business environment, which focus on problematic factors for doing business.

Figure 15. Most problematic factors for doing business



Note: From the list of factors, respondents to the World Economic Forum's Executive Opinion Survey were asked to select the five most problematic factors for doing business in their country and to rank them between 1 (most problematic) and 5. The score corresponds to the responses weighted according to their rankings.
Source: World Economic Forum, Executive Opinion Survey 2016

Figure 15 shows the subjective view given by the survey results. The tax environment in the WEF report is the consolidated index for corporate income tax, under goods market efficiency, and how the tax environment affects motivation to work, under labour market efficiency.

The ease of doing business index[13] puts Estonia among the best in the world, in twelfth place among the OECD countries, just behind Taiwan and ahead of Finland, leaving it one place lower than in 2016. Only the ranking positions are published for the components in this list, or the gap to the category leader. The best results for

12 The three main categories are divided into subcategories, with institutions, infrastructure, the macroeconomic environment, and health and primary education under basic requirements; higher education, efficiency of goods and labour markets, development of financial markets, technological readiness and market size under efficiency enhancers; and business sophistication and innovation under innovation and sophistication factors.

13 The ease of doing business index of the World Bank assesses the categories of: starting a business, dealing with construction permits,getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing-contracts and resolving insolvency.

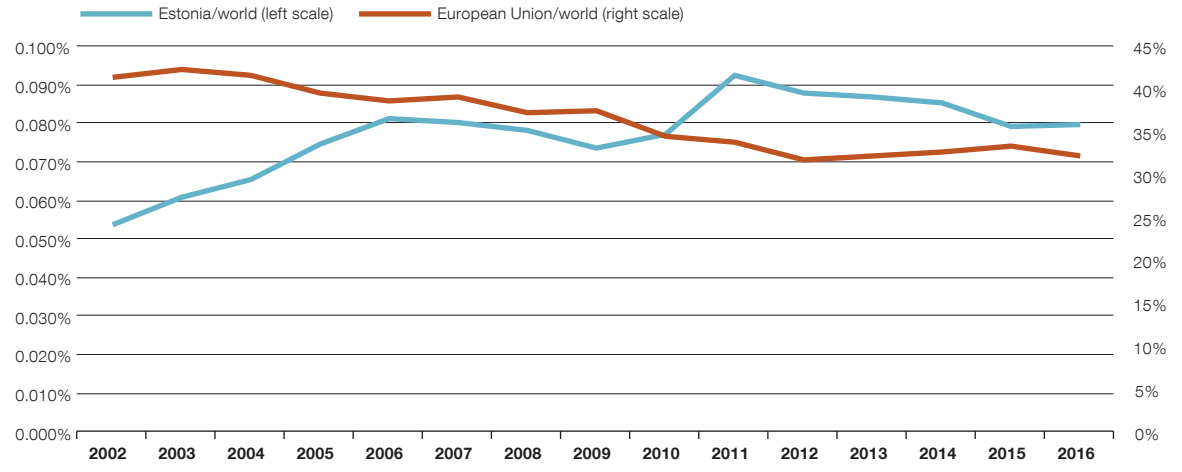
Estonia were sixth place in registering property, ninth in dealing with construction permits, 11th in enforcing contracts, and 14th in starting a business. The weakest results were 53rd for protecting minority investors, 42nd for resolving insolvency, and 38th for getting electricity.

Summary:

- The strength of the Estonian economy in these indexes is that the basic requirements are well met, for both the macroeconomic environment and the basic legal environment. The biggest issues are in developing the business environment further from the basic level, for example through insolvency procedures and protection for minority investors, and the lack of innovation.
- The base values for the indexes can be seen as drawing attention to management of both strengths and weaknesses, depending on the choice of indicators.

The rankings for Estonia in international league tables remain good despite the cumulative decline of 8% in goods exports at current prices in 2013–2015. From the previous parts of this report it may be inferred that market share has probably shrunk because of the loss of price competitiveness. A more thorough comparison would require information on the price competitiveness dynamics of Estonia's direct competitors and changes in their market shares for exports. Figure 16 shows the global market share of Estonian goods exports in comparison to that of European Union exports, combining intra-EU and extra-EU trade.

