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Impact of Corporate Taxation on Foreign Direct Investments: Evidence from the European Union

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Declaration:

Hereby I declare that this dissertation, my original investigation and achievement, submitted for the doctoral degree at Tallinn University of Technology has not been submitted for any other academic degree.

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MAJANDUS H39

Ettevõtte tulumaksu mõju otsestele välisinvesteeringutele: järeldusi Euroopa Liidu andmestikust

SVETLANA RAUDONEN

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CONTENTS

INTRODUCTION

This study contributes to the discussion about the importance of taxation in investment flows into the EU countries. Inward foreign direct investments (FDI) to EU economies have included considerable flows from the other EU countries, mainly from the United Kingdom, the Netherlands, Germany and Luxembourg, and from third countries, mainly from the United States. The European Union has become one of the most important economic regions due to its favourable location and high levels of economic development and economic freedom, including free movement of capital, goods and labour.

There are several reasons that motivated the study and why the effect of corporate taxation is an important subject for study. The first reason is the fact that the income flows generated by foreign direct investments are subject to corporate income tax in the host country. The expected cash flows from investment and the value of investments may be subject to international double taxation: corporate tax in the host country and tax on dividends in the home country. The question is: How much are FDI flows influenced by the level and mechanism of taxation?

Secondly, it is important to study the behaviour of a country in this context, in particular one aspect of its fiscal policy, the policy of decreasing the tax rate. Statutory corporate tax rates have declined over the last 25 years in most of the EU countries and various countries pay attention to the advantages of a policy of decreasing tax rates. For example, the level of FDI has increased in Estonia as well as in the other Baltic States after the decreasing of the corporate tax rates in Latvia and Lithuania to 15 per cent and in Estonia to 21 per cent. Important questions are whether the decrease of the corporate tax rate has been a result of tax rates decreasing policy. However, according to the author's knowledge, no assessment of the impact of corporate taxation on FDI flows of the Baltic States has so far been carried out. This is a strong argument to concentrate in this research on the Baltic States.

Thirdly, although the policy of decreasing tax rates has been the subject of numerous studies, the results of these studies are mixed. Since some authors (e.g. Hartman, 1985; Boskin and Gale, 1987; Grubert and Mutti, 1991; Hines and Rice, 1994) suggest that the level of foreign investment depends on tax factors, but earlier studies (e.g. Root and Ahmed, 1979; Porcano and Price, 1996) conclude that taxes do not have a significant effect on FDI and even a positive effect has been reported (Swenson, 1994), it is important to reassess the results. Moreover, the literature comprises mainly American studies and mature market economies. Therefore it is interesting to examine the significance of taxation in the context of other developed countries, such as European countries.

Fourthly, an important reason to study the influence of taxation on FDI in the European Union besides the coverage of this topic in the academic literature is the unique corporate taxation system in some EU member states, for example in Ireland. Ireland has created special tax incentives in order to create a better business climate for investors. Gropp and Kostial (2000) have paid special attention to the impact of corporate tax policy on FDI in Ireland; according to them corporate tax rate was deducted by 2003 to 12.5 per cent across all industries, started from

creation incentives for manufacturing in the late 1950s. As the result the level of FDI increased and achieved in 2003 58 billion euro (Eurostat, 2014). The influence of taxation on the FDI flow into Ireland was the subject of numerous researches (Gunnigle and McGuire, 2001; O'Dwyer, 2002; Gerald, 2009; Campa and Cull, 2013). However, the question is how much the policy of decreasing tax rates will influence the level of FDI in the whole EU. The author's hypothesis is that under certain conditions the introduction of tax incentives for example for EU manufacturing will attract more investments to this particular sector. However, comprehensive researches in this field are still missing.

