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WORKING PAPER NO.25

# Estonia's Economic Development: Trends, Practices, and Sources

Rünno Lumiste  
Robert Pefferly  
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## **A Case Study**

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## About the Series

The Commission on Growth and Development led by Nobel Laureate Mike Spence was established in April 2006 as a response to two insights. First, poverty cannot be reduced in isolation from economic growth—an observation that has been overlooked in the thinking and strategies of many practitioners. Second, there is growing awareness that knowledge about economic growth is much less definitive than commonly thought. Consequently, the Commission’s mandate is to “take stock of the state of theoretical and empirical knowledge on economic growth with a view to drawing implications for policy for the current and next generation of policy makers.”

To help explore the state of knowledge, the Commission invited leading academics and policy makers from developing and industrialized countries to explore and discuss economic issues it thought relevant for growth and development, including controversial ideas. Thematic papers assessed knowledge and highlighted ongoing debates in areas such as monetary and fiscal policies, climate change, and equity and growth. Additionally, 25 country case studies were commissioned to explore the dynamics of growth and change in the context of specific countries.

Working papers in this series were presented and reviewed at Commission workshops, which were held in 2007–08 in Washington, D.C., New York City, and New Haven, Connecticut. Each paper benefited from comments by workshop participants, including academics, policy makers, development practitioners, representatives of bilateral and multilateral institutions, and Commission members.

The working papers, and all thematic papers and case studies written as contributions to the work of the Commission, were made possible by support from the Australian Agency for International Development (AusAID), the Dutch Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency (SIDA), the U.K. Department of International Development (DFID), the William and Flora Hewlett Foundation, and the World Bank Group.

The working paper series was produced under the general guidance of Mike Spence and Danny Leipziger, Chair and Vice Chair of the Commission, and the Commission’s Secretariat, which is based in the Poverty Reduction and Economic Management Network of the World Bank. Papers in this series represent the independent view of the authors.

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## Abstract

This paper is a case study of an open small economy whose development and growth is based largely on foreign trade and foreign direct investment (FDI). One purpose of the paper is to uncover the causes that have created such a development pattern. Estonia is a former socialist economy, part of the former Soviet Union (FSU), which introduced comprehensive structural and institutional reforms in the 1990s. The country's transition to a market economy has been enhanced by integration with the European Union (EU), which was very important in evolution of institutions. Other research in this paper concerns the role of external anchors upon economic development; that is, mandates that reflect the values, objectives, and aims of a socioeconomic alliance, and which also frame Estonia's economic policy. One conclusion of the paper is that the EU integration process played an important role in creating and supporting development of a liberal, private sector-based market economy. Implementation of the rules, standards, and norms helped to increase the competitiveness of Estonian companies by improving market access to the EU and other markets. The external anchor concept is related to the international agents.

A critical factor for future development and structural changes will be transforming Estonia from a transition economy to an innovation economy. The paper examines the role of the information and communication technology (ICT) sector and Skype in this development. The case of Skype demonstrates the much wider impact of the new telecommunication technology on society. Estonia's development in this field is empirical evidence that location, production, technology, and timing along with external anchors represent a catalyst for change.





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# Estonia's Economic Development: Trends, Practices, and Sources

## A Case Study

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## I. Introduction

Since regaining independence in 1991, Estonia's economic development has been influenced by initial conditions (age structure, skills, and education of the population; geographic location; infrastructure) as well as economic and political reforms. Introduction of Estonia's national currency, the kroon, and monetary reform supported by prudent macroeconomic policy brought price stability and created a solid basis for economic development. Comprehensive structural and institutional reforms created a well-functioning market economy. According to the definition given by the World Bank, Estonia's transition process already was a success by the early 2000s.<sup>2</sup>

Estonia is an example of an open economy whose development and growth is based largely on foreign trade and FDI. One purpose of the current study is to describe Estonia's most important development trends and investigate their causes.

Estonia's transition to a market economy has been enhanced by integration with the EU. This was very important in the evolution of institutions in the decade before Estonia joined the EU in 2004. After accession, Estonia became a participant in the general deepening and widening process of the EU, which included development of more integrated markets and associated institutions in the country, and improved capacity of economic agents for adjusting to market competition.

One particular research question is related to the possible role of external anchors upon economic development; that is, mandates that reflect the values, objectives, and aims of a socioeconomic alliance, and which also frame Estonia's economic policy. Thus, the EU membership is considered as one important

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<sup>2</sup> World Bank (2002).

anchor and the fulfillment of a wide set of indicators for this membership definitely framed Estonia's economy and political system.

Estonia is still a middle-income country. For future development and reduction of the income gap with high-income countries, further structural changes are necessary. To that end, what new activities could help create economic growth? The ITC sector and new services associated with the sector could be one source of growth. This invites wider questions: are values related to high-tech industries and the results of information-based innovation external anchors? Does creating a positive image and providing support for ITC applications yield measurable development in the sector and help further the role of ITC in society? To help answer these questions, the development of Skype and its application from an Estonian perspective is discussed in this paper.

## **II. General Economic Framework**

### **Initial Conditions**

Estonia, like the other Baltic States of Latvia and Lithuania, gained its independence for the first time after World War I during the collapse of Czarist Russia and in the rise of Soviet Russia. The statehood lasted from 1918 to 1940 and ended with Estonia's annexation by the Soviet Union in June 1940. That was followed by the German occupation of 1941–44 and the return of Soviet power in 1944. The Baltic States were part of the Soviet Union in the form of Soviet Socialist Republics from August 1940 until the collapse of the Soviet Union in 1991. The experience of statehood and a market economy between the two World Wars is a distinctive feature of the Baltic States in comparison with the other 13 former Soviet Republics that were part of the Soviet Union.

German cultural had a strong impact on Estonia until World War II. There was a small but economically influential Baltic German minority until 1939 and Germany was Estonia's single most important trade partner, accounting for 30 percent of exports and imports. After regaining independence in 1991, Estonia started to build up state institutions and emulated the German law system. The historical experience had a role to play but there were probably more important circumstances. After reunification in 1990, Germany became the largest and the most powerful EU economy, and the deutschmark was the most stable European currency.

Neighboring Finland has always been of importance to Estonia. The similarity of the Estonian and Finnish language has been crucial. The general issues of the market economy and the main rules of a democratic society were spreading through TV and other communication channels from Finland during the Soviet period. In Estonia, that partly helped to compensate for the closed "iron curtain" during the communist period compared to Central European countries like Hungary or Poland, and made the exchange of information

possible. The close economic connection with Finland played an important role in the transformation of foreign trade from east to west and later supported the integration with the Western world and particularly with the EU.

There was a strong political consensus in Estonia on the need for fast and substantial economic reforms, centered on a fast and comprehensive break from the Soviet-type economic system. There was a widely shared understanding by the general public that the reason for modest economic development was the Soviet-type economy with its state ownership; its closed nature and orientation towards the Soviet market; and its rigid, value-losing currency (the Soviet ruble). The historical experience of Estonian statehood and the market economy was glorified, which also created a very strong support for the economic reforms.

Estonia also understood that it did not need to invent all the necessary economic tools to introduce reforms. Different models from other countries were borrowed to accelerate economic reforms. As a result of a political consensus, the German Law system was adopted as a basic legal framework.

### **Liberalization of the Economy**

Economic liberalization means abolishing a system of fixed prices and most subsidies for socially or politically relevant goods and services. A starting point for price liberalization in Estonia, as in the other parts of the FSU, was a very different from the market economy price structure. Liberalization was accompanied by the adjustment of the whole price system to the new conditions through very deep changes in relative prices.

One feature of liberalization in Estonia and other Baltic States was a huge jump in prices of oil and other natural resources that were relatively cheap in planned economies. These resources became more expensive in comparison with other goods and services. The adjustment process also was accompanied by high inflation.<sup>3</sup> Increases in some prices caused additional costs in the entire economy, which resulted in cost-push inflation (due to fast increase in prices of energy and raw materials).

Another set of prices was connected to the purchasing power of citizens and influenced the consumption of socially essential goods and services (such as rental payments, prices of communal services, and transportation). The combined solution that was applied is often used in the set of economic reform methods: the majority of prices have been liberalized but administrative regulation of some prices has been retained. In Estonia the administratively regulated prices are those of electricity and central heating, postal services, telecommunications, and public transportation. Those prices have been increased

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<sup>3</sup> In 1991 and 1992 Estonia experienced very high inflation due to the collapse of the FSU and lack of monetary discipline. The Consumer Price Index (CPI) was 1,076 percent in 1992. The monetary reform in June 1992 meant a very deep policy change. The average annual CPI was 89.8 percent in 1993, 47.7 percent in 1994, 29.0 percent in 1995, 23.1 percent in 1996, 11.2 percent in 1997, 8.2 percent in 1998 and 3.3 percent in 1999 (Estonia 1999, p. 220).

but the price policy is controlled by the respective central government agency or in some cases (such as prices of communal transportation) by local governments.

Foreign trade liberalization includes the introduction of a single foreign currency exchange rate, along with a substantial decrease in necessary licenses and quotas and other administrative restrictions on trade activities. Full convertibility of a currency is a very important element of liberalization. For the Estonian kroon, the transactions described on the current account and on the capital account of balance of payments have been liberalized practically from introduction of the currency.

Liberalization of trade is intended to expand markets for domestic producers. Through specialization and realization of absolute and relative advantages, trade liberalization can increase of supply of consumer goods through imports, and can also create spillovers of knowledge from more advanced products.<sup>4</sup> Trade liberalization can be considered also in the context of price liberalization. Because most of Estonia's industries have been dominated by monopolies or have had features of oligopolistic competition, the import of foreign goods has been an important way to provide needed products for the domestic market and to balance demand and supply at the beginning of reforms and before structural changes. Through trade, international prices have transformed the economy and formed the basis for a completely new set of market signals, which have started to allocate resources within the economy.

Liberalization of Estonia's banking and financial sector also had a profound effect on the money and capital markets. By liberalizing activities, interest rates, and lending procedures, entrepreneurship has been unleashed, opening up possibilities for creating companies and different ownership forms and attracting investment beyond one's means. Liberalization tools also have been related micro-level changes in the economy.

Estonia pursued a liberal framework from the very beginning of the economic reforms. For example, a foreign trade regime without any customs tariffs for imported goods was in place until end 1999. In January 2000, a limited number of tariffs were introduced against non-EU countries. Although EU membership from May 1, 2004 generally has been seen as a positive event, it also introduced the EU foreign trade barriers against the non-EU members.

### **Monetary Reform and Stabilization of the Economy**

The first liberalization attempts were made when Estonia still belonged to the ruble zone. The Estonian kroon was introduced in the framework of the monetary reform in June 1992.<sup>5</sup> The currency board regime was used to achieve

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<sup>4</sup> See more about the role of trade in Åslund (2002), Estrin (2002), and Rodrik (2006).

<sup>5</sup> During the currency reform, all Estonians who had registered their names for the conversion were allowed to exchange 1,500 rubles at a rate of 1 kroon per 10 rubles (approximately 18 deutschmarks) from June 20 to June 22, 1992. Larger amounts of rubles were converted into kroon at a ratio of 1 kroon to 50 rubles from June 26 to June 30. Bank deposits made by residents were

macroeconomic stability in Estonian and the convertibility of the Estonian kroon was introduced. The exchange rate of the kroon was fixed to the deutschmark (1 DM = 8 EEK) and to euro since January 1, 1999. The exchange rates to other currencies are calculated according to the rate with the euro. The introduction of the kroon was an important condition for stabilizing the economy and the basis for future economic development.

The exchange rate between the kroon and the deutschmark was set at the level of the ruble at the time of the currency reform. The ruble's market rate was determined in interbank auctions, which began at end of 1980s. Due to the scarcity of currencies offered and abundance of the rubles, the ruble rate was undervalued. Taking that exchange rate between the ruble and the deutschmark as the basis for the exchange rate between the kroon and the deutschmark undervalued the kroon. That undervaluation meant that the kroon's exchange rate was below the level that prevailed in the medium term once Estonia's productivity began to rebound.<sup>6</sup>

In June 1992, when Estonia introduced its currency and started the stabilization, the average wage was US\$41, two times lower than in Poland and three times lower than in the Czech Republic. A similar level in the Russian Federation, which was at the time the key trading partner of Estonia, led to a mandated low initial wage level. Setting the exchange rate to bring the dollar wages close to Poland's level was not a serious option, as it would have destroyed the competitiveness of the unreformed industrial and agricultural sectors.

In this matter, Estonia's choice regarding the exchange rate and its impact on domestic prices compared to international prices was exactly the opposite to what happened in the German Democratic Republic after reunification with the Federal Republic of Germany. Of course, in Germany there were very strong political reasons that determined the exchange rate between the eastmark and the deutschmark, but the result was that the German Democratic Republic had wage levels and social costs that were too high in comparison with the level of productivity.<sup>7</sup> Another reason was probably high migration from the eastern part to the western part of Germany, and the young and better-educated part of the

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converted into kroons at the rate of 1:10. Rubles held by enterprises were also converted into kroons at the rate of 1:10. There are several articles written on the details of the Estonian monetary reform; see Hansson (1995), Kallas and Sörg (1995), and Lainela and Sutela (1994).