Figure 16. Global market share of Estonian and European Union exports in the first 10 months of 2016



Source: Eurostat

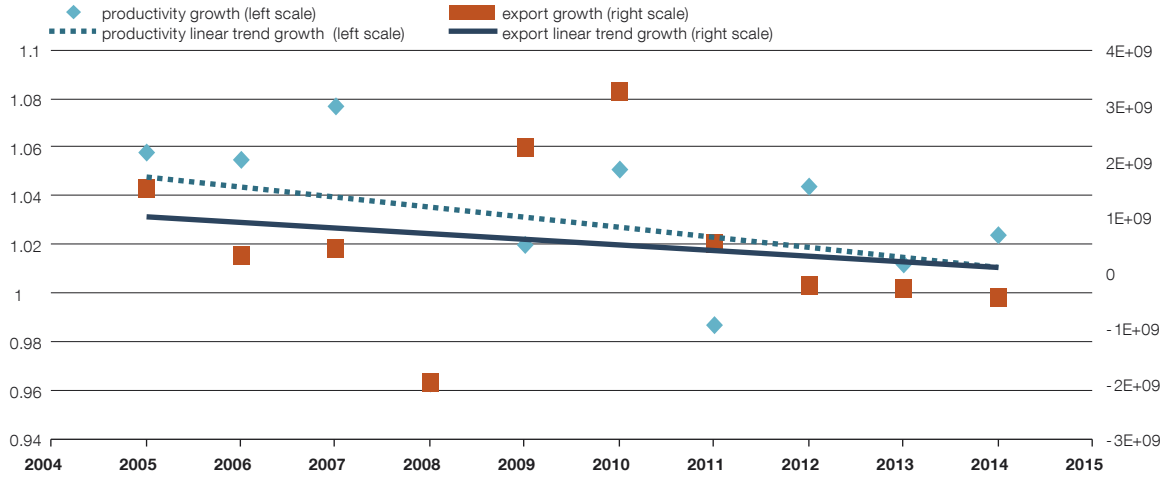
Estonia's market share fell in 2013–2015 in both EU and non-EU markets, and especially in CIS markets, though the fall there was not only in Russia. In 2016 the market share of EU markets increased slightly. There were structural changes behind this, which are reflected in the stagnation of the EU's global market share as the position of Asia increased.

Competitiveness and productivity

One key aspect of competitiveness – if not the number one key aspect – is productivity. With populations shrinking almost everywhere in Europe, despite recent waves of immigration, growth is more important in productivity than in the labour force. It is well known though, that productivity growth has been low in all the advanced economies. The next discussion will look at the reasons for low productivity and the factors that might apply in the Estonian case.

When discussing productivity and exports, the quote that "for competitiveness, productivity is not everything, but in the long run it is almost everything" is quite appropriate. A quick look at the Estonian data reveals a correlation of around 90% between export volumes and productivity growth in 2004–2015, after Estonia joined the European Union. The same relation can be seen in differences, as shown in Figure 17. This example is only illustrative though, as the relation between productivity and exports is much more complex.

Figure 17. The relationship between export volumes and productivity growth



Source: Statistics Estonia

Measuring productivity is an issue. Productivity is largely measured with GDP statistics, though it is easier to assess employment. Inadequate measurement of GDP can cause productivity to be inaccurately assessed too. In this context the question has arisen in recent years of whether all the dramatic developments in information technology are recorded in the statistics for GDP or not, or why the expected and hoped for impact on economic growth from the information technology revolution has been unexpectedly small after the initial boom in 1996–2003.

We can use as a basis the example of the USA described in Syverson (2016)[14]. Assuming that the impact of IT is incorrectly estimated in GDP, it can be hypothesised that 16% of US GDP for 2015, or 2.9 trillion dollars, was missing. As this gap is enormous, it should be possible to find the missing amount somewhere else within the economic statistics. Four options were tested, but none of them reveals the missing part, and two of them directly contradict the hypothesis.

The four approaches are estimated using the indicators for digital technology intensity, internet-linked technologies, missing ICT sector output, and income side GDP. The two arguments that reject the hypothesis are:

- a survey in more than 20 advanced countries did not find any connection between the intensity of use of IT and productivity growth; and
- the labour share in the income-based calculation of US GDP should grow faster in this hypothesis, but the capital share actually did, indicating growth in the relative share in GDP of capital rather than of wages income[15].

