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FDI, TECHNOLOGY & KNOWLEDGE TRANSFER FROM NORDIC TO BALTIC COUNTRIES*

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Abstract. The purpose of this study is to examine the intensity of technology and knowledge transfer to the selected Baltic countries through foreign direct investment. The intensity of technology and knowledge transfer across the Baltic countries varies widely, with Estonia showing the leading position in the Baltic region. The amount of foreign direct investment in three countries is linked with the level of technology and knowledge transfer. It is indicated that during the Financial Crisis in 2008, the extent of foreign direct ownership changed in all three countries and later recovered. In the aftermath of this disruption, countries recovered their stock Foreign direct investment attraction rates and almost reached their 2004 level. Latvia has achieved a 50 per cent increase among Baltic countries, benefiting from it. Foreign direct investment and technology transfer increased through effective strategies and policies. In contrast, Estonia maintains a sustained stock foreign direct investment and has moderately lower margins than in other Baltic countries. Among countries, Estonia is the dominant stock FDI absorber in the Baltic region and have made significant contributions in the region.

Keywords: FDI; Technology transfer; Knowledge transfer; Baltic countries; Nordic countries

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1. Introduction

Technology and knowledge transfer among countries is an important topic in recent studies. In the latest research, it is observed that there is a significant transfer of knowledge between countries in various forms. Foreign trade and Foreign direct investment (FDI) are treated as the two main channels helping to facilitate knowledge transfer. The studies confirmed the role of foreign trade in transferring knowledge between countries. However, the FDI, the transfer of technology and knowledge from Nordic to Baltic Countries have not yet been researched.

The three Baltic States – Lithuania, Latvia and Estonia – constitute relatively small countries, though they enjoy highly synchronized, highly opened for trade and still fast-growing economies. In the last years, much more rapidly growing export of services have resulted in the positive current account of the Baltic countries. Slower growth in terms of productivity rather than in the purchasing power parity raises concerns about future sustainable growth prospects.

The study revises the technology and knowledge transfer that help to support the development of countries' economies. However, the key question is to what extent the economies of Baltic countries benefit due to the transfer of technology and knowledge via FDI from the Nordics. In this regard, the main goal of the paper is the revision of stock FDI flows in three Baltic countries – Lithuania, Latvia, and Estonia. In addition, the study shed light on the important determinants of technology transfer, as well as the relationship between FDI and macroeconomic performance in the Baltic countries.

The study is organized into several sections. In the first part, the relationship of FDI with technology and knowledge transfer is presented. The second section is dedicated to the transition of the Baltics in catching up to the European Union and the Nordic. Thereafter, we investigate the international competitiveness of Baltics industries, where advanced technologies are crucial, in the third section. The fourth section is devoted to the inward FDI from the Nordics to the Baltics. In the fifth section, technology and knowledge transfer from Nordics to the Baltics is described. Finally, the results of the study are summarized under the conclusions in the sixth section.

2. Relationship of FDI with Technology and Knowledge Transfer

Foreign direct investment (FDI) occurs if a foreign company acquires a significant part of a local firm of at least 10 per cent or when some enterprises that are obtained by the same owner and operate in different foreign markets exchange financial flows among themselves (Antràs, & Yeaple, 2014).

In the mainstream FDI literature, two types of FDI are distinguished; horizontal (i.e., FDI in the same part of the value chain, confer Markusen, 1984) and vertical (i.e., FDI in customers or suppliers; confer Helpman, 1984). As Ha & Kang (2016) state, the role of FDI might be both substitutive and complementary. Horizontal FDI motives are related to trade costs optimization and market size ('market seeking'), while vertical FDI – to cost efficiency due to cost differences that occur in different markets ('efficiency seeking'). In general, horizontal FDI means production process replication in host countries when trade costs are high, while vertical FDI often involves splitting the production process by locating different stages thereof in different countries. Therefore, vertical FDI often implicates supply chain fragmentation and intermediate goods export (Herger et al., 2016).

It is hard to establish which FDI type dominates in trade: although some authors claim that horizontal (Harms & Wacker, 2019) or vertical FDI dominates (Bombarda, 2013), Baldwin & Okubo (2014) reports that it differs greatly in terms of regions and periods. Some studies reveal that this domination heterogeneity in terms of FDI types has some patterns. For example, after examining 400 industries in 90 countries, Alfaro & Charlton (2009)

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reported that vertical FDI tends to occur in countries that exhibit similar features; high-skill sectors are more related between rich and industry advanced countries. FDI vertical-ness even might win over its horizontal-ness in case of local plant acquisition by a foreign owner, when it results in boosting productivity (Arnold & Javorcik, 2009).

In addition to horizontal and vertical FDI typology, some authors suggest that there are more of them. For example, Baldwin & Okubo (2014) notice that there are three more FDI types: (i) affiliates that are exploited as export-platform to third markets; (ii) affiliates that engage into value chains (i.e., added value to the products produced by their parent firms); (iii) affiliates that assume the role of a wholesale distributor; and (iv) affiliates that have mixed motives (so-called 'complex FDI'). All this complexity might suggest that international trade transforms to networks of affiliates interacting among themselves also in terms of FDI ('networked FDI').

Also, after researching the Japanese FDI that took place between 1996 and 2006, Baldwin & Okubo (2014) proposed an idea that it had been progressed in technologies of information and communication that had served as the main reason for spatial unbundling of production. That study suggested that, in general, technological progress triggers dispersing of production stages to different locations that might offer the highest cost efficiency opportunities. Therefore, technological progress may foster FDI vertical-ness through growing comparative advantages. That also suggests that high generalized trade costs (including transaction costs and other trade frictions) promote FDI horizontal-ness (i.e., FDI serves as a trade substitute). Furthermore, these findings might lead to a thought that the higher FDI vertical-ness, the larger the impact on local productivity and wages.

Unsurprisingly, FDI depends on the heterogeneity of different sectors in terms of modularity of production process, the scale of economies and trade frictions. Baldwin & Okubo (2014) revealed that, in Japan, different FDI sectors have different trade patterns with outstanding classic FDI sectors – manufacturing of consumer and capital goods. After it had experienced a huge advance in technological progress, manufacturing – especially machinery – faced internationalization of the supply chain. More concretely, the chain of different affiliates adding value at intermediate production stages and passing down their output.

Most of these empirical research findings were predicted by the studies of international trade theory, which has a long history of examining the relationship between FDI and trade. Harms & Wacker (2019) claim that the theory of FDI has deep connections with the theory of industrial organization. A firm that considers entering the foreign market always faces a choice between exports or arms-length interaction with other firms, or greenfield FDI, or foreign acquisition.

However, despite the microeconomic perspective of FDI, which reveals a firm's strategic choices, the mainstream of the macroeconomic literature treats FDI as a sort of international investment because it tends to raise the capital stock and total factor productivity of a host country. Positive impulses from FDI to economic growth is content on the host country's absorptive capacity for the associated technologies (Borensztein et al., 1998) and its degree of economic freedom (Azman-Saini et al., 2010). Xu (2000) present similar findings on impulses from multinational companies on economic growth. Alfaro et al. (2009) find that improvements in total factor productivity constitute the main channel for economic growth impulses induced by FDI and not improved factor accumulation associated with physical and human capital.

In their OLI (Ownership, Location, and Internalization) literature review, Antràs & Yeaple (2014) reports that it is widely believed that the ownership advantage is one of the main determinants of multinationals domination in international trade. In the scientific literature, the mainstream interpretation explains this phenomenon by a proprietary technology that gives its owner a cost advantage over local producers.

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This phenomenon is called the location advantage. The development of advantageous technology bears a significant fixed cost which, in the case of multinational firms, can be exploited in different foreign markets simultaneously. It includes both tangible and intangible assets that allow utilizing economies of scale. Another gain brought by the location advantage is related to the breakdown of production into the locations that are the most cost-efficient.

With time the OLI literature was absorbed by the new trade theory: in the profound models of Dixit and Stiglitz (1977) with product differentiation and market structure and Krugman (1979, 1980) with CES (constant elasticity of substitution) preferences. The seminal work of Melitz (2003) gave this strand of literature new breathing by incorporating firm heterogeneity to the former models. In addition, there were a lot of studies that examined the relationship of FDI with various aspects that were as follows; tax policies of host countries, the financing of firms; the labor market effects of offshoring; the cultural distance issues for the strategies of multinationals; and products diversification and the transmission of business cycles (Harms, P., & Wacker, K. M., 2019).

In their model, Antràs & Yeaple (2014) combined vertical FDI with firm heterogeneity. It predicted that only the most cost-efficient firms would participate in vertical FDI. Also, in high R&D industries, trade frictions are related to the costs of technology transfer mostly. In an empirical investigation, Alfaro and Charlton (2009) find clear tendencies of multinational companies owning stages of production proximate to their final production, which gives rise to a class of high-skill intra-industry vertical FDI. The studies that concentrated on the firm-level data examined the relationship between productivity and ownership too. In his literature review of theoretical and econometric studies and qualitative analysis thereof, Smeets (2008) proposed an explanation and mechanism of how FDI might be related to knowledge spillovers and knowledge transfer. It should be considered that FDI effects do relate more to intentional knowledge and technology transfer rather than unintentional knowledge spillovers. Therefore, in this regard, an accurate distinction should be made. Also, it is important to notice that the knowledge transfers and spillovers do arise through the channels of vertical linkages, worker mobility and demonstrations effects. However, it seems that it is intentional knowledge and technology transfer that should be related to vertical linkages and, subsequently – vertical FDI.

Javorcik & Poelhekke (2017) report finding evidence that, in Indonesia, foreign ownership of affiliates is related to the boost of local firms in terms of total factor productivity; it increases after local firms have been bought by foreign firms and it decreases after being sold back to local ownership. In addition, Fons-Rosen et al. (2021) show that an increase in local firms' productivity due to foreign ownership happens if a foreign firm owns enough to affect production decisions. Although this study reports that this effect is rather small, it does not give much attention to the heterogeneity of foreign firms. Therefore, 'the search for universal relationship is futile' (Smeets, 2008).