<sup>6</sup> Hansson (1995).

<sup>7</sup> From July 2, 1990, the two Germanies were pre-united by sharing the deutschmark as a common currency. Stocks of eastmarks were changed into deutschmarks at an average rate of 1.8:1 and all monetary contracts were converted to a deutschmark base. Children below 15 years could exchange 2,000 eastmarks, adults below 60 years 4,000 eastmarks, and pensioners 6,000 eastmarks on a one-to-one basis. Most other amounts of money and financial claims, including company debt of about 260 billion eastmarks, were exchanged or converted at a rate of 2:1. Price contracts, wage contracts, and pension claims were converted at a rate of 1:1 (where pensions were recalculated using the West German schedules amended with the East German pension claims as lower bounds). See Sinn (1996, p. 146).

population dominated this trend. There were very big investments from the federal state budget into the infrastructure in the eastern part of Germany, but that was probably only a necessary but insufficient condition for economic growth. The result was that wages and other costs were too high in comparison with productivity in the eastern part of Germany, which caused unemployment and modest economic growth in the area.<sup>8</sup>

The applied exchange rate with ruble made Estonia's imports expensive and favored the export of goods and services. The exchange rate promoted FDI, but domestic producers that sold the majority of their output on the domestic market had limited resources for importing equipment for technological changes. These conditions created a stimulus for export and were favorable for foreign capital to achieve a larger share in the economy.

Estonia has had relatively high inflation, especially in the first years after monetary reform. Economic development under a fixed exchange rate arrangement has resulted in constant appreciation of domestic inputs. On the other hand, the economy has witnessed a rapid growth of output and exports, which is manifested in the fact that Estonian enterprises have been competitive despite the growing production costs.

The ability of Estonia to sustain the exchange rate peg was related to sharp growth of productivity of tradables producers. Estonia maintained huge growth rates of exports in the face of real appreciation. Furthermore, the quality of consumer goods and services increased markedly once firms were exposed to competition from producers from other countries. That increased the competitiveness of local goods and services, allowing producers to sell them for higher dollar or deutschmark prices. At the same time, the inflation was quite high because the continuing relative price shifts took place first of all through the price increases. The country did not plan very low inflation in 1990s.

Inflation decreased to a single-digit figure in 1998, six years after the monetary reform was introduced. The prices of services (a closed sector) tended to increase more rapidly practically during the whole period, though, the difference between the price increase of services and the total CPI figure was 1–2 percent after 2000 (figure 1). The CPI was lowest in 2003, 1.3 percent, but afterwards price increases returned and the CPI was 4.1 percent in 2005 and 4.4 percent in 2006. The increase of prices of services was 4.1 percent in 2005 and 5.7 percent in 2006. During the first half of 2007, the price increases speeded up even more and the CPI was 6.4 percent in July 2007. That postponed the European Economic and Monetary Union (EMU) membership for several years. The price increases were caused by a shortage of resources due to the fast economic growth (shortage of labor first of all, which was accompanied by a fast growth of wages and domestic demand) and a very rapid growth of credits and the real estate market. That put strains on the currency board system adjustment capacities. The

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<sup>8</sup> Sinn and Westermann (2001).

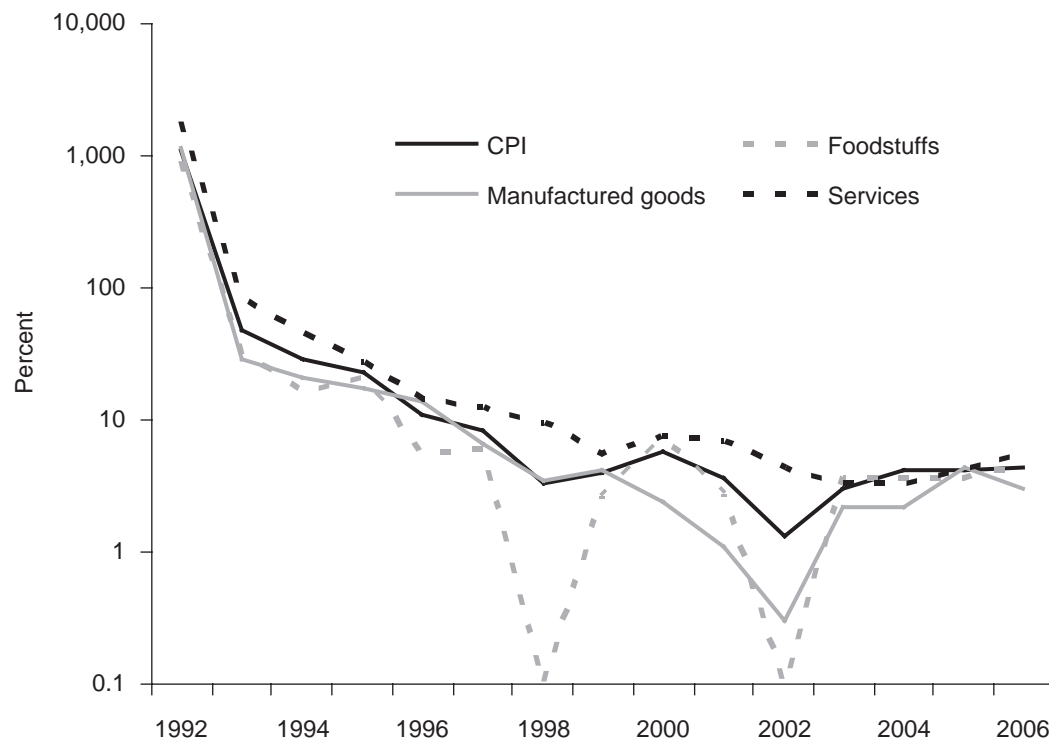


increase of interest rates due to the restrictive policy of the European Central Bank (the majority of interest rates of the real estate financing credits are fixed to the six-month EURIBOR) would limit demand of credits. Then, after the required increase of excise taxes of gasoline and alcoholic beverages to achieve the EU required minimum levels, the price increases would presumably cool down. At the end of 2007, it was too early to say if that decline in demand would also limit price increases.

### Structural Reforms

The structure and dynamics of the Estonian economy have been substantially influenced by local natural resources, of which oil shale is the most important. Oil shale mining for burning in equipment and for the chemical industry started in the 1920s. After World War II, an oil shale-based power engineering industry had been created. That industry produced the majority of electricity in Estonia in the 2000s.

**Figure 1: The CPI and Its Components, 1992–2006 (percent, log)**



Sources: Eurostat, National Statistics.

In 1970s and 1980s Estonia had typical features of an industrial country. The share of manufacturing and agriculture was larger than in developed countries whereas the state of infrastructure, service, and trade sectors in the economy was modest. The transition to a market economy has been accompanied by the introduction of modern banking and finance, real estate markets, and business services. The retail and wholesale trade grew also very rapidly.

Substantial investments were made in the 1980s in transportation. The most important construction was Muuga Port near Tallinn. This port has been increasingly important for the Estonian economy, serving domestic needs as well as transit trade after regaining independence.

Structural changes have been very important because the structure of planned economies was one of the main sources of problems. Such changes addressed the industrial structure of the economy (a very large share of manufacturing and agriculture, a small service sector); the size structure of industries (a limited number of large companies in every branch, a modest proportion of small and medium-size companies); ownership structure by type (dominating state ownership, a missing private sector, basically domestic companies and very few foreign companies); and market structure (the proportion of domestically produced and exported production).

Changes in the economic structure have been connected with privatization and liberal capital transfers, which created a variety of new activities. The new private sector, which was formed as a result of the privatization of state-owned companies and the emergence of new private companies, was a major engine of stabilization of the economy and of further economic growth.

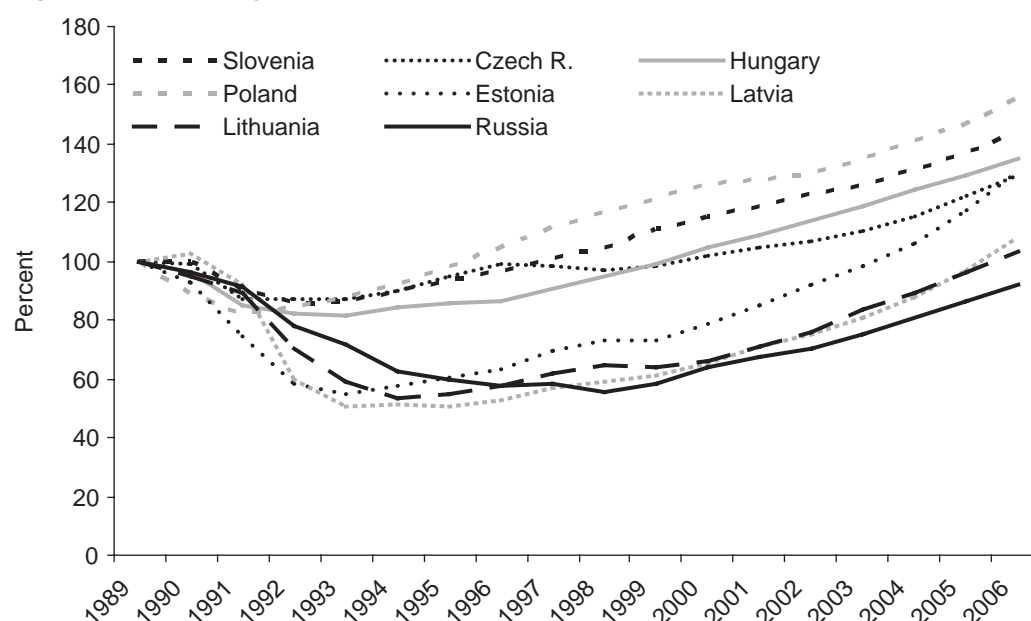
From GDP dynamics, it is evident that following reforms to create a market economy, all economies in Central and Eastern Europe went through a period of economic decline (figure 2). The decrease was 15–20 percent in Slovenia, the Czech Republic, Hungary, and Poland and 40–45 percent in the Baltic States and Russia.<sup>9</sup> These figures show that economic changes and adjustment to new conditions were much more dramatic in the FSU. The decline in the Baltic States was as deep as in Russia, the main difference being that due to very radical and comprehensive reforms, the Baltic States started to grow in 1994–95 and achieved the 1989 level of GDP growth in 2004–06.<sup>10</sup>

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<sup>9</sup> There have been several critical comments on the reliability of statistics and possible comparisons of time series data in Central and Eastern European countries. In the FSU, very high inflation made the evaluation of real growth figures also very complicated. Furthermore, the transformation from the material balances system to the value added concept of GDP had an impact on this measurement problem. Our estimates are based on growth figures presented by countries included and we agree that the comparisons of different countries on the basis of available statistics could be quite conditional.

<sup>10</sup> The 1989 level is used for comparison because that was the last pre-reform year. Market economy reforms started in 1990.

**Figure 2: Real GDP Dynamics in Central and Eastern Europe (percent, 1989 = 100)**



Sources: Eurostat, National Statistics.

In Russia, the economic decline continued much longer and the first year of GDP growth was in 1997, followed by a decline in the next year due to financial crises and deep devaluation of the ruble. The level of 1989 was not achieved in 2006; nevertheless there was fast growth starting from 1999, mostly due to revenues from the sale of oil.

Before economic reforms, Estonia had features typical of other industrial economies, albeit, compared with developed countries, a larger share of manufacturing and agriculture and less developed infrastructure, service, and trade sectors. After reforms, the general structure of the economy changed substantially.

The structural changes described in table 1 show that between 1990 and 2003, the Baltic States transformed from Soviet-type economies to modern market economies with a structure quite similar to the EMU member states. That economic growth is first and foremost related to institutional and structural changes.

**Table 1: The Structure of the GDP in the Baltic Countries and the EMU (percent)**

Sector	Estonia			Latvia			Lithuania			EMU
	1990	1995	2003	1990	1995	2003	1990	1995	2003	2002
Agriculture	16	9	5	22	10	5	27	12	7	2
Industry	50	29	30	46	33	24	31	35	34	28
Services	34	62	65	32	57	71	42	53	59	70

Source: World Bank EU-8 Quarterly Economic Report, January 2005, Part III.

Access to new markets was ensured by institutional changes such as free trade agreements with other countries, relations with new foreign trade partners, and implementing quality control systems, all of which made Estonian production acceptable in foreign markets. Structural changes also were manifested in the formation of new companies producing high-quality goods and in the adaptation of existing companies so that goods and services could be marketed despite increased domestic production costs.

### **The Role of FDI**

Estonia liberalized its capital movements further than required by EU accession. Since the country's monetary reform in 1992, there have been no restrictions on FDI. Foreign investors may open accounts in both foreign and domestic currencies, profits and enterprise liquidation income can be freely repatriated, and the currency is fully convertible.

At the beginning of the transition period FDI flows into Estonia were mainly caused by the privatization process. As privatization in the former German Democratic Republic was perceived as the fastest model for changing state ownership into private ownership, that model has been taken into consideration for Estonia. The Estonian Privatization Enterprise was founded in 1992, followed by the Estonian Privatization Agency, which was founded in 1994 and operated until 2000.