14 Chad Syverson is a member of the National Bureau of Economic Research and a professor at the University of Chicago.

15 The trend in Estonia in recent years has been in the opposite direction, with wages growing at the expense of profits. It should be remembered here that Estonia is still a converging economy and the rise in wages is partly because of income convergence.

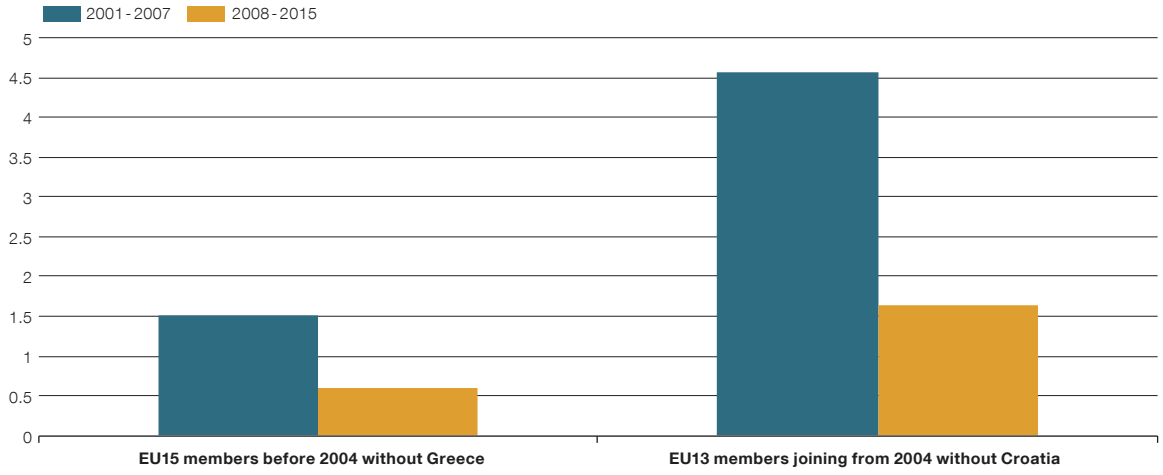
Thus it can be seen from Syverson's treatment, and other sources that support him, that a certain part of the contribution of IT to economic growth may remain uncounted, but it cannot be the major part. This means that weak productivity growth, or even declining productivity, is a real problem. The fundamental problem is described at the start of the Syverson research, and is worded by Alan Blinder (2015) as: "... the drop (in productivity growth) is large, and the scary thing is that we don't understand why". The OECD's economic review (2016) found the following reasons for low growth in productivity:

- weak global demand since the Great Recession;
- a fall in business dynamism;
- increased difference between the productivity growth rates at top companies and those in the middle; and
- an inappropriate structure for production capacity and investment.

The OECD differentiates between cyclical reasons, which is the weak demand, and structural reasons, which are the other three. It finds that about half of the reduction in productivity growth can be explained by cyclical factors. In other words global demand has still not recovered after the crisis of 2008–2009, which can partly be seen in the turnover of global trade, and this explains the weak productivity growth.

This is illustrated in the two following figures.

Figure 18. Real productivity growth in the European Union by region and over time