Some authors (for example, Taglioni & Winkler, 2016; Ismail et al., 2018) see a difference in technology and knowledge transfer concerning many characteristics, including their channels. Knowledge transfer is more likely related to management (together with the sufficient ownership of a local firm by a foreign parent company), while technology is embodied in the capital that a hosting firm imports. In this strict sense, regarding technology transfer, Newman et al. (2015) report that there is a lot of studies (including their own) that relate it more likely to downstream vertical FDI rather than the horizontal one.

Investigation patent citations in Europe, Maurseth and Verspagen (2003) find evidence of barriers to knowledge flow. Moreover, registered patents are more likely to be cited in the registration country or countries located nearby geographically countries with similar industry structures or countries speaking languages within the same linguistic group. In their study, Fons-Rosen et al. (2018) support such evidence revealing that a company with successive expansion abroad enjoys an increase of citations regarding the patents it employs and its pace of issuing more patents prevails. However, such studies as of, for example, Amoroso & Müller (2018), relate

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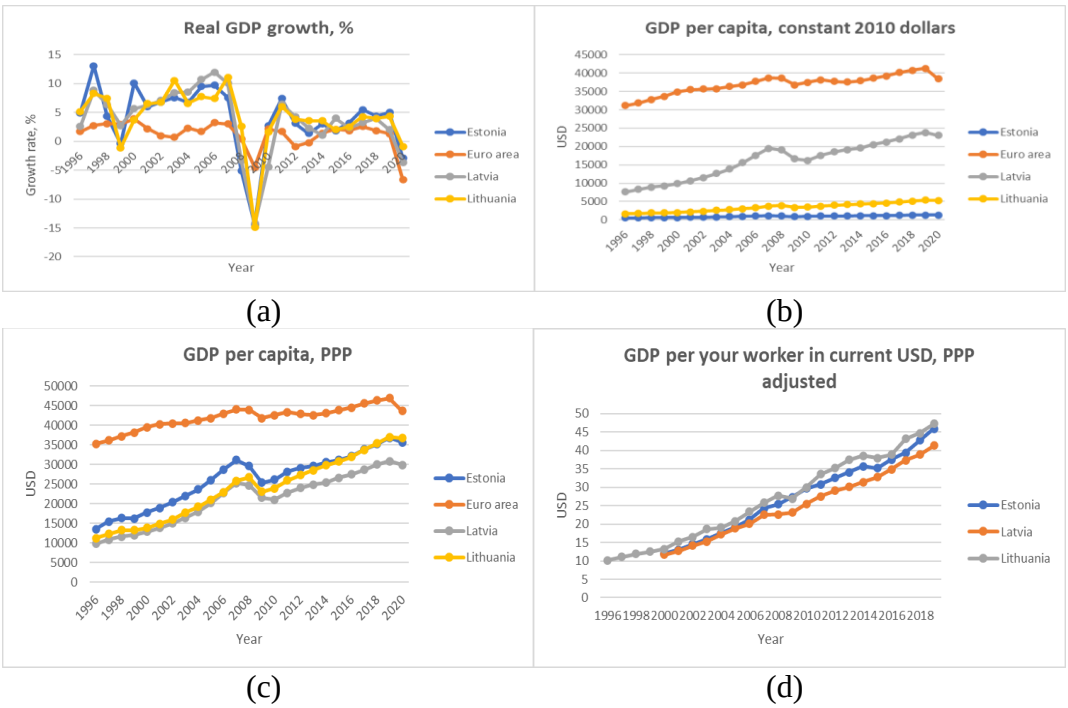
knowledge transfer not with management skills diffusion only, but with capital investment, design and R&D expenditures, greenfield investment.

2. The transition of Baltics in catching-up to the European Union and the Nordic

The three Baltic States – Lithuania, Latvia and Estonia – are relatively small. The combined population is only around 6 million, and the combined GDP is of similar magnitude as in Slovakia. Being small economies may make them less attractive for horizontal FDI, as the market opportunities there become limited (Hunya 2004).

After the Baltics have gained their independence at the beginning of the last decade of the 20th century, they pursued free-trade policy with the EU and Nordic countries. Subsequently, a few years later, all three Baltic States started negotiating free trade agreements among themselves and other countries and association agreements with the EU (Borsos & Erkkilä, 1995). As it was at the beginning of their independence, the Baltics still follow up remarkably similar economic policies and seem like being an integrated Baltic economy in the last years (Poissonnier, 2017). All three economies are highly synchronized (confer Graph 1 (a)).

After the Baltics had experienced incredibly high GDP growth rates, they were hit by the Great depression severely and subsequently settled to more modest growth rates (Graph 1(a)). While all three of them are far away in catching up with EU GDP per capita average, they have been gained on quickly in terms of purchasing power parity and productivity (Graph 1 (b-d)).



Graph 1. Compared GDP, its growth and labor productivity in the Baltics
Sources: The World Bank, 2021; OECD, 2021

Comparing with Nordic countries in terms of many economic indicators, Baltic States are still far away. What worries is that the labor productivity growth falls behind the purchasing power in the Baltics, raising concerns of sustainable development (Graph 2).

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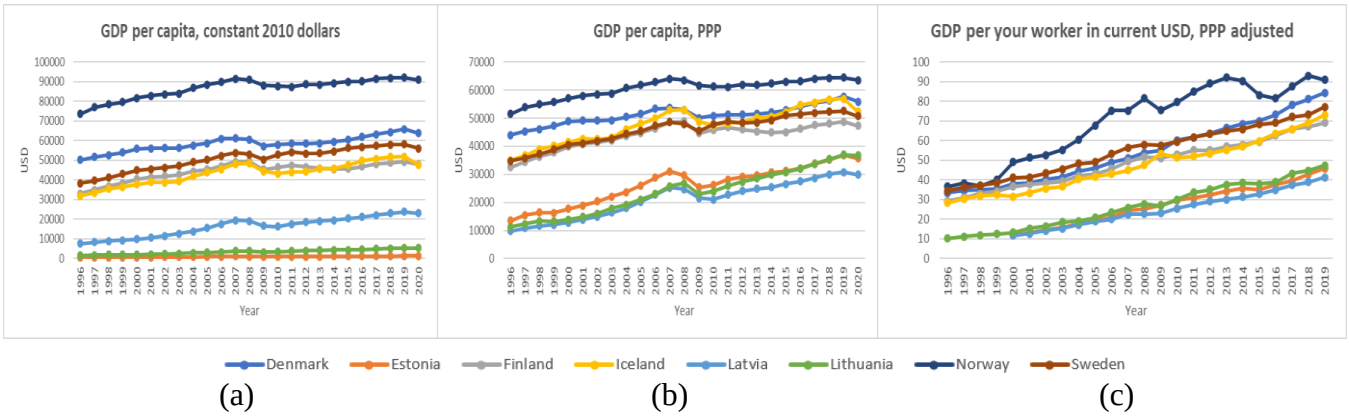
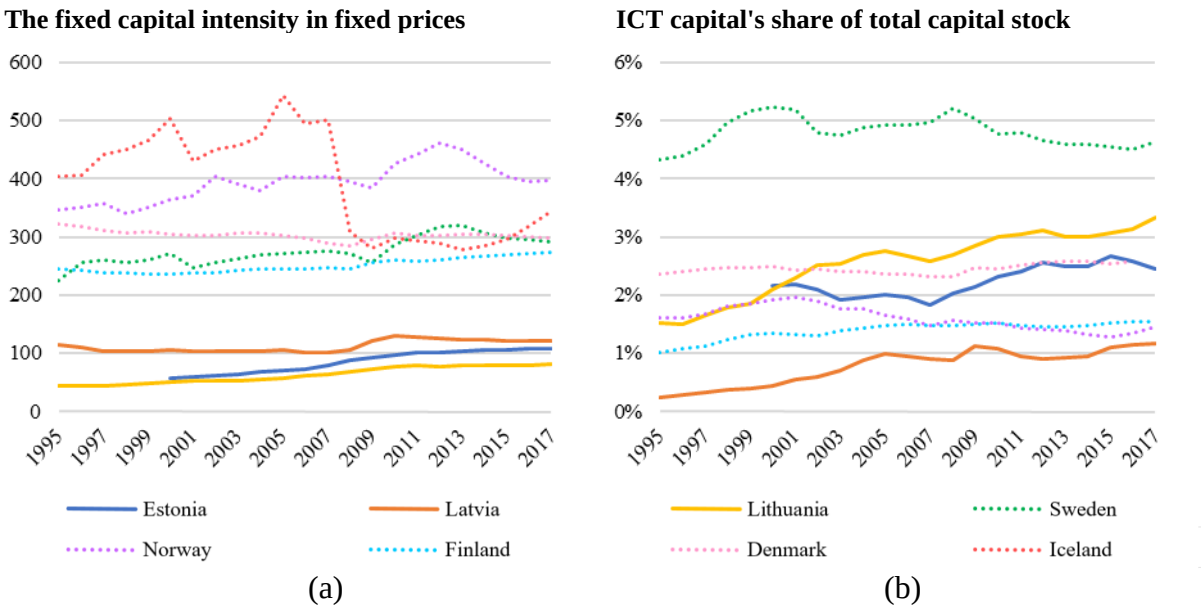


Graph 2. Compared GDP and labor productivity in the Baltics and the Nordics
Sources: The World Bank, 2021; OECD, 2021

Although some of the wedges in labor productivity obviously are caused by differences in technical productivity, differences in fixed capital also play a notable role. In Graph 3 (a) below, we have depicted the development in fixed capital behind employees and self-employed in the Baltics and Nordics. The figures clearly show that the Nordic economies are more capital intensive than the Baltic economies. Yet, the capital intensity has increased relatively much in the Baltics during the last decades, especially in Estonia, but also in Lithuania.



