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Abstract

Estonia is widely regarded as a paramount example for a successful transformation of a socialist economic system to a functioning market economy. Against the backdrop of this positive image which contrasts strongly with the crisis scenarios in Southern Europe the remaining problems of Estonia are often ignored. Estonia has hardly succeeded in catching-up economically with the richer countries of the euro area. In this paper the authors raise the question what the causes of the sluggish catching-up process are, and which opportunities Estonian economic policy has in order to close the wealth gap. It turns out that Estonia faces a serious productivity problem, particularly in the manufacturing sector producing tradable goods which is normally the driving engine behind economic and technological catching-up. The Estonian economy has failed to undergo the necessary structural change towards technologically more advanced employment structures and export patterns. Accordingly, Estonian economic policy needs to create a suitable business environment to support this kind of structural change.

Keywords: Estonia, catching-up, growth and structural change

JEL classification: F14, O12, O52

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1. Motivation

Estonia is widely regarded as a paramount example for a successful transformation of a socialist economic system to a functioning market economy. This process can be considered as a model case not only for other transformation countries, but even for crisis-shaken EU members in Southern Europe. Moreover, Estonia has gained reputation for a consequently performed stabilisation policy, which was crowned with the success of the countries' membership in the Euro Area.

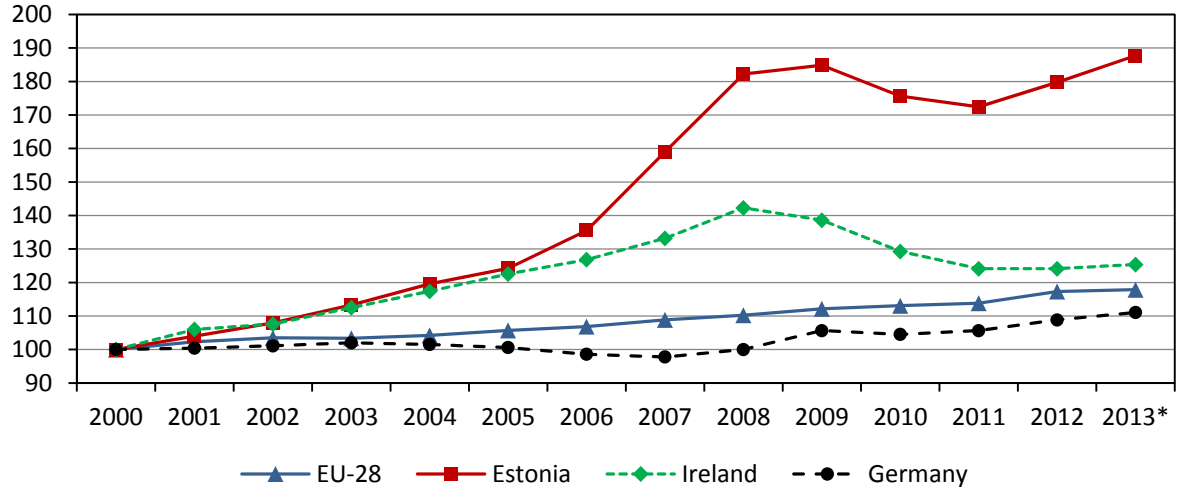
Against the backdrop of this positive image which contrasts strongly with the crisis scenarios in Southern Europe the remaining problems of Estonia are often ignored. Estonia has hardly succeeded in catching-up economically with the richer countries of the EU since its independence. Its productivity level is lagging behind that of most other EU members. Structural change of the Estonian economy since EU-accession appears to be insufficient to support a catching-up of Estonia vis-à-vis the EU core members. The aim of this paper is, therefore, to show why structural change in Estonia is still far from being. The question is raised which obstacles to economic development still exist in Estonia, and which options Estonian economic policy has in order to overcome development deficiencies.

2. Structural Weaknesses

2.1 The Productivity Problem

The development of Estonian unit labour costs in the 2000s displays the fact that the country lost competitiveness towards the EU on average (Figure 1). Unit labour costs have risen faster in Estonia since the 2000s than in other EU countries, thus making Estonia less competitive. It becomes obvious that during the period of demand driven growth, fueled by cheap credits from European banks, Estonians lost sight of saving the country's international competitiveness. In the course of the economic crisis unit labour costs shrinked temporarily but at present they are rising again. Compared with a highly competitive country like Germany, Estonia's development of unit labour costs appears to be even more precarious.

Figure 1:
Development of unit labour costs in Estonia compared to the EU and selected EU countries 2000–2013[a]



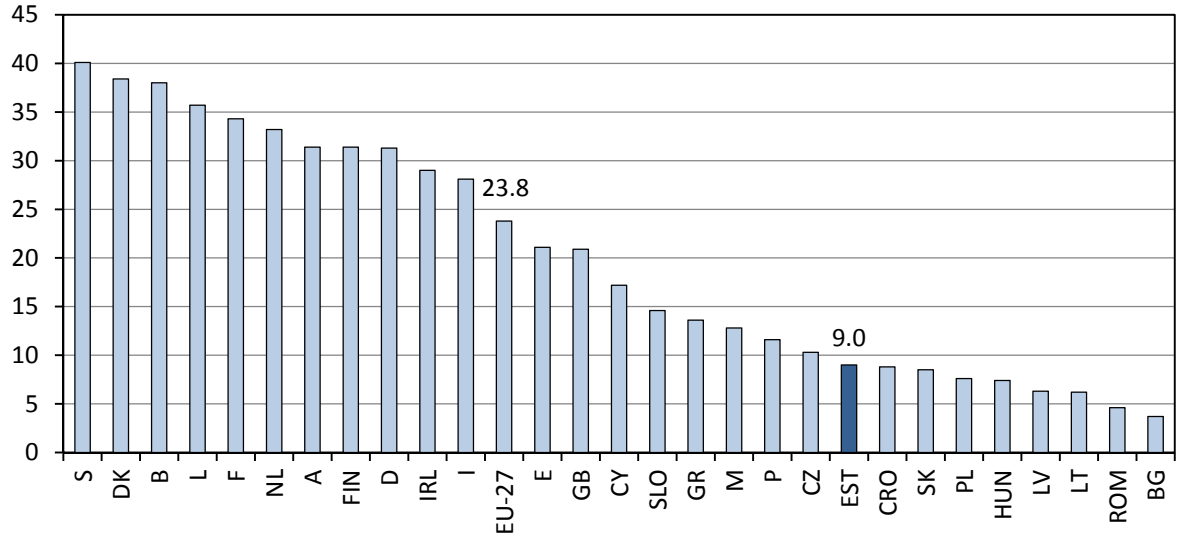
[a]Index values 2000 = 100; nominal unit labour costs = (total compensation of employees / total employees in persons) / (GDP in market prices, chain-linked volumes / total employment in persons). — *Estimates for Estonia by Eurostat.