Additionally to the abovementioned there is another reason to study influence of corporate taxation. Estonia, one of the Baltic States, has introduced a special regime of corporate taxation for the purpose of attracting additional investments. The changes in the taxation regime were made in 2000. The system of distributed profit taxation was introduced instead of the classical profit-based corporate taxation system. Similarly to Ireland, this topic has been deeply analysed by researchers (e.g. Funke, 2002; Hazak, 2008; Lehis et al., 2008; Staehr, 2014) as well as by practitioners. There is a general belief that the high amount of foreign investment in Estonia has been stimulated by the tax policy adopted by the government in 2000. In comparison with the year 2000, when the Estonian corporate taxation system was completely changed, FDI increased 5.45-fold by 2014 (Bank of Estonia, 2014). Almost all investment came from developed countries, particularly from the European Union. The public debate on the influence of low tax rates on foreign investment in Estonia has been stirred up after the acquisition of many Estonian companies by foreign investors.

Earlier research shows that investors are sensitive both to changes in tax rates and to possible charge-offs. For example, look at the neighbouring countries Lithuania and Poland, which have almost the same geographical advantages. From the economic geography point of view, their position is very good: the Russian Federation is on one side and old Europe is on the other side. This enhances economic development in both states. At the same time, Poland has more natural resources and cheaper labour force. Lithuania has more qualified specialists, and from the perspective of tax policy, allocation of capital into Lithuanian companies is more beneficial, because the income tax rate is lower. Hence, the Lithuanian government competes with Poland by offering lower tax rates instead of natural resources. In the author's opinion, in the EU there are strong links between fiscal policy, in particular taxation policy, investors' decision-making process and the volumes of FDI inflows.

It is well known that investors will not look at a country only from the point of the most acceptable tax policy but will consider also its location and available resources. As a result, in the EU a situation may arise where the poor (from the point of land resources) states will become even poorer, because the flow of capital and budget revenue, including tax revenue, will decrease, and there will be no state funds for the development of business environment and infrastructure. Therefore, it is important to compare how taxation impacts the inflow of FDI to small and large countries. Moreover, the evaluation should cover European countries that are

characterised by the same general principles, freedom of movement of capital, people, services and goods (Treaty, 2012).

According to the theory of FDI, multinational companies are affected by ownership-, location-specific and internationalization variables (OLI). Many studies have been conducted on the basis of the above-mentioned approach to examine investment incentives, including tax treaties, investment agreements and free trade agreements. The general purpose of these treaties and agreements is to ensure that the investments will be promoted and protected and that the profit earned will be exempted from double taxation. However, the actual effect of tax treaties on FDI flows is questionable. As the effect of low tax rate policy, which may enhance, stimulate or damage investments, is examined in numerous studies, the author investigates the relationship between inward FDI and EU taxation because it may influence FDI flows into the EU countries both from other EU economies and from third countries.

The aim of this doctoral thesis is to review and supplement the knowledge on the influence of taxation factors on FDI via investment theory, and especially with the help of the evaluation of location-specific advantages. This includes an exploration and re-evaluation of the results of previous researches done in this field. Special attention is paid in this thesis to different industries, especially to comparison of manufacturing and nonmanufacturing industries. The following research tasks of the thesis are addressed in distinct papers:

- to investigate how sensitive foreign direct investments into the EU, and in particular manufacturing investments, are to the corporate income tax differences across European Union countries (Study I);
- to examine whether the bilateral FDI inflows into the Baltic States affected by differences in nominal and effective corporate tax rates (Study II);
- to investigate how the number of double taxation treaties signed by host countries influence the EU FDI, in particular manufacturing investments (Study I);
- to find out whether bilateral FDI flows into European Union sensitive to the risk of double taxation measured by the existence of a double taxation treaty signed between the host and the investor country (Study III).

The thesis consists of four sections. Section 1 gives an overview of related literature. Section 1.1 presents the contribution of Hymer (1960) and his followers in explaining the basis of investment theory. Section 1.2 looks into the empirical researches of taxation impact on FDI. Section 2 describes the methodology and the data set. Section 3 introduces and discusses the studies conducted in the course of this research and Section 4 presents the conclusions of the thesis.