Graph 3. a) Fixed capital stock in fixed 2015-euros per total employment and b) ICT capital's share of total capital stock in the Baltics and the Nordics
Source: OECD, 2021

As the fixed capital intensity is lower in the Baltics than the Nordics, the amount of ICT capital per total employment (i.e. employees and self-employed) is also lower. However, the ICT capital's share of the total fixed capital stock is not very between the two Northern European regions. Here, the industry structure also contributes to explaining large differences. However, the ICT capital share of total fixed capital has increased relatively much

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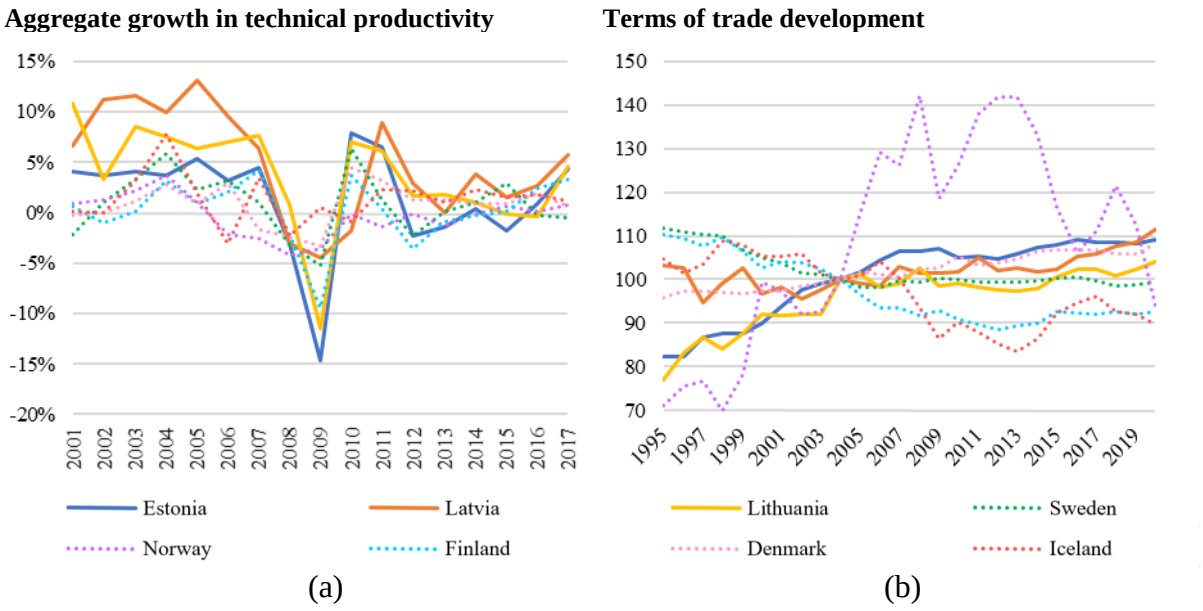
in the Baltic countries, at least in Latvia and Lithuania. Overall, the development in the aggregate fixed capital stock leaves the impression of tendencies of a slow catching up for the Baltic countries, but they are still far behind the Nordic countries in terms of capital input.

In Graph 4 (a), we have shown the development in technical productivity in the Northern European counties, calculated by standard growth accounting under the Cobb-Douglas technology (confer Solow 1957). We have assumed constant return to scale with sample average factor shares of net value added as output elasticities for each factor. Compared to the Nordic countries, the technical productivity growth in the Baltic countries was relatively high in the period from 2001 to 2017, particularly in Latvia and Lithuania. In the case of Latvia, it thus seems that the somewhat weaker growth in capital intensity than in the neighbouring countries were compensated by higher productivity growth over the period.

The Baltic states were also affected relatively badly by the financial crisis. Overall, the graph resemblances the growth patterns for GDP from Graph 1 (a). Yet, there are some differences caused by fluctuations in factor allocation, the technical specification and differences between gross and net value added.



Graph 4. a) Development in aggregated technical productivity, calculated through growth accounting under a Cobb-Douglas technology with constant returns to scale. Measurement variables: Net value added (production measure), total employment (labor), fixed capital stock (capital measure) and the sample average for labor costs and self-employed' s part of a mixed-income joint share of net value added (output elasticity for labor). b) Terms of trade, indexed with 2004 as the base year. Baltics and Nordics
Source: OECD, 2021

In Graph 4 (b), we have illustrated the development in terms of trade in Northern Europe. The figure clearly shows that the Baltic countries overall have had a relative beneficial development in terms of trade since they became EU members in 2004, especially Estonia and Latvia. Their terms of trade have also been less exposed to large fluctuations in prices for financial services, natural resources, and technology merchandise than some of the Nordic countries.

The Baltic States have a high degree of trade openness: Estonia and Lithuania are almost twice as higher as Finland, Norway, and Sweden in this respect. In 2019, trade openness was as high as 149 % of GDP in Lithuania,

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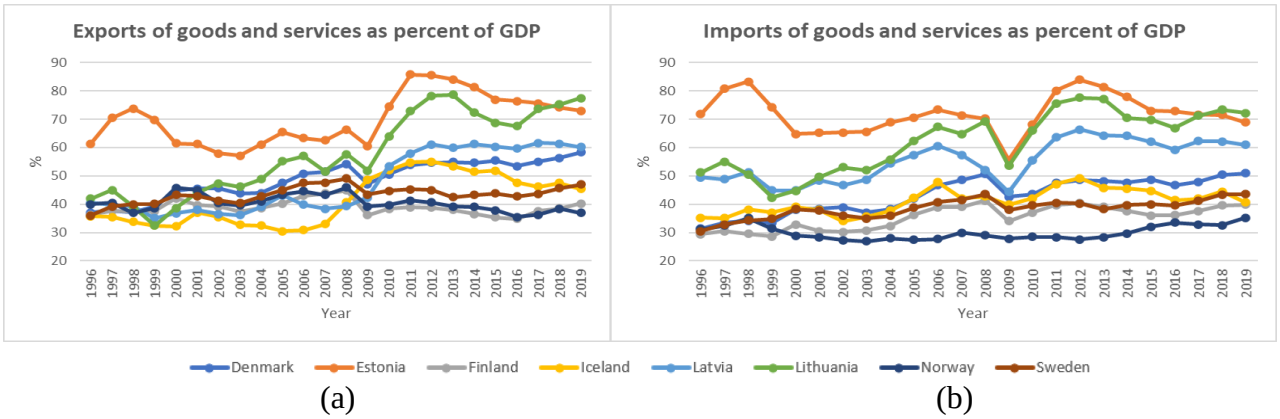
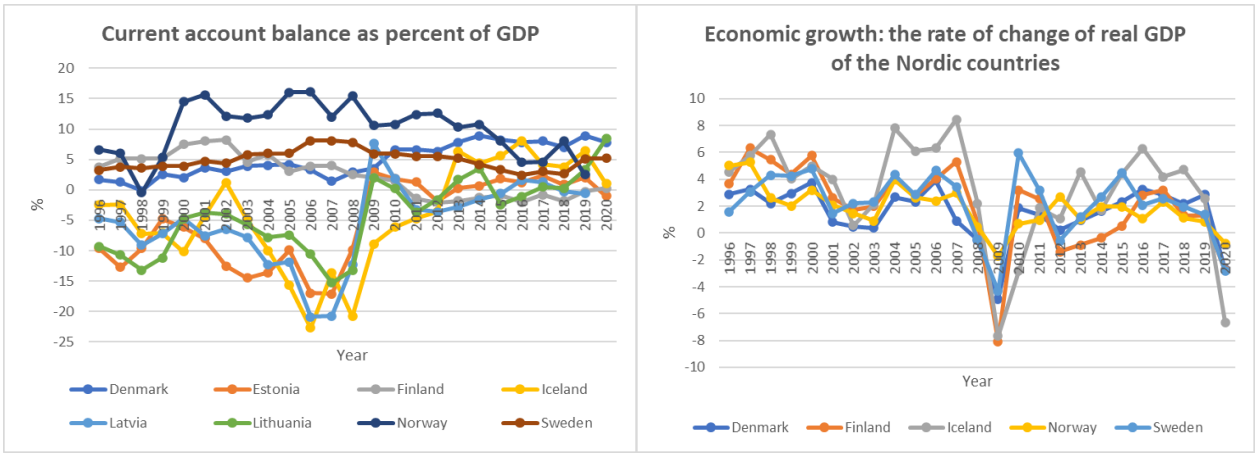
141 % of GDP in Estonia, and 121 % of GDP in Latvia, while among the Nordic countries, only Denmark exceeded 100 % and reached 109 % of GDP only (Graph 5).



Graph 5. Comparison of trade openness: export and import
Source: The World Bank, 2021

Right up until the Great Depression, the Baltic States had a large current account deficit, which in 2007 ranged from 15% in Lithuania to 17% in Latvia and 20% in Estonia (Graph 6 (a)). However, later, when the crisis began, imports of goods and services fell drastically when exports did not suffer so much. It should be noted that since then, the current account in the Baltic States has been balanced. Meanwhile, in the Nordic countries, the current account surplus in the total, albeit slightly decreased, remained positive (except for Finland, whose current account has become somewhat negative since 2011).



Graph 6. Comparison of current account as a per cent of GDP and business cycle synchronization
Source: The World Bank, 2021

Overall, although the Baltic States are still far behind other Nordic countries in their level of development, it can be noted that after the Great Depression, the business cycles of all Nordic countries became much more in sync (Graphs 1 (a) and 6 (b)). It can therefore be intuitively assumed that the integration of the entire Nordic region (including the Baltics) should have increased significantly.

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3. Performance in Technological-Driven Industries Subsequent to Regional Integration

International competitiveness could be understood as the extent to which a country can maintain or expand its activities and factor returns in international markets. FDI may both facilitate and be facilitated by high competitiveness (e.g., Narula and Wakelin, 1997, and Anastassopoulos, 2007).

For countries that generally are behind the technological frontier, it is particularly challenging to penetrate advanced industries, such as producers and intensive consumers of R&D and ICT. This is because the barriers and the technological prerequisites for success generally are relatively large for these industries. Thus FDI maybe means to succeed in these industries, but also requires that the hosting countries have something to offer as location advantages, such as, for instance, proximity to attractive product and factor markets.

Relative unit labor costs – that is, the comparison of labor cost per gross value added in fixed prices – is a much-used explanatory indicator for international competitiveness. As increased unit labor costs strictly imply a weakening in competitiveness, we will apply the inverse of unit labor costs as our indicator: Ceteris paribus, the measure weights development in production and cost competitiveness. Yet, the indicator may, in some cases, also reflect other factors, such as for instance relative changes in capital intensity, price changes and self-employment rate. Other factors may also affect realized competitiveness in terms of gained market shares and improved factor utilization, such as, for instance, changed regulations and market access. This was indeed what the Baltic states gained when they became EU members in 2004.

