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## Estonia: Transition, EU Membership, and the Euro

*"I would distance myself from victory laps and back-patting, because Estonia still has not found an answer to what [...] to do next."*

— Estonian President Toomas Henrik Ilves<sup>1</sup>

Estonia, a small country on the Baltic Sea, had become a showcase for economic reform after regaining independence in 1991. After 50 years under the Soviet regime, Estonia had established modern government institutions and an open market economy. Growth had been rapid, outpacing most peers in the region. Skype, a Voice-over-IP platform developed by a team of software designers based in Tallinn, had become a proud symbol of "e-estonia." Following multiple cycles of boom and bust Estonia was by 2015 again in the top ranks of European growth tables. But the speed of catch-up towards the more prosperous countries of Western and Northern Europe seemed to have dropped. What was next for the famous Baltic tiger?

### Country Background

Estonia was a small country with 1.3 million inhabitants, strategically located on the Baltic Sea and offering a gateway to Russia (see **Exhibit 1**). Tallinn, the capital city, had just over 400,000 inhabitants. The population consisted of 64% Estonians, 29% Russians, and 7% of other descent. Estonia was geographically and culturally close to Finland. While Russian had been the second Estonian language under Soviet rule, English had been quickly adopted in the years since 1990.

The first national elections after independence had been restored were held in September 1992. Following the 2015 election, there were a total of six parties represented in the parliament, the Riigikogu. While the strength of individual parties had changed considerably from election to election, a broad majority had remained reform-oriented since the early 1990s. Despite frequent changes in government until the mid-2000s, Parliament had unanimously backed the country's economic transformation and supported Estonia's accession to NATO and the EU. The country was a member of the OECD (since 2010), part of the Euro-Zone (since 2011), and actively involved in regional collaboration efforts across the Baltic Sea Region.<sup>2</sup>

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The 2015 election had returned Taavi Rõivas of the center-right Reform Party to the Prime Minister's office. The 34 year old Rõivas had the previous year taken over from his party colleague Andrus Ansip who had become European Commissioner after nine years as Estonia's Prime Minister. The President, elected by Parliament<sup>3</sup> for up to two five-year terms, had a largely ceremonial role. In 2011, Toomas Henrik Ilves, a former Foreign Minister and Member of the European Parliament from the center-left Social Democratic Party, had been re-elected as President. Ilves was one of the few members of the Estonian diaspora that returned to the country after it had regained independence.

## Early Economic History

Estonia's development had been shaped by its geographic position in the Baltic Rim region. Stuck between the main powers dominating the region at different times – Denmark, Germany, Sweden, and Russia – the country was controlled by others for most of its history. The capital, Tallinn, was founded in 1219 by the Danes, who ruled Estonia between 1219 and 1346. Tallinn (Taani Linn means Danish City) was one of the Hansa trading hubs during the medieval ages. The Hansa was an economic union covering the Nordic and Baltic region, led by the German port city of Lübeck between the 14<sup>th</sup> and early 17<sup>th</sup> century. As a Hansa town, Tallinn traded under common Hansa rules and used a common set of measurements and standards facilitating integration. The country came under Swedish influence from 1561 through 1709. During the so called “good Swedish times” the Swedish King Gustav II Adolphus had opened up the first university, the University of Tartu, in 1632. When Russia defeated Sweden in 1709, Estonia passed to Russian control. Prosperity levels in Estonia were generally higher than in Russia, and sometimes even higher than in Finland.

The country experienced a short period of independence between the two World Wars (1918-1940). During this time, the country had a GDP per capita that was less than Sweden but ahead of Finland. Germany and Great Britain were among the country's leading trading partners. The main industry clusters were forest products, pulp and paper, food processing, and logistics (ports). An example of the relatively advanced economy was Tarkon, an Estonian company producing radios and telephones as early as 1907. The company was partly owned by Ericsson, a Swedish telecommunication equipment manufacturer, and exported by 1939 to 27 countries including in Africa and North America.

## The Soviet Era

World War II devastated Estonia, and the Soviet Union gained control of the country. Estonia became a Soviet Republic within the context of the USSR. Many Estonians hoping to regain independence for their country went into exile or were deported into Siberian labor camps. Sweden and Finland, as well as countries further afield, became a new home for the Estonian diaspora. During the first few years of the Soviet occupation, Estonian land, real estate, and industrial and agricultural assets were entirely nationalized and/or collectivized. Growing numbers of Russians settled in Estonia, encouraged by Soviet policies.

Living standards in Estonia were relatively high compared to the rest of the Soviet Union but far behind those in other parts of Europe. Residential housing was in bad condition. When the sailing events of the 1980 Moscow Olympics were held in Tallinn, the medieval part of the city had been renovated to impress the world. Other parts of Estonia remained closed to foreign visitors. Finnish TV was one of the few ways in which Estonians could follow developments abroad. Estonian and Finnish belonged to the same family of languages, which made it relatively easy for Estonians to follow the Finnish broadcasts.

As of the late 1980s, 12% of the population made their living in agriculture, which accounted for almost 20% of GDP. The major industries included food processing, textiles and clothing, paper, chemicals and electronics. Compared to peers like neighboring Latvia, heavy and large-scale industry was a relatively small part of economic activity. Within the Soviet system, Estonia had become a center for relatively advanced activities, producing products like medical, optical and other precision instruments, TV sets, and radios. The vast majority of Estonian exports were to other parts of the Soviet Union and COMECON countries.<sup>4</sup> Food Processing was one of the traditional industries with a strong presence in Estonia. Agriculture was organized in cooperatives. Estonia also had a chemical industry focused on the production of oil from shale oil. There was also a small pharmaceuticals industry.

Manufacturing prior to independence took place in old, run-down plants managed by politically chosen elite. All important economic decisions were made in Moscow, including operational choices about investment, production goals, sourcing, sales, and wages. Factories were built for specialized tasks designated by Moscow. They had neither R&D departments nor sales and marketing functions. Within a centrally planned “input-output” system covering the Soviet Union and the Soviet-led COMECON trading partners, each manufacturing unit would produce a certain component or assemble a certain product. For example, factory number 89, later renamed pk-32, was given the role of producing black boxes for civil and military aircraft for the whole of the Soviet Union.

Telecommunications infrastructure, roads, and railways were in bad condition. The only communications link to the world was via a handful of telephone lines going through a manual Moscow exchange. There was no mobile phone system in place prior to 1991. Basic education was emphasized during the Soviet times, and the Estonian literacy rate was virtually 100%. However, factory workers were paid higher wages than individuals with university degrees. Young people who chose to stay outside Soviet youth organizations (which paved the way to a good career) tended to study apolitical subjects such as mathematics.

Estonia had oil-shale resources in the North Eastern part of the country, which fueled almost all of Estonia’s electricity generation and was the base of its chemical industry. The Estonian power grid was part of the Soviet system, with no transmission connections to Northern Europe. Over the years, oil-shale extraction and use in energy generation had caused great environmental damage to the land, the air, and the water.

As the Soviet Union started to experiment with reform in the late 1980s, a few Estonian manufacturing plants were sold to management. The first joint venture involving a foreign investor was founded in 1987, and the first Estonian private bank emerged in 1989. By the end of 1990, more than 200 joint ventures had been registered in Estonia, with Finnish and Swedish companies the key investors.<sup>5</sup> As the movement for independence gathered pace, internal price liberalization also began.

## **Independence and Economic Transformation: 1991–1995**

After a period of political turmoil and uncertainty, including visible demonstrations in Estonia of Russia’s military might, Estonia regained independence in 1991. Estonia lacked a constitution, democratic institutions, and a functioning legal system. Infrastructure was in disrepair.

The economy fell into crisis. As in many other transition economies, GDP dropped by more than a third, industrial production dropped by more than half, and inflation skyrocketed. Exports to the former Soviet Union came to a halt. Domestic demand dropped and many companies went bankrupt, leaving a large number of both skilled and unskilled people looking for jobs. Population numbers dropped as many ethnic Russians left the country.