The Estonian Privatization Enterprise and the government followed the example of and received advice from the Treuhand (Treuhandanstalt or Treuhand agency), which was the agency that privatized the German Democratic Republic's state-run enterprises. At the same time, Estonia's privatization had important differences from the German scheme. State-run companies were not introduced into the balance of the Estonian Privatization Enterprise as was done in Germany's Treuhand. There was an open tender only for core ownership of enterprises in Estonia, and the minority shares were reserved for the voucher scheme and combined with the privatization of living rooms. The whole process was framed by competition between political parties that advanced the interests of former owners in the restitution process, interests of former managers, and interests of workers and foreign companies.<sup>11</sup>

The privatization process began in manufacturing and services and was completed in these sectors by the end of 1996. The privatization of infrastructure took more time and continued into the 2000s. Economic concerns dominated the privatization of enterprises, especially the selling of enterprises for cash, the lack of privileges for employees of privatized enterprises, a limited role of privatization securities (vouchers), and finding a core investor for a privatized enterprise before shares of the company were sold for privatization securities.

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<sup>11</sup> On privatization and political motives in Estonia, see Frydman, Rapaczynski, and Earl (1993); Kilvits, Purju, and Pädam (2005); Purju and Teder (1999); and Terk (2000).

Because of this approach, foreign investors had an important role in the privatization process. The new owners with foreign participation paid 16 percent of the total purchasing price and offered 30 percent of all investment guarantees in 1993–96. Only one important advantage was given to the domestic owners during that period: they had the right to pay by installments and the period of paying was up to 10 years.<sup>12</sup> This also led to the creation of joint ventures registered in Estonia or using Estonian companies to participate in privatization by foreign economic agents. The characteristic feature of the Estonian model of privatization was to sell without reorganizing and restructuring, which also was very suitable for foreign participation in this process.

The privatization of the national infrastructure enterprises—that is, the energy and telecommunication sectors (Estonian Railway, Estonian Energy, Estonian Oil Shale, Estonian Telecom, and the Port of Tallinn)—became topical in 1995. By 1992, 49 percent of Estonian Telecom shares had been sold to the TeliaSonera joint venture, but the state still had part ownership and in 1999 organized the IPO of 24 percent of the shares, while retaining a minority position. In 2002 and 2003, TeliaSonera held negotiations with the government about the possible purchase of its shares but negotiations failed partly due to the price, which the government thought too low.

Estonian railway's majority shares were privatized in 2001 to the Baltic Rail Service (a private company) and the tender included infrastructure such as railway and related land. The main source of income for the Estonian Railway has been oil transportation from Narva, a town on the Estonian-Russian border, to the Port of Tallinn. The main beneficiaries of the oil product's export through Estonian ports have been the privately owned companies operating in the Port of Tallinn. These companies are owned by Estonian, Western, and Russian investors and had a strong impact on political discussion on the privatization of the railway and ports. Estonia made the decision to buy shares back from the Baltic Rail Service in autumn 2006 and the deal was completed at the beginning of 2007. The future approach to railway business is planned to be keeping the infrastructure in the ownership of a state-owned company and to clearly separate the operating services and allow them to be provided by competing private companies.

Table 2 describes the sources of the Estonia's fast economic growth. The investment rate was more than 30 percent of GDP at the beginning of the 2000s and inflows of FDI created around 30 percent of total investments. A very large inflow of FDI in 2005 was caused by the takeover of remaining shares of Hansapank, the largest commercial bank in Estonia, by Swedbank.

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<sup>12</sup> Purju (1999); Purju and Teder (1999).

**Table 2. GDP and FDI, 1995–2006 (€ millions, current prices)**

Indicator	1995	2000	2003	2004	2005	2006
GDP	2,638	5,926	8,494	9,375	11,060	13,074
Gross fixed capital formation	676	1,519	2,488	2,951	3,436	4,423
Inward FDI	148	425	822	775	2,254	1,341
Outward FDI	2	67	137	217	507	876
Gross fixed capital formation/GDP, %	25.6	25.6	29.3	31.5	31.1	33.8
Inward FDI/GDP, %	5.6	7.2	9.7	8.3	20.4	10.3
FDI/gross fixed capital formation	21.9	28.0	33.0	26.3	65.6	30.3
Total FDI stock, end of year	540	3,572	5,553	7,378	9,539	9,616
Stock of FDI/GDP, %	20.5	60.3	68.2	78.7	86.2	73.6

Sources: Statistical Office of Estonia, Bank of Estonia, author's calculations.

### The Political Effects of FDI

One strong factor driving the Estonian political and economic path has been the integration with the West and drifting away from Russia. That policy paid off with membership in the EU and NATO. FDI from the EU and the United States has been seen as an important factor for the integration process by providing additional financial resources for investments and for enabling modern technologies. The Baltic politicians observed potential investments not only in terms of their economic value but also in their political impact. In light of candidacy for the EU and NATO membership, priority was given to investments from the EU and the United States.

Until the mid-1990s, the majority of FDI went into privatized companies. Because politicians formed the major part of members of boards of privatization agencies, realization of political preferences was quite easy. Afterward the situation changed, because more green-field investment occurred. Investment decisions were made then by the private economic agents and state's political preferences were not so strongly represented.

Political relationships with Russia have been complicated and an issue of concern. Economic agents in Estonia could see the economic advantages from linkages with Russia. The primary energy resources and raw materials from Russia are important for Estonia. The Baltic Sea ports have been an important transit trade channel for Russian exports to the EU and other countries. Therefore, investments accompanying and supporting that trade could be a reasonable economic step. However, FDI from Russia has been met with suspicion in the Baltic States. The two main reasons for avoiding Russian investments have been fear of losing control over vital aspects of the economy and unclear sourcing of investments.

In the Estonian economy Russian investments made up only 2.6 percent of FDI at the end of 2006, suggesting a low penetration rate of Russian FDI into the Baltic countries. However, it is generally believed that the economic influence from Russia is larger than official figures indicate. Because Russian investors use

third countries like the Netherlands, Cyprus, or sometimes even Scandinavian branches for direct investments, the whole stock of Russian investments is not given by the official statistics on country allocations.<sup>13</sup> In the case of Estonia, expert estimates evaluate that actual Russian investments may be 5–7 percent of FDI.

### Structure of FDI by Components, Countries, and Industries

In the period 1992–96, the main reason for foreign investments was privatization. From 1997 onward acquisition of private Estonian firms by foreign firms started to play a major role. The biggest acquisitions occurred in the Estonian banking system in 1998 and in telecommunications in 1999. In the 1990s, the investments into equity capital dominated; but since 1997, reinvested earnings have grown to 50–70 percent of total annual FDI. Another trend has been an increase of loan capital in FDI. Equity capital was a majority of FDI in 2005 due to the takeover of Hansapank by Svedbank (see tables 3–5).

**Table 3. Structure of FDI, 1995–2006 (€ millions, current prices)**

Indicator	1995		2000		2003		2004		2005		2006	
	€ mln	%	€ mln	%	€ mln	%	€ mln	%	€ mln	%	€ mln	%
FDI in Estonia	148	100	425	100	822	100	775	100	2,254	100	1,341	100
Equity capital	75	51	251	59	341	41	296	38	1787	79	147	11
Reinvested earnings	11	7	116	27	409	50	510	66	525	23	911	68
Other direct investment capitals	62	42	58	14	72	9	-31	-4	-57	-2	283	21
Loans	53	36	65	15	50	6	-20	-3	-56	-2	283	21

Sources: Statistical Office of Estonia, Bank of Estonia.

**Table 4. FDI Flows by Industry, 1995–2006, and Position of FDI, end of 2006 (€ millions, current prices)**

Indicator	1995	2000	2003	2004	2005	2006	FDI stock, end of 2006	
							€ mln	%
Total	148	425	822	775	2,254	1,341	9,616	100
Financial intermediation	10	112	121	159	1,978	785	2,700	28.1
Real estate, renting, and business activities	0	79	186	251	-24	67	2,865	29.8
Manufacturing	67	70	102	177	190	249	1,678	17.5
Wholesale and retail trade	35	27	293	145	55	12	997	10.4
Transport, storage, and communication	16	64	59	21	0	110	677	7.0
Other	20	73	61	22	55	118	699	7.8

Sources: Statistical Office of Estonia, Bank of Estonia.

<sup>13</sup> Kilvits, Purju and Pädam (2005).

**Table 5. FDI Flows by Country, 1995–2006, and Position of FDI, end of 2006**  
(€ millions, current prices)

Country	1995	2000	2003	2004	2005	2006	FDI stock, end of 2006	
							€ mln	%
Total	148	425	822	775	2,254	1,341	9,616	100
Sweden	64	169	285	183	1,832	725	3,797	39.5
Finland	13	166	365	205	357	344	2,543	26.4
Great Britain	12	7	51	74	26	73	362	3.8
The Netherlands	1	17	-87	-25	-28	-30	328	3.4
Norway	4	3	6	72	3	48	315	3.3
Russia	1	-5	2	47	57	51	251	2.6
Latvia	1	0	13	39	-25	53	228	2.4
United States	13	9	18	0	-53	-101	202	2.1
Germany	1	12	27	34	70	-13	188	2.0
Denmark	4	7	18	13	-13	9	180	1.9
Other	34	40	124	133	28	182	1,222	12.6

Sources: Statistical Office of Estonia, Bank of Estonia.

The most attractive fields of activity for FDI in Estonia have been real estate, renting, and business activities (29.8 percent) and financial intermediation (28.1 percent). The other important fields of activity were manufacturing (17.5 percent); wholesale and retail trade (10.4 percent); and transport, storage, and communication (7.0 percent).

Total FDI in Estonia was €9.6 billion at the end of 2006. A significant part of FDI came from Sweden (39.5 percent) and Finland (26.4 percent) and the Estonian economy is closely connected to the economies of Finland and Sweden via trade linkages. Finland and Sweden have specialized in high-tech industries and have been looking increasingly toward Central and Eastern European (CEE) economies for new high-growth markets as well as sources of labor and raw materials.

Various studies (Purju, 2003; Roolaht, 2006; Vissak, 2006; Varblane, 2001) have described the main determinants of FDI in Estonia. Among investors coming to Estonia for the first time, the main determinants were potential market growth, financial stability (convertibility of Estonian currency and free movement of capital), and political stability. Among those investors who are reinvesting in Estonia the main determinants were availability of labor, financial stability, and production costs. The impending EU membership also played an important role, because it was possible by 1997, after Baltic countries had signed the Association Agreements with the EU, to forecast that they would become EU members in the near future. That meant harmonization of institutional frameworks and lower transaction costs for foreign investors.

Other important advantages for FDI have been related to Estonia's open economy, its flexible legal framework with no foreign exchange controls or



restrictions on foreign investments, the ability of foreign businesses to own land, the unrestricted repatriation of profits, the fact that all profits retained in the company are exempt from corporate income tax, the high level of spoken English, and the modern business infrastructure, particularly in telecommunications.

At the same time, there has been a vision of Estonia as a gateway to Russia for foreign companies. A comparison of success estimates by the affiliates' host countries or regions (Varblane, 2001) shows that investments into the other Baltic States have met expectations more often than investments in the CIS or the EU region. Big multinational companies have preferred to go to Russian markets directly, without a gateway. However, there are some rare examples where Estonian or Baltic markets have been preferred. These include the Scandinavian banking sector and the purchase of breweries in the Baltic States, Russia, and Ukraine by the Baltic Beverage Holding, initially a joint venture of the Hartwall from Finland and Pripps from Sweden. This project started with purchase of Saku Brewery in Estonia in 1991, which was a pioneering exercise of participation in the privatization process for Scandinavian companies.<sup>14</sup>

A very important aspect for foreign investors has been the possible expansion to the markets of other Baltic states. Investment in the Estonian financial sector still is a large proportion of total FDI and further investment opportunities in this sector also have played an important role. Similar developments have occurred in insurance and real estate activities.

Recent FDI projects in Estonia have been realized also in forestry and the pulp and paper industry. The Finnish-Swedish firm Stora-Enso, an integrated forest products company, acquired the largest forestry group in Estonia, AS Sylvester. The goals of this purchase were Estonian forestry resources, manufacturing capacities, and also the possibility of manufacturing products with timber imported from Russia. Another comprehensive FDI project that targeted Estonian forestry resources was a cellulose plant constructed by the Norwegian company Larvik Cell in Kunda, on the northern coast of Estonia.

A significant factor in generating new FDI is the extent of networking between existing firms in Estonia. Such networking includes expansion of the existing foreign-owned enterprises through initiating new subcontracting orders to domestic firms and also more active cooperation between foreign-owned firms themselves. An example is provided by the establishment of the Finnish-owned JOT Eesti OÜ, which produces equipment and assembly lines for electronics plants and provides its services to Estonia's largest export firm, Finnish-owned electronics plant Elcoteq. JOT Eesti OÜ is connected to more than 30 subcontractors in Estonia.