In Graph (7), we have depicted the changes in unit labor costs for four selected industry groups from 1999 to 2017, compared to the Nordics and benchmarks of countries from Western, Southern and Eastern Europe, as well as Northern America. The selected groups are selected because they all represent advanced industry groups, including producers and intensive consumer industries of R&D and ICT. The Graph clearly shows a seemingly discouraging development in unit labor costs for the Baltic countries for all industry sectors, especially for Latvia. Admittedly, parts of the research and development industry are non-market oriented, so it might be that parts of the value contribution of this sector to the society are not fully captured for this group.

After 2004, the Baltic countries' competiveness predicted by the development in unit labor costs was poorer than all benchmarks for all selected industry groups. This development occurs despite relatively high increases in capital intensity in the Baltics, which ceteris paribus suggest an opposite development path. In addition, the self-employed constitute stable shares of total employment, noting that the reported labor costs applied in our measurement-do not include the labor compensations for self-employed. Yet, the seemingly worsening in international competitiveness for the Baltic countries might instead represent a taste of convergence in productivity, and factor compensation after access to the inner European market was obtained.

Relative unit labor costs are often preferred over relative value costs – that is, a comparison of labor cost per gross value added in current prices – since the development product prices are considered as random. However, it is far from a clear cut that this is the case. First, the different nature of industries and goods may imply different price paths for products and intermediates. Second, increases in prices may reflect quality improvements and the ability to reorient towards attractive markets. As a gross value added corresponds to the difference between gross production and intermediates, the current price version of the measure will both involve price developments for products and intermediates.

We do not necessarily consider unit labor costs and value labor costs as competing but instead regard them as potential supplementary measures. Accordingly, we have considered the development in the inverse of value labor costs for the Baltic States and benchmarks in Graph (8).

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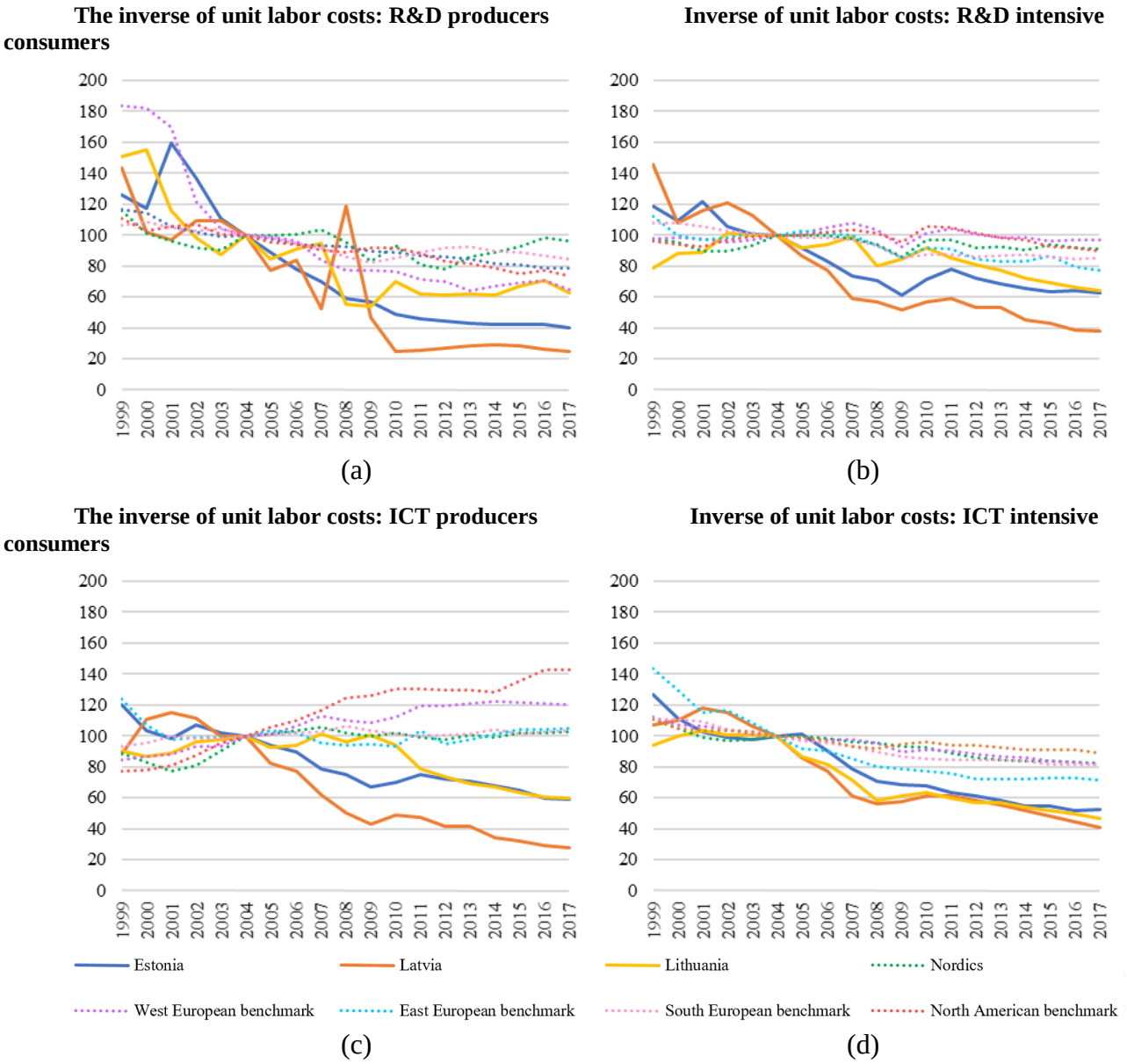

Graph 7. Indexed development in unit labor costs with 2004 as base year for a) scientific research and development (NACE 72), b) high- and medium-high R&D intensive activities (2-digit definition), c) High- and Medium-high R&D intensive activities (2-digit definition), d) high digital intensive industries (complex definition); Baltics, Nordics and benchmarks: Western European benchmark (Germany, France, Netherlands, Belgium and Austria), Southern European benchmark (Italy, Spain, Greece and Portugal), Eastern European benchmark (Poland, Czech Republic, Hungary, Slovakia and Slovenia) and North American benchmark (the United States and Mexico)
Source: OECD, 2021

The figures indicate a more positive picture of the Baltic States competitiveness, indicating relatively favourable price development for these countries. Nevertheless, the development in value labor costs is still poorer than the benchmarks for all industries. In the case of R&D intensive consumer industries, the differences are small.

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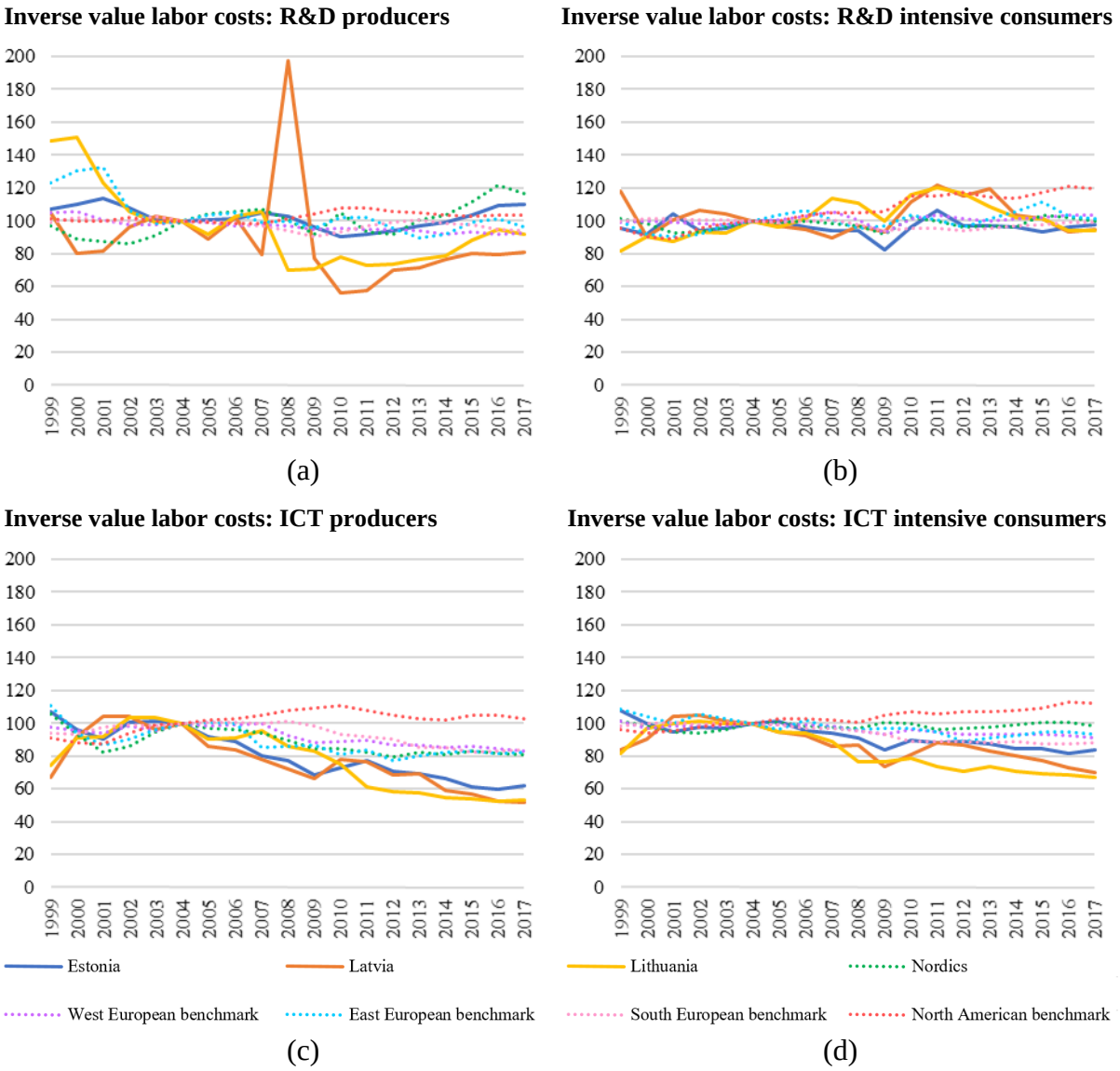
Considering the Baltic States' developments in unit labor costs and value labor costs, the realized competitiveness of the Baltics during the period could be expected to be decreasing. On the other hand, the entrance to the inner European market and corresponding economic integration point in the opposite direction.