The first free elections took place in 1992, and returned a government with only a one vote majority in parliament. The desperate economic situation forced decisive action: almost all subsidies were eliminated and the size of the government sector was radically reduced. One third of all ministries were closed and the vast majority of Soviet-era officials laid off. The creation of an effective, non-politicized civil service as outlined in the Constitution became one of the new government's central projects. With few exceptions, an entirely new generation of politicians and civil servants took over. Following the experience with Communism, new leaders were orientated towards the West, and believed in free market policies.<sup>6</sup> Most leaders were young, with Mart Laar, prime minister in 1992-94 and again 1999-2001, only thirty-two when first taking office.<sup>7</sup>

Estonia sought to gain accession to NATO and later on the EU. The possibility of Estonian NATO membership was viewed with suspicion by Russia, and complicated resolving a border dispute between the two countries that had slowed down the negotiations over implementing separation. Estonia also sought close ties with the Nordic countries and its Baltic neighbors Latvia and Lithuania. In 1992, it became a founding member of the Council of Baltic Sea States, a forum for policy dialogue among all countries around the Baltic Sea (including Russia).

The newly elected Estonian government quickly took steps to transform the country into a Western market economy. The cornerstone of the country's reforms was the establishment of a currency board that pegged the Estonian Kroon (EEK), the country's new currency, to the German Mark in 1992 (and starting January 1, 2002 to the Euro, where 1 EUR = 15.64664 EEK). At this rate, the Kroon was believed by some analysts to be undervalued in the first years after its introduction. The Estonian Kroon was made fully convertible without restrictions on capital movements.<sup>8</sup> Estonian monetary policy was effectively set by the German Bundesbank (and later the European Central Bank).

The government also began a process of structural reform. Private property and land nationalized during the Soviet period were returned to their previous owners. The principles of restitution were established by the Parliament in the Principles of Ownership Reform Act adopted in 1991 and the Land Reform Act of 1991. This process led to the dissolution of most of the agricultural cooperatives that had been created in Soviet times. Privatization was modeled on the German Treuhand approach, using direct sales to strategic investors versus distribution of shares widely to the public. Small scale privatization started in 1991. By 1993, the Estonian Privatization Agency was launched to sell larger business entities. Many of the privatized companies were acquired by foreign firms. Estonia adopted a policy of no restrictions on foreign investment or exchange controls. Foreign companies were granted equal rights with local ones, and there were no restrictions on capital flows back to the investing country. By 1996, the private sector, virtually non-existent in the late 1980s, accounted for roughly two-thirds of Estonian GDP.

Estonia opened up all markets to international competition. Soviet import quotas were removed in 1991-1992, and for a number of years Estonia had no import tariffs. Estonia concluded a free trade agreement with the European Communities in July 1994 and applied for EU membership in November 1995. Free trade agreements were signed with EFTA nations and East and Central European nations over the course of the 1990s. From 1995 onwards, however, Russia imposed double import tariffs on all goods and services from Estonia, reflecting continuing political tension between the two countries.

The telecommunications infrastructure left by the Russians was placed in a newly established state-owned company, the Estonian Telecom Company (ETC). Soon thereafter, in 1993, a seven-year monopoly in fixed lines was granted to ETC in exchange for commitments to modernize the country's infrastructure. ETC made huge investments in telecommunications infrastructure during the 1990s,

including building a mobile network that was bought second-hand from its Nordic neighbors. Internet connectivity remained outside of ETC's monopoly, and other service providers had developed.

In 1994, Estonia introduced a new tax system with a flat tax rate of 26% (both for individual income tax and corporate profit tax), a VAT of 18%, and no corporate tax on reinvested profits. Wages were also subject to a social security tax of around 30%, payable by the employer.

## **An Emerging Baltic Tiger: 1995–2002**

By 1995, the Estonian economy had returned to growth and inflation was receding. Growth reached double digits in 1997, one of the fastest growth rates across all Eastern European economies. Unemployment continued to rise as firms restructured. Both exports and imports grew rapidly, with the current account deficit rising from 4% of GDP in 1995 to 11% of GDP in 1997. Close to 90% of the current account deficit during this period was financed by rising foreign direct investment (FDI).

Foreign multinationals investing in Estonia quickly accounted for the majority of exports. The Finnish firm Elcoteq, a leading contract manufacturer of mobile phones and other equipment to Nokia and Ericsson, built a greenfield plant in Estonia and became Estonia's single largest exporter in 1994.<sup>9</sup> By 2000 the company contributed about a quarter of Estonia's USD 3.3 billion in exports. In 2001, the company cut handset production in half and reduced staff after Ericsson outsourced handset production to another firm. Foreign investors in retail and financial services often entered all Baltic countries simultaneously, leading to growing economic integration across the three countries.

Estonia introduced a new Commercial Code, based on the so-called German model, in September 1995. The Tallinn Stock Exchange began operating on June 3, 1996, with 27 listings. From 1998, the Association (or Europe) Agreements, provided the framework for Estonia's integration into the political and legal structures of the European Union. Estonia was also granted pre-accession funds from the EU. Estonian researchers and companies gained access to EU research and innovation programs.

Estonia's trade policy was highly open. By the late 1990s, customs' regulations and procedures were fully digitalized and were brought into almost full compliance with EU standards. Estonia joined the WTO in November 1999. Estonia's trade policy regime in the late 1990s was among the most liberal in Europe, comparable to Hong Kong and Singapore. Estonia refrained from trade protection, while its Baltic peers maintained some tariffs and quotas, notably on agricultural goods, it had no such barriers.<sup>10</sup> In 1997, visa-free travel was allowed for citizens from EU and Nordic countries, opening up more tourism.

The mobile phone market was opened for competition in 1994, and growth accelerated. State-owned Estonian Mobile Telephone Company (EMT), the mobile arm of ETC, started to face competition when Finnish Radiolinja entered the market in 1995. Two years later Tele2, a Swedish company, became the third mobile operator in the country. By 2001, Radiolinja had 23% of the market, and Tele2 21%.

The Russian financial crisis in 1998-1999 brought Estonian growth to a temporary halt. The Estonian stock market crashed as the general investor sentiment towards emerging economies soured. Estonian companies that still relied heavily on the Russian market, especially from the food industry but also logistical firms handling transshipments from Russia to Western markets, were hard hit. Investment dropped, unemployment jumped to 12%, and the government budget deficit reached 4% of GDP.

Government spending was at slightly more than 33% of GDP at levels similar to Latvia and Lithuania but below the EU's average of more than 45%. As the economy recovered, the government budget began registering surpluses starting in 2002, after small deficits in most prior years. Public debt

was less than 10% of GDP. In August 2001, the international rating agency Fitch raised Estonia's rating to A-, stating the country's solid fiscal policy and positive macroeconomic outlook.

Following the crisis, a number of leading Estonian companies like Hansapank and Ühispank (banking), Rakvere (food processing), and Marat (textiles) that had suffered in the downturn were acquired by foreign investors. In the fall of 2001, the government adopted the OECD Declaration on International Investment and Multinational Enterprise, committing the country to internationally agreed rules for the treatment of foreign investors. By the end of 2001, the privatization process was in its final stages, with only a small number of utilities (e.g., Estonian Post, Energy Estonia, Port of Tallinn) still in government hands. The Privatization Agency was closed.

Around 2000, the government launched a range of initiatives to develop the information and communication technology sector. In February 2000, Estonia Telecom's (ETC) monopoly concession in the fixed-line market expired, opening the market for new entrants. Within a short time, nine operators were competing. In 2001, Estonian Telecom established Atlas CityNet, an ISP offering connections up to 100 megabits per second in Tallinn. Internet penetration in 2001 was estimated at 35%, or just over the EU average, compared to 3% in neighboring Latvia. The CEO of Estonian Telecom noted that "Estonia has five international fiber-optic lines which is more than the whole of Russia." Schools were equipped with internet enabled computers. Government services like paying taxes and voting were brought online, electronic IDs were issued to every citizen, and the cabinet started to move fully towards electronic documents. An IT college was created in September 2000, with a governing body that included representatives from government, the University of Tartu, and the Tallinn University of Technology.