This thesis is based on three independent research papers connected by a common theme, namely the influence of corporate taxation on foreign investments. The research papers represent different studies mainly focused on investments in European Union countries and the influence of tax factors on them. The first factor that influences foreign investments is the statutory income tax rate and the differences of tax rates between investor and host countries. The second is the implicit tax rate calculated by dividing the revenues from taxes on a special activity

or good by an appropriate corresponding aggregate tax base. The third aspect is an open and liberal tax policy of the host country, determined by agreements for the avoidance of double taxation (DTA).

The first paper (Study I), co-authored with Enn Listra, is titled "The Impact of Corporate Income Taxation on Foreign Direct Investment into European Union Manufacturing Sector". It was published by EuroMed Press in peer-reviewed conference proceedings of the EuroMed Academy of Business (ETIS[1] 3.1). The paper explores the impact of corporate taxation in the EU on foreign manufacturing direct investment flows and macroeconomic indicators across the EU countries from 1998 to 2008. The analysis demonstrates that the policy of reducing the tax burden encourages foreign investors to invest into the sector. Two main questions were examined: **the impact of changes in taxation on foreign direct investment** and the importance of a country's size on this impact. The paper examines the importance of taxation for the inflow of manufacturing foreign direct investments into the European Union member states regardless of the size of the country, and in particular the impact of the number of agreements for the avoidance of double taxation signed by the host country with different investor countries and corporate income tax rate. The paper presents an empirical analysis of the impact of corporate tax rate and other location-specific factors on attracting foreign direct investment. The author of the thesis prepared the literature overview, complied the empirical data set and ran the empirical analysis for the paper. Enn Listra provided the ideas for the setup the paper and the regression model. Both authors were jointly involved in the formulation, interpretation and discussion of results.

The value of the second and third research papers is related to the examination of bilateral FDI flows and their sensitivity to changes of taxation in the host countries. The host countries examined are the EU countries, particularly the Baltic States. The second research paper (Study II), co-authored with Andreas Freytag, explores how the **difference in corporate tax rates between countries**, geographical and cultural distance, institutions, regulations and the size of the economy, as well as its economic development, affect FDI inflows into the Baltic States. The paper "Determinants of FDI Inflows into the Baltic Countries: Empirical Evidence from a Gravity Model" was published in the *Journal of Business and Economics* (ETIS 1.2). In that paper, we investigate the effect of tax differentials on investor and host countries and the degree of economic freedom on bilateral FDI of the Baltic States using a gravity model. The author of the thesis compiled the empirical data set, took an active part in the discussion of the methodology employed in the research and formulation of the conclusions. Andreas Freytag prepared the literature overview, was leading in the selection of the data set of independent variables and participated in the formulation of the conclusions.

The aim of the third research paper (Study III) is to check the applicability of the gravity model to the investigation of foreign direct investments between EU

[1] ETIS – classification scheme of scientific publications in Estonian Research Information System adopted by regulation No 704 of the Ministry of Education and Research dated 20 July 2009; https://www.etis.ee/otsingud/classification.aspx

countries and their main investor partners, and **to measure the importance of** the indicators of distance between two countries, **the tax rate variable, and double taxation treaties** on the bilateral flows. The paper titled "Role of Taxation in Investments Allocation Decisions: Using a Gravity Approach for Exploring Bilateral FDI into the EU" was published in peer-reviewed conference proceedings of the EuroMed Academy of Business (ETIS 3.1). The research is essential for evaluating the importance of corporate taxation and its incentives for different groups of investor countries. The general purpose of the paper is to examine whether an investor-oriented and favourable tax climate, i.e. low tax rates, will promote FDI.