Graph 8. Indexed development in unit labor costs with 2004 as base year for a) scientific research and development (NACE 72), b) high- and medium-high R&D intensive activities (2-digit definition), c) High- and Medium-high R&D intensive activities (2-digit definition), d) high digital intensive industries (complex definition); Baltics, Nordics and benchmarks: Western European benchmark (Germany, France, Netherlands, Belgium and Austria), Southern European benchmark (Italy, Spain, Greece and Portugal), Eastern European benchmark (Poland, Czech Republic, Hungary, Slovakia and Slovenia) and North American benchmark (the United States and Mexico)
Source: OECD, 2021

In the case of technological manufacturing and ICT services, the latter mentioned drivers appear to dominate the aggregate effect. As depicted in Graph (9), the Baltic states have actually increased their gross value shares of the underlying European industries (here defined as the EEA market and UK). Yet, the market shares are relatively low, manufacturing of technical equipment constituting the largest local ICT-related sector. This is in contrast to

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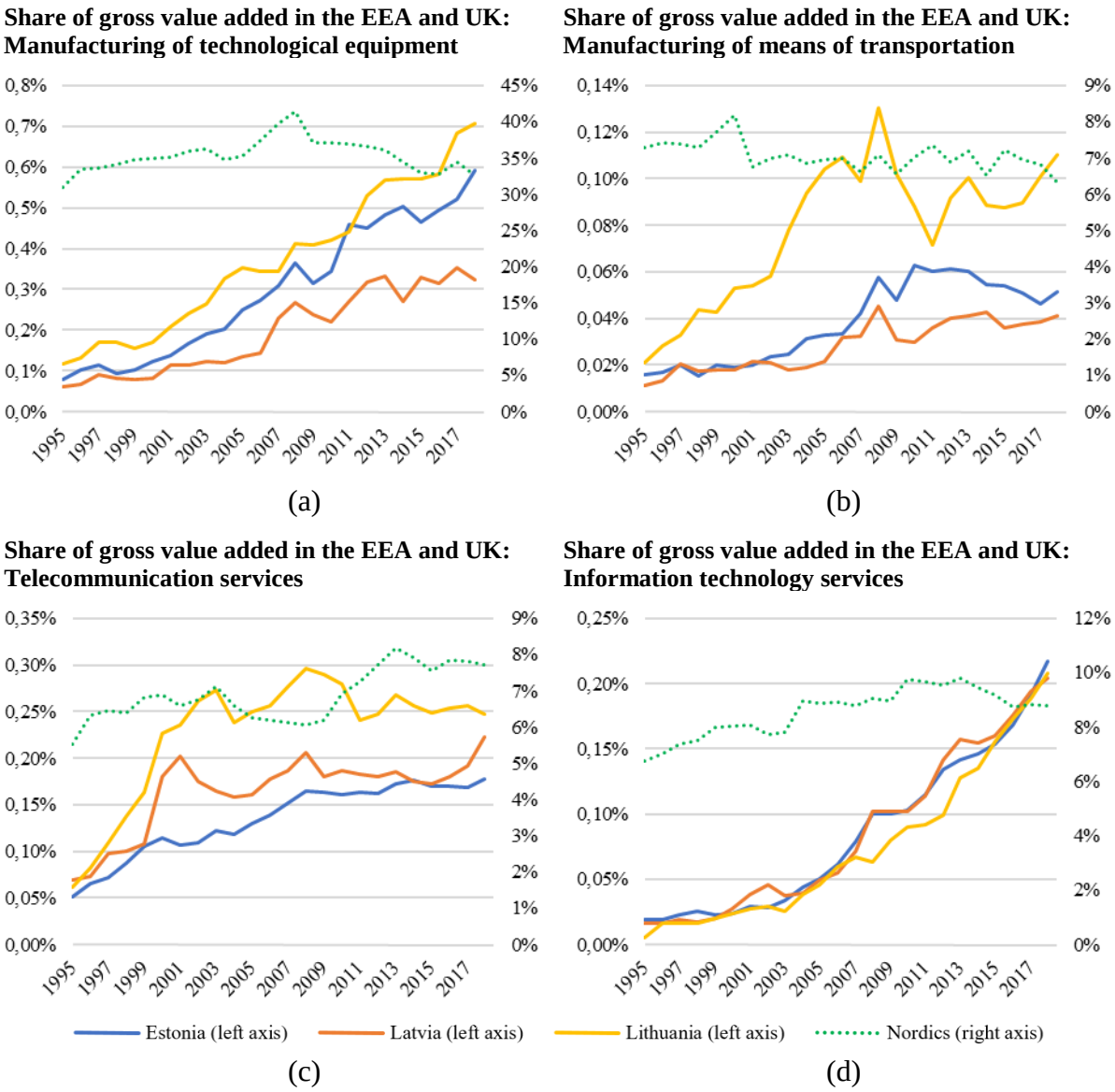
the Nordic countries, which constitutes larger European players in these industries than their economical size would suggest.

Moving on to the international export markets for technological merchandise and ICT services, a resembling – but somewhat weaker – the pattern is revealed, as shown in Graph (10).



Graph 9. Share of gross value added in the European Economic Area and the United Kingdom in the following industries: a) technological equipment (NACE 26 to 28 and 33), b) means of transportation (NACE 29 to 30), c) telecommunication services (NACE 61) and d) information technology services (NACE 62 and 63).
Source: OECD, 2021

In this comparison, the industries face competition from countries outside the inner European market, and production for domestic consumption are not accounted for. In addition, these shares are estimated based on value creation rather than gross value-added, such that it is not accounted for how efficient the intermediates are utilized.

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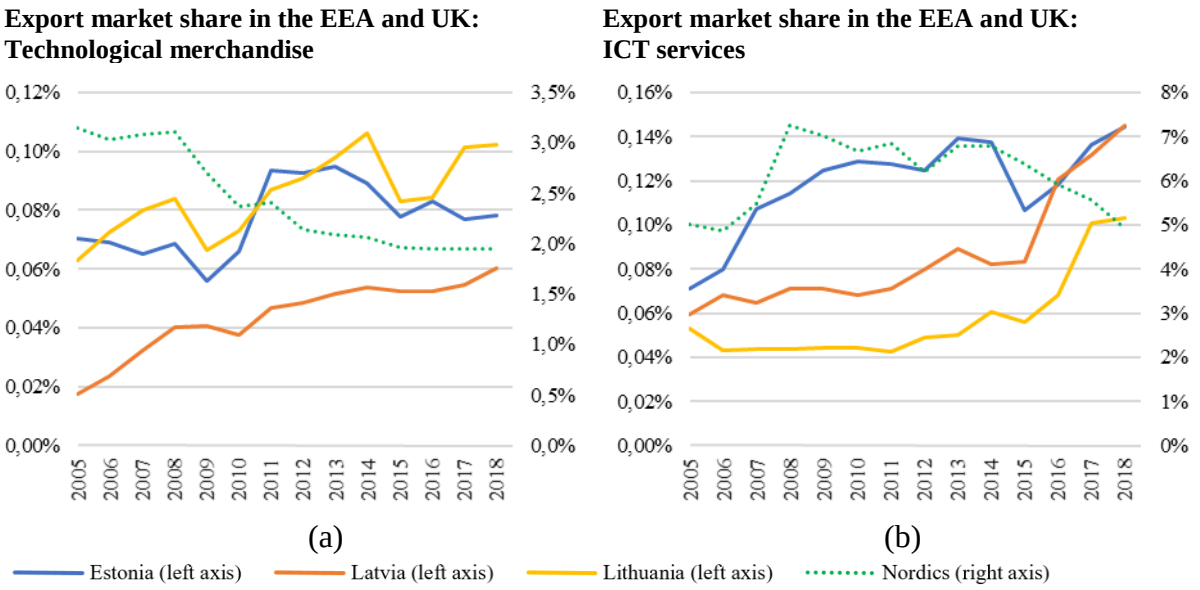
Again, the Baltic countries have had relatively low but increasing market shares since the mid-2000s. In the case of Estonia, the export market shares have stabilized subsequently to the Euro crisis. On the contrary, the market shares were relatively stable up to the Euro crisis for Latvian and Lithuania ICT service export.



Graph 10. Market share of the international export markets for the following goods: a) technological merchandise, b) information and communication technology services (NACE 62 and 63).
Source: WTO, 2021

Overall, our investigation on competitiveness in the technology-driven industries in the Baltics shows that these, as of today and in recent years, have had to limit importance outside of the Baltics. Probably due to improved market access, these Baltic industries have been able to capture small market shares, despite increasing unit labor costs and value labor costs. FDI from inter alia Nordic sectorial players may play a role in lifting these industries but would require location advantages such as local competence, infrastructure, cost savings and product market access. Industries that are less technology-intensive may, of course, also benefit from knowledge transfers. Here, the barrier for success will often be lower, but so will the potential for knowledge transfers.

4. Baltics Inward FDI from Nordics

Small countries usually attract investments from their richer neighbours. Moreover, as cheap assets and small markets require small amounts of investments, the largest transnational corporations may have little interest to invest in such countries in contrast to regional players. The best example is Estonia that benefits from investment flows that come from Finland and Sweden, mostly among all Baltic States (Hunya, G., 2004). Christiansen (2010) makes a good point that iceberg costs are an insignificant factor for trade between the Nordics and the Baltics due to comparatively short distances. However, being the Nordics among the richest and the Baltics among the poorest in the European Union makes very likely capital flows from the Nordics to the Baltics. In his FC model applied to an empirical study, Christiansen (2010) claims that the firms from Nordics do not treat the Baltic countries very differently.