There is also a relatively large number of companies in the service sector from Finland and Sweden, which have moved to Estonia together with their

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<sup>14</sup> The Baltic Beverage Holding was bought by Carlsberg and Scottish & Newcastle in 2004, and after further consolidation of the industry in 2008, ownership passed to Carlsberg.

clients in Scandinavia. One example is the Finnish company TietoEnator, providing banks with IT software for accounting and other banking operations.

Networking also is important for FDI-based companies bringing together foreign capital and local R&D. Particular areas of strength for Estonia are information technology, biomedicine, and material technologies. The network of companies, some of them working on Spinno-type projects, increases innovation in companies and promotes cooperation between industry and the science community. The Tartu Science Park, working closely with the University of Tartu and the Tallinn University of Technology Innovation Center, is another example of such networks.

### III. Institutional Reforms

Institutions regulate the relations of economic agents and reduce uncertainty associated with transactions, thus guaranteeing the stability of the economic system.<sup>15</sup> The lack of stability arising from legal loopholes and arbitrary actions has hindered Estonia's economic growth. Estonia's institutional environment can be characterized by the legal system established in essential features, operating political machinery, and dominant share of private entrepreneurship in the economy.

Integration with the EU will significantly affect the development of Estonia's institutions. The application for the integration has forced the implementation of a more detailed legislative regulation, which will enable institutions to control the activities of foreign and domestic monopolies and balance the competitive interests of different economic agents.

The introduction of several institutions to regulate the market might seem at first an unnecessary expense, but it will actually promote stability in the economy. Estonia and the other Baltic states should rapidly adopt institutional frameworks from industrialized countries to gain credibility with economic agents. The introduction of such institutions would also have positive effects on domestic economic policies and external security.

The Free Trade Agreement and Association Agreement concluded with the EU have played a very important role in the development of Estonia's economy. These agreements created a framework for the international participation and cooperation of Estonia's enterprises. To ensure the growth of exports and the entire economy, with the increasing production costs, the Estonian economy needs further changes in structure. Domestic resources have not been sufficient for this kind of change in structure and the need for further foreign investment has been one of the main pillars of integration with the EU. In order to guarantee

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<sup>15</sup> For more detailed description of the role of institutions in the economy see North (1990, 2000).

enough FDI to ensure changes in structure, motives are needed. Accession into the EU economic area has been one of those motives.

Time is an important change factor because different economic policies require different timeframes to create results. Liberalization and macroeconomic stabilization have been achieved through relatively short-term programs and later policy has focused on maintenance and monitoring of the achieved conditions.

Structural reforms need time for realization, measured in years. For example, FDI-based restructuring of an industry through privatization can take several years. The same applies for the reform of the social insurance system and similar complex policies, which were established in Estonia just before the EU membership.

For institutional reforms, the time period is even longer. Very important are acquisition of new qualities and skills for the enforcement system. The ability of the legal system to cope with complicated business matters is very limited or missing and needs practice and discipline to improve. The EU accession process supported these reforms in Estonia substantially.

### **Institutional Explanation for the Liberal Trade Policy**

Estonia's foreign trade policy has been somewhat unique: customs tariffs practically did not exist in the 1990s and restrictions to enterprises in developing foreign economic relations were minimal.<sup>16</sup> Although the foreign trade policy of the Soviet Union, whose impact on Estonia ended with the restoration of Estonia's independence in 1991, was characterized by an extensive autarchy, the newly independent Estonia adopted different policies: there was a political determination to achieve as open an environment as possible.<sup>17</sup>

Other factors that contributed to Estonia's liberal trade policies were more closely linked to the economy. For example, the population's demand for Western consumer goods and the need for imports of various kinds of equipment and other technical goods were key considerations. In addition, Estonia is smaller than other transition economies, has an advantageous location between rich Scandinavian countries and Russia, and is closely connected to the Finnish economy.<sup>18</sup> The introduction of the freely convertible kroon in the

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<sup>16</sup> There were no customs tariffs even for agricultural products before January 1, 2000. At that time, a limited number of tariffs were introduced on agricultural products from non-EU countries and countries without a free trade agreement with Estonia.

<sup>17</sup> In 1991–92 the Estonian political elite had already come to the decision that a liberal economic policy would be the best for the country. The Prime Minister of Estonia, Mart Laar, stressed the following in his address to the colloquium of the German Foreign Policy Association in June 1993: "A vital factor in Estonia's economic success has been the openness of the Estonian economy" (Laar, 1993).

<sup>18</sup> According to Sõrg and Vensel (1999, p. 16), the reasons for the laissez faire policy in Estonia were as follows: (i) the small size of the Estonian market; (ii) the long-term experience of the over-regulated socialist command economy, which had been strongly unfavorable and thus gave rise to

framework of a currency board in 1992 was an important tool of liberalization<sup>19</sup> as was initial access to high-quality consumer goods and services (tourism). Such access alleviated short supplies in the economy and acted as a counterweight to a temporary decreases in real wages that accompanied economic reforms.

Trade reforms in Estonia were facilitated during the periods when the controlling coalition had a sufficient majority in the parliament. A large number of important draft laws were prepared by the executive branch, co-coordinated with the corresponding ministries, and approved by the government before they were submitted to the respective parliamentary commissions. These draft laws were passed with relative ease. An advantage of the significant role of executive power was that a more utilitarian approach predominated.

The Department of Foreign Trade of the Ministry of Foreign Affairs played a central role in the harmonization of various legal acts related to foreign trade. The department also acted as a coordinator of measures to integrate Estonia into the EU and the WTO and to build relations with the European Free Trade Association (EFTA) and other countries. The department has been the most liberal of all the institutions that influenced the regulation of foreign trade. One reason for this is that Soviet Estonia had no Ministry of Foreign Affairs and hence no political history. Since it was formed during a period of political changes in Estonia in the early 1990s the department employed many young people who did not have the burden of associations with the old system.

As there were no experts competent in market economics for a number of spheres of economic policy in Estonia, the role of international organizations has frequently been of utmost importance in formulating principles of legislation and regulations. Their representatives often preferred solutions that were not influenced by Estonian lobbies.

The role of other ministries became more important during the second half of the 1990s. The ministries of Economic Affairs, Finance, Agriculture, and Transportation, as well as the Customs Board and several other executive branch agencies, have had bigger roles in solving specific problems in foreign trade because wider integration with the EU introduced additional issues to that had

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a generally negative attitude towards state regulation; (iii) a lack of funding for regulation; (iv) the political and economic weakness of public authorities. For a long time the population had regarded the state as an instrument of a foreign power and passive resistance to government structures was widespread. If the authorities in the restored Republic of Estonia had tried to impose significantly higher tax rates and tighter regulations than before, the reaction to these measures would have been hostile; and (v) events in other post-socialist countries showing that the more liberal is the economic policy of a country, the faster improvements caused by reforms will work to stop the decline of the economy. In order to prevent the development of pressures that might be conducive to a return to the former system, the first stage of transition (economic decline) must be passed as quickly as possible.

<sup>19</sup> The liberalization of Central and East European countries from the socialist political and economic regime gave birth to financial and economic problems analogous to those caused by liberation from colonial subjection. It was therefore natural for the idea of the currency board to be reborn in 1990s (Sörg and Vensel, 1999, p.12).

to be addressed by the government. These developments have introduced more complicated issues that have attracted the interest of several growing lobby groups.

One explanation for the success of new coalitions in promoting a liberal foreign trade policy was the weakness of traditional lobby groups. During the transition period the former managers of state-owned enterprises lost the basis for their economic power.<sup>20</sup> Though many of them were successful in the privatization process, they were not effective initially in exerting pressure to obtain advantages from the government. A reason for this, as suggested by Messerlin (1995), is that the managers of many state-owned enterprises included into the privatization program were not inclined to fight for trade protection, if only because the final set of goods to be produced by the successor of privatized firms is largely unknown.

Another reason for the success of new coalitions is that the competition in the privatization process between several groups in the same field hampered consolidation of activities to achieve common protection of a certain industry. Agriculture is the usual applicant for protection in most countries but Estonia's liquidation of state and collective farm systems radically changed the economic and political structures in rural areas. Though many collective farms were reformed into cooperatives and joint-stock companies in which the former leaders played a leading role, the influence of representatives of these new entities was initially modest.

In addition, the middle 1990s brought significant power to the banking sector as it began to dominate the economy. The sector's attitude has been more liberal than that of the traditional industrial branches such as agriculture or manufacturing and this has had a profound effect.

When evaluating the meaning of liberal trade policy for different groups it is important to consider both the benefits from Estonia's image as a country of liberal reforms and the costs of that image. The Estonian economic environment and Estonian entrepreneurs have certainly profited from that image. The benefits include FDI and support from international organizations. Foreign trade policy without customs tariffs has been a part of that image. The EU membership returned some regulations but that did not have a crucial impact on trade flows and was counterbalanced by increased credibility of institutions and the business environment.

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<sup>20</sup> László Csaba described this in following way: "With the collapse of Comecon and of the one-party state, a peculiar situation emerged in Central and Eastern Europe. Because of their strong integration into the outgoing power structures, priority areas and large firms often found themselves defenceless: subsidies were cut, trade regimes opened and their secure market gone. In the first months of disarray, reformist governments could indeed make great advances in legislating market-comfortable institutions and arrangements: structural adjustment had started. As employment started to follow output losses, however, after a delay of some two years, resistance to the open trade regime started to gather momentum." (Csaba, 1995).

## IV. Role of External Anchors

Generally recognized aims of reforms at the beginning of the 1990s were creation of a private ownership-based market economy, escape from the autarky and autocratic system of the Soviet planned economy, and reestablishment of economic institutions that existed before World War II in the Republic of Estonia. Afterward, discussion of practical reform was dominated by the basics of contemporary developed market economies, reforms in Central and Eastern Europe, advice of international organizations, and a liberal agenda.<sup>21</sup>

Estonia's main foreign trade partners since the introduction of Estonian kroon have been the Scandinavian countries that belonged to EFTA. Estonia's possible membership in EFTA has been discussed, as well as EU membership, which started to be a target in 1993–94. The accession of Finland and Sweden to the EU in 1995 played an important role in motivating Estonia to seek membership.

### The Scandinavian Impact

The role of Scandinavian countries in the process of Estonia's integration with the EU deserves special discussion. As described previously, approximately 40 percent of the Estonia's foreign trade is executed with Finland and Sweden and close to 70 percent of FDI comes from these two countries, reflecting their large role in structural changes in Estonia, the importance of their products for consumers, and importance of these markets for producers of Estonia. Much of this trade was characterized by vertical intra-industry arrangements and reflected closer industrial integration of Estonian companies with companies in Finland and Sweden. At the same time, Scandinavian integration did not cover all areas and there were activities in which other contacts were also important to Estonia.

On the institutional side, Estonia's market regulations and aspects of its welfare state are quite different from Scandinavia. The tax burden and social expenditures as a proportion of GDP are much closer to Anglo-American economies than to Scandinavian countries. However, EU integration with the obligatory takeover of a wide set of regulatory tools certainly has worked to redefine Estonia's institutions, probably moving the country closer to the Scandinavian countries.

Regarding state aid and technical assistance, Scandinavian countries were most important during the first half of 1990s. Afterward, German organizations were involved, followed by support from various country-, regional-, and

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<sup>21</sup> See Janos Kornai's book *The Road to a Free Economy*, first published in Hungarian in 1989, in English in 1990, and in 1992 in Estonian and other languages. It was a sort of guidebook during the earlier days of reforms and is still worth reading when comparing the initial design and later realization of reforms.

industrial-level organizations. International organizations like the IMF, the World Bank, and the UN played important roles.

Starting in the mid-1990s, EU accession started to play a central role. Finland and Sweden together with Austria joined the EU in 1995, but that did not by itself explain why Scandinavia's central role in the Estonian economy was in ways replaced by the EU. The empathy of the Scandinavian countries towards the Baltics had some role in the EU discussions, and probably helped their EU accession proceed more smoothly.

Note that the development level of the Baltic States was in several aspects lower than that of the Central Eastern countries like the Czech Republic, Hungary, and even Poland, not to mention Slovenia at the beginning of 1990s. For example, the price system of the Baltic States was much more different from that of the market economies than in Poland or Hungary, one reason being that the Baltic economies during the Soviet period were more closed to Western markets.

Other factors may explain why the Baltic States developed a different type of market economy than the Scandinavian countries. For example, there was very strong antipathy to the Soviet-type planned economy, and economic freedom with limited intervention in market transactions was seen as the most important factor of market economy. In this context, arguments about the social aspect of market economy and the role of redistribution and wider welfare states in Scandinavia way were not supported by the public. Furthermore, this one-sided embrace of the market economy was exploited by emerging lobbies and political parties.

### **Integration with the EU**

Substantial changes in CEE countries created conditions for EU cooperation and integration of Estonia, Latvia, and Lithuania. The first assistance was granted to these countries under the "Poland and Hungary: Assistance for Restructuring their Economies" (PHARE) program, and another step toward deeper integration was implemented through free trade agreements. The Free Trade Agreement between Estonia and the EU came into force on January 1, 1995. Estonia together with the other Baltic States negotiated the Europe Agreement (Association Agreement) in 1994–95. Estonia signed the Europe Agreement on June 14, 1995, thus becoming the first country to conclude such an agreement without a transition period. The Europe Agreement was partly based on the Free Trade Agreement between Estonia and the EU, which it replaced after its ratification in February 1998.