Source: Eurostat (2014a); own compilation and calculations.

To be sure, it can be argued that Germany might be an inadequate benchmark country due to its quite different economic patterns and its position as the largest economy in the EU (see chapter 2.2). However, Germany as a technological leader better outlines the catching-up potential Estonia theoretically possesses. Moreover, the comparison with Ireland, being a successful catching-up EU country since the 1980s and a smaller economy in the old EU, might also serve as a benchmark to evaluate Estonia's state of competitiveness.[1]

To explain Estonia's deficiencies in the context of unit labour costs it is necessary to analyse the two components of this variable: Labour costs and productivity. The analysis reveals that on the one hand Estonian labour costs are among the lowest in the EU (Figure 2). They range in the bottom third of the respective EU ranking. Compared to the benchmark countries Germany and Ireland Estonian wages and salaries even accounted for only 29 per cent of the German and 31 per cent of the Irish level in 2013 – without a significant catching-up during the 2000s (Figure 3). Estonia still appears to be a country of cheap labour, at least by European standards.

Figure 2:
Ranking of total labour costs in the EU countries 2013[a]

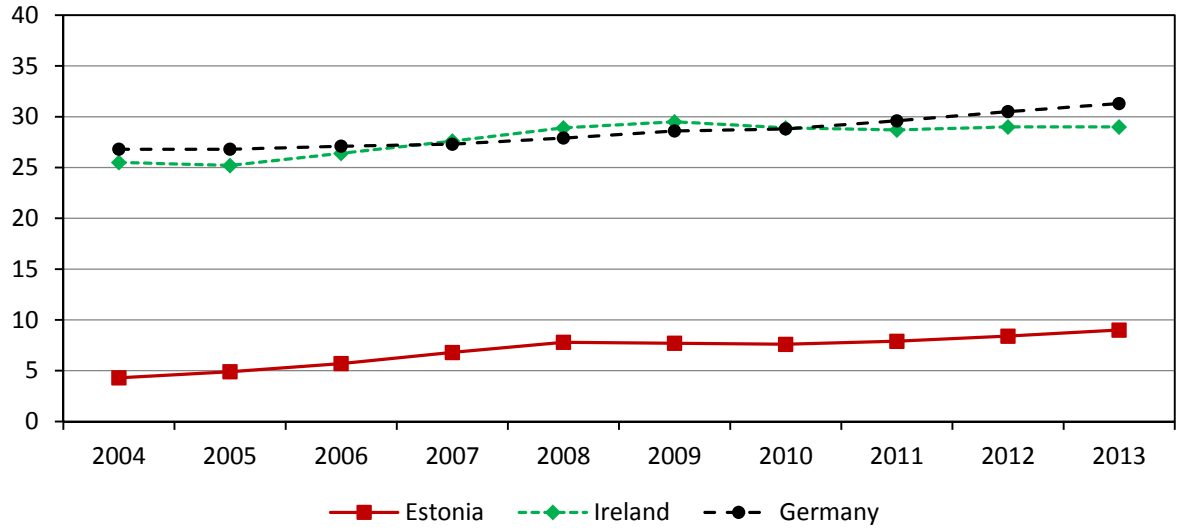


[a]Euro per hour; ranking follows declining labour costs by country; country codes: S = Sweden, DK = Denmark, B = Belgium, L = Luxembourg, F = France, NL = Netherlands, A = Austria, FIN = Finland, D = Germany, IRL = Ireland, I = Italy, E = Spain, GB = Great Britain, CY = Cyprus, SLO = Slovenia, GR = Greece, M = Malta, P = Portugal, CZ = Czech Republic, EST = Estonia, CRO = Croatia, SK = Slovakia, PL = Poland, HUN = Hungary, LV = Latvia, LT = Lithuania, ROM = Romania, BG = Bulgaria. — Total labour costs in industry, construction and services (except public administration, defense, compulsory social security).

Source: Eurostat (2014b); own compilation and calculations.

[1] Ireland was chosen instead of Finland, which also could be imagined to be a suitable benchmark, because of its higher catching-up potential in the early 1980s and its dynamic development from one of the poorest to one of the wealthiest EU countries during three decades (see Yusuf and Nabeshima 2012: 21–24).

Figure 3:
Wages and salaries in Estonia, Germany and Ireland 2004–2013[a]

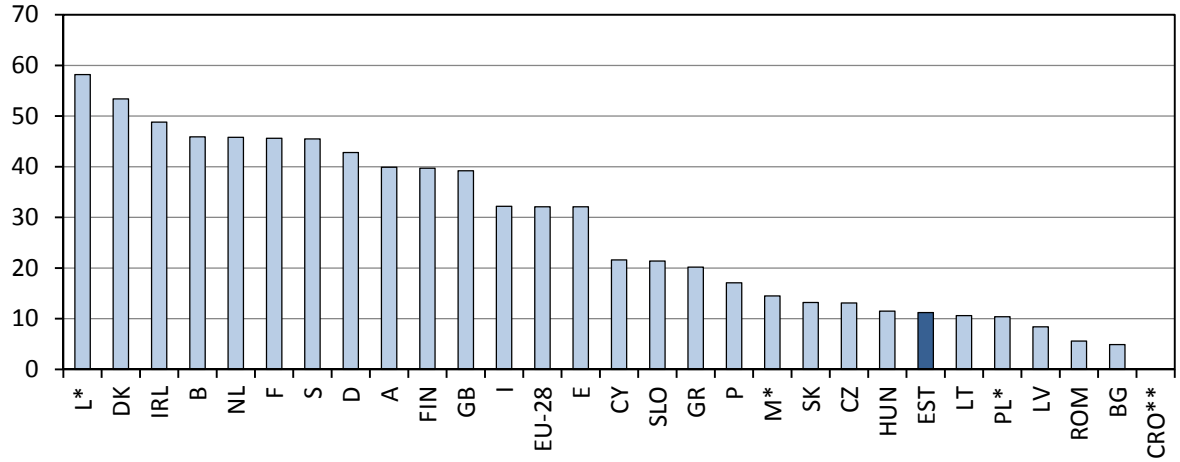


[a]Euro per hour; total labour costs in industry, construction and services (except public administration, defense, compulsory social security).

Source: Eurostat (2014c); own compilation and calculations.