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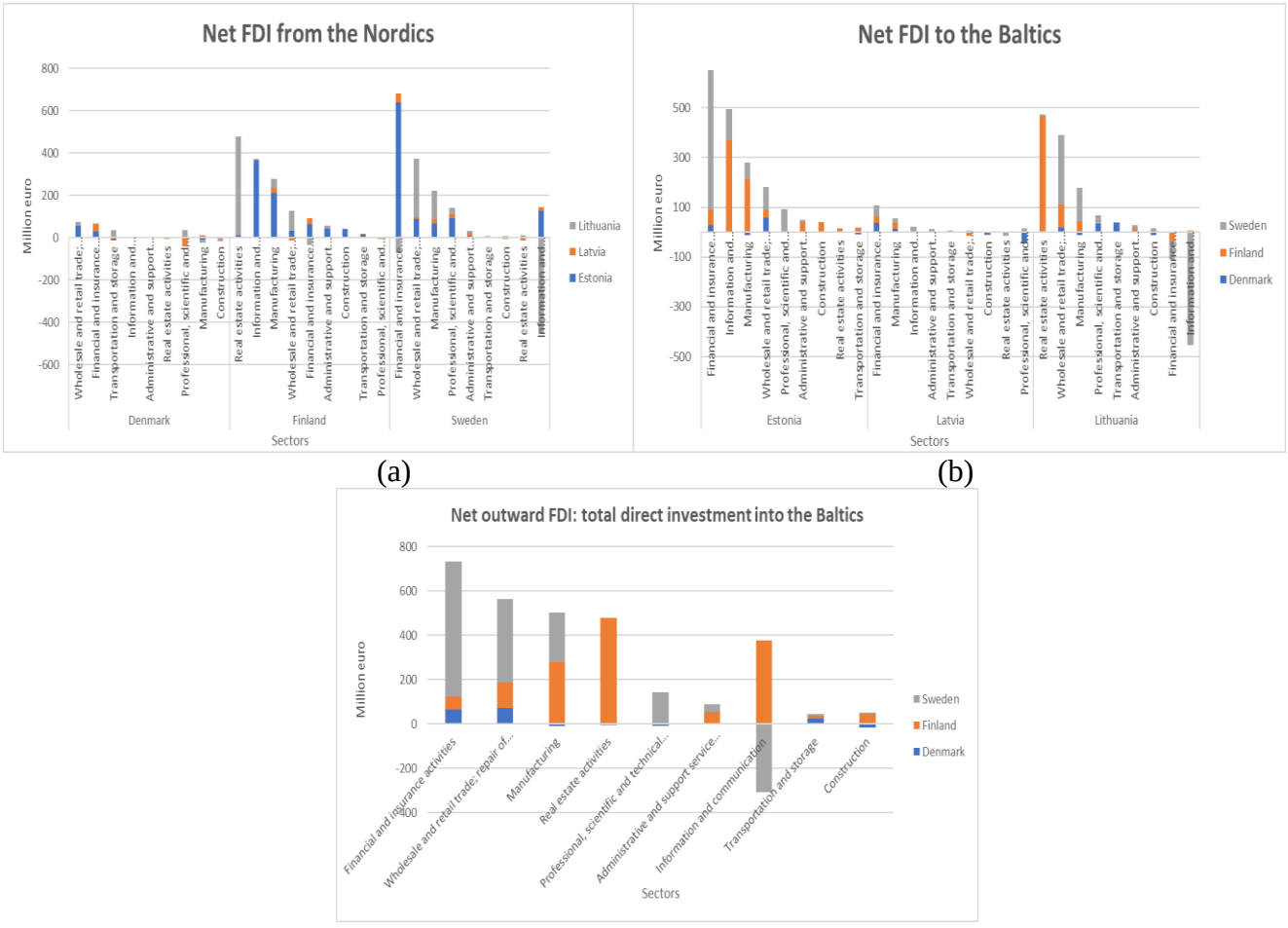
When looking at the investment structure of the Nordic countries by sector, it can be noted that the priorities are very different. Swedish investors give absolute priority to investments in the Estonian financial, Lithuanian wholesale and retail and manufacturing sectors. Meanwhile, Finnish investors invest mainly in Lithuanian real estate and Estonian IT and manufacturing sectors (Graph 11 (a) and (b)). Overall, the financial, wholesale and retail, manufacturing, and real estate sectors receive the most investment in the Baltic States from Scandinavia (Graph 11 (c)). This diversity of priorities for Scandinavian investors is both surprising and makes us wonder what the reason is behind such phenomena?



Graph 11. Net outward FDI: a) from the Nordics, b) to the Baltics, c) total direct investment into the Baltics.
Source: Eurostat, 2021[†]

There is a lot of studies that consider other FDI factors as supporting inward FDI in the Baltics. In their study, Amdam et al. (2007) report that the cost of labor was among the main factors that attracted foreign investments from other Nordic countries since the independence of the Baltics. There is a lot more factors that might attract FDI in the Baltics: exemptions from taxes, subsidies for new jobs and staff training, other forms of support for R&D activities (Brenkevičiūtė, 2010). Laskienė (2010) claims that FDI fosters export activity in the Baltics. Barauskaite (2012) found evidence that inward FDI in the Nordic and the Baltic countries are related positively

[†] Unfortunately, Eurostat does not provide data on Norwegian and Icelandic outward FDI in the Baltics.

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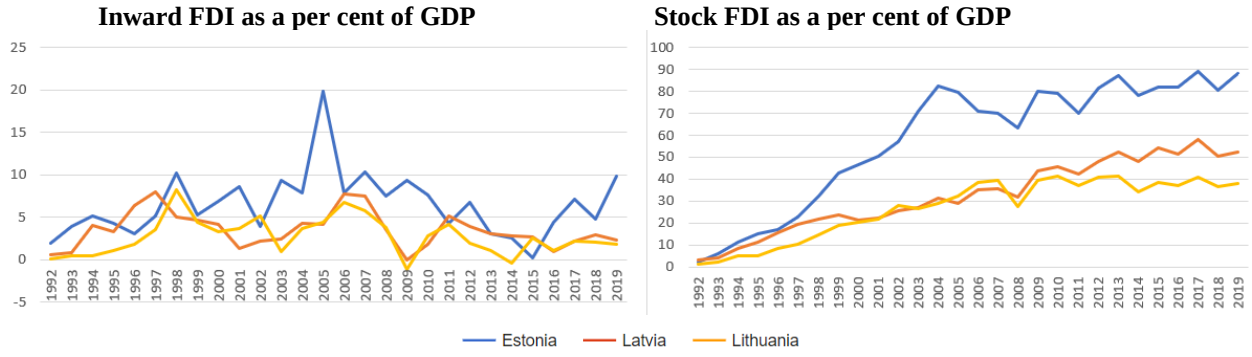
with tax wedge on labor cost, active workforce, and R&D expenditures. However, as small countries, the Baltic economies might lack the economies of scale that some of their larger competitors enjoy foreign investors might not come because of insufficient market size or labor pools, lumpy infrastructure investment might be too large for any one of the Baltic countries to shoulder on its own, etc.

In summary, the availability of relatively low-cost resources serves as a supporting factor for investments in manufacturing, i.e. (in the traditional labor intensive-industries such as food, textile, and wood). However, there is a difference between the Baltic States how inward FDI comes to. Both Lithuania and Latvia attracted equity capital in the forms of acquisitions and greenfield investment, while Estonia receives much more reinvested capital, probably due to a zero-tax rate on reinvested capital in Estonia (Irandoust, 2016). As mentioned above, the higher inward FDI flows in Estonia (Graph 12 (a)) goes to the financial and IT sectors that usually demonstrate high productivity (Graph 11).

Whatever the reason would it be, Estonia has been exceeding the other two Baltic States far away in terms of both inward and stock FDI (Graph 12); almost twice as Latvia and more than twice as Lithuania on average.



(a) (b)

Graph 12. Comparison of inward and stock FDI
Source: UNCTAD, 2021

In levels, the biggest contributor in terms of FDI is Sweden (Graph 13 (a)) with its exceptionally high investment in the service sector (Net outward FDI for services) in all three Baltic states. Swedish corporate investment in the services sector is mainly covered by banks and IT. It should also be noted that FDI in the manufacturing sector (Net outward FDI for manufacturing) in Estonia is on average more than twice as high as in Latvia and Lithuania: the average is EUR 249 in Estonia, EUR 111 in Latvia and EUR 121 per employee in Lithuania.

In general, it should be noted that the FDI of the Nordic countries in Estonia is incomparably more significant than in Latvia and Lithuania. We have found that for the period from 2013 to 2017, the Nordic FDI in Estonia averaged as much as 75% of total inward FDI, while in Latvia – only 30% of all inward FDI and in Lithuania – 39% of all inward FDI constituting 0.51% of GDP (Graph 13 (b)).

The data on the Baltic firms owned by the Nordic enterprises (from 2008 onwards) gives a lot of insights regarding what might attract inward FDI in the Baltics. First, looking at Graph 14, it seems strange that Nordic capital companies operating in Estonia have moderately lower margins (the left axis) than in other Baltic countries: in Estonia - 7.76%, in Latvia - 9.31% and in Lithuania – 9.86%. The margins do not correlate with firms' turnover (142 thousand Euro, 155 thousand Euro and 118 thousand euro per employee respectively; see Table 1). This seems to be due to the exceptional margins of Swedish investments performance in Latvia and Lithuania (Graph 14).

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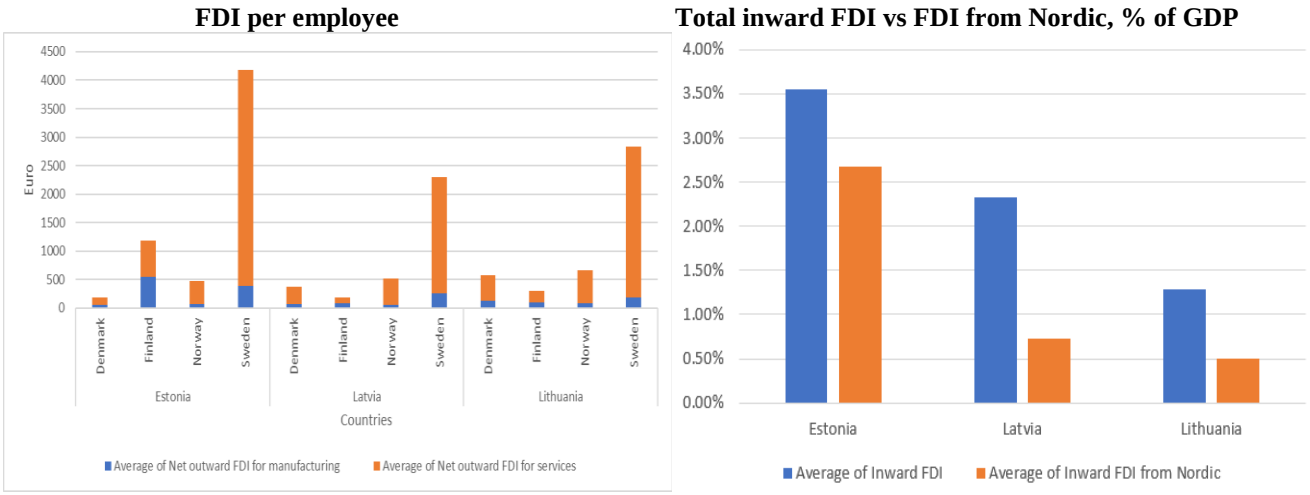
It should be noted here that, according to industrial organization and new trade theories, lower margins may indicate more intense competition, while higher margins may indicate the existence of more expressed leadership in the market, and at the same timeless competition and greater market power.