Estonia presented its application for membership in the EU on November 24, 1995. The European Commission presented an opinion on the application and recommended commencing accession negotiations with Estonia. At the Luxembourg Summit at the end of 1997, the European Council decided to begin EU accession negotiations with six countries, including Estonia. The

Intergovernmental Conference in Brussels in March 1998 marked the beginning of Estonia's formal accession process.

Special standards, quality requirements, and other regulations as well as differences in legislation and complicated administrative procedures can be important trade barriers to market access. One way to remove trade barriers is to harmonize regulatory regimes (including standards, administrative requirements, customs procedures, product testing, and certification).<sup>22</sup> For example, adoption of quality standards that are similar to the EU's was one of the main objectives of Estonia's pre-accession phase (*Government Activity Plan for Joining the European Union*, 1996). Implementation of the rules, standards and norms of the Single Market helped to increase the competitiveness of Estonian companies by removal of cost-creating barriers and, thus, improving market access.

EU harmonization started with the government implementing the European Commission's White Paper on integration into the Internal Market. The final objective of Estonia was to harmonize its legislation with the *acquis communautaire* in all relevant areas. The *Government Activity Plan for Joining the EU*, the detailed road map for Estonia's integration with the EU institutions and structures, was part of the recommendations in the White Paper. In October 1997, the government published *Estonia's Road Map to Reform*, a document that laid out a strategy for Estonian integration into the EU, taking into account the various issues. The more comprehensive strategy for Estonia's integration into the EU, the *National Work Program*, was created by the government at the beginning of 1998.

In March 1998, the accession negotiations between Estonia and the EU were launched. During 1998 and 1999, the so-called "screening" exercise took place, which was finished in autumn 1999. The *acquis communautaire*, the body of all the EU rules, is divided into 32 chapters, under which Estonia's legislation and administrative system was carefully analyzed. The aim was to find out to what extent Estonian legislation had already been harmonized with the EU rules and what steps still needed be taken to harmonize the major part of Estonian legislation with the EU system by the end of 2002. In several areas, the need for a transition period was envisaged.<sup>23</sup> When Estonia joined the EU on May 1, 2004, most of its legislation had been harmonized with the EU *acquis communautaire*. In the course of negotiations, several transition periods and conditions were agreed upon in the fields of environment, taxation, and energy.

Table 6 shows that during the accession process, and following membership from May 1, 2004, the new Central and Eastern European market economies on average grew faster than the EU-15 (and later, faster than the EU-25). As a result the new EU member states converged with the wealthier countries on the basis of per capita income. For comparison, the trend of Portugal with the lowest GDP per capita figure from the EU-15 is presented.

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<sup>22</sup> Baldwin (1994); Baldwin, Francois, and Portes (1997).

<sup>23</sup> Koidu, Kuldkepp, and Purju (1999).



**Table 6. CEE Countries' GDP Convergence with Less Developed Countries of the EU**

Country	Convergence level of GDP per capita at PPP with the EU average (%)				Average annual growth rate of real GDP per capita, 1995–2006, %	Reduction of the GDP gap with EU-15 average, 1995–2006, %
	1995, with EU-15	2000, with EU 15	2006			
			With EU-15	With EU-25		
Slovenia	61.2	66.4	76.0	83.3	4.0	14.8
Czech Republic	62.2	59.6	69.4	76.0	2.9	7.2
Hungary	44.9	48.8	57.9	63.4	4.2	13.0
Poland	34.4	41.7	46.7	51.2	4.2	12.3
Estonia	31.2	37.5	59.3	60.0	7.2	28.1
Latvia	26.2	31.5	48.6	53.2	7.1	22.4
Lithuania	31.9	35.8	50.1	54.9	5.9	18.2
Portugal	61.2	64.9	64.2	70.3	2.3	3.0
EU-15	100.0	100.0	100.0	100.0	1.8*	
EU-25			91.2		1.9*	

*Sources:* For comparisons with the EU-15, Varblane and Vahter (2006); for other comparisons, authors' calculations on the basis of Eurostat figures.

\*Average growth of GDP per capita during 2000-2006.

Growth estimates demonstrated that all the CEE countries converged with the average level of the EU-15 or EU-25 levels. The Baltic States, with the lowest GDP per capita in comparison with the EU-15 average, had the fastest growth rates and rapidly decreased the income gap.

### Accession to the World Trade Organization

Estonia became an observer to the GATT 1947 in June 1992. In March 1994, the Estonian government requested accession to the GATT 1947, which was later transformed into membership application to the WTO. On May 31, 1994, the Working Party agreed to pursue market access negotiations with Estonia for goods and services. Estonia held bilateral negotiations on tariffs with the United States, Canada, Australia, Mexico, Japan, Poland, Hungary, the Kyrgyz Republic, and New Zealand. Negotiations on trade in services were held with the United States, Canada, Poland, Japan, Switzerland, and the EU. The accession protocol was signed on May 21, 1999, and Estonia's membership came into force on November 13, 1999.

Membership in the WTO fulfilled an important missing aspect of Estonia's trade policy. Although Estonia had a very liberal trade regime at the beginning of the negotiations, there were several horizontal and sector-level regulations that did not conform with WTO rules. The government made available to the negotiating members 61 laws and many other documents to prove Estonia's trading regime's conformity with the WTO rules. Changes had to be made in all laws and regulations that did not comply with the WTO agreement or that were not clear enough to satisfy the negotiating partners. Some new laws, mainly

related to technical barriers to trade, had to be adopted. In some specific sectors, such as commercial policy instruments, Estonia had no regulations and therefore agreed not to use such instruments until they conformed with the Uruguay Round commitments.

Reorganizing the activities of government agencies and the process of trade negotiations influenced the administrative capacity of the Estonian government institutions by deepening the know-how of government officers. This included basic training, as well as training in matters of WTO agreements and instruments and structures of market economy. Perhaps the most important benefit of WTO negotiations was the wide range of questions raised, which prepared the government and the private sector for the negotiations with the EU. Thus, Estonia solved beforehand many problems that would have arisen in the process of integration into the EU.

## V. The Role of Foreign Trade

### General Trends

The geographic position between the Scandinavian countries and Russia has been one important determinant of the economical, political, social, and cultural development of Estonia. This geographic position has resulted in fluctuation between open and wide trade flows enabling an accumulation of wealth and forced political dependence retarding development.

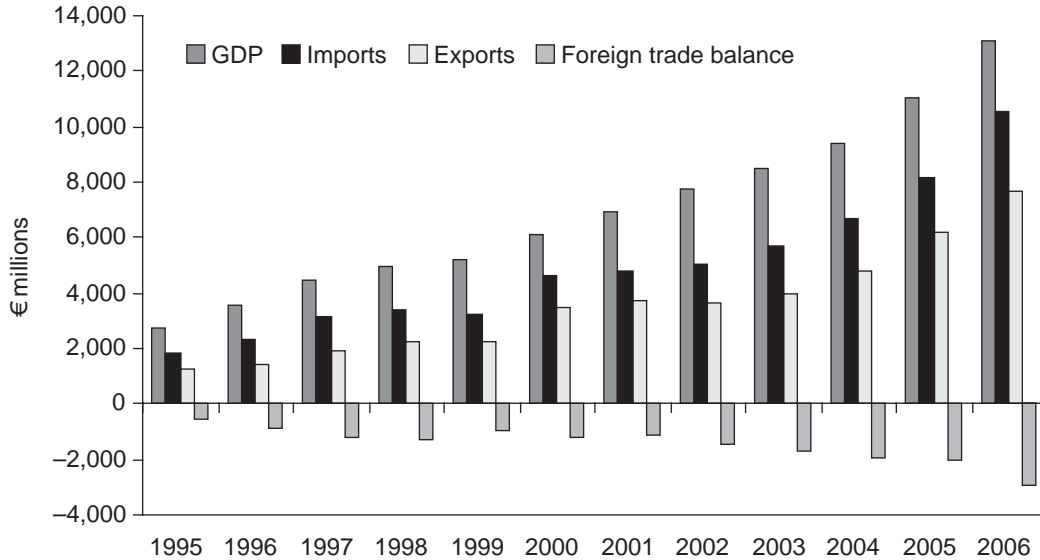
Estonian foreign trade started to grow very rapidly after monetary reform. Free trade agreements with Finland and Sweden, replaced later by free trade agreements and the Association Agreement with the EU, played a great role in that growth of trade. When Estonia's main trade partners Finland and Sweden joined the EU in 1995, the EU became the Estonia's main trade partner.

The Estonian economy has remained very open, with trade turnover exceeding GDP. The openness of the Estonian economy, as measured by the ratio of exports to GDP, was between 40–50 percent in the 1990s and as high as 58.4 percent in 2006. Estonia had a foreign trade deficit, that was quite stable in relative terms and accounted to 16–22 percent of GDP and 13–18 percent of total foreign trade turnover in the 2000s (see figures 3 and 4).

The growth of exports during the period under the fixed exchange rate arrangement when at the same time the real exchange rate of the currency appreciated seems to be at first glance paradoxical. However, the initial conditions of the economy and the general framework of development should be taken into account. Estonia started reorientation toward Western markets at the time when a very large share of its production was unacceptable to the markets of developed countries; Estonian enterprises had to substantially change the character of their products. Many enterprises changed from being manufacturers of final and semi-final products to being subcontractors of Western firms. Raw

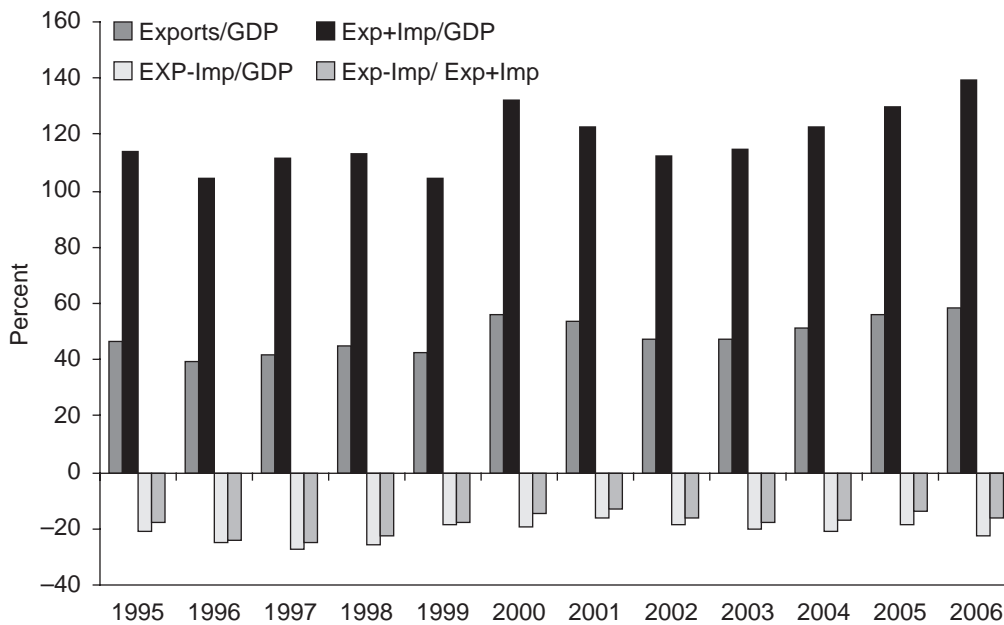
materials (unprocessed wood, scrap metals) formed a very large share of Estonian exports. Afterwards the structure of Estonian exports improved, traditional industries started to export more processed products. Intra-industry trade was a significant part of exports and imports of mechanical appliances and electrical equipment.

**Figure 3. GDP, Exports, Imports, and Foreign Trade Balance, in Current Prices (€ millions)**



Source: Statistical Office of Estonia.

**Figure 4. Openness of Estonian Economy and Relative Size of the Foreign Trade Deficit (percent)**



Source: Statistical Office of Estonia.