On the other hand, Estonian labour productivity is also one of the lowest in the EU (Figure 4). It occupies rank 23 in the EU-28, accounting for only 35 per cent of the EU-28 average. The Estonian productivity shortcomings become even more obvious when Estonian labour productivity is compared to the productivity of the benchmark countries Germany and Ireland. In these cases Estonian labour productivity reaches only relative values of 23 rsp. 27 per cent of the level of these benchmark countries (Figure 5).

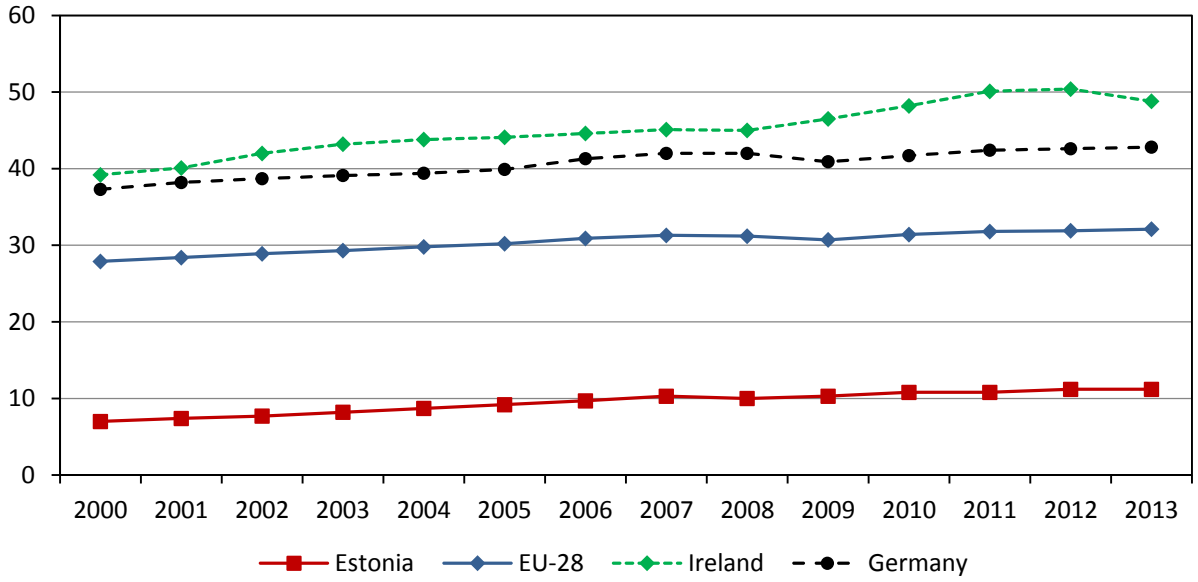
Figure 4:
Real labour productivity in the EU countries 2013[a]



[a]Euro per hour worked; ranking follows declining labour productivity by country; for the country codes see Figure 2. — Real labour productivity per hour worked defined as real output (deflated GDP measured in chain-linked volumes, reference year 2005) per unit of labour input (measured by the total number of hours worked). — *Labour productivity for 2012. — **Not available.

Source: Eurostat (2014d); own compilation and calculations.

Figure 5:
Estonia's real labour productivity in comparison to selected EU countries 2000–2013[a]



[a]Euro per hour worked. — Real labour productivity per hour worked defined as real output (deflated GDP measured in chain-linked volumes, reference year 2005) per unit of labour input (measured by the total number of hours worked).

Source: Eurostat (2014d); own compilation and calculations.

Estonia's weak productivity performance is in need of explanation: In the course of its successful transformation from a Soviet-type into a workable market economy and the integration into the European and global division of labour, Estonia should have visibly closed its productivity gap. Especially sectors producing tradable goods are expected to exhibit productivity gains due to the pressures of global competition, the implementation of technology imports and the participation in international value added chains. However, in Estonia at the beginning of the 2000s the labour productivity in tradable goods producing sectors accounted for just about half of that in the sectors producing non-tradable goods (Figure 6).[2] During the 2000s, labour productivity in the traded sectors did not grow much faster than in the non-traded sector despite the strong growth of GDP in those years. The tradable sector was neither the driver for economic nor for productivity growth.[3] Only in the aftermath of the economic and financial crisis 2007/2008 productivity in tradable goods won some momentum and approximated to 75 per cent of non-tradable goods productivity.

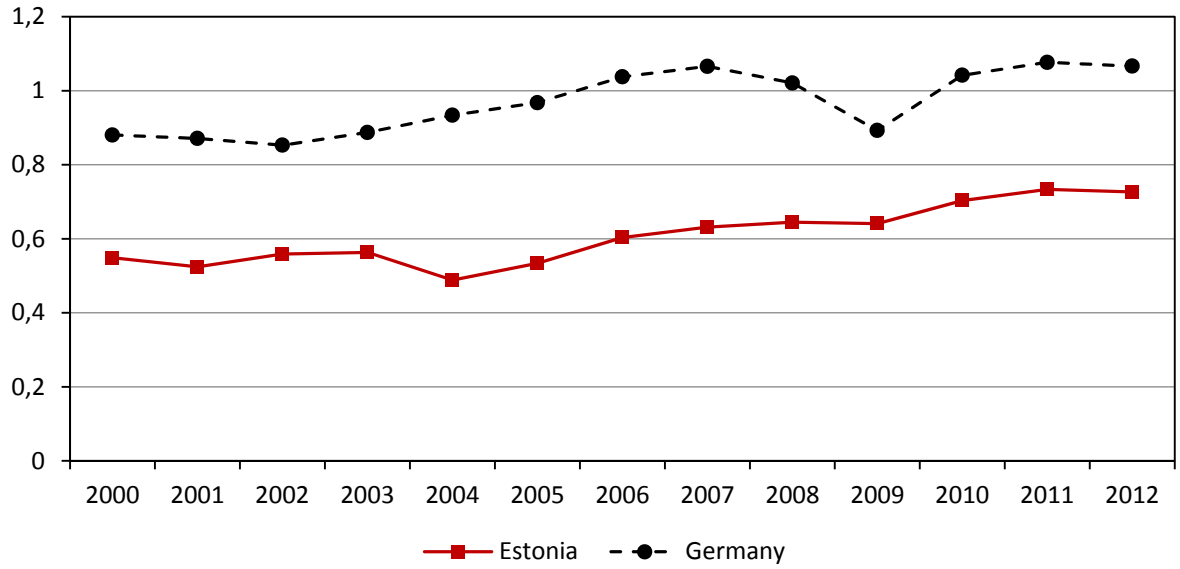
In contrast, German labour productivity in tradable goods is about four times up the Estonian level and since 2006 it exceeds productivity in non-tradable goods – except for the crisis year 2009 with high short-term unemployment bringing down labour productivity (Figure 6). Furthermore, as a country with technological leaders in a variety of manufacturing industries at the technological frontier, Germany's potential productivity growth is limited. Due to Estonia's lower level of development, and as a consequence thereof, a significant catching-up potential, the situation in Estonia is quite different. Investments in sectors producing tradable (manufactured) goods could trigger off high productivity growth which would serve as a main driver of economic wealth for the whole economy. But the

[2] With respect to the distinction of tradable and non-tradable goods no consensus has been reached in the literature. For this reason we follow a traditional approach as displayed in Figure 6. See, e.g., Egért et al. (2002: 8) and Mihaljek and Klau (2008: 6) for details.