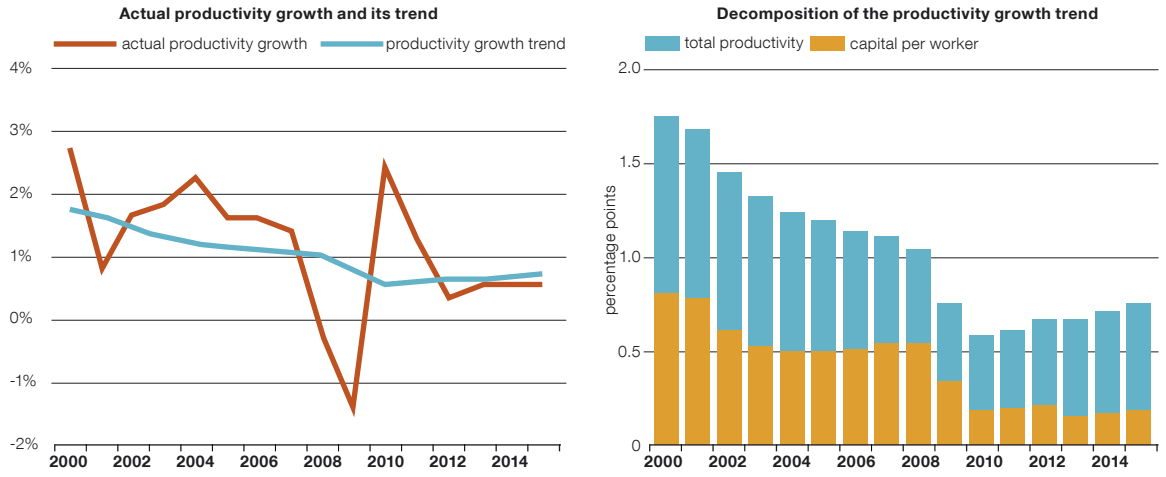


Source: Eurostat

Figure 18 shows the decline in productivity growth in the European Union. The earlier members of the European Union are shown separately from the newer member states that joined from 2004. The main message of the right-side panel of Figure 19 is that capital per employee has been lower since the crisis than it was before, indicating that weak demand and general uncertainty have prevented investment recovering. Comparing the panels shows that the trend of productivity eliminates the effect of the economic cycle from total factor productivity but not from the stock of fixed capital. As global demand is a universal phenomenon, it doesn't say anything specific about Estonia, though the problems of slow growth in recent years have been related to general weakness in foreign demand, including the stagnation in the economy of Finland, Estonia's main trading partner.

Next we may consider structural factors. The estimate of the fall in business dynamism is based on the number of companies entering and exiting the market and thus on the extension of the average age of companies (ECB 2016), the ability of less productive companies to stay in the market longer, and the general reduction in invest-

Figure 19. Global productivity growth and the decomposition of it

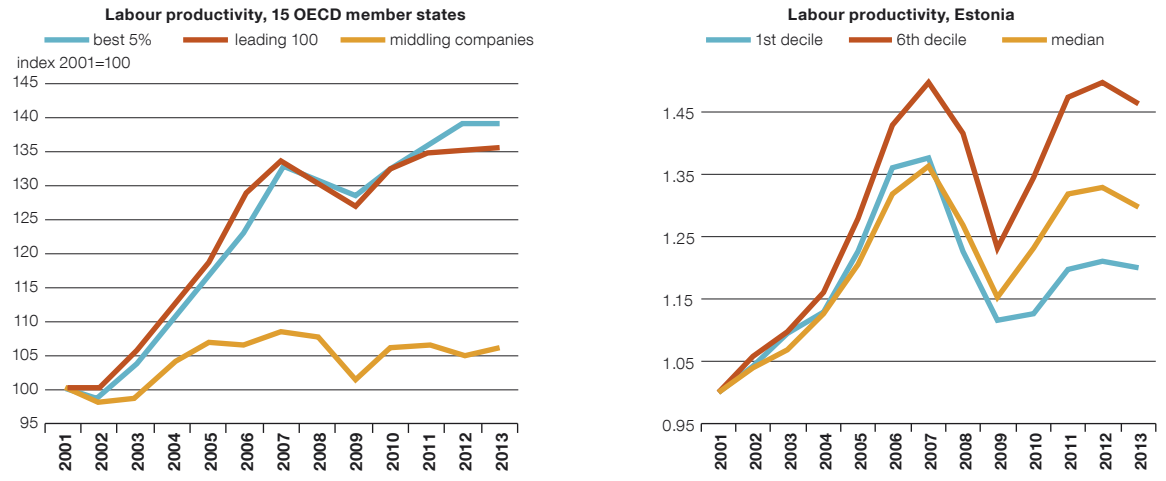


Source: OECD

ment in research and development in almost all OECD countries. It was particularly emphasised (OECD 2016) that the fall in productivity in Europe was larger in those branches of the economy where the number of new companies has dropped fastest. This factor is also significant in Estonia (IMF 2016). For more detail on Estonia see Box 1.