Estonia's mobile penetration had reached close to 50% by 2001, versus the EU average of 73.6%. Among Eastern European countries, only Slovenia (76.8%) and the Czech Republic (57.8%) had higher mobile phone penetration levels. The first mobile Internet (WAP) service was introduced in April 2000, and a GPRS mobile system (an enhancement of GSM) in the fall of 2001. In May 2001, a Mobile Applications Initiative Center was opened at the Tallinn Technical University in co-operation with EMT, providing testing facilities for training and development purposes. With rapidly increasing users, new services were tested throughout the country. Parking fees in the main cities in Estonia could be paid via a mobile phone in 2001, with some 20% paid this way in Tallinn.

Following the collapse of Maapank, a local Estonian Bank, in 1998, proposals were made to strengthen banking supervision. In 2002, the Financial Supervision Authority was created, combining functions previously distributed between the Bank of Estonia, the Ministry of Finance, and the Securities Inspectorate. Bank lending grew at very high rates (>20% annually for consumer lending), but the depth of the banking system measured by loans relative to GDP was still far behind more advanced economies.

The downturn in many OECD countries at the end of the IT/telecom boom reduced the growth of Estonian exports, especially in telecommunication equipment. With local demand for imports still strong, the current account deficit grew to more than 12% of GDP in 2002.

## **Becoming Part of the European Union: 2002–2007**

A goal shared by all Estonian governments since 1992 was to make Estonia a full member of the European Union. In 2002, Estonia had closed negotiations on 26 of the 29 chapters of the *acquis communautaire* (the collective set of EU rules and regulations that all EU members had to implement). The same year, Estonia was formally invited to join the EU along with nine other countries: Cyprus,

Czech Republic, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. A referendum on EU accession was held in September 2003, gaining approval for EU membership from more than two-thirds of voters. Estonia joined the EU on May 1, 2004.

Upon EU membership, Estonia had implemented all EU rules and regulations. It gained full access to EU funding instruments through the so-called structural and cohesion funds that supported economic and social policy, as well as funding for agriculture. Between 2004 and 2006, roughly EUR 800 million in structural and cohesion funds flowed into Estonia. Estonian workers and students were also now free to move to other parts of the EU to look for employment or further their education.<sup>11</sup>

EU membership led to a transfer of responsibility in some policy areas from Estonian to EU institutions, in particular in competition and trade policy. The most visible change was in trade policy, where Estonia had to adopt the EU's Common Commercial Policy. While gaining full access to the European Common Market (which had occurred as part of the 1998 Accession Agreement), Estonia's trade was now subject to the EU tariffs. Although the average EU tariff was low, tariff protection was meaningful in areas such as agriculture, textiles, and cars. The EU also applied a system of nontariff measures – such as quotas, anti-dumping and rules of origin regulations, export subsidies, and technical and sanitary standards – that went far beyond those in Estonia.

In May 2004, Estonia entered the European Exchange Rate Mechanism II (ERM II), which tied the Estonian currency more closely to the Euro. This was a necessary step on the path towards Euro-accession, a government goal. While Estonia had consistently met the accession criteria for government debt and budget deficit, its inflation rate was above the 3% benchmark applied to potential new members. This put a halt to the country's ambition to join the Euro-Zone by 2007.

Estonia's economic growth accelerated from around 7% in 2003 to 11% in 2006, and unemployment fell from 11% to 6%. Wages increased by more than 50%. International trade more than doubled, with imports growing slightly faster than exports. The current account deficit remained above 10% of GDP for the entire period. FDI inflows remained strong, reaching a record EUR 2.25bn in 2005. Local demand was strong, fueled by growing credit provided by the predominantly foreign-owned banking system. Housing loans increased from EUR 1bn to EUR 4bn, with many of them denominated in Euros.

In 2005, Estonia became globally known for IT when eBay bought Skype, a company providing Voice-over-IP services. Skype had been founded by two Danish and Swedish entrepreneurs and had its research and development center in Tallinn. The Skype center with about 200 employees remained in Tallinn even after the company was acquired. Two years later, a wave of cyber-attacks on Estonian government institutions and companies, believed to be triggered by a dispute with Russia about the relocation of a Russian war memorial, made Estonia's cyber security efforts internationally known. Prior to this, in 2003, Estonia had already proposed the creation of a 'cyber excellence center' to its future NATO partners.

In 2006, Tallink, an Estonian company operating ferries and cruise ships on the Baltic Sea, made headlines across the region when it acquired much of the ferry business of Silja Line, a well-known brand operating ships between Finland and Sweden. Tallink had grown out of a Finnish-Russian joint venture launched in 1989 to provide transport between Tallinn and Helsinki. The company had grown rapidly since the mid-1990s, using bank loans and international equity offerings to expand its fleet and establish a hotel chain.

## Crisis and Recovery: 2007 - 2015

During the course of 2007 signs were growing that the pace of growth achieved since the early 2000s was becoming unsustainable. Exports plateaued, both as a share of Estonian GDP and as a share of global trade; trade had already since 2003 failed to make a positive contribution to GDP growth. Inward investment dropped significantly after the strong inflows around the time of EU accession. Construction, retail, banking, and real estate accounted for about 2/3s of growth. Public expenditures rose by a cumulative 60% between 2004 and 2008. Wage growth accelerated, reaching 20% during 2007. Productivity growth (GDP per hour worked) had slowed to between 5% and 6%.

The Nordic banks that had in 2005-06 provided much of the capital inflows to fuel rapid credit expansion started to tighten lending conditions.<sup>12</sup> Year-on-year credit growth had peaked in the second quarter 2006 at an annual rate of 70%; the banks aimed to slow the expansion to around 30% in 2007/08. Housing prices reached their peak in the third quarter of 2007 after having more than doubled in the previous 2 ½ years. GDP growth rate started to drop below 10%.

The outbreak of the global financial crisis in the fall of 2008 then dramatically worsened Estonia's economic situation. Domestic demand was hit the hardest: the sudden lack of international refinancing possibilities brought credit expansion to a halt, while consumer and firm sentiment dropped. Exports were also severely hit from the global trade collapse that affected Estonia's main trading partners disproportionately hard; export values dropped by about a third between the late 2008 and late 2009. GDP fell by 5.1% in 2008 and by 13.8% in 2009. The drop in economic activity led to massive job losses, especially in construction. The unemployment rate increased to 14% in 2009 and 17% in 2010; in addition, a significant number of companies agreed with their employees and the unions to cut working hours alongside wages.

The Estonian government reacted with a policy of fiscal retrenchment.<sup>13</sup> While many other countries let 'automatic stabilizers' in the public tax and social security system work to provide a fiscal stimulus, Estonia cut public expenditures by 9% of GDP to limit its budget deficit to 1.7% of GDP. The vast majority of the fiscal tightening was achieved through expenditure cuts; only a small part was achieved through higher social security contributions and consumption tax hikes. Cuts were focused on social programs; measures for company support and infrastructure upgrading were largely sheltered, and EU funds were used as much as possible.<sup>14</sup> The budget changes were narrowly approved by parliament, but the government lost its stable majority when the social democrats left the coalition.

The government remained committed to its goal of joining the Euro-Zone, eventually reaching this goal on January 1<sup>st</sup>, 2011. It refused any suggestions to devalue the Estonian Kroona, and instead pursued so-called 'internal devaluation', i.e. pushing down wages and domestic prices. While the government could only set wages in the public sector, private sector wages too fell significantly throughout 2009. Reforms in June 2009 reduced the costs of lay-offs; EU funds were used to widen job matching and training programs.

By late 2009 the economic situation started to stabilize, with GDP growth returning to positive figures in the second quarter of 2010. The reduction in unit labor costs together with the gradual resumption of global trade enabled an export-led recovery. Investment rates resumed and capital-deepening was the main driver of productivity growth. Exports grew from 65% of GDP in 2009 to over 90% of GDP in 2010. FDI inflows reached 5% of GDP in both of these years, and the current account turned positive. Housing prices started a modest recovery. Domestic demand remained low, however, and the labor market improved only slowly. The jobs created after the crisis were largely in sectors that required more skills than those jobs that had been lost in construction. While the unemployment rate finally came down in 2011, the share of long-term unemployed rose to more than 55%. Some businesses

were in the meantime starting to report skill shortages as emigration of young, higher skilled employees had accelerated during the crisis.