[3] See Schrader and Laaser (2010: 5–16) for details on the Estonian growth story.

empirical findings suggest that this process did not win momentum during the 2000s, although the period before the economic and financial crisis was characterised by high growth rates.

Figure 6:
Relation of real labour productivity in the sectors of tradable and non-tradable goods in Estonia and Germany 2000–2012[a]



[a]Real labour productivity in tradable goods in relation to real labour productivity in non-tradable goods; real labour productivity is defined as gross value added (chain-linked volumes, reference year 2005) in relation to hours worked. — Tradable goods: chapters A-C, Nace rev. 2, non-tradable goods: chapters D-M, Nace rev. 2.

Source: Eurostat (2014e); own compilation and calculations.

It could have been expected that in the course of EU accession and trade integration the Estonian manufacturing sector would have benefited from investments in new locations of production with new products and processes. Especially foreign direct investments (FDI) should have pushed up the technological level in Estonian manufacturing industries, thereby enhancing productivity and international competitiveness. But the flows and structure of FDI reveal that the focus was on sectors producing non-tradable goods, dominated by financial and insurance activities, real estate activities and wholesale/retail trade (Table 1). The relation of FDI in tradable goods sectors versus non-tradable goods sectors started with a value of 0.55 in 1998, then even shrank to 0.22 until 2013. Since the end of the nineties the FDI inward stock in manufacturing industries grew more than fourfold, but in non-tradables more than 12fold, in real estate activities even 33fold. Against this backdrop, manufacturing industries failed to become productivity boosters.

It is low labour productivity that remains a massive obstacle to the Estonian efforts to catch-up with the wealthier Euro countries: The Estonian economy's very low productivity level and only modest productivity gains are unlikely to make the country a candidate for a real appreciation in the near future. Estonia evidently failed to overcome the structures of a low-wage country with a low value-adding product range in the first decade of the new millennium.

Table 1:
FDI inward stock in Estonia by sectors 1998–2013[a]

	Industry	1998	2001	2004	2007	2008	2009	2010	2011	2012	2013
	Tradable	**35.0**	**20.1**	**17.7**	**15.5**	**14.7**	**15.2**	**17.7**	**19.4**	**19.3**	**17.4**
A	Agriculture, forestry and fishing	1.2	0.6	0.5	0.6	0.8	0.7	1.1	2.0	2.7	2.7
B	Mining and quarrying	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4
C	Manufacturing	33.4	19.1	16.7	14.5	13.4	13.9	16.1	16.9	16.1	14.3
	Non-tradable	**63.3**	**78.2**	**80.0**	**82.2**	**82.7**	**82.0**	**78.7**	**76.2**	**76.0**	**77.2**
D	Electricity, gas, steam, air conditioning supply	0.8	3.5	0.9	2.1	2.4	3.2	3.3	3.2	2.5	2.4
E	Water supply, sewerage, waste manag., remediation	0.0	1.9	0.7	1.1	0.8	0.9	0.8	0.8	0.8	0.8
F	Construction	4.0	2.4	2.1	2.8	3.2	2.7	1.9	1.7	1.3	1.3
G	Wholesale, retail trade, repair of motor vehicles etc.	20.5	11.8	10.0	13.5	12.5	12.2	11.2	13.0	12.5	15.3
H	Transportation and storage	3.6	4.4	4.1	3.6	4.2	4.7	5.4	5.8	6.0	5.5
I	Accommodation and food service activities	1.1	1.9	0.9	0.2	0.7	0.6	0.6	0.6	0.6	0.5
J	Information and communication	3.5	2.3	1.4	0.8	1.5	2.1	3.0	2.9	2.8	2.1
K	Financial and insurance activities	23.7	44.2	47.6	43.8	37.9	32.1	31.0	23.5	24.3	24.9
L	Real estate activities	4.8	4.9	11.7	12.9	11.3	11.0	12.7	15.7	16.3	16.0
M	Professional, scientific and technical activities	1.2	1.1	0.6	1.4	8.2	12.4	8.7	9.1	9.0	8.4
Memorandum items:											
Total FDI inward stock in mn EUR		*1 561*	*3 573*	*7 374*	*11 386*	*11 775*	*11 670*	*12 495*	*13 109*	*14 667*	*15 554*
Relation FDI tradable: FDI non-tradable		*0.55*	*0.26*	*0.22*	*0.19*	*0.18*	*0.18*	*0.23*	*0.25*	*0.25*	*0.22*

[a]Shares as per cent of total mFDI inward stock. — Classification according NACE Rev. 2.

Source: WIIW (2014); own compilation and calculations.

2.2 Estonia as a Non-Balassa-Samuelson Case

Given these shortcomings of (i) only moderate productivity growth and (ii) weak FDI flows into manufacturing, Estonia seems to form a counterexample to what is normally taking place in a catching-up process of accession countries. When joining the European Union in 2004, Estonia and the other accession countries still had a long way to go before catching-up in per-capita-income with the richer core members of the EU15.[4] In the course of integration, however, it was expected that the accession countries would succeed in catching-up vis-à-vis the core of the integration area sooner or later. Their per-capita-incomes would have been expected to increase relatively to that of the richer countries, thereby reducing the wealth gap but in this case running into inflation (Halpern and Wyplosz, 2001: 4). An explanatory macroeconomic approach for the characteristics of a catching-up process as expected in the case of Estonia is given by the so-called Balassa-Samuelson-effect.[5]

The Balassa-Samuelson-effect, which goes back to two seminal papers of Bela Balassa (1964) and Paul Anthony Samuelson (1964), describes the difficulties with domestic inflation into which a successfully catching-up country might run: higher domestic inflation and real appreciation may be the

[4] Estonia's GDP per capita in purchasing power parity ranged at about 50 per cent of that of the EU-15 at that time (Schrader and Laaser 2010: 5).