The **contribution of this doctoral thesis** lies in the following:

- Comparison of different economic sectors is one step further in terms of analysing business climate conditions and in stressing the need to focus on increasing tax incentives besides the profitability of industry. The results point to the importance of further changing the EU tax policy with the purpose of making the investment environment more attractive. The author is of the opinion that incentives within the corporate taxation of the manufacturing industry and wholesale and retail sectors are necessary for the further development of the EU economy.
- This research helps to improve the implementation of fiscal policy in the field of taxation. A suggestion for politicians is to seek new regulation to achieve attractive and more effective business climate for investors in the European Union.
- In any account, the results of the research point to the importance of further changes in tax policy. Policymakers should be highly motivated to insist on tax incentives within the European Union rather than to concentrate on certain industries.
- The results of the research help to improve the implementation of fiscal policy and focus on aspects of international taxation, in particular on the avoidance of double taxation of sources and investment of income in host and investor countries.
- Special attention in the thesis is paid to the impact of corporate taxation in the Baltic States. The analysis of FDI flows into the Baltic States point to the importance of determinants influencing investors, especially high level of economic freedom and taxation policy.
- Apart from other advantages of tax rate deduction policy and policy of increasing tax incentives, such as that it forces governments to pursue efficiency and welfare, tax policy can be instrumental in attracting investment from abroad.
- This thesis offers ideas for policymakers in considering whether harmonisation of tax rates will help to attract investments.

The **following articles** were **published** in the course of the research:

1. Raudonen, S. 2013. Role of Taxation in Investments Allocation Decisions: Using a Gravity Approach for Exploring Bilateral FDI into the EU. EuroMed

Press, Conference readings book proceedings, Confronting Contemporary Business Challenges Through Management Innovation, pp 1878-1900.
2. Raudonen, S., Freytag, A. 2013. Determinants of FDI inflows into the Baltic countries: Empirical evidence from a gravity model, Journal of Business and Economics, Vol 4, Issue 2, February 2013, pp 180-194.
3. Raudonen, S., Listra, E. 2011. The Impact of Corporate Income Taxation on Foreign Direct Investment into European Union Manufacturing Sector. EuroMed Press, Conference readings book proceedings, Business Research Challenges in a Turbulent Era, pp. 1481-1494.
4. Raudonen, S. 2010. Role of Corporate Taxation and Bilateral Tax Treaties in Investments into Estonian Manufacturing Companies? FindEcon, 1–18. Poland: Łódź University Press, pp. 35-49.

Overview of the approval of research results:

1. The results of the research reported in "The role of Taxation Policy in Investments Allocation Decisions: Using a Gravity Approach for Exploring Bilateral FDI into the EU" were presented at the 6th annual conference of the EuroMed Academy of Business in Estoril, Cascais, Portugal on 23–24 September 2013.
2. An early version of the research of „Determinants of FDI Inflows into the Baltic Countries: Empirical Evidence from a Gravity Model" was presented at the "Doctoral Summer School 2012" organized by the Doctoral School in Economics and Innovation in Aegviidu, Estonia, in August 2012. Conclusions drawn from the results of the research paper "Determinants of FDI Inflows into the Baltic Countries: Empirical Evidence from a Gravity Model" were presented by the corresponding author Andreas Freytag at the Miami 2nd World Congress of the Public Choice Societies, Hyatt Regency Miami, Miami, Florida, on 8–11 March 2012.
3. An early version of "The Impact of Corporate Income Taxation on Foreign Direct Investment into the European Union Manufacturing Sector" was presented at the International Workshop on Current Researches in Taxation held in the Münster Institute of Accounting and Taxation on 27–28 June 2011. The results of the research were also presented by the corresponding author, Enn Listra, at the conference "Business Research Challenges in a Turbulent Era" in Elounda, Crete, Greece on 19 - 22 October 2011.
4. An early version of "Role of Corporate Taxation and Bilateral Tax Treaties in Investments Results Investments into Estonian Manufacturing Companies" was presented by the author at the conference "Finance and Economy" in Lodz University in Poland in 2009. The redrafted version of this paper was presented at the 2nd international conference "Economic Challenges in Enlarged Europe" in Tallinn in 2010.