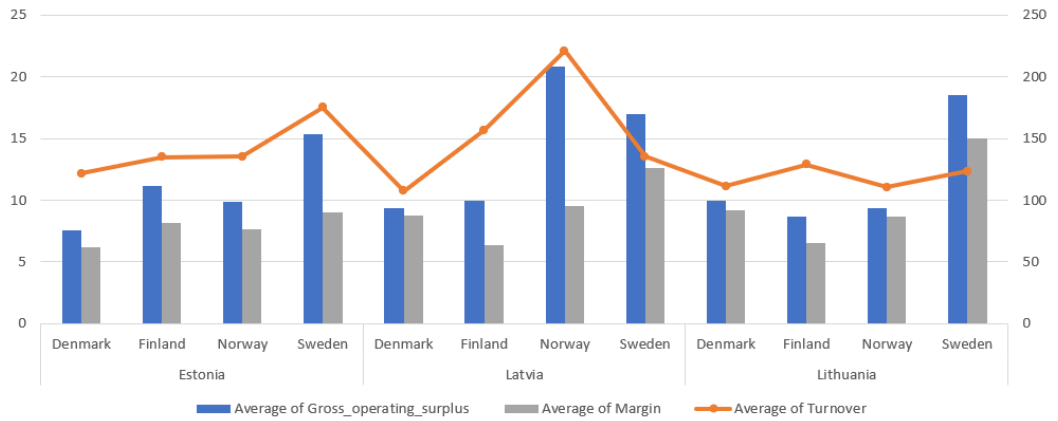
FDI returns reveal one possible reason why Estonia leads the way in inward FDI volumes among all Baltic countries. As can be seen from Graph 15, the investment return rate (in percentage terms) in both the manufacturing sector (return in percentage for manufacturing) and the services sector (return in percentage for services) is the highest in Estonia (with a few exceptions).



(a) (b)

Graph 13. FDI to Baltic firms controlled by the Nordic business and its share of total FDI
Source: Eurostat, 2021; UNCTAD, 2021

Particular attention should be paid to the return on investment in the manufacturing sector, where both Finland and Sweden – the two countries closest to Estonia – stand out.



Graph 14. Comparison of the Baltic firms controlled by the Nordic business: turnover and profitability by an employee
Source: Eurostat, 2021

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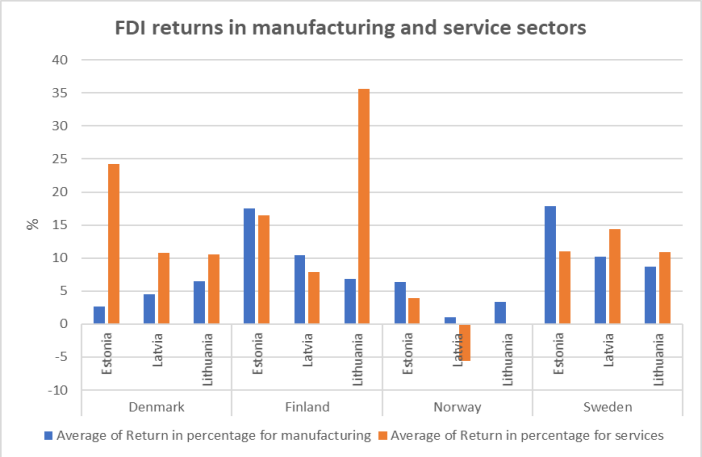
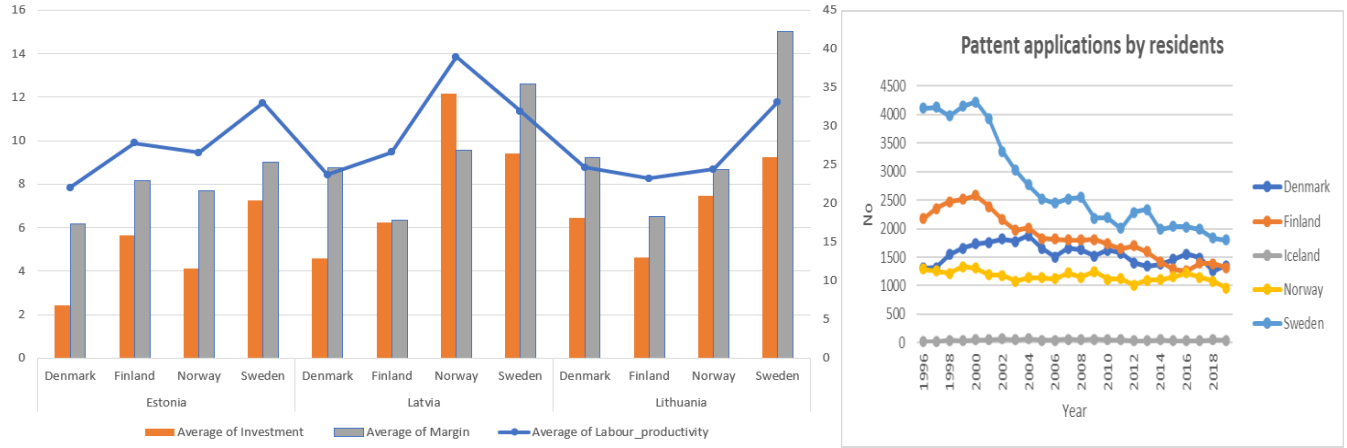
Both Graph 16 (a) and Table 1 reveals the most likely factors for attracting FDI are: gross operating surplus and gross value added per person employed (the right axis). Particular attention should be paid to the high correlation between gross value added per person engaged and gross operating surplus. In industries with high value-added, the gain is often distributed over both capital owners and employees/self-employed, although value capturing from one factor to the other or reallocation of the factor inputs in some cases will induce an opposite pattern. Besides, competence and capital are often complements, implying that industries often are both capital and knowledge-intensive at the same time, again predicting relatively high gross value added per person engaged and gross operating surplus.



Graph 15. Comparison of the Baltic firms controlled by the Nordic business: FDI return in percentage in sectors of manufacturing and services
Source: Eurostat, 2021

Yet, the correlation pattern still supports the hypothesis that the most productive industry sectors are among those that attract the most FDI in the Baltic States. Also, as Graphs 16 (a) and (b) apparently suggests, it is Sweden that enjoys the biggest patent application numbers, provides the biggest investment, and its firms obtains the highest margins in the Baltic market.



(a) (b)

Graph 16. Comparison of the Baltic firms controlled by the Nordic business: FDI, margins and labor productivity by an employee
Source: Eurostat, 2021

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As Hunya (2004) reported that FDI in the Baltic states was not at a sufficient level to stop their deindustrialization: most of the manufacturing sector that attracted FDI was low-tech, characterized by low productivity and thus low profitability. This is in line with the analysis in the previous section. However, after the Great Depression, FDI attracts those manufacturing and service sectors that could offer the highest productivity and profits (Table 1).

To sum up, Nordic FDI in the Baltics was still focused on the services sector from 2013 to 2018; FDI accounted for an average of 21.45% in the manufacturing sector: in Estonia – 23.93%, in Latvia – 20.91%, and in Lithuania – 19.51%. Interestingly, although investments from the Nordic countries in Estonia are the largest, profitability indicators, which are of great importance in attracting FDI, do not stand out there. Although it can be intuitively inferred that there is less market concentration and more competition in Estonia, these links need to be explored in more detail.

Table 1. Correlation analysis of indicators of the Baltic firms controlled by the Nordic business

Correlation / Probability	TURNOVER	GROSS OPERATING SURPLUS	MARGIN	LABOUR PRODUCTIVITY	INVESTMENT
TURNOVER	1 -----				
GROSS OPERATING SURPLUS	0.59 0.00	1 -----			
MARGIN	-0.10 0.27	0.73 0.00	1 -----		
LABOUR PRODUCTIVITY	0.67 0.00	0.95 0.00	0.60 0.00	1 -----	
INVESTMENT	0.35 0.00	0.54 0.00	0.38 0.00	0.49 0.00	1 -----

In Table 1, labor productivity (gross value added per total employment) demonstrates high enough correlations with turnover and gross operating surplus that could indicate that the Nordic business is value-added oriented.

5. Technology and Knowledge Transfer from Nordics to Baltics

Of course, it is difficult to assess directly how technology and knowledge transfer to the Baltic States from the Nordics. However, as it will be presented in detail here, some differences between countries in terms of various indicators defining their innovativeness make it intuitive to infer how this is happening.

When comparing Nordic and Baltic countries according to their innovation and R&D expenditure, there is a significant divide in both respects: Nordic countries stand out for both high innovations and almost double the R&D expenditure level. Meanwhile, from the Baltic States, Latvia and Lithuania have the lowest levels of these indicators. It is interesting that Estonia and Norway occupy an intermediate position between the two extremes identified (Graph 17).