[5] The Balassa-Samuelson effect is described in detail in Buiter and Grafe (2002: 131–136) in the context of their discussion which exchange-rate regime accession countries should choose. See also Halpern and Wyplosz (2001) and Mihaljek and Klau (2008) who try to assess the magnitude of the Balassa-Samuelson effect for a couple of accession countries.

result of catching-up. This will take place, if the country exhibits a positive productivity growth differential between traded and non-traded goods, what is normally driving the catching-up process. When a developing country actually increases its per-capita-income relatively to the more advanced countries, this is accomplished particularly via productivity growth in the sector producing tradable goods which is definitely. This sector's productivity growth should be higher than the productivity gains in the sheltered domestic sector producing non-tradable goods. The productivity advantage of the tradable sector can be explained by the higher degree of competition pressure on world markets. Because of its higher productivity the tradable sector can pay higher wages without having to increase prices.[6] These higher wages in the tradable sector will attract workers from the sheltered sector. In return, the sheltered sector has to pay higher wages as well, but due to its productivity disadvantage it has to increase prices of domestic goods. As a consequence, the domestic consumer price level – comprising both tradable and non-tradable goods – increases in the catching-up country relatively to the core of the integration zone, in the case of Estonia to the Euro zone. In the end there is a permanent tendency of real appreciation in the accession country.[7]

At first sight, one might feel encouraged to detect a Balassa-Samuelson effect also for Estonia since the late 1990s: There was indeed a – however only moderate – positive differential in productivity growth between manufacturing and services, i.e. production of tradables and non-tradables.[8] Wages in Estonia also increased somewhat faster in the tradable sector than in the non-tradable sector. And the differences in CPI between (mostly tradable) goods and (mostly non-tradable) services were negative in most years of the early 2000s (Table 2).[9]

However, this is not the entire picture, and some ingredients of the standard Balassa-Samuelson effect are missing in Estonia. Table 2 also reveals that the productivity level – not growth, as addressed in macroeconomic Balassa-Samuelson analyses such as Halpern and Wyplosz (2001) or Mihaljek and Klau (2008) – was substantially lower for the tradable sector in Estonia from the beginning. At the same time the wage level in the tradable sector was on average only 75 per cent of that in the non-tradable sector in the observation year 2000. Until the crisis in 2007 the situation had not changed much, the pertinent relation had only slightly improved to 82 per cent (Table 2). Thus during this period and beyond no incentives existed for labour to move from the non-tradable to the tradable sector: Employees would have incurred an income loss of nearly 20 per cent of their monthly wages in 2007. Even in 2012 tradable sector wages had not yet achieved the level of the non-tradable sector ones, though approaching the 95 per cent threshold (Table 2). During the period from 1995 to 2012 employment in the non-tradable sector increased by 8.8 per cent while in the tradable sector it shrinked by 36 per cent.[10] Thus, the tradable sector was not the driving engine of economic develop-

[6] As the law of price holds on international markets, producers would even not be able to increase their prices.

[7] See Mihaljek and Klau (2008: 5). In the literature the Balassa-Samuelson effect is raised as an important topic for catching-up countries joining a monetary union such as the Euro zone: The Maastricht criteria might be too strict for countries which succeed in catching-up because the usual channel for approaching higher income levels – higher productivity increases in the tradable sector – might create a kind of "domestic catching-up inflation". This inflation differential is not "pathological", as Mihaljek and Klaus (2008: 2) put forward, but is instead an ingredient of the catching-up process itself. Therefore it may be required to loosen the criteria of exchjange rate and inflation convergence for accession countries.

[8] See also Mihaljek and Klau (2008: 8) who find a Balassa-Samuelson effect from 1996/7 until their final year of analysis 2008 in most accession countries including Estonia, where it was found to be 3.1 percentage points on average in this period.

[9] Mihaljek and Klau (2008: 8) found an inflation differential between non-tradable and tradable goods which amounted to 1.9 percentage points on average from 1997 to 2008.

[10] In the boom years from 2000 to 2008 the non-tradable sector even had an employment gain of about 20 per cent, in contrast the tradable sector lost more than 6 per cent of its employment (calculation based on Eurostat 2014e).

ment and job creation. Its only moderate productivity growth advantage vis-à-vis the non-tradable sector was not sufficient neither to raise its low productivity level significantly nor to bring about a real appreciation of Estonian wages and prices.

Table 2:
Productivity, wages and inflation in Estonia 2000–2013

	$prod_t/prod_{nt}$	w_t/w_{nt} [a]	$p_t–p_{nt}$ [b]
2000	0.55	0.75	–2.1
2001	0.52	0.74	–2.7
2002	0.56	0.74	–1.4
2003	0.56	0.73	–4.0
2004	0.49	0.75	–0.3
2005	0.53	0.74	0.6
2006	0.60	0.79	–1.1
2007	0.63	0.82	–4.0
2008	0.64	0.85	0.7
2009	0.64	0.83	–1.6
2010	0.70	0.90	3.6
2011	0.73	0.91	2.7
2012	0.73	0.91	1.2
2013	n.a.	0.94	1.3

[a]2008: break in series. — [b]Differences for 2000 and 2001 based on consumer price indices of goods and services by Statistics Estonia.

prod = labour productivity, in tradable goods ($prod_t$) and in non-tradable goods ($prod_{nt}$); w = Average monthly gross wages (salaries) in EUR, in tradables (w_t) (average of goods producing sectors) and non-tradables (w_{nt}) (average of private service sectors); p = harmonised index of consumer prices, annual rate of change in per cent; p_{nt}= services (overall HICP index excluding goods), p_t= goods (overall HICP index excluding services).

Source: Eurostat (2014d, 2014f); Statistics Estonia (2014a, 2014b); own compilation and calculations.

Against this backdrop it might be asked for the determinants of the slightly higher inflation in the domestic sector. The answer lies in the rise of domestic demand especially for non-tradable services including housing, financial services, retail trade and other consumer-related services – driven by cheap Euro loans of mostly Scandinavian banks at low interest rates in the wake of Estonia's EU access. In the early 2000s domestic demand regularly outpaced gross domestic product, indicating the Estonians were consuming much more than they earned. Consumption per head nearly tripled in Estonia between 2000 and 2007[11] which crucially fueled prices in the non-tradable sector. Accordingly, the inflowing FDI was more or less absorbed by the non-tradable sector, particularly financial and insurance activities and real estate activities which obtained only a slightly lower percentage share of the FDI stock than the entire manufacturing sector (Table 1). I.e. the vastly growing FDI stock was not primarily used to improve and renew the capital stock in the tradable sector.[12] Or to put it that way: Estonia was not a catching-up country in the sense of Balassa-Samuelson but a country failing to attract capital needed to build up competitive industrial structures at the productivity level of EU benchmark countries such like Germany or Ireland.