While it was staging its recovery, Estonia had to face macroeconomic turbulences in the region and in Europe more broadly. In October 2008 Latvia had to rescue Parex bank, the third largest bank in the country and the only one domestically owned. One month later the country asked for international support to avoid a default. Latvia eventually stabilized the economy and stuck to its currency peg to the Euro in the face of a number of speculative attacks against its currency. In the meantime a public debt crisis of even larger proportions was developing in other parts of the Eurozone, mostly when national governments took on debt to rescue their failing banking systems. In early May 2010 a 110bn-euro bail-out program was announced for Greece; programs for Ireland (November 2010) and Portugal (May 2011) soon followed.

Estonia's GDP growth rate accelerated to 8.3% in 2011 as domestic investment and consumption replaced net exports as the main driver of growth. Exports continued to grow strongly, with robust demand from Estonia's main trading partners in Northern Europe. Imports picked up significantly, too. Growth then slowed markedly to around 2% in 2012-15. The slow European recovery and anemic global trade took its toll, domestic investment dropped off, and local demand remained subdued.

## The Estonian Economy in 2015

By 2015, Estonian prosperity levels, purchasing power adjusted GDP per capita, had reached 78% of the EU-27 average, up from 45% at the beginning of the decade (see **Exhibits 2 and 3**). Labor productivity had reached 63% of the EU average. Despite recent investments capital intensity remained low compared to the EU average, and total factor productivity<sup>15</sup> was slightly below that of other Central European EU members. The estimated hourly labor cost was at EUR 9.80 at 40% of the EU average; the equivalent cost in Poland was EUR 8.40 and in Latvia and Lithuania around EUR 6.50.<sup>16</sup>

Total trade (exports + imports) was at 130% of GDP. Estonia's major exports were machinery and equipment (29% of Estonia's total exports; this categories includes telecommunication equipment), mineral products (11%, including gasoline, shale oil and electricity) and wood products (9%) (see **Exhibits 5 and 6**). European Union countries accounted for 78% of all Estonian exports, CIS countries for 11%. Main markets were Sweden (18% of Estonia's total exports), Finland (15%) and Latvia (11%).

By 2015, Estonia had attracted roughly USD 18.7bn in foreign direct investment, with Finland and Sweden the source of about 45% of the total. Services in particular had increasingly dominated in the FDI stock (see **Exhibit 8**).

### *The Estonian Business Environment*

Estonia's business environment was regularly ranked among the top of all transition economies (see **Exhibit 10**). Particular relative strengths were seen in administrative infrastructure, information and communication technology infrastructure, and the openness of markets. Weaknesses remained in some dimensions of physical infrastructure and the access to advanced workforce skills.

Estonia had an efficient public administration. Corruption was virtually absent, in stark contrast to many other post-Soviet societies. Rules and regulations imposed a limited burden on companies. In the World Bank's 2015 Doing Business index, Estonia was ranked 16<sup>th</sup> globally, far above most transition economies and ahead of many more advanced countries.

Taxation was based largely on indirect taxes and social contributions, significantly more so than in the EU average. Company profits were taxed only when distributed, at 20%. Wage income was taxed at the same flat rate. Employers paid a social security contribution (SSC) of 34% of wages, much higher than in other EU countries. The overall tax-to-GDP ratio (including SSC) was at 32% of GDP; the EU average was at 38% while the other Baltic countries and Poland were at 26% to 32%.<sup>17</sup>

Estonia's education system was well developed. In international assessments of educational attainment, Estonian secondary-school students outperformed their peers in most advanced European countries, including Germany and Sweden<sup>18</sup>. All schools were equipped with Internet-connected computers. Life-long and vocational training for the existing workforce was, however, less well developed than in the EU average. The government had recently adopted new policies in these areas.<sup>19</sup>

Estonians had a good reputation among foreign employers for their work ethic. They were also seen as entrepreneurial, despite the legacy of communist rule. Well educated employees, however, were in increasingly short supply. Talented and entrepreneurial Estonians had found jobs in other EU countries, especially the UK, Ireland, and the Nordics. A skills mismatch, especially for older workers and those living in rural regions, was becoming a significant challenge. Average labor costs had risen to about 1/3 of the EU average (see **Exhibit 9**). Labor markets were characterized by decentralized bargaining at the firm level, and union membership had dropped below 10% of the labor force.

Higher education was expanding, building on four public universities, especially the University of Tartu and the Technical University of Tallinn, which had a long tradition as regional education and research hubs. The high quality of programmers, in particular, had been instrumental in the development of Skype's research and development activities in Tallinn. Research was growing but remained largely separate from the bulk of economic activity. R&D spending as a share of GDP had increased strongly until 2011 and was still far ahead of its Baltic neighbors despite recently dropping again below the EU average. Patenting activity remained low. Participation in international research collaborations had increased significantly after EU accession. The country made extensive use of the available EU R&D and innovation programs; about 2/3s of all public R&D spending were from the EU, much higher than in most other EU member countries. Estonia offered a wide range of policies to support R&D, focused on the most advanced and science-driven industries. A recent review had asked for making the existing good research more relevant for the economy at large.<sup>20</sup>

Estonia had made significant steps to build strong communications technology infrastructure. Estonians, both young and old, seemed to have an infatuation with the Internet. By 2014 internet penetration was at 84%. Neighbors in Northern Europe registered penetration rates above 90%; the other Baltic countries stood at 82%. Physical infrastructure was solid, but not a particular advantage. The biggest focus had been on upgrading seaports. The country's five airports (of which only Tallinn had international flights) were below western standards. Estonian Air, the government-owned airline, had in late 2015 ceased operations. Riga, the Latvian capital, increasingly established itself as the Baltic hub for flight connections. The road system was being gradually upgraded, drawing on EU funds. There were plans to create a modern "Rail Baltica" railway line, connecting the Baltic countries and ultimately also Poland and, through Russia, Northern Europe. Utilities had been privatized in the late 1990s, and a modern energy system had emerged. The Estlink cable had become operational in early 2007, establishing the first direct connection between Estonia and its Baltic neighbors and the Nordic electricity grid. Estlink 2, a second cable to add capacity, was inaugurated in March 2014.

Financial markets had grown significantly in recent years. Banking assets were equivalent to 124% of GDP, much going into real estate investments from both private and corporate borrowers. The banking market was dominated by four Nordic banks, with the largest one, Swedish Swedbank, holding about 50% market share. The Nordic banks had defined the Baltics as a 'home market' and

retained their presence throughout the 2007-2009 crisis. The local subsidiaries of the Nordic banks had been very active in introducing internet-based banking products, and sometimes used the Estonian market to test new offerings. The stock market was still relatively small and had a limited role in financing companies. US-based NASDAQ, which had acquired the OMX group initially formed by the Swedish and Finnish exchanges in 2007, owned all three Baltic exchanges, including Estonia's.

### *Clusters*

Traditional sectors dominated employment. New activities were emerging, especially services related to IT, but accounted for a limited number of jobs (see **Exhibits 5** through **7**). Clusters with critical mass had lost 14.7% of employment between 2007 and 2012, other industries had lost 1/5 of all jobs.

Furniture, forestry, and wood products drew on a long tradition in wood and wood products. Almost 50% of the total Estonian land area was covered with forests, and there were about 360 sawmills in the country. The leading Estonian sawmill, Imavere Saeveski, was partly owned by the Finnish-Swedish group Stora Enso, and another sawmill, Paikuse Saeveski, was majority-owned by Finnish UPM Kymmene. Furniture and construction companies from Northern Europe outsourced production to Estonia and its Baltic neighbors.