ABBREVIATIONS

FDI – Foreign Direct Investments
EU – European Union
EU-12 – European Union Member States that accessed in 2004
EU-15 – European Union Member States before 2004
EMU – European Monetary Union
GDP – Gross Domestic Product
OECD – Organization for Economic Co-operation and Development
DTA – Conventions for Avoidance of Double Taxation and Prevention of Fiscal Evasion
OLI – Ownership–Location–Internationalisation theory
CFO – Chief Financial Officer

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Furthermore, I would like to express my deepest gratitude to my co-supervisor Professor Andreas Freytag, who believed in me and thanks to whose encouragement I gave up my earlier decision to leave the university and not to continue with my project.

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Finally I would like to thank my family and friends. I would like to express my greatest gratitude to my family, especially to my daughter Kristina and to my spouse Enn. Without their understanding, support and love this project would have been impossible.

The findings, interpretations and conclusions expressed in this thesis are entirely mine and do not necessarily represent the views of the Estonian Tax and Customs Board for which I work. They should therefore not be attributed to the Tax Administration. Any remaining errors and omissions are those of mine only.

1. THEORETICAL FRAMEWORK

In this section the literature related to the topic is reviewed and bases for the discussion are prepared. The modern literature on FDI started from Hymer's (1960) contribution followed by Kindleberger (1969), Dunning (1979, 1980) and others. It became the basic approach for the further analysis of the activity of multinational companies. From this comes the ownership–location–internationalization (OLI) theory, which formulated the grounds for the empirical studies on determinants of foreign investments. Section 1.1 gives an overview of the development of the investment theory and its main principles. In Section 1.2 the main attention is paid to the taxation-related factors analysed in different studies.

1.1. The basics of the theory of foreign direct investments

An important part of investment theory has focused on the subject of foreign direct investment and multinational enterprises. The first great contribution to this theory was made by Stephen Hymer (1960) in his dissertation studying foreign investment. Hymer defines the direct investment as long-term international capital movements in enterprises that are controlled by foreign enterprises. Hymer's dissertation deals with market-power advantages, ownership-specific advantages and advantages of international diversification. Hymer was the first to note that local companies have better information about their country than do foreign companies and that for foreigners the expenses of acquiring this information are considerably higher. Dunning (1972) explained like Hymer (1960) the activity of multinational companies by location- and ownership-specific factors. According to that theory, multinational companies are institutions that control the process of production outside national entities. In the 1970s there was no particular theory on foreign direct investment and Hymer focused his attention on multinational entities. Nowadays the theory of FDI is based on the set of processes made by multinational entities for the purpose to move assets using their internationalizing advantages (Rugman, 1981; Teece, 1981; Casson, 1982).

Further the theory of foreign direct investments was developed in the researches of McManus (1972), Buckley and Casson (1976) and Magee (1976). Dunning (1977) was the first who explained the behaviour of multinational companies to extend international activities with the help of eclectic theory and evaluated the significance of ownership- and location-specific variables. Kindleberger (1969), similarly to Hymer, explained international production by the ownership endowment approach, which is one of the basics of the eclectic theory. Contributions of Hirsch (1976) as well as Buckley and Dunning (1977) are important in examining the main approach of the theory of foreign direct investment in terms of ownership and location characteristics. Characteristics of the physical distance and cultural differences between countries became the conceptual approach to the examination of the variables affecting FDI (Johansson and Wiedersheim, 1975; Johansson and Wahine, 1977).

Dunning (1993) extended following Buckley and Casson (1981) and McManus (1972) the approach to internationalisation advantages and formulated the relationship between OLI and the level of cross-border transaction. The main point of discussion is around the advantages of location-specific factors that influence cross-border transactions. On the base of this approach numerous studies have been conducted.

In the 1970s and 1980s the approach of mergers and acquisitions attracted more attention. In particular attention was paid to the cost of takeovers, including the cost of cultural integration. Hofstede (1980) and Kogut and Singh (1988) explored the expansion of FDI and the effect of cultural barriers. Buckley and Casson (1991) examined cultural differences at both firm and national level, paying particular attention to the influence of the differences in multinational enterprises.