[11] See Schrader and Laaser (2010: 14–15) for a comprehensive analysis of the Baltic overheating phase shortly before the crisis.

[12] The fdi stock rose from 1.6 Bill. Euro in 1998 to 7.4 Bill. Euro in the year of EU accession 2004; in 2007 it had reached already nearly 11.4 Bill. Euro (see memorandum item in Table 1).

2.3 Insufficient Structural Change

The productivity weakness can be attributed to an insufficient structural change of the Estonian economy as mirrored by the country's sectoral employment structure (Appendix Table A1): Estonia has a relatively high primary sector share (6.4 per cent) due to the size of agriculture and forestry and an above average share of the secondary sector (27.4 per cent) comprising of manufacturing and construction.[13] It is a sign of weakness that Estonian manufacturing is dominated by labour-intensive industries at the low end of industrial development, with products displaying only low or middle income elasticities. These are food products, textiles and clothing as well as furniture and timber products. In contrast, the Estonian industry lacks an appropriate production of investment goods with a high value-added and a demand for highly qualified workers. Core investment goods industries – such as the automotive industry, machine-building or electrical engineering – only play a minor role or are even not in place.[14]

With respect to the – by European standards – small Estonian tertiary sector (65 per cent) the perspectives for a growth stimulus are not substantially better than in the manufacturing sector. In the (private) service sector, low income jobs with low qualification requirements located in wholesale and retail trade, transportation and storage and also in accommodation and food service activities account for a major share of service employment (cf. Appendix Table A1).

The backwardness of the Estonian manufacturing sector can be illustrated analytically by an approach of Donges et al. (1982: 47–65). These authors estimated typical patterns of industrial value added and industrial employment for OECD countries and industrial branches at the three-digit ISIC level. They regressed both variables on per-capita-income, population and the relative degree of industrialisation. Subsequently they grouped these industries into four categories which are typical for different phases of economic development (Box 1). Given this classification, a successfully catching-up country should have a focus – with respect to value added and employment – on the third category of industries which have competitive advantages in generating research-, skill- and capital-intensive products.

Box 1:
Categories of industries in the course of economic development

1. First category: Industries dominating in early phases of industrialisation. High income elasticities are obtained only in this early phase; later on these industries are subject to declining income elasticities and lose their dominating position. Tobacco manufactures, textiles, pottery, glass and other non-metallic mineral products belong to this category.
2. Second category: Industries found in more advanced phases of economic development which are subject to increasing competition from developing countries due to the relatively high labour intensity of production. Typical industries of this category are food and beverages, wearing apparel, leather products and footwear, furniture, plastics, rubber, fabricated metal products, jewellery, musical instruments, sporting goods and toys.
3. Third category: Industries typical for higher developed countries, dominating in mature phases of economic development. Income elasticities of demand are high for its products, which are relatively research-, skill- and capital intensive. Highly industrialised countries have a comparative advantage in these industries. This category comprises most groups of capital goods (including all types of transport equipment), paper products, printed matter and non-ferrous metals.
4. Fourth category: Industries with ambiguous results towards the regressions on the development level. Includes are iron and steel, chemicals, wood manufactures, petroleum refineries as well as petroleum and coal products.

Source: Donges et al. (1982: 55–57); own composition.

[13] For a comparison with the EU see Eurostat (2014g).

[14] Also see Raudjärv (2013: 150–151) for a similar assessment.

Table 3 exhibits the classification results for Estonia's manufacturing sector compared with those of Ireland and Germany.[15] Estonia shows a relatively high share of output and employment in the first category – industries in early phases of development – compared to both Ireland and Germany, a feature that already indicates Estonia's industrial backwardness. The second category of industries – coming under competitive pressure by developing countries – are Estonia's industrial focus with respect to value added as well as to employment, the latter with a share of even more than 50 per cent. It means that Estonia may be subject to increased price competition from developing and catching-up countries and has to fear a race to the bottom which it can hardly win. Similar structural shortcomings can be observed in the case of Ireland, which, however, benefits from a much higher productivity level than Estonia.

Table 3:
Composition of industrial value added and employment in Estonia, Ireland and Germany according to industrial categories 2011[a,b]

	Industrial value added 2011			Industrial employment 2011		
	Estonia	Ireland	Germany	Estonia	Ireland	Germany
Category 1: Industries dominating in early phases of industrialisation	7.7	1.5	4.0	7.7	4.9	4.6
Category 2: Industries in more advanced phases of economic development which are subject to increasing competition from developing countries	40.1	36.0	29.0	51.2	51.5	39.9
Category 3: Industries in mature phases of economic development in which highly industrialised countries have a comparative advantage	27.0	13.0	50.0	22.3	24.3	43.3
Category 4: Industries which are rather independent of the development level	24.6	48.6	17.0	18.6	16.2	12.2
Statistical difference (c)	0.6	0.9	0.0	0.2	3.2	0.0

[a]Per cent of industrial value added or industrial employment. — [b]No 2012 data available for value added in Germany and value added and employment in Ireland. — [c]Partly because of statistical concealment.

Source: Eurostat (2014h); own compilation and calculations.

In contrast, Germany as a high-income country has its focus on category 3 industries applying end of the pipe-technologies and benefitting from scopes of monopolistic price setting. More than 43 per cent of industrial employment and 50 per cent of value added account for this category of industries. It thereby reflects the backwardness of both Estonian and Irish industries and the still significant potential for technological and economic catching-up.

[15] For this end, manufacturing value added and employment of the three countries have been investigated by virtue of the detailed Eurostat database of annual enterprise statistics for special aggregates of activities (NACE Rev. 2) whereby the four categories of Donges et al. (1982) based on ISIC2 have been translated to NACE Rev. 2. By using this detailed database one had to compromise insofar as data for 2012 were not yet available for value added in Germany and both value added and employment in Ireland. Therefore, the comparison has been made for 2011.