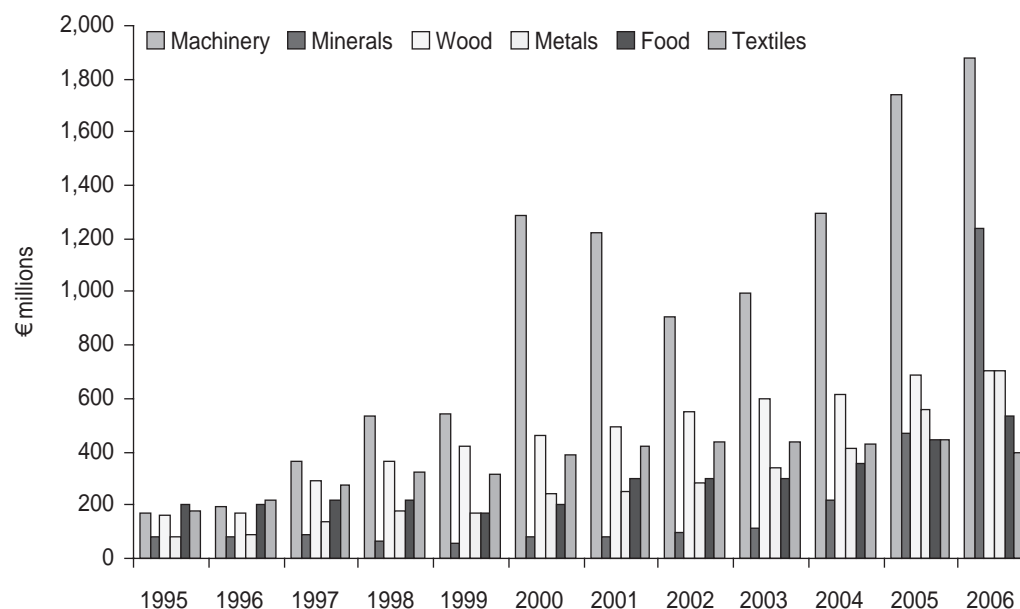
## Commodity Structure

The commodity structure of Estonian exports is shown in figures 5, 6, and 7. Traditional exports such as textiles and food products have declined in relative and absolute terms. In 2006, machinery and equipment had the largest share (24.6 percent) in Estonian exports, of which electrical devices was 80 percent and machinery and mechanical devices accounted for 20 percent. About one third of exports of electrical devices was parts for mobile phones and televisions, with the most important markets being Sweden and Finland.

The second main commodity group was mineral fuels, the share of which increased significantly in Estonian foreign trade. The fast growth in the exports and imports of mineral products can be explained by the fact that since 2004, the goods that previously crossed Estonia as transit have been included in official statistics of exports and imports.<sup>24</sup>

Wood and wood products accounted for 9.2 percent of exports in 2006. The major markets for round timber were Sweden, Finland, and Norway, and for sawn timber, the United Kingdom and Germany. Textiles and textile articles accounted for 13.9 percent of exports in 1995 but only for 5.2 percent in 2006. The shares of capital- and knowledge-intensive industries have increased in Estonian exports, but there is still a relatively high proportion of industries that are natural resource and labor intensive, such as the manufacture of wood and textiles

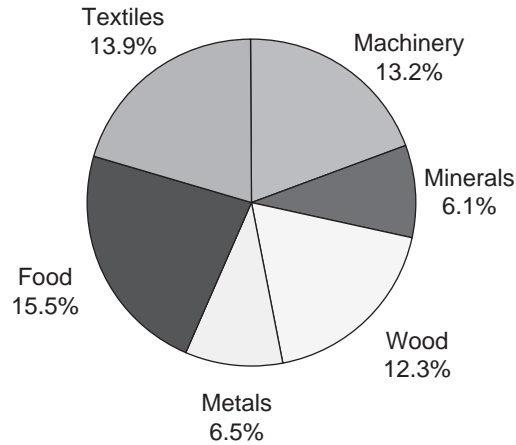
**Figure 5. Exports of Goods, 1995–2006 (€ millions, current prices)**



Source: Statistical Office of Estonia.

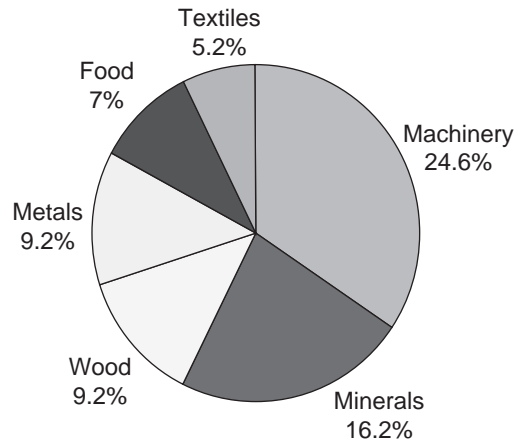
<sup>24</sup> Estonia (2006), p. 10.

**Figure 6. Structure of Estonian Exports, 1995 (percent)**



Source: Statistical Office of Estonia.

**Figure 7. Structure of Estonian Exports, 2006 (percent)**



Source: Statistical Office of Estonia.

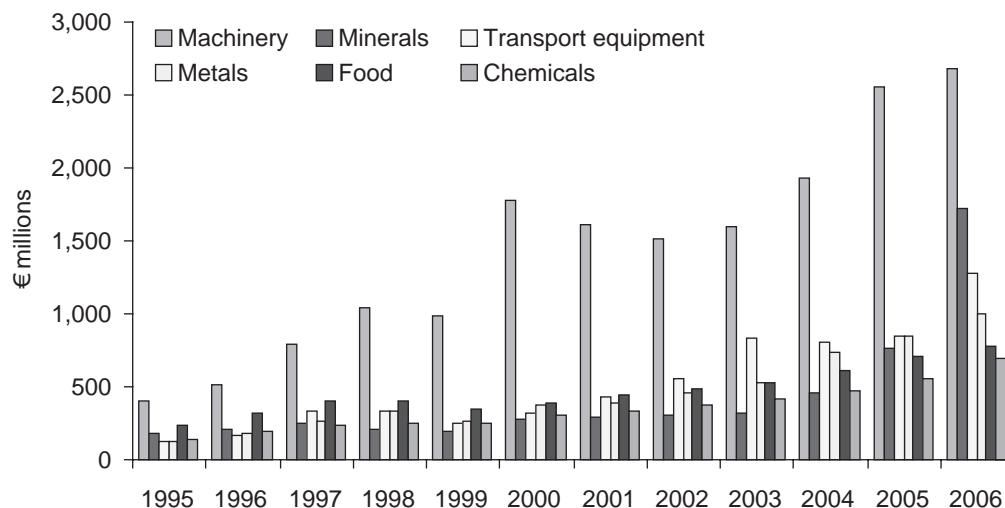
Subcontracting accounted for 70–80 percent of the exports of clothes in the 1990s, but decreased substantially in 2000s. The main markets were Finland and Sweden, which also were the major customers of subcontracting. In 2000s, also the Commonwealth of Independent States (CIS) markets started to be more important.

A very rapid increase in exports of food products to the CIS market occurred in middle of 1990s. However, the Russian financial crisis put an end to the boom in the Estonian food industry and forced another restructuring toward a lower share of traditional manufacturing industries. In 2000s, the main target markets of food products were Latvia, Lithuania, Russia, Finland, Germany, and the Netherlands.

The structure of Estonian imports has been largely determined by the necessity to purchase fuel and other raw materials, such as metals and cotton. Machinery and equipment was the most important single category with 25.4 percent of total imports in 2006. More than one third of those products were imported for processing (figure 8).

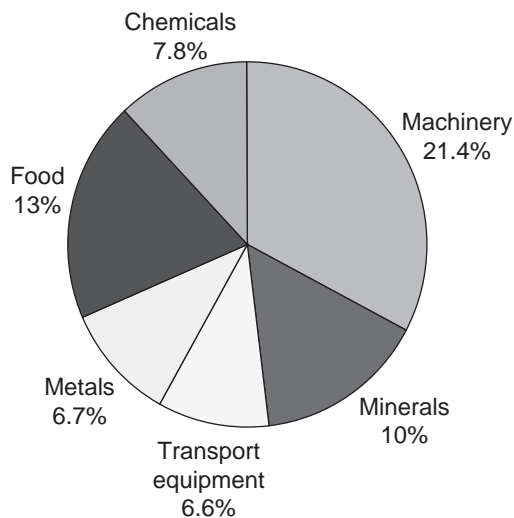
Minerals created 16.3 percent of imports and the increased importance of this category has been partially related to changed statistics. Mineral products accounted for 7.4 percent of imports (95 percent of which fuels, of which two thirds was light and heavy oil and one third gas) (figures 9 and 10). The main suppliers of oil were Russia, Lithuania (refined oil products from Mazeikiiai refinery), and Finland (re-export) and the main supplier of gas was Russia.

**Figure 8. Imports of Goods, 1995–2006 (€ millions, current prices)**



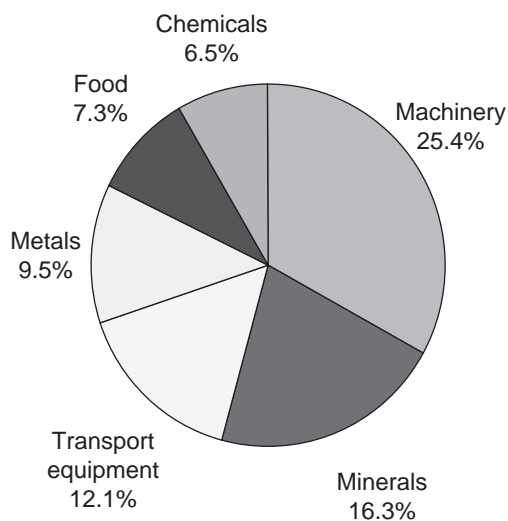
Source: Statistical Office of Estonia.

**Figure 9. Structure of Estonian imports, 1995 (percent)**



Source: Statistical Office of Estonia.

**Figure 10. Structure of Estonian Imports, 2006 (percent)**

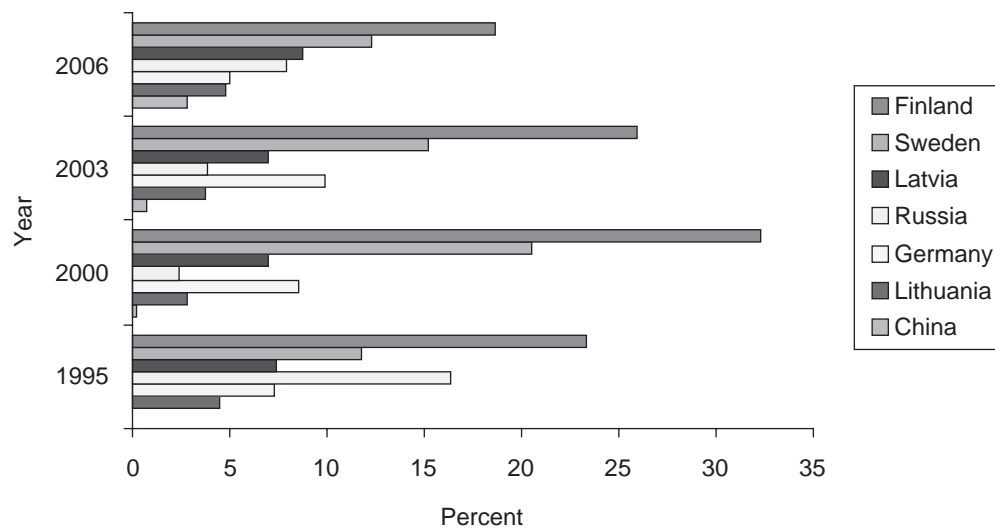


Source: Statistical Office of Estonia.

### Geographic Pattern

The geographic pattern of Estonian foreign trade changed substantially in 1992. Finland played a very important role, encouraged by its knowledge of regional markets and its linguistic similarity to Estonian. Additionally Finland's share in imports is high due to its large amounts of FDI, which increased the number of Finnish companies in Estonia. Those companies tend to trade with Finland, creating a large trade in re-exported, subcontracted items.

**Figure 11. Export Structure by Country, 1995, 2000, 2003, 2006 (percent)**



Source: Statistical Office of Estonia.

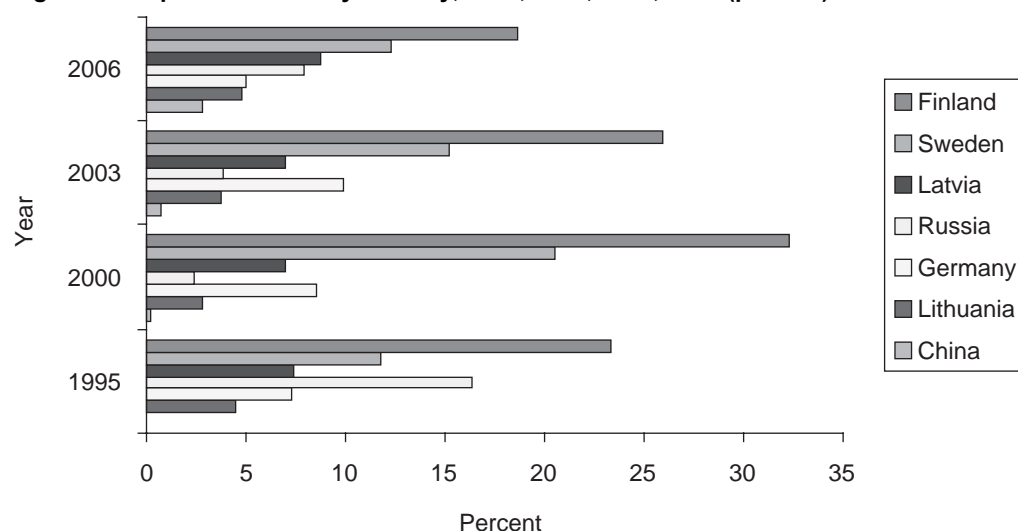
Figure 11 shows the geographic pattern of Estonian exports. Among Estonian exports to Finland, machinery and mechanical appliances and textiles and textile products were the leading items. Both are related to subcontracts, through which a large number of Estonian producers manufacture semi-final products for Finnish enterprises. Often Estonian producers and traders who sought foreign contacts in Finland later moved on to Scandinavian and to other West European countries.