Experience of the other structural factors shows that differences between high productivity companies and others are getting deeper, though the high productivity group suffered more in the economic crisis (see the left panel of Figure 20). The OECD data for industry in 15 OECD member states show that productivity growth has remained the same at top companies in highly productive countries, but the productivity of less productive companies has fallen since the crisis. There is no research on this topic that focuses on Estonia, but an initial impression is given by the right panel of Figure 20. The figure has two panels, the left one using the OECD data (OECD 2016), and the right one using equivalent data for Estonia. The figure for the OECD compares the dynamics of productivity growth for the most productive companies (the top 100 and the top 5%) and compa-

Figure 20. The dynamics of productivity globally and in Estonia at top and middling companies



Sources: OECD, CompNet

nies in the middle. The figure for Estonia uses the same principle. The fastest productivity growth is at companies in the sixth decile for productivity, with the assumption that the position of each company in its decile is fixed at the start of the observation period and does not change later. This is in line with the conclusions of the IMF (IMF 2016) that productivity in Estonia grew across a broad base in 2004–2015, but mainly in traditional branches of the economy and from a relatively low base.

The third group of structural factors is inefficient capital placement and investment. The impact of these factors is harder to grasp, with the OECD noting only a couple of points: 1) the decline in capital has been largest in those EU member states where interest rates were lowest before the global crisis, indicating a possible excess of investment prior to the crisis; and 2) the structure of the more productive sectors has changed in some member states since the crisis, which indicates that capital placement was previously inefficient.

It is appropriate to remember at this point the position on Estonia that the IMF took earlier (IMF 2015), that the best companies in Estonia are almost at the Scandinavian level as a proportion of the economy and in their innovation, but there are no manufacturing companies close to the top level by employment, or services companies near the top for value added. Estonia is known for its software development, with Skype, Kazaa and GrabCad, and for its innovative oil shale sector. Despite this, traditional sectors dominate in the Estonian economy. Agriculture, industry and construction provide about one third of the value added in Estonia, but only one quarter on average in the European Union. Wood processing, furniture and textiles provide around 40% of manufacturing employment and 27% of value added, but in manufacturing in the European Union they provide an average of 17% of employment and 10% of value added. Exports reveal basically the same picture.

The last paragraph also highlights that services still have a smaller share in the structure of the economy than in the EU12, though the structure has been shaped by market forces, innovation, economic policy, and the combined impact of the international economic crises of the past 25 years. Furthermore, high technology companies are not the drivers of productivity growth, which is also shown by the fastest development occurring in the sixth decile, an opinion that is confirmed by the IMF (IMF 2016).

Box 1: Productivity at the company level in the IMF country report

The IMF Country Report for the Republic of Estonia: Selected Issues 2016 focused on productivity growth. There are problems everywhere in the advanced world with productivity growth, not just in Estonia. The connection between productivity and competitiveness is evident, as productivity growth taken broadly can be considered the basis for competitiveness over a longer horizon. This is explained in the consolidated position of the IMF (IMF 2016):
Labour productivity has been weak in recent years. Firm-level data can shed light on where in the economy growth was strong and where it lacked. Moreover, they reveal which firm-level characteristics were critical for productivity performance. It turns out that the bulk of productivity growth in Estonia can be attributed to the more traditional firms, that there was a strong catching-up effect of firms with initially below-average performance, and that the superior performance of younger firms disappeared in the period after the global financial crisis, suggesting reduced dynamism in the economy. Firm characteristics that were associated with strong productivity growth were also associated with weak employment generation, suggesting a pronounced labour rationalisation element in productivity growth. There is tentative evidence that this effect might have been stronger in Estonia than elsewhere in Europe.

The IMF analysed changes in value added in several categories of company, looking at contribution to economic growth, company size, technological level and export orientation. All these categories of company were analysed in four ways, for growth, employment, productivity and TFP growth. The analysis covers the years 2005–2014, during which period Estonia was a member of the European Union.

Economic activity was analysed in industry, agriculture, construction and trade, and on market basis and for basic services provided by the government. The shifts that occurred were an increase in the share of industry and agriculture in total output at the expense of all the others, and substantial growth in productivity in those sectors. At the same time there was a fall in employment in agriculture, while it stayed the same in trade and rose everywhere else. The biggest increase in productivity was in agriculture, where it reached about 80% of the level of the EU12, leaving a gap of only 20%. In other sectors the gap measured in real money was much wider and it is nowhere less than one third even at purchasing power parity.

In the category of company size the predominance of livelihood companies is of note, meaning the growth in output and employment at micro enterprises with up to nine employees came together with a drop in productivity. In total, the micro enterprises have been more of a brake than an accelerator for productivity growth. The data for Estonia affirm the general global trend of reduced business dynamism, as shown by the life expectancy of companies. It can be seen that the companies with the fastest TFP growth in 2004–2009 were younger than those with the fastest growth in 2010–2014.