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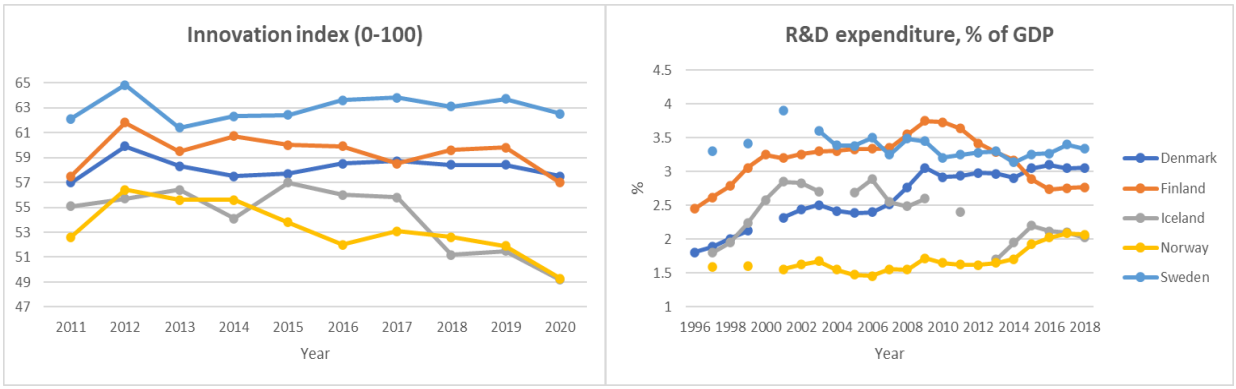
Also, it should be noted that the degree of innovation is highly dependent on the industry sector. Some industries inter alia within technological manufacturing are in principle very innovative. Yet, this can often not be read directly from the statistics, as their knowledge generation occurs as learning by doing integrated with the production activities rather than separated innovation activities.

In the general context of the EU, the Baltic States are among the moderate innovators, when Nordic countries are among the leaders in innovative activities (Graph 18).

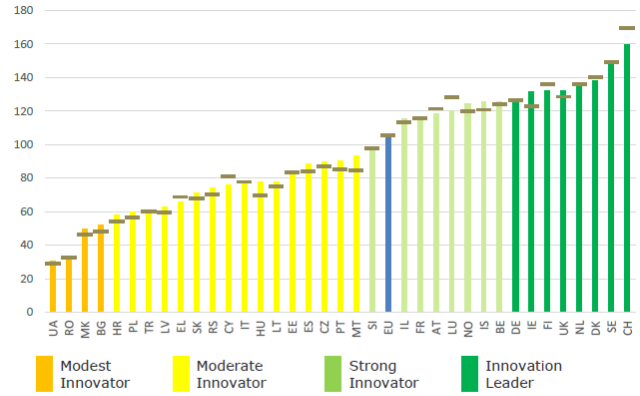
In terms of IT and high-tech exports, the difference between the Nordic and Baltics is not so great, while patent applications remain the area where the Nordic countries remain far superior against the Baltics.



(a) (b)

Graph 17. Comparison of innovativeness and R&D expenditure
Source: Cornell University, INSEAD, and the WIPO; the United Nations

The comparative analysis presented shows that, with the Nordic countries being much more innovative and spending more on innovation activities, it is Estonia that stands out among the Baltic States in terms of these indicators. Bearing in mind that it is Estonia that attracts the most FDI, both in general and from the Nordic countries (Graph 12 and 13), it can be assumed that Estonia's greater innovativeness is due to the increased inward FDI.



Graph 18. Innovativeness of EU countries in 2019 (relative to the EU in 2010)
Source: European Innovation Scoreboard, 2021

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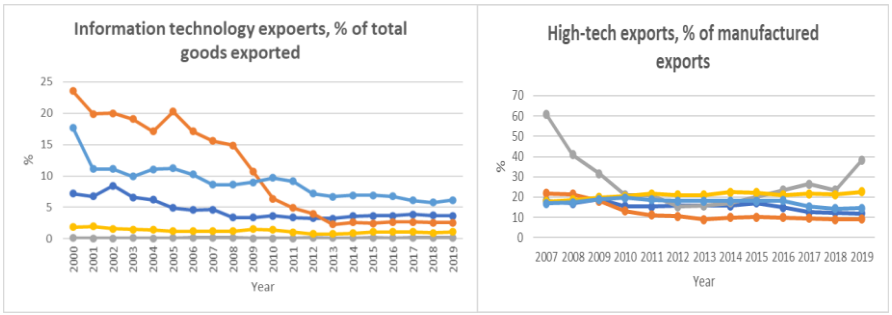
If that is the case, then Graph 19 might suggest that it is foreign ownership that could serve as a channel of technology and knowledge transfer.

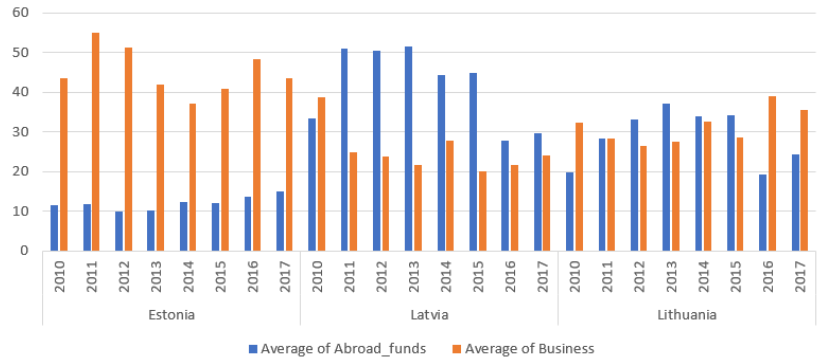
Compared to other Baltic countries, Estonia's uniqueness in terms of R&D expenditure is characterized by the fact that this type of expenditure is financed by local business funds (on average – forty-five per cent), while in Latvia (on average – twenty-five per cent) and Lithuania (on average – thirty-one per cent) local business funds play a much less significant role in this aspect (Graph 20).



(a) (b)

Graph 19. IT & high-tech exports and patent applications
Source: The United Nations; The World Intellectual Property Organization

This assumption is only reinforced by comparing the Baltic States according to the intellectual assets held by their companies (Graph 21).



Graph 20. Gross domestic expenditure on R&D by the source of funds, %
Source: uis.unesco.org

Also, it is interesting to notice that it is Estonia that receives the most FDI from the Nordic countries and whose companies invest the most in R&D activities that have the most intellectual capital. Therefore, Graph 21 likely reveals one of the reasons why Estonia attracts more FDI.

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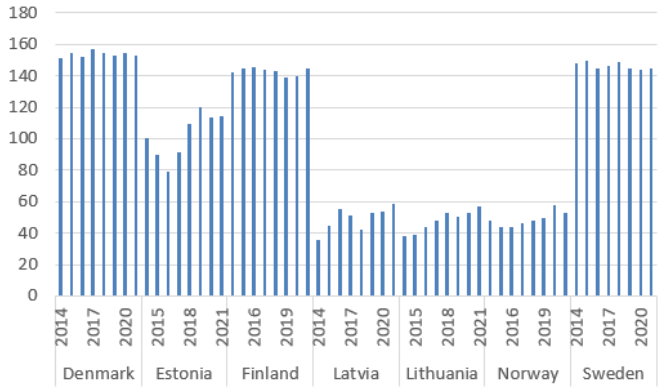

Graph 21. Intellectual assets (relative to the EU in 2014)
Source: European Innovation Scoreboard

Overall, as innovation leaders in the EU (Graph 18) and with the largest investment in Estonia (Graph 13 (b)), Nordic companies have transferred a significant part of their investments to their affiliates in Estonia to finance R&D activities and create intellectual assets (Graph 21). Therefore, intuitively it can be concluded that this knowledge and technology transfer from the Nordics might be one of the factors determining Estonia's exceptionally high innovativeness among the Baltic States.

6. Conclusions

In literature, vertical FDI results in splitting production process by locating different stages thereof in different countries, which implicates supply chain fragmentation. Therefore, it occurs when the boosting of productivity due to some benefits provided by the host country is expected. IT and communication technological progress triggered dispersing of production stages to different locations that might offer the highest cost efficiency opportunities. Therefore, international trade has been transforming rapidly to networks of affiliates and the chains of different affiliates that add value at intermediate production stages and pass down their output. In theory, the ownership advantage and a proprietary technology give its owner a cost advantage over local producers. Therefore, commonly the most cost-efficient firms can afford to participate in vertical FDI and high R&D industries.

The Nordics and the Baltic have become more synchronized recently; therefore, one could expect the integration of the entire Nordic region (including the Baltics) should intensify significantly. Many studies reported that the foreign ownership of affiliates is related to the boost of local firms in terms of total factor productivity: it increases after local firms have been bought by foreign firms, and it decreases after being sold back to local ownership.

Estonia has been exceeding the other two Baltic states in many aspects of FDI: both inward FDI flow and stock; in volumes and returns in the sectors of FDI manufacturing and services from almost all the Nordic countries. This separation of Estonia from the other Baltic States can be attributed to some kind of Estonia's attractiveness, specifically for direct investment to the Nordic countries. Estonia appears to attract more than 70% of all inward FDI from Scandinavia, which is leading position in the European Innovation Index and has significantly higher capital intensity indicators. Intuitively, it can be assumed that this results in Estonia receiving more modern technologies and know-how, as evidenced by the intangible assets held by Estonian companies, which exceed the same assets of other Baltic states in times. More, unlike in other Baltic states, Estonian companies finance most of their R&D expenditures from private business sources.

Estonia also distinguishes itself by the sectors that receive the most inward FDI. These are the financial, information technology and manufacturing sectors, which tend to be characterized by higher productivity and bigger sustainability in terms of economic development. It is no coincidence that Sweden, which invests the most in Estonia, also stands out by the number of patent applications.

However, in terms of labor productivity (value-added per employee) and profitability, the affiliates of Nordic firms in Estonia are not exceptionally different from Latvia and Lithuania. Also, in Estonia, their margins and investment per employer even tend to be slightly lower that could indicate lower market concentration and higher competition. Therefore, with foreign investment being moderately correlated with gross profit and labor productivity and the latter being highly correlated with gross profit, it is not likely that these elements might serve as the main factors behind higher inward FDI in Estonia phenomena.

Being the leaders in terms of innovativeness in the EU and patent applications, the Nordics also experience high levels of R&D expenditures, high-tech exports and interestingly, firms in Estonia tend to invest in R&D activities more than other Baltic states. In addition, Estonian firms enjoy much higher levels of intellectual assets, almost as much as firms in Nordics do. These findings might suggest that the firms in Estonia attract much higher levels of FDI flows from the Nordics because Estonia was considered as a better place for investment in the higher productivity industry sectors of finance, IT and industrial manufacturing.

However, in the last years, Latvia and Lithuania have shown signs of attracting more inward FDI from the Nordics.

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