The logistics cluster had emerged around ports in Tallinn, Muuga, Pärnu and Kunda with good navigational access, deep water, and favorable winter ice conditions. They competed with Latvia, Finland, and Russia as transit ports between Russia and Western Europe. There was a related maritime industry with Tallink, the leading regional ferry company at its center. Cruise ships were increasingly visiting Tallinn harbor, benefiting a growing tourism industry. Baltic Ship Repairers (BSR) provided ship repair services and manufactured metal masts for wind generators.

Telecommunication equipment, remained an important part of Estonian exports, despite a clear downward trend since the early 2000s. The core of the cluster had for many years been the Elcoteq plant which had assembled mobile phones and network equipment for Nokia and Ericsson;<sup>21</sup> the company filed for bankruptcy in 2011. Other contract manufacturers like Swedish-owned Tarkon had been broadening to automotive parts. The information technology cluster was anchored by Skype's research center in Tallinn, which had developed the core software for the global Voice-over-IP system. Other companies were Playtech (gambling software, listed on London Stock Market) and NORTAL (offering e-government solutions). The IT cluster also included the IT College and IT-related activities at Tartu University and the Technical University in Tallinn. The Estonian government applied many e-government solutions, and had in 2008 attracted the NATO cyber security center.

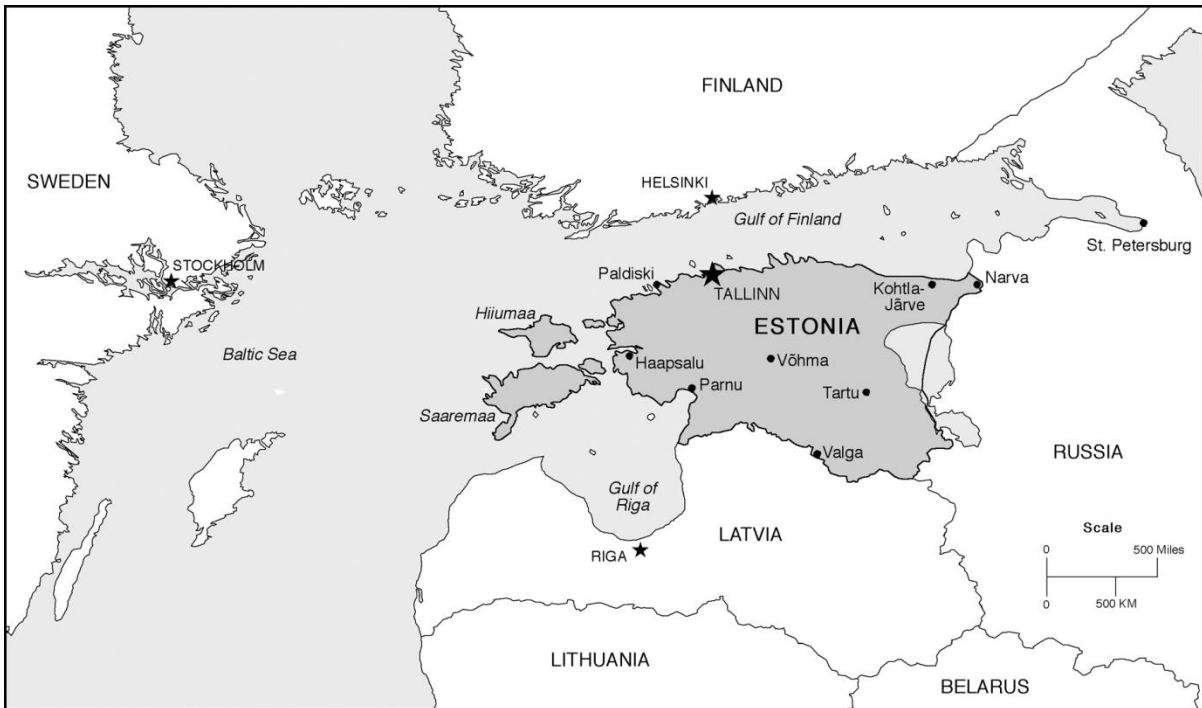
## **Future Challenges**

The 2015 election results had returned Prime Minister Taavi Rõivas to office, with his party controlling the largest bloc in parliament despite some losses. He stood in the political tradition of his predecessor Andrus Ansip, who had been a strong supporter of Estonia's free market approach, and an advocate of the country's ambition to become a globally leading e-society.

While Estonia had weathered the global and EU crisis better than most of its peers, there were difficult choices ahead. Prosperity growth remained solid but had dropped to a lower level than before the crisis.<sup>22</sup> A key challenge was the relatively low rate of productivity growth. These trends were in line with a plateauing of improvements in the quality of exports. The rate of catch-up to the more prosperous countries in the region had fallen as well, and the main markets in Europe were expected to face a protracted period of low growth. Estonia was also facing an increasingly difficult demographic

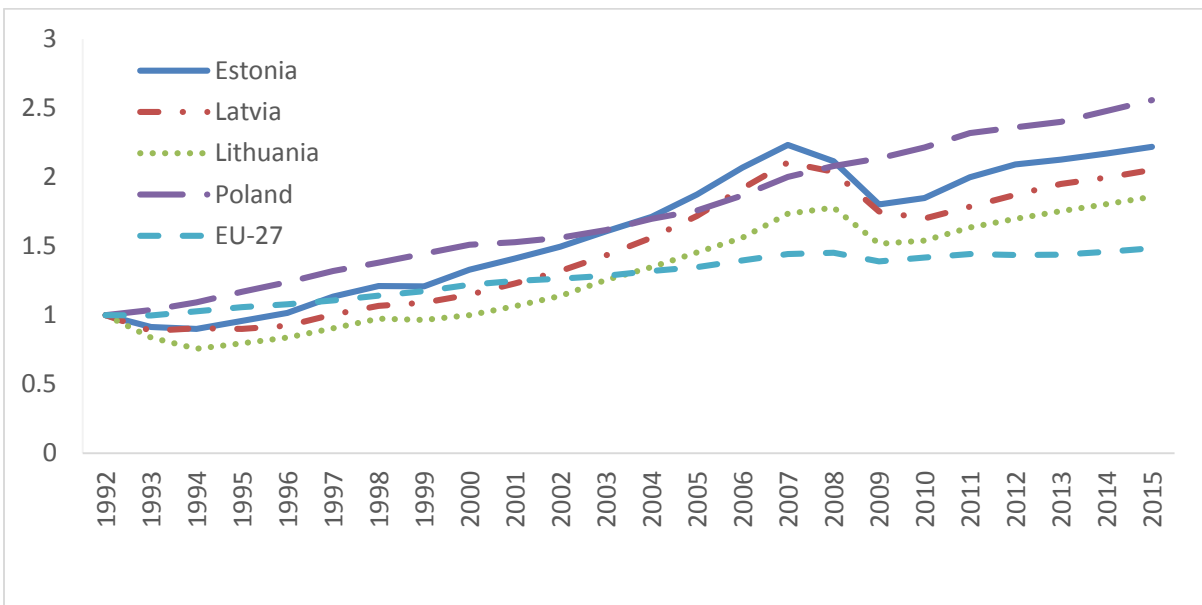
outlook. While in the past improvements in labor market mobilization had compensated for the decline in working-age population, the country was now facing a shrinking labor force.<sup>23</sup>

**Exhibit 1** Map of Estonia



Source: Adapted from the University of Texas at Austin.