At the technological level, the economy can be divided into high technology production and services and general production and services. By this measure value added has grown in general production and high technology services, while there has been no change in high technology production, and a fall in general services. Employment has increased in high technology services and fallen or stayed the same elsewhere. Productivity has mainly increased, especially in high technology production, but it has fallen sharply in general services.

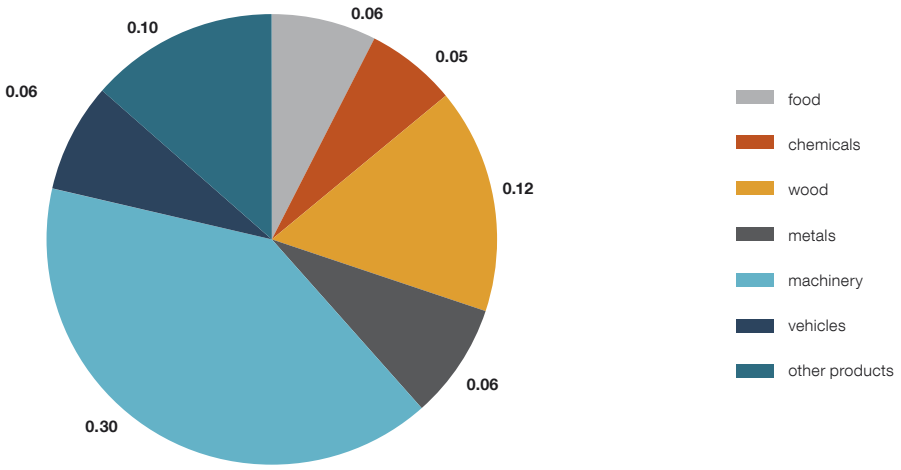
Companies were divided for their export orientation into groups with low, medium and high orientation to exports. Companies with low export orientation made a notable contribution to growth in value added and employment, but their productivity growth dropped considerably. TFP has grown in this group, which stands in contrast to the parallel growth in productivity and TFP that has so far been the case throughout, which is the reason that TFP was not previously considered separately.

The conclusion of the IMF is that productivity growth and the catching-up effect have primarily appeared in traditional branches of the economy, while start-ups do not stand out in the bigger picture. Estonia also stands out for the opposing directions in the movements in employment and productivity growth, which is much stronger than anywhere else in Europe.

Generalising, it can be said that the quite low level of productivity growth is the net result of the growth in traditional branches of the economy and high-technology services, and the decline in productivity in general services, where the large share of services in GDP has amplified the downwards effect.

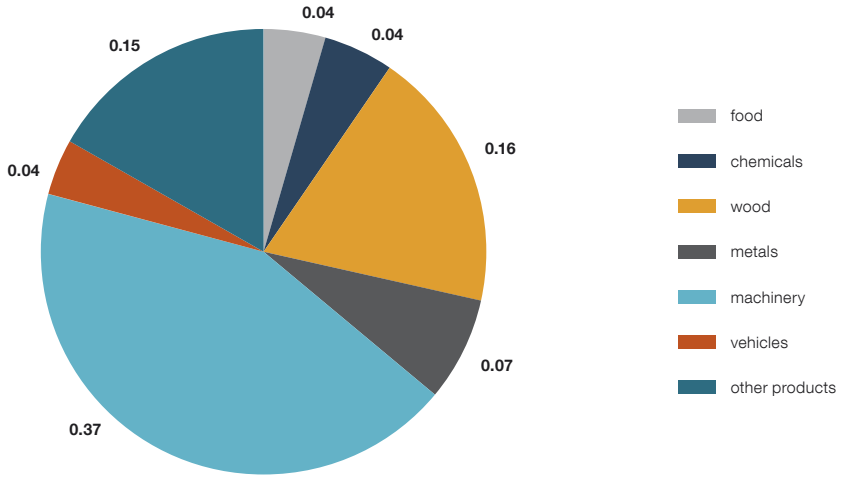
Appendix. The structure of total exports and of manufacturing exports

Figure 21. Estonian total goods exports by groups of goods (coverage ratio 74%)



Source: Statistics Estonia

Figure 22. Exports in manufacturing by groups of goods (coverage ratio 87%)



Source: Comtrade

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