2.4 Low-tech Exports

These structural barriers for catching up can be observed in terms of Estonia's foreign trade structures as well. For this purpose a factor intensity classification approach has been deployed to Estonian trade flows. The pertinent classification scheme is derived from the seminal product life cycle hypothesis of Vernon (1966) and Hirsch (1974). It says that highly developed countries have comparative advantages in the production of research-intensive goods (so-called "Schumpeter-goods") while lower developed countries specializes on raw material-intensive goods (so-called "Ricardo-goods") as well as on labour- and capital-intensive goods ("Heckscher-Ohlin-goods"). "Schumpeter-goods" can be further subdivided into mobile and immobile goods, selection criterion is the feasibility of separating research and production spatially. In the case of mobile goods this kind of separation is feasible because complementary relations between research and production are limited; spatial separation is no barrier for the knowledge transfer necessary of the production of mobile goods. Under these circumstances mobile goods are more easily to imitate than immobile goods (Klodt 1987: 29–37; Heitger et al. 1992: 43–5).[16]

This factor intensity analysis of Estonian sectoral trade patterns and international competitiveness corroborates that during the 2000s a shift towards technologically advanced products did not take place. Labour-intensive and raw-material-intensive products still comprise of about 65 per cent of Estonian exports with positive revealed comparative advantage (RCA) values[17] signaling Estonia's comparative advantage (Table 4). The shift towards raw material-intensive products signals that the export potential of standardised labour-intensive products is limited due to the strong competitors primarily from Asia. At least, immobile Schumpeter-products grew by 8 per cent points thus contributing significantly to a total Schumpeter share of about 26 per cent. This may be regarded as positive insofar as immobile Schumpeter products dominate with nearly 16 per cent the mobile ones with 10 per cent. Particularly the latter productions may not be sustainable in the long run, as plants can more easily be relocated to cheaper locations or production may be confined to activities with low domestic value-added content, such as final packing of assembly groups in the case of cell phones. The RCA values of Estonian Schumpeter trade continue to be negative, however, and indicate that Estonia's trade in technology-intensive goods is not very competitive – with "high tech made in Estonia" remaining the exception – despite all improvements made in the value-added content of Estonian export commodities. For instance: Estonia's relative strengths in merchandise trade are hardly unchanged in the category of labour- and raw material-intensive goods.[18]

In comparison to the benchmark countries Germany and Ireland, Estonia's technological gap becomes even more apparent. Germany as one of the technological leaders in the world plays in another league than Estonia. That is mirrored by a German total Schumpeter export share of about 60 per cent versus 26 per cent of Estonia and a German RCA value at immobile Schumpeter-products of 0.79 vs. –0.13 in the period 2010–2012. Especially the German focus on immobile Schumpeter-products (nearly 38 per cent in contrast to the nearly 16 per cent in Estonia) makes the crucial difference. By contrast, Estonia should be expected to be closer at eye level with Ireland. Ireland is far from being a technological leader, its immobile Schumpeter-products are even less competitive than the Estonian and the export share is also lower than the Estonian. But Ireland has managed to develop a significant competitive advantage at mobile Schumpeter-products, indicated by a RCA of about 1, and these products

[16] See Box A1 in the appendix for the classification scheme.

[17] RCA-values > 0 indicate either a more than proportional net export or a less than proportional net import in that commodity group compared to total trade and, thus, a relative strength of the reporting country. RCA-values < 0 reflect comparative disadvantages.

[18] See Eesti Pank (2013: 28).

comprised of close to 50 per cent of Irish exports in the observation period. Estonia obviously failed to enter a similar path of development.

Table 4:
Foreign trade patterns and international competitiveness of Estonia, Germany and Ireland[a,b]

	Estonia		Germany	Ireland
	1999–2001	2010–2012	2010–2012	2010–2012
Raw material-intensive products				
Exports	10.0	31.4	13.0	15.9
Imports	14.9	29.8	33.6	36.8
RCA	–0.40	0.06	–0.95	–0.84
Labour-intensive products				
Exports	63.1	33.5	17.7	10.9
Imports	39.6	23.1	18.5	20.1
RCA	0.47	0.37	-0.04	–0.62
Capital-intensive products				
Exports	9.1	9.2	9.8	10.9
Imports	10.6	12.0	10.6	9.0
RCA	–0.15	–0.27	–0.08	0.19
Mobile Schumpeter-products				
Exports	10.7	10.3	21.8	49.8
Imports	17.6	17.1	20.3	18.2
RCA	–0.49	–0.52	0.07	1.01
Immobile Schumpeter-products				
Exports	7.0	15.7	37.7	12.6
Imports	17.4	18.0	17.1	15.9
RCA	–0.90	–0.13	0.79	–0.23

[a]In per cent of total exports or total imports (special trade) on the basis of revised data of Eurostat (2010) as far as classified on SITC; averages for the years 2010–2012. — [b]RCA-values for commodity group *i* have been calculated by virtue of the following formula: $RCA_i = \ln[(Export_i : Import_i) : \sum Export_i : \sum Import_i)]$; positive RCA-values indicate competitive advantages; assignment based on SITC 3 (cf. Appendix Box A1).

Source: Eurostat (2013); own compilation and calculations.

The export recovery in Estonia observed over the past several years has not been accompanied by a significant increase in the technology content of Estonian exports, which means the structural weaknesses still prevail to this day. The situation is very similar in the Estonian services sector: although there are tendencies for rising exports of high-value financial or communications services, exports are still dominated by traditional transport and tourism services with a low content of technology and human capital (Appendix Table A2).

3. How to leave the "Race to the Bottom"

Without doubt, Estonian policy makers succeeded in developing a functioning market economy in the course of the last two decades. With good reason the Estonian market economy served as a benchmark for other transformation economies as well as a model euro crisis countries should follow in their efforts to regain fiscal stability. However, Estonia did not manage to catch-up economically with the average of the euro countries. Estonian incomes still rank at the lower third of the EU countries.

The Achilles' heel of the Estonian economy is of structural nature due to a technological gap towards the leading industrialised countries. The majority of Estonia's manufacturing and service industries continue to produce on a relatively low technology and human capital level that is again mirrored in a rather low productivity. Naturally, the low productivity is mirrored by low wages and salaries. Without any significant improvements of its economic structures Estonia will be caught in a poverty trap and is endangered by a race to the bottom because on markets of standardised goods and services the competition by emerging and developing economies will further intensify.

Estonia should become a Balassa-Samuelson country. In this case Estonia would have a relatively high domestic inflation rate and pressure towards real or internal appreciation. This would be the result of a catching-up process driven by an above average productivity growth in the tradable goods sector. This kind of productivity growth would improve Estonia's international competitiveness and increase its relative per-capita income. Moreover, Estonia could more easily cope with the hard currency it has since the introduction of a currency board regime from the outset, initially providing for a fixed exchange rate to the deutschmark and, later, to the euro.[19] To be sure, the Estonian currency board system proved to be successful with respect to monetary stabilisation and facilitated the membership in the Euro zone. But in the case of a hard currency union productivity gains are required to compete on the EU internal market as well as on the world markets. Instead, a nominal devaluation which is a policy option in case of a flexible exchange rate regime is no longer a means to improve international competitiveness.