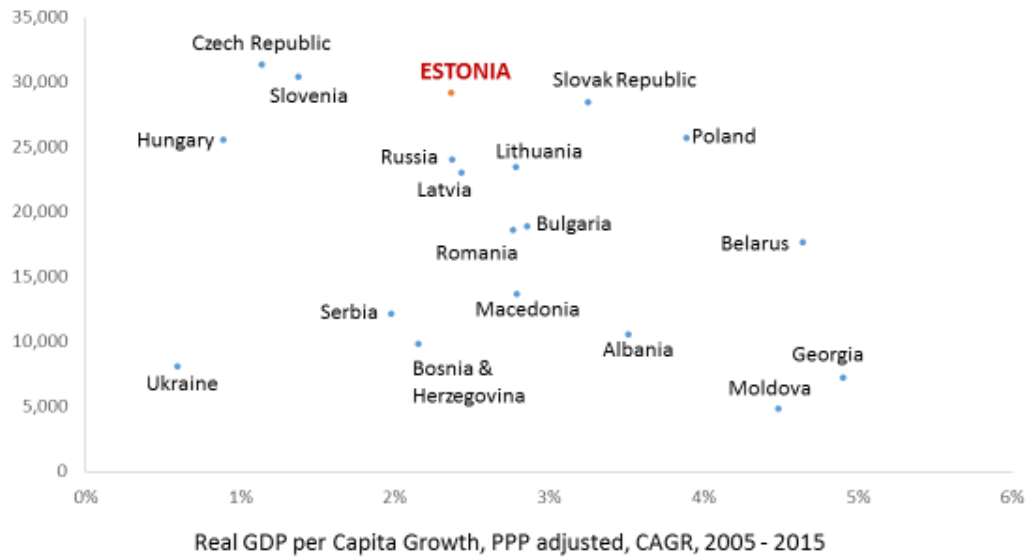
**Exhibit 2** GDP Growth in the Baltics and Poland (1992 = Index 100)



Source: Conference Board, Total Economy Database, 2016.

**Exhibit 3** Prosperity Performance, Central and Eastern European Countries, 2005–2015

Real GDP per Capita , (PPP adjusted), US-\$, 2015



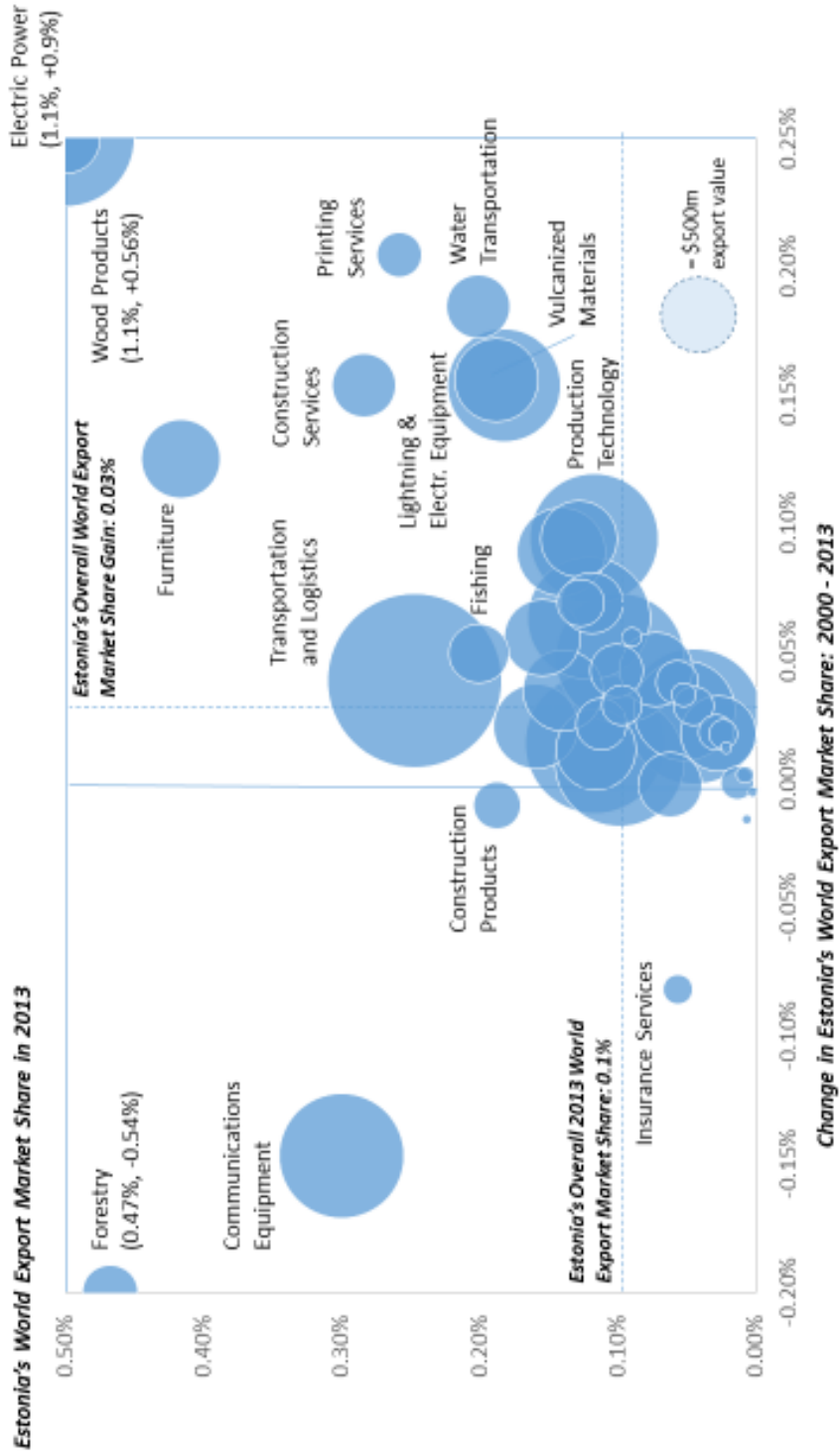
Source: Conference Board, Total Economy Database, 2016.

**Exhibit 4** Economic and Social Indicators for Estonia and Selected Neighbors, 2015

	Estonia	Latvia	Lithuania	Poland	Finland
<b>Population</b>					
Population (in millions)	1.31	2.01	2.88	38.40	5.5
Population Growth (2000-2015 CAGR)	-0.43%	-1.09%	-1.27%	0.02%	0.41%
<b>Economy</b>					
Nominal GDP (\$ in billions)	\$22.3	\$27.8	\$41.9	\$477.1	\$228.5
GDP Per Capita (PPP \$)	\$26,612	\$22,076	\$25,813	\$23,976	\$35,535
Gini Index (2012)	33.2	35.5	35.2	32.4	27.1
Exports of Goods and Services (\$ in billions)	\$13.1	\$12.6	\$17.2	\$197.7	\$60.1
Imports of Goods and Services (\$ in billions)	\$14.5	\$15.3	\$29.0	\$189.5	\$57.6
Consume Price Inflation CPI (%)	-0.4%	0.1%	-0.6%	-0.9%	-0.1%
Labor Force Participation (% of 15+ age pop.)	62%	61%	61%	57%	59%
<b>GDP Structure (% of GDP)</b>					
Agriculture	3.4%	3.3%	3.4%	3.4%	2.8%
Industry	28.1%	23.4%	30.5%	32.6%	26.5%
Services	68.4%	73.4%	66.0%	64.0%	70.6%
<b>Health and Education</b>					
Life Expectancy at Birth (years)	76	74	74	77	81
Health Spending (% of GNI)	5.7%	5.7%	6.2%	6.7%	9.4%
Education Spending (% of GNI)	4.8%	4.3%	4.9%	4.6%	6.3%
Student performance in math (PISA, 2012)	521	491	479	518	519
Student performance in reading (PISA, 2012)	516	489	477	518	524
Student performance in science (PISA, 2012)	541	502	496	526	545
<b>Infrastructure</b>					
Mobile Phone Users (per 100 people)	161	124	147	156	140
Secure Internet Servers (per 1 million people)	927	361	207	430	1,791
Energy Use Per Capita (kg)	4,476	2,171	2,469	2,551	5,993
<b>Financial Sector</b>					
Domestic Credit to Private Sector (% of GDP)	73.7%	60.7%	46.2%	54.0%	94.2%
Stock Market Capitalization (% of GDP)	10.4%	3.9%	9.2%	30.7%	57.2%

Source: Economist Intelligence Unit, World Bank, OECD, IMF, January 2016.

**Exhibit 5** Estonia's Goods and Services Exports by Cluster, 2013



Source: Prof. Michael E. Porter, International Cluster Competitiveness Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director. Underlying data drawn from the UN Comtrade, SITC Trade Statistics, IMF Balance of Payments Statistics.