The structure of Estonian exports to Sweden—Estonia’s second largest trading partner—is similar. The leading export items are machinery and mechanical appliances, wood and articles of wood, and textiles and articles thereof. The main structural shift in exports to Finland and Sweden has been a decrease in the share of textiles and an increase in machinery and mechanical appliances.

Russia’s share of Estonian foreign trade declined dramatically in the 1990s, but then recovered in 2000s. Russia furnished 13.1 percent of Estonian imports and received 7.9 percent of Estonian exports in 2006. For mineral oil, metals, and wood resources, Russia is an important source of imports; Estonian producers and traders are interested in having economic linkages with Russia. Russia also has been an interesting market for Estonian food and textile products.

Trade with other Baltic countries, Latvia and Lithuania, was modest in the 1990s, but increased rapidly in the 2000s. Estonia’s largest single export in the 1990s to Latvia was electricity. Later the share of electricity fell and food and chemical products became the leading items.

**Figure 12. Import Structure by Country, 1995, 2000, 2003, 2006 (percent)**



Source: Statistical Office of Estonia.

Lithuania's share of trade with Estonia was 4.7 percent of exports and 1.6 percent of imports (figures 11 and 12). Estonia received a substantial amount of its petrol from the Mazeikiiai refinery in Lithuania. Food products, machinery and mechanical appliances, and chemicals dominated Estonian exports to Lithuania.

Germany has been an export market for wood, furniture, and textile products. From Germany Estonia imported mainly transport vehicles, machinery and mechanical appliances, and chemicals. Historically, between the two World Wars, Germany was the main trading partner of the Republic of Estonia.

The majority of trade with China was made up of imports of electronics components and exports of electronics components by Elcoteq company.

### **Importance of Transit Trade**

Transit trade of goods from Russia through Estonia to Western Europe, of which oil and oil products created a major part, has had an important role in Estonia's economy. That has also been a politically sensitive issue due to the recent tensions between Estonia and Russia and claims that Estonia's fast economic growth is first of all due to absorption of profits from the trade with Russia's natural resources. Estimates are that those profits have made up to 20 percent of Estonia's GDP.<sup>25</sup> The following discussion describes the conclusions of a special report prepared jointly by researchers from the Tallinn University of Technology and the Estonian Statistical Office.<sup>26</sup>

<sup>25</sup> Bronshtein (1999).

<sup>26</sup> Purju, Dedegakeva, and Soosaar (2003).



The amounts of transit flows of goods; services, and tourists are easily measured, but to determine the size of value added created by transit is a complicated task. The role of transit trade is even harder to define if the indirect impact of those activities is considered. The transport and storage services are accompanied by different financial, security, and other services, and re-export should also be included in the transit cluster. However, this report's evaluation only considers direct transit services.

Calculations on different transit flows are described in table 7.<sup>27</sup> Only transit trade through ports has been taken into account. According to estimations from other sources, the amount of goods and services passing the Estonian territory without going through ports is very limited, whereas trade and services flowing through ports make up 90 percent of transit flows. The Port of Tallinn's share during 1990s was 80–90 percent of trade flows through ports.

GDP in basic prices is a value added from which the FISIM (indirect estimation of financial services) is deducted. To GDP in basic prices, the net production taxes (production taxes are added and subsidies are deducted) are added and GDP in market prices is derived.<sup>28</sup> The value added at company level is calculated according to the following formula: value added product = net turnover – purchased goods + changes in inventories – products for own use. In the case of transit trade, a similar formula has been used and the companies whose main activities are described in table 8 have been picked up.

GDP in basic prices has been the basis for comparisons. The assumption is that net production taxes have been distributed between different activities and the structures in the same proportion for GDP in basic prices and GDP in market prices.

Another critical issue has been the determination of the share of transit in those enterprises involved in transit trade. The proportion of transport turnover in ton/kilometers has been the basis for calculation of the proportion of value added (known only for total activities in the case of railway transportation).

For marine transportation and port activities, volume of goods in tons is used to calculate the share of transit in value added production of enterprises. In the case of road transportation, estimates are made using port statistics for visiting transport vehicles. For port operators and expeditors, it has been estimated that all of their activities are related to transit trade.

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<sup>27</sup> Calculations have been made by the Estonian Statistical Office according to assumptions worked out jointly with the working group from Tallinn University of Technology, Faculty of Economics and Business Administration.

<sup>28</sup> See also table 2.

**Table 7. Value Added in Transit Trade (EEK millions, current prices)**

	Production		Intermediate consumption		Value added		Share of main activity (%)		Share of main activity in value added		Transit in value added		Share of transit in GDP (%)		Share of transit in transportation and storage (%)		Employment related to transit	
	1	2	3=1-2	4	5=4*3/100	6	7=5*6/100	8	9	10	11							
Transit goods, total	9,024.4	6,493.1	2,531.2	86.8	2,196.3	39.9	1,010.2	1.3	13.4	15,113.5	5,070.4							
Railway	1,562.6	891.3	671.3	98.9	663.8	89.6	594.8	0.8	7.9	4,532.0	3,258.5							
Marine	2,644.0	2,232.6	411.4	77.3	318.0	77.2	245.4	0.3	3.3	1,190.0	710.1							
Road	4,817.8	3,369.3	1,448.6	83.8	1,214.5	14.0	170.0	0.2	2.3	9,391.5	1,101.8							
Transit goods through ports	1,302.3	411.9	890.4	71.9	640.4	75.3	482.0	0.6	6.4	1,218.0	659.4							
Operators in ports	5,982.6	3,722.9	2,259.7	88.3	1,995.3	100.0	1,995.3	2.6	26.4	2,654.0	2,348.7							
Agents in ports	2,895.3	2,004.3	891.1	99.7	888.4	100.0	888.4	1.2	11.8	700.0	697.9							
TOTAL	19,204.6	12,632.2	6,572.3	87.0	5,720.4	76.5	4,375.9	5.1	58.0	19,685.5	8,776.4							
Transportation and storage	24,611.0	17,062.3	7,548.7															
VALUE ADDED TOTAL			85,244.6															

Source: Estonian Statistical Office.

The share of transit was 58 percent of value added in the transport and storage sector in 2000. The value added created by transit goods and services was 4.38 billion kroons or 5.1 percent of the total value added.<sup>29</sup> Transit value added was 86.8 percent of railway transportation and 77.2 percent of marine transportation, showing that transit trade has been very much dependent on services related to the flow of goods and services through Estonia.

## VI. The IT Sector and New Products

### A Background

The general aim of the Estonia's economic policy has been the creation of an open, competitive, and stable economic framework supporting business activities. That economic framework has been considered as a necessary precondition for FDI. FDI in turn has been considered not only an important source of financial tools but also a source of technical knowledge, business culture, and marketing skills necessary for structural changes in the economy. FDI supplements the limited domestic capital accumulation, which was a result of high inflation that destroyed practically all savings from the Soviet period at the beginning of 1990s.

Just as important as FDI to Estonia's growth has been low taxes and public expenditures. There has been a strong bias toward indirect taxes, a relatively low tax rate for personal and corporate income tax, and a wide tax base with very few exemptions.<sup>30</sup> One outcome of this fiscal policy was that there have been limited resources for substantial industrial policy. Furthermore, the role of public policy has been to guarantee a stable framework, a reliable legal system, and consistent enforcement of limited necessary regulations.<sup>31</sup>

No special industrial policy has supported IT sector development. The public sector has been a big client and the IT sector was considered a symbolically important field, but very limited public resources for this sector were available up to the second half of the 1990s. The situation changed slightly at the end of the 1990s when the government started a "Tiger's Leap" project to

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<sup>29</sup> For comparison, the ETLA research report (Widgren et al., 2000) estimates the value of transit trade in Finland in 1998 at 650 million FIM or 0.13 percent of the GDP. The same report estimates that indirect services related to transit trade were 30 percent of direct transit trade.

<sup>30</sup> The tax reform of 1994 introduced a common 26 percent tax level of personal and corporate income tax. Starting from 2000, a new income tax law introduced several regulations regarding personal and corporate income taxes, one of which was the exemption of undistributed profits from the corporate income tax. The income and corporate tax rate has been decreased further and a 21 percent tax rate was introduced in 2008. The state and consolidated government budget has been in surplus during the 2000s and the public sector total debt burden was low, about 4 percent of GDP (Estonia, 2007; Purju, 2004).

<sup>31</sup> In *Doing Business 2008*, Estonia was ranked 17<sup>th</sup> in ease of doing business (World Bank, 2008).

computerize high schools and the e-government project to widen the set of public services provided by Internet.

EU membership changed somehow this minimal government approach because harmonization of the regulatory framework with the *acquis communautaire* in all relevant areas was a necessary condition. At the same time, EU industrial policy has emphasized a supportive framework and a horizontal industrial policy and has paid relatively less attention to sectoral policy, except technology policy in some areas.<sup>32</sup>

EU structural funds created in the 1990s provided large additional resources to finance Estonia's R&D activities. The quasi-government organization Enterprise Estonia played an important role in assistance by compiling pre-accession financial resources before 2004 and afterwards organizing the use of EU Structural Funds, accompanied by self-financing by the Estonian government.<sup>33</sup> State programs in information technology and telecommunications (including technological applications in healthcare), together with biotechnology, materials sciences, and power engineering, are planned to start up in 2008.<sup>34</sup>

### **Structure of the IT Sector**

The IT sector inherited from the Soviet period did not have public support, and it reoriented rapidly to the changing conditions. Programming was taught in some secondary schools already at the end of the 1970s, and was in the curricula of universities even earlier. During the last decades a number of people have received diplomas in electronics, cybernetics, physics, and mathematics, and many work in the software sector.

The Institute of Cybernetics (part of the Academy of Science system) is a notable institution. Despite the general rigidity of the Soviet system, the Institute of Cybernetics had substantial international scientific recognition in some areas and researchers published in Western journals. A big role in training programmers was also played by the Institute of Physics, the Tallinn University of Technology, and by computing centers of different state-owned firms and

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<sup>32</sup> European Commission (2004).

<sup>33</sup> The first organization supporting R&D and innovation, The Innovation Foundation, was established in 1991. The initial target for innovation policy was to support spillovers from applied research to product development. The understanding of innovation policy was widened during 1990s from project-based activity to a more systematic understanding of innovation. The Estonian Technology Agency (ESTAG) was founded in 2000 as a result of reorganization of The Innovation Foundation (using the Finnish National Technology Agency TEKES as a model). Enterprise Estonia (EAS) was set up as a merged institution in 2001 became the state's main organizational tool for matching pre-accession financial resources before 2004. Later it organized the use of EU Structural Funds, accompanied by government self-financing. The Estonian Development Fund, Smart Money, started in 2006. Its major tasks are to invest in 3–5 projects each year in existing firms to support expansion of these enterprises, and to monitor development in areas critical for economic innovation.

<sup>34</sup> Estonia (2007), p. 14.

municipalities. The collapse of the Soviet science system and state funding led to big changes in these IT organizations. Most were liquidated, merged with other organizations, or reorganized on a much smaller scale, which forced younger scientists to start up their own ventures.

Nowadays, the Estonian IT sector consists of a variety of institutions with specialized firms such as software development companies, IT departments of small and large institutions, freelance IT specialists, and outsourced expertise. Most of the software firms are small- and medium-size firms with mixed Estonian and foreign ownership.

In 1990s, the biggest employers of programmers and IT professionals were the financial sector (including banks and insurance companies) and the telecommunications sector. IT projects in both sectors were characterized by the handling of large numbers of customers and high security and reliability levels. Modern post-Soviet banking “jumped over” several older technological solutions used in Western economies. Since 2000 banking and telecommunication sectors have concentrated more on their core activities. Most of the IT service and development activities started to be outsourced to specialized firms. In addition to the banking sector, Estonian software firms have done much work for transport and manufacturing industries.

Local offices and product support units of global software firms form a second important part of Estonian IT; examples are Microsoft Estonia, IBM Estonia, Oracle Estonia, and others. Although the offices have been working more on sales and support, some product development has taken place in Estonia. In addition to hiring local specialists and providing technology transfer, these global companies have also provided career paths for technical talent. Several technologically gifted Estonians have made international professional careers. Units of smaller software firms of mostly Finnish and Swedish origin create another part of the international software business.

A third group of IT firms are genuine local software firms concentrating both on product development and services. They have created new solutions for customers with various successes. These companies were mostly small, often initiated for a particular project. Their business idea is to sell services, solutions, or the whole company to big international purchasers in the area.

A fourth part of the IT sector is people working in the public sector. There have been several activities by the state and the municipal governments aimed at enhancing the use and development of IT services. These include subsidizing computer ownership for less well-off groups, supporting infrastructure creation, and digitizing municipal and state services such as registering and obtaining different permits. The public sector has been the biggest single client.<sup>35</sup>

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<sup>35</sup> In 1990s, 49 percent of computers sold in Estonia were sold through the public procurement procedures. There are not available similar figures about software services. The software situation is much more complex because some part of the software was worked out by the public sector

In addition to the formal IT sector located in Estonia there are also Estonian nationals who have moved to Finland and Sweden and work in Nokia and LM Ericsson. The Estonian IT sector has benefited also from relative ability to communicate in the English language. Estonia has benefited as whole from government activities creating a positive public opinion and successful IT projects that improved image and increased attraction for new investors to finance the software industry.