Because the focus of this thesis is on the impact of taxation on the volumes of foreign investments, readers' attention should be drawn to the tax determinants. However, firstly a brief overview of the determinants relevant to the topic under discussion should be discussed. The survey done on the base of related literature (Raudonen, 2008) showed that the majority of studies on determinants of FDI decisions pointed out that these decisions mainly depend on the perspectives of the host country's economy, its openness, degree of growth, institutional quality and many other political, economic and social factors. To summarize this overview, it is suggested that the differences in economic conditions, political climate and legislation of countries have a significant impact on the decision-making process concerning the allocation of investments.

Many researchers have investigated the determinants that influence the flows of investment. Root and Ahmed (1978) were the first to analyse factors that influence foreign direct investments. They identified and grouped into categories 44 different factors influencing FDI. Their study depicts the main categories of these factors, namely economic, social, political and policy determinants. The economic determinants include economic growth, stability and also infrastructure variables. Political stability and social environment are irrefutably important factors for attracting foreign investors. Taxation issues are categorized into the policy group of factors that influence foreign investment allocation decisions. Hereby most essential are corporate taxation conditions, availability of tax incentives and their value, and the general complexity of the taxation system. Among the political factors similar importance is attached to governmental policy in issues concerning foreign employees and legislative restrictions on foreign investors.

1.2. OLI theory and location-specific variables of taxation

There is a large amount of empirical evidence on the extent of various location-specific determinants, among them are studies examining the sensitivity of taxation determinants and differences in taxation in host countries. The main focus of the empirical literature on the impact of taxation is based on the suggestion that the flows are influenced by the level and mechanism of taxation. A possibility of deducting expenses, especially payable taxes as part of corporate income, may be

viewed as potential preferences of host countries. Altshuler et al. (1997) and Wilson (1999) examined the effect of tax rate on location decisions of US multinational companies and found that foreign investment by manufacturing firms is sensitive to differences between tax rates in host countries.

Tax rate of corporate taxation is one of the factors that is thoroughly analysed in various empirical researches. The Dutch researchers de Mooij and Ederveen (2003) explain the impact of the variation of company taxes between different countries on the allocation of foreign direct investments. According to their study, FDI is attractive if OLI conditions are met. According to the OLI theory, the person has to decide whether owning or leasing is more beneficial, export or not, domestic or international etc. The Dutch authors pointed out that many other researchers have used in their work the distinction between the above-mentioned systems for the evaluation of tax rate elasticity. Different approaches to the definition of tax rates were taken into consideration, incl. average tax rate computed from data, marginal effective tax rate and average effective tax rate computed from tax codes. To make the outcomes of different studies comparable, de Mooij and Ederveen (2003) transformed the coefficients of each of the studies into a uniformly defined elasticity, semi-elasticity. Finally, there were 371 semi-elasticities, which formed a meta-sample. Meta-regressions in their study suggest that both average tax rates and effective tax rates have a larger effect on FDI than country legitimate rates do.

Another important question tackled by de Mooij and Ederveen (2003) as well as Hines and Rice (1994) is the impact of differences of taxation systems. Because of the complexity of taxation systems in different countries and the difficulty with comparing those between themselves, another approach for the evaluation of taxation in the same field was suggested by Boskin and Gale (1987), who evaluated tax effects on the international location of investment by effective tax rate. Their results were very close to Hartman's (1985), especially as regards retained earnings.

As was mentioned above, the scope of discussions is broader than the description of empirical models of the relations between inflow of foreign direct investment and tax rates. Therefore the aspects of location decisions influenced by tax base differences and tax incentives of host countries should be discussed. Graham (2003) from Duke University analysed in his research how taxes can affect corporate decision-making and firm value and proposed a theory. He argues that capital structure choice of a multinational company is based on taxes affecting the tax advantage of debt. He concentrates on effects of multinational tax incentives like imputation or integrated tax system, residence or place of incorporation, degree of interest allocation and specificity of foreign subsidiaries. Smith and Florida (1994), Coughlin et al. (1991), Bénassy-Quéry et al. (2005) have examined the role of credit and exemption schemes applicable for profit taxation in investors' location decisions. As an example, it is important to refer to the research of de Mooij and Ederveen (2