**Exhibit 6** Estonia's Top 25 Export Industries by Value, 2013

Industry	Cluster	Export Value		CAGR	Export Share	
		2013 (\$m)	2007-2013 (%)		Country	World
		2013 (%)	2013 (%)		2013 (%)	2013 (%)
Petroleum Oils	Oil and Gas Production and Transportation	1,330.0	1.2%	8.01%	0.13%	
Line telephone or telegraph equipment	Communications Equipment	533.0	116.1%	3.21%	3.65%	
Parts for telecommunication equipment	Communications Equipment	446.3	-1.0%	2.69%	0.31%	
Insulated wire, cable and conductors	Upstream Metal Manufacturing	366.8	3.4%	2.21%	0.34%	
Electric current	Electric Power Gen. and Transmission	365.7	23.2%	2.20%	1.05%	
Passenger transport vehicles	Automotive	316.4	-5.6%	1.91%	0.05%	
Rubber tires, tubes	Vulcanized and Fired Materials	312.8	15.4%	1.88%	0.35%	
Prefabricated buildings	Wood Products	290.3	7.2%	1.75%	2.84%	
Builders' joinery and carpentry of wood	Wood Products	288.7	4.8%	1.74%	1.83%	
Self-propelled mech. shovel, excavators	Production Tech. and Heavy Machinery	270.1	46.1%	1.63%	0.83%	
Cocoa	Agricultural Products and Inputs	235.5	11.6%	1.42%	1.37%	
Ships, boats and other vessels	Water Transportation	234.2	96.9%	1.41%	0.27%	
Wood of conifer, sawn	Wood Products	217.3	0.9%	1.31%	0.83%	
Spirits	Food Processing and Manufacturing	209.5	1.7%	1.26%	0.88%	
Mattresses, articles of bedding	Furniture	201.5	2.5%	1.21%	1.37%	
Other ferrous waste and scrap	Upstream Metal Manufacturing	189.5	2.3%	1.14%	0.65%	
Wood rough, rough squared	Forestry	182.2	5.7%	1.10%	1.08%	
Glaze, enamel, driers	Downstream Chemical Products	168.2	7.9%	1.01%	1.13%	
Static converters	Lighting and Electrical Equipment	163.8	13.9%	0.99%	0.36%	
Wood in chips or particles	Wood Products	159.8	6.4%	0.96%	2.29%	
Convertible seats and parts	Automotive	153.1	3.4%	0.92%	0.23%	
Other metal structures and parts	Downstream Metal Products	147.2	-3.0%	0.89%	0.41%	
Fish, fresh, chilled, or frozen	Fishing and Fishing Products	143.2	13.0%	0.86%	0.23%	
Electric control panels, boards, cabinets	Lighting and Electrical Equipment	137.2	11.1%	0.83%	0.28%	
Gold, non-monetary, excluding ores	Upstream Metal Manufacturing	135.7	437.0%	0.82%	0.07%	
<b>Top 25 Industries Proportion of Total Estonian Exports</b>		<b>43.4%</b>				

Source: UN Comtrade, SITC Trade Statistics, IMF Balance of Payments Statistics, January 2016.

**Exhibit 7** Leading Clusters\* across the Baltic Countries, 2012

	Employees	LQ	Job Creation, CAGR, 07-12	Annual Wage, Euro
<b>ESTONIA</b>				
Transportation and Logistics	24500	1.55	-1.2%	10,597
Wood Products	14992	5.14	-4.2%	9,593
Furniture	7296	2.28	-5.6%	8,697
Apparel	5730	1.47	-10.2%	6,108
Nonmetal Mining	4620	5.56	15.7%	13,508
Textile Manufacturing	4270	1.16	-12.8%	7,778
Water Transportation	4061	1.80	-2.2%	14,242
Forestry	3915	6.06	NA	11,003
Communications Equip. and Services	3720	1.52	-6.0%	14,780
Agricultural Inputs and Services	2239	3.28	9.2%	9,035
Fishing and Fishing Products	2238	3.65	-1.9%	8,769
Oil and Gas Prod. and Transportation	2156	1.85	0.4%	12,959
<b>LITHUANIA</b>				
Transportation and Logistics	52619	1.96	0.4%	6,941
Distribution and Electronic Commerce	43017	1.22	-4.3%	8,458
Furniture	19664	3.63	-3.0%	6,263
Food Processing and Manufacturing	19341	1.56	-4.4%	7,949
Wood Products	17423	3.53	-8.0%	5,292
Apparel	16617	2.52	-7.2%	4,518
Construction Products and Services	14410	1.99	-3.5%	8,208
Marketing, Design, and Publishing	9604	1.17	-3.4%	8,771
Textile Manufacturing	8809	1.42	-10.1%	5,792
Forestry	8182	7.48	-0.9%	6,195
Livestock Processing	7621	1.56	-4.8%	4,377
Environmental Services	7032	1.89	-1.8%	7,297
Water Transportation	6112	1.60	-4.0%	11,373
Fishing and Fishing Products	5003	4.82	-1.7%	6,310
Agricultural Inputs and Services	2495	2.16	-3.9%	15,130
Nonmetal Mining	2191	1.56	-5.4%	8,138
<b>LATVIA</b>				
Transportation and Logistics	38062	2.40	-2.1%	10,111
Wood Products	17505	5.98	-11.0%	7,832
Construction Products and Services	9914	2.31	-6.7%	12,617
Marketing, Design, and Publishing	7159	1.48	-9.6%	12,097
Apparel	5751	1.47	-12.6%	5,495
Fishing and Fishing Products	4607	7.49	-5.5%	5,817
Water Transportation	3613	1.59	-4.6%	15,624
Nonmetal Mining	2480	2.97	-3.1%	9,556

Source: European Commission Cluster Portal, 2016.

Note: All cluster categories with more than 1,000 employees in 2013 and a location quotient (LQ) larger than 1. LQ indicates the relative specialization vs the overall EU, with a value of 1 equal to the EU average.

**Exhibit 8** Estonia's Inward Foreign Direct Investment Inflows by Sector, selected years, 2000–2014

(EUR in millions)

	2000	2004	2007	2010	2014
<b>Total</b>	2843	7374.3	10645	11638.3	16235.8
Administrative and support services	31.1	117.0	163.6	392.7	528.5
Agriculture and Fishing	24.8	40.1	67.8	169.5	331.2
Construction	87.6	157.4	322.7	179.2	165.4
Electricity, Gas	67.4	63.7	239.6	407.2	241.9
Financial Intermediation	1224.2	3511.9	4241.2	2953.2	4363.9
Information and Communication	53.7	103.3	93.0	315.8	342.9
Manufacturing	584.6	1228.3	1647.6	1722.4	2118.7
Professional, scientific, technical services	55.3	43.3	158.1	1318.5	1335.0
Real Estate	145.7	863.2	1472.1	1796.5	2858.4
Trade and Repairs	346.7	738.2	1534.6	1484.0	2377.5
Transportation, Storage	122.3	304.0	414.5	631.4	899.0
Water and Waste Management	9.9	51.1	120.2	103.3	137.1

Source: Eesti Bank (Estonian Central Bank), FDI statistics, accessed January 2016.