### **Interesting Projects**

The success of several software projects has been based on various international and micro-level (country, firm) factors. As a macroeconomic factor there is the general IT and Internet revolution. New hardware products and technologies have provided a platform and opportunities for the entrance of new, creative ideas and solutions. New technologies have substantially changed the telecommunications industry and the legal environment of copyright issues. In the software industry, a small number of talented and visionary people have had a large impact. Like every pioneering activity, IT depends on human talent more than mature industries.

On the country level, there have been human resources available for the software industry. The collapse of the Soviet science system forced younger scientists to start up their own ventures and also freed material resources for the development of new sectors of economy. As a new, challenging industry, IT had much in common with the emerging market economy.

Skype, Playtech Ltd., Rate.ee, Regio Ltd., and Helmes Ltd are the most notable success stories, which greatly benefited from Estonian developers, programmers, and other employees. Skype and Playtech Estonian partners have played a considerable technological role and a smaller financial role.

The common denominators in the software success stories have been that there were people with strong management and technologic skills. In most cases there has also been involvement of foreign partners who have been responsible for financing, marketing, and external communications. One of the more publicized stories is Skype, which has acted as a motivating factor for many programmers and entrepreneurs.

None of these projects have been started as spinoff-type projects, where a scientific idea comes first, which in turn is developed as a product or service technology. Most IT activities have been service oriented and customer specific. The customer very often financed the project or created a link with venture capital.

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organizations themselves. Nevertheless, the public sector is a big client in software (Kilvits and Purju, 2008).

**Table 8. Some Successful Estonian IT Companies**

<b>Company</b>	<b>Field of activity</b>	<b>Most important transaction</b>	<b>Main partner(s)</b>
Skype	Communication software, VoIP	Sold to eBay	eBay
Playtech	Gambling software	IPO in London Stock Exchange	
Rate.ee (Serenda Invest)	Internet portal	Sold to biggest local telecom firm	Estonian Telecom
Regio	Geoinfo systems (digital maps)	Sold to Done Corporation (Finland). 2002 MBO by local management	Ericsson
Helmes	Integration software	Societe Generale's Baltic Republic Fund acquired 34% of shares in 2000. In 2005 was MBO.	Various local firms

Source: Authors interviews, NASDAQ and OMX announcements.

At the same time, the development in this sector is based largely on formal higher education in the field combined with an entrepreneurial spirit, and heated up by the international boom and new opportunities. These circumstances endowed the IT sector with much wider meaning than just particular products in the area. Most successful and important in this sense has been Skype, which has acted as a motivating factor for many programmers and entrepreneurs.

Sometimes IT projects were in areas with specific risks, including legal issues, that have had an impact on development. There have been lawsuits against Kazaa program owners, the program to download music from the Internet developed in Estonia. The same team worked further with Skype. Development of software for Internet gambling, in which the Estonian firm Playtech participates, is also regulated differently in different countries and the legal environment is both chaotic and opportunistic.

## VII. Skype

### Skype as a VoIP

Voice over Internet Protocol (VoIP) is a term that has been popularized recently despite the fact that the terms and concepts have been in use since the early 1990s (Keating, 2007). VoIP relies upon two technologies—digitization and peer-to-peer (P2P) networking:

- Digitization: Converting analog speech to digital signals involves hardware and software that samples the sound at small but discrete time intervals and converts the signal to a numerical format. This signal can be compressed since the human ear has a limited range and the human brain is adept at filling in missing data.

- Peer-to-peer (P2P) communications: VoIP's underlying architecture relies upon internal modularization and the power of geometric progression that occurs in a stochastic, well-connected parallel network. Rather than routing all traffic through a series of servers, thus creating a logistical bottleneck, P2P services register users at a server but then direct the individual clients to contact themselves. Thus, rather than use a hub/spoke architecture, a sparse but potentially well-connected architecture is utilized via a system of dynamic networking.

Thus, the human voice is an analog signal that is discretized into a digital signal for data transmission in the following manner:

- A PCM/TDM channel establishes a connection between two phones and maintains a dedicated line of communication whereby the discretized voice signal is fed continuously. Bandwidth is reserved for two way traffic but not always utilized and the channel is most often a proprietary communication line maintained by a traditional phone company's public switched telephone network (PSTN).
- A VoIP channel establishes connection between two computer/phone nodes and distributes packetized data across multipurpose Internet channels. The Internet channel is maintained by an Internet service provider (ISP), which also uses the line for general data transmissions, hence optimizing bandwidth usage.
- Although the sound "quality of service" (QoS) on a PCM/TDM channel is superior to a VoIP channel, there are a series of additional logistical and price (dis)advantages that will be discussed. Once voice data is discretized, data packets are sent on open Internet channels such that systems can be optimized and bandwidth maximized under normal use.

The most popular provider for VoIP services in Europe is Skype due to their emphasis on customer service, marketing prowess, and ease of use. Although the mystique toted by numerous sources is that Skype was a small start-up firm, this is only a partial truth; Skype was a small but well-funded firm with necessary liquidity from previous Kazaa experience and incoming European-based venture capital. Although Skype is not the most innovative or even the best VoIP technology provider on the market, they have critical mass and perceived innovation mystique that they use to their advantage.

### **Skype: Specification and Services**

Skype is an independent software platform focusing on peer-to-peer data/voice over IP (P2P VoIP) transmissions. In the construction of the platform, the overall topology of the system has been strictly designed to minimize bandwidth and utilize the power of well-connected stochastic networks. Thus, user availability as well as functionality can be easily implemented, changed, and modified with the assurance that the platform is robust and error resistant. Not only does this



architecture decrease the system's entropy but it also allows for value added enhancements to be implemented.

Utilizing advanced P2P technology allows Skype to enact carrier-class services that integrate voice, data, and video in a seamless manner. The platform is a multifaceted and integrated tool that enhances the communication experience by transmitting quality voice over IP as well as allowing users to communicate via shared text, pictures, documents, and other electronic means.

The following features are provided either for free or at a lower cost than tradition PSTN providers. In particular Skype empowers their users by providing effective client-based enhancements that control parameters, which allows individuals to customize their service and personalize their system. By enacting user-friendly technologies and superior end-user experience, users can focus their skills/attention on their specialization and features such as the following:

- Multiple language control
- Encryption for secure communications
- Gain control, acoustic echo cancellation, and voice activation delay
- Video calls
- One-to-one and conference calls (up to nine people)
- Forwarding calls to other Skype names, phone number, mobiles
- Calling computers, land-line phones, mobile phones, for little or no cost
- Ring tones, pictures, and hardware such as headsets, phones, gear, Web cameras, and so forth
- Phone numbers in countries of user choice tied to Skype accounts
- One year of unlimited calls to any phone
- Gift certificates
- Instant messages, SMS via the computer, and file transfer capabilities
- Contact storage as well as search capabilities
- Voice mail and call forwarding
- Encryption and security capabilities
- Skype running on a mobile device (phone)
- E-mail and Webmail
- Job pages and networking tools
- Blog solutions
- Business solutions
- Simple phone calls

In order to decrease maintenance costs and software entropy, the overall topology of the software has been strictly designed using an Object Oriented (OO) modular approach. Thus, functionality can be easily implemented, changed, and modified with the assurance that the Skype system is robust and error resistant. Not only does this decrease the entropy of the overall system from the construction and maintenance points of view, but it also allows value

added enhancements to be easily implemented. Because of this approach, Skype has a cross-platform tool kit that can be customized and run as an independent service under an end-users personalized control (Skype, 2007).

P2P architectures allow Skype to harnesses the power of geometric progression experienced in stochastic parallel networks to ensure peer availability. The Skype network relies upon the peer-to-peer schemes when determining the visibility of unknown peers. The design provides superior visibility/coverage in chaotic parallel networks, allows for increased scalability, optimal path determination, and takes advantage of the “small-world effect” described in the Kazaa P2P flooding algorithm system. By taking into account the small-world effects and super-node connectivity, a distributed hash table network utilizes super nodes known to call setup and signal a priori peers to identify peers that are not known a priori. Thus, when making a phone call or connecting to a node, routing algorithms find the optimal path to the “needle in the haystack.”

### **Changing the Communication Experience**

Although a variety of different technologies and industrial paradigms can be chosen to illustrate economic paradigm shifts (music, television, movies, peer-to-peer file transfer), VoIP services represent a classic example of how social and technological forces have challenged and changed establish lines of thinking. There has been an under-appreciated shift in how people communicate. Peer-to-peer (P2P VoIP) multilayered communication services are viable solutions and superior substitute goods for traditional telecommunications, because VoIP services extend beyond simple voice transmissions. Services such as Skype build tangible systems (on the back of other services) that deliver practical implementations, which directly benefit communities and often allow people to communicate for free.

Initiatives that were initially developed to facilitate communication over multiple mediums have opened new opportunities for the implementation of distributed systems, which connect parallel nodes—that is, people. These new technologies, social changes, and economic anchors are capable of delivering significant benefits to organizations and individuals that share information via a distributed and collaborative environment.

Due to their digital background, lack of industrial history, and customer focus, VoIP providers generally understand that voice communications are more than just voice—they are personal communication experiences via multilayered information data streams. Just as an onion consists of many layers, there are also communication layers that mesh the functionality of VoIP into new services involving text, blogs, pictures, videos, documents, expressions, music, links, and voice via multiple channels. By focusing technical and artistic expertise, VoIP and other social networking tools allow users to personalize their experience by combining real time end-user simplicity with leading-edge product

development. The emphasis is on allowing customers to select from a range of service providers, for each aspect of their telephony requirements, rather than choosing a telephony provider on the basis of the services they offer.

## VIII. Concluding Remarks

Estonia is an example of an open economy whose development and growth is based largely on foreign trade and FDI. Analysis of economic growth, the role of the FDI in capital accumulation, and the role of foreign trade in expanding the markets and internationalizing economic activities demonstrates the close and important linkages between them. In addition, a feeling of stability is required for FDI to be a continuous flow instead of shocking increases and decreases, and that is where external anchors assist the market—by providing stability.

The EU integration process, membership in the WTO, and cooperation with the other international organizations such as the World Bank and IMF played an important role in creating and supporting a private sector-based, liberal market economy. Implementation of the rules, standards, and norms of the Single Market helped to increase the competitiveness of Estonian companies by removal of cost-creating barriers and thus improving market access. These international agents certainly functioned as external anchors.

Those trends were related to institutional and structural changes as well as true restructuring of the infrastructure of the economy. Rapid but positive and proactive change with a determined government bred opportunity, and institutional changes ensured access to new markets. With free trade agreements, active relations with new foreign trade partners, the implementation of quality control systems, and enhanced production methods acceptable in foreign markets, structural changes were manifested in the adoption and formation of companies producing high-quality goods and services that could be marketed despite increased domestic production costs.

A critical factor for future development and structural change is moving from a transition economy to an innovation economy. Skype is telecommunication technology that also makes possible a much wider impact of new telecommunication technology on society. It is too early comprehensively assesses the impact, but new telecommunications technology has definitely influenced the preferences of the younger generation regarding societal behavior and working habits and tools. That could change the economy and society just as when the train and car allowed for fast, low-cost, and on-demand personal transportation. And economic knock-on effects—such as the liberalization of data to a cheap, mobile, and immediate medium—will have unknown economic and social consequences.

As with most economic evolutions, establishing a linear cause-effect relationship is moot given the interconnectivity between human behavior and

economic development. That said, there is clear empirical evidence that location, production, technology, and timing along with external anchors are catalysts for change. Yet, just as a chemist creates a complicated solution by mixing and stirring chemicals, if the necessary ingredients are not present in their proper proportions at the proper time, then results strongly vary. For example, Skype would not have been possible just a few years ago even with similar circumstances in Estonia. Without powerful computers of the required world-wide infrastructure to transfer large amounts of data as well as the lessons learned from Kazaa, another VoIP from another country would have been the success story of choice.

Like a pendulum, economic forces oscillate, but regardless of the situation, economic fundamentals are as important, such as “being in the right place at the right time.” External anchors are an important catalyst to this process, but as a catalyst, a reaction requires the necessary ingredients in place.

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This paper is a case study of Estonia, an open, small economy whose development and growth is based largely on foreign trade and foreign direct investment. The country's transition to a market economy has been enhanced by integration with the European Union, which has been very important in the evolution of institutions that support development of a liberal, private sector-based market economy. Also important has been the role of external anchors upon economic development—that is, mandates that reflect the values, objectives, and aims of a socioeconomic alliance and frame Estonia's economic policy.

Estonia's progress from a transition economy to an innovation economy will depend on critical development and structural changes. The information and communication technology sector will play an important role in this development. In particular, the case of Skype demonstrates the much wider impact of new telecommunications technology on society. Estonia's development in this field is empirical evidence that location, production, technology, and timing, along with external anchors, are catalysts for change.

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