Without these productivity gains Estonia is in a much less comfortable competitive position as member of a hard currency union. As relatively poor country Estonia has a focus on the production of raw material- and labour-intensive goods with a relatively low technology and human capital intensity, and primarily it has to compete with developing and emerging economies on world markets. Competition of this kind comes along with low prices for standardised products as the main driver for competitiveness and a missing monopolistic pricing scope. Estonia as a member of a hard currency union hardly stands any chance of winning such price wars. Moreover, in this "race to the bottom" Estonia cannot improve its competitiveness through a nominal devaluation. Therefore, devaluation in real terms, i.e. falling or at least stagnating wages and prices for such products, would be short-term the only alternative to maintain competitiveness anyway. As a negative side effect, a real devaluation would strengthen the income gap in relation to the other members of the currency union. To avoid these negative adjustments and to leave the "race to the bottom" Estonia had to become a candidate for a real appreciation.

A real appreciation in Estonia, however, demands structural improvements taking place: The economy's product range will have to change towards higher value-added products with a higher input of technology and human capital which, according to the theory of monopolistic competition, would provide scope for price gains.[20] The resulting increase in productivity would allow for a real appreciation, thus lowering the income gap in relation to highly developed member countries of the EU. This means that membership in the hard currency union of the euro is not necessarily an obstacle to an economic catching-up in Estonia but it demands a structural change facilitating high productivity gains.

[19] See Sepp et al. (2002: 330–331); Wolf et al. (2008: 152); Schrader and Laaser (1994: 83–85).

[20] This would lead to the required productivity gains in the tradable sector that would drive real appreciation without reducing competitiveness.

To overcome these structural deficiencies Estonian policy has only a limited scope of options. In the long run, internal devaluations are not a suitable instrument to raise Estonian competitiveness, because it would impede technological catching-up. Due to Estonia's membership in the hard currency area of the euro, the country needs to be rather a candidate for internal appreciation if the catching-up process should gain momentum. In this respect the euro membership requires the development of competitive economic structures in Estonia, following those of a benchmark country like Germany. The challenge for the Estonian economic policy is to create a suitable business environment to support this kind of structural change. The country itself is too small to rely on home markets or homemade technologies – it needs the global integration of its economy. It should follow the recipe of success of the so-called Sifire countries – Singapore, Finland and Ireland – which are small economies as well, but are paramount examples for rapid and sustained growth. By setting an appropriate institutional framework and by focusing on human capital formation these countries pushed forward technological progress and the development of profitable new products and tradable services as well as integration into worldwide networks of production (Yusuf and Nabeshima 2012: 48-49).

Fortunately, there is evidence that Estonian policy has already made appropriate settings. With respect to the Europe 2020 targets, which aim at strengthening the international competitiveness of the EU countries, Estonia has made visible progress in the course of the 2000s years. Furthermore, Estonia's performance in the World Bank's Doing Business Ranking and in the World Economic Forum's Global Competitiveness Index is promising. In the World Bank's Doing Business Ranking Estonia attained rank 17 out of 189 countries (World Bank 2014), in the World Economic Forum's Global Competitiveness Index Estonia climbed up to rank 29 which means rank 12 in a EU country comparison (World Economic Forum 2014: 13). Particularly, foreign direct investment is needed that could give a technological push and help to integrate Estonian locations of production at the top of global value-added chains. Structural change in favor of competitive Estonian products and services with a high content of technology and human capital would revive the catching-up of the Estonian per capita income and thereby getting a reward for the economic reforms of the last decades.

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Appendix

Box A1:
Assignment of commodities according to standard international trade classification (SITC) to commodity groups of specific factor intensities[a]

Commodity groups	Commodity division no. according to SITC rev. 2
Raw-material-intensive products	0, 2 except 26, 3 except 35, 4, 56, 57
Labour-intensive products	26, 6 except 62, 67, 68, 8 except 87
Capital-intensive products	1, 35, 53, 55, 62, 67, 68, 793
Mobile Schumpeter-prodcuts	51, 52, 58, 59, 75, 76, 77
Immobile Schumpeter-products	54, 71, 72, 73, 74, 78, 791, 792, 87

[a]The assignment scheme originally is based on SITC rev. 2 and has been converted to SITC rev. 3.

Source: Klodt (1987), Heitger et al. (1992: 43 ff.); own compilation.

Table A1:
Sectoral Employment Structure in Estonia 2013a

	in 1 000	share in per cent[b]
Total	**619.3**	**100.0**
Primary Sector	**39.7**	**6.4**
Agriculture, forestry and fishing	26.2	4.2
Mining and quarrying	4.8	0.8
Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities	8.7	1.4
Secondary Sector	**169.4**	**27.4**
Manufacturing	115.0	18.6
Construction	54.4	8.8
Tertiary Sector	**404.6**	**65.3**
Wholesale and retail trade; repair of motor vehicles and motorcycles	85.0	13.7
Transportation and storage	42.5	6.9
Accommodation and food service activities	23.7	3.8
Information and communication	19.9	3.2
Financial and insurance activities	10.3	1.7
Real estate activities	9.9	1.6
Professional, scientific and technical activities	29.3	4.7
Administrative and support service activities	25.1	4.1
Public administration and defence; compulsory social security	45.8	7.4
Education	51.1	8.3
Human health and social work activities	34.8	5.6
Arts, entertainment and recreation	16.6	2.7
Other service activities	10.6	1.7

[a]Employed persons from 15 to 64 years in the 2nd quarter 2013. — [b]Employed persons in per cent of total employment.

Source: Eurostat (2014g); own compilation and calculations.

Table A2:
Structure of Estonian service exports 2000–2013

Balance of Services	2000	2003	2006	2009	2013
Transport	47.8	43.8	41.9	37.0	37.9
Tourist travel	34.2	30.3	28.3	24.2	23.6
Others	18.1	26.0	29.9	38.8	38.5
Communication	1.4	1.8	2.2	4.3	4.1
Construction	2.7	3.9	2.4	4.8	5.0
Insurance	0.4	0.7	0.3	0.3	0.1
Finance	0.7	0.8	2.0	1.6	1.7
Computer and information	1.4	1.5	2.5	4.2	5.4
Royalties and licence fees	0.1	0.2	0.2	0.6	0.2
Other organisations	9.5	15.8	18.7	21.9	20.6
Personal purposes	0.0	0.0	0.2		0.7
Government	1.9	1.6	1.3		0.8

Quelle: Eurostat (2014i); own compilation and calculations.