**Exhibit 9** Estonia's Labor Market Relative to Neighbors, 2005-2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Estonia</b>										
Real Wage Growth in EUR (%)	7.0	11.5	13.2	3.0	-4.5	-2.0	0.5	1.8	4.8	5.7
Labor Productivity Growth (%)	7.0	4.2	6.8	-5.2	-5.7	7.1	1.3	3.2	0.5	2.3
Unemployment Rate (%)	8.0	5.9	4.6	5.4	13.6	16.7	12.3	10.0	8.6	7.4
Unit Labor Cost Growth in US-\$ (%)	5.7	9.1	16.0	16.5	0.9	-5.1	-2.1	3.8	7.6	3.0
<b>Latvia</b>										
Real Wage Growth in EUR (%)	9.0	15.5	19.6	4.5	-7.3	-2.3	0.0	1.3	4.7	6.3
Labor Productivity Growth (%)	9.2	5.3	7.0	-2.9	-0.4	3.7	3.7	3.2	2.1	3.4
Unemployment Rate (%)	8.0	7.0	5.7	5.3	12.1	15.6	12.8	11.4	9.9	8.9
Unit Labor Cost Growth in US-\$ (%)	17.7	16.5	39.3	28.7	-17.3	-13.6	5.5	-5.4	6.3	4.6
<b>Lithuania</b>										
Real Wage Growth in EUR (%)	7.2	12.4	12.7	7.4	-8.3	-5.0	-1.9	-0.5	3.8	4.3
Labor Productivity Growth (%)	6.7	7.8	9.4	4.4	-7.7	7.3	5.5	2.0	2.2	1.0
Unemployment Rate (%)	8.3	5.8	4.3	5.8	13.8	17.8	15.4	13.4	11.8	10.7
Unit Labor Cost Growth in US-\$ (%)	3.3	9.2	19.1	22.6	-1.9	-14.7	1.5	-7.1	6.2	3.6
<b>Poland</b>										
Real Wage Growth in PLN (%)	-1.7	3.8	6.5	5.9	0.4	1.0	0.7	-0.2	1.4	3.7
Labor Productivity Growth (%)	1.2	2.7	2.7	0.2	2.2	6.3	4.4	1.4	1.4	1.4
Unemployment Rate (%)	18.2	16.2	12.7	9.8	11.0	12.1	12.4	12.8	13.5	12.3
Unit Labor Cost Growth in US-\$ (%)	15.3	5.2	16.4	25.9	-21.8	6.8	2.7	-6.5	3.8	0.8

Source: Economist Intelligence Unit, EIU Country Data, accessed January 2016.

**Exhibit 10** Estonia's Competitiveness Assessment Relative to Neighbors, 2013

	Estonia	Latvia	Lithuania	Poland
<b>OVERALL COMPETITIVENESS RANKING</b>				
Country Competitiveness Ranking	25	40	41	50
Change in Comp. Ranking, 2007-13	+1	+9	-3	+5
GDP Per Capita Ranking (PPP-Adjusted)	42	49	41	44
<b>MACROECONOMIC COMPETITIVENESS</b>				
<b>Human Development and Political Institutions</b>	<b>25</b>	<b>46</b>	<b>45</b>	<b>52</b>
<u>Political Institutions</u>	<u>22</u>	<u>58</u>	<u>55</u>	<u>82</u>
<u>Rule of Law</u>	<u>23</u>	<u>49</u>	<u>51</u>	<u>47</u>
<u>Basic Health and Education</u>	<u>34</u>	<u>47</u>	<u>42</u>	<u>50</u>
<b>Monetary and Fiscal Policy</b>	<b>43</b>	<b>1</b>	<b>40</b>	<b>41</b>
Government surplus/deficit	1	1	106	1
Government debt	1	1	1	1
Inflation	70	1	1	58
<b>MICROECONOMIC COMPETITIVENESS</b>				
<b>National Business Environment</b>	<b>25</b>	<b>49</b>	<b>44</b>	<b>58</b>
<u>Factor (input) conditions</u>	<u>28</u>	<u>40</u>	<u>39</u>	<u>58</u>
Logistical infrastructure	46	43	32	77
Communications infrastructure	16	41	35	48
Administrative infrastructure	10	36	32	73
Capital market infrastructure	33	52	88	62
Innovation infrastructure	37	49	41	63
<u>Demand conditions</u>	<u>17</u>	<u>63</u>	<u>47</u>	<u>78</u>
<u>Supporting and related industries and clusters</u>	<u>33</u>	<u>67</u>	<u>41</u>	<u>62</u>
<u>Context for strategy and rivalry</u>	<u>19</u>	<u>31</u>	<u>53</u>	<u>48</u>
<b>Company Operations and Strategy</b>	<b>34</b>	<b>55</b>	<b>39</b>	<b>71</b>
Strategy and operational effectiveness	41	57	37	68
Organizational practices	25	34	41	65
Internationalization of firms	57	68	47	99

Source: Institute for Strategy and Competitiveness, Harvard University (2015), based in part on survey data from the World Economic Forum; analysis prepared based on research findings by Mercedes Delgado, Christian Ketels, Michael Porter, and Scott Stern.

Note: Rank versus 116 countries.

## Endnotes

<sup>1</sup> Comments made at the “Quo-Vadis, Estonia?” conference, August 19th 2010

<sup>2</sup> There were regular meetings among the government of the three Baltic countries and a close collaboration with the Nordic Council of the Nordic countries. Estonia had in 2005 joined the Nordic Investment Bank, a public development bank for the Nordic-Baltic region. It was also active in the EU Strategy for the Baltic Sea Region, a structure to enhance collaboration among the EU members across the Baltic Sea that had been initiated in 2009.

<sup>3</sup> The President required a two-thirds majority in Parliament to be elected. If that majority was not achieved (as in 2006), an electoral college from Parliament and local officials elected the President with simple majority.

<sup>4</sup> Quoted in: Magnus Feldmann, “Free Trade in the 1990s: Understanding Estonian Exceptionalism,” in *Demokratizatsiya*, Vol. 11, No. 4, 2003.

<sup>5</sup> US Library of Congress, Country Study Estonia.

<sup>6</sup> There was some influence from outside advisors like Ardo Hansson, an Estonian who had gained his PhD in economics at Harvard in 1987 and became in the early 1990s advisor to the Estonian government

<sup>7</sup> See Mart Laar’s own account is in M. Laar, “Estonia: Little Country That Could, Tallinn: Centre for Research into Post-Communist Economies,” 2002.

<sup>8</sup> A currency board fully backs the monetary base with foreign currency reserves.

<sup>9</sup> Marek Tiits, Juriado (2006), “Intra-Industry Trade in the Baltic Sea Region,” Working Papers 02-2006, Institute of Baltic Studies.

<sup>10</sup> Runno Lumiste, Robert Pefferly, Alari Purju (2007), “Estonia’s Economic Development: Trends, Practices, and Sources,” Commission of Growth and Development, Tallinn.

<sup>11</sup> There were some limitations to full mobility on the labor market, for example in Germany.

<sup>12</sup> Ringa Raudla, Rainer Kattel (2011), “Why Did Estonia Choose Fiscal Retrenchment after the 2008 Crisis?”, *Journal for Public Policy*, 31 (2), pp. 163–186.

<sup>13</sup> This later triggered a public dispute between the US economist Paul Krugman and the Estonian President Tomas Ilves about the success of these policies. See Raudla/Kattel above.

<sup>14</sup> The Estonian government allocated scarce budget resources to ensure that no available EU funds were lost due to insufficient national co-financing which was in most cases required to be eligible for EU funding.

<sup>15</sup> Total Factor Productivity measures productivity levels after accounting for differences in skill and capital intensity. It is often viewed as an indicator of technical and management quality.

<sup>16</sup> Eurostat (2015), [http://ec.europa.eu/eurostat/statistics-explained/index.php/Wages\\_and\\_labour\\_costs](http://ec.europa.eu/eurostat/statistics-explained/index.php/Wages_and_labour_costs), accessed February 2016.

<sup>17</sup> European Commission (2013), Taxation Trends Report.

<sup>18</sup> OECD (2012), PISA 2012 Results in Focus.

<sup>19</sup> European Commission (2015).

<sup>20</sup> European Commission (2012), Peer-Review of the Estonian Research and Innovation System

<sup>21</sup> Marek Tiits, Tarmo Kalvet, “Nordic Small Countries in the Global High-Tech Value Chains: The Case of Telecommunications Systems Production in Estonia,” Tallinn University of Technology (2012).

<sup>22</sup> IMF (2015), IMF Country Report 15/227; Ketels/Pedersen (2015), 2015 State of the Region Report, BDF.

<sup>23</sup> IMF (2015). The labor force was expected to shrink by 1% annually for the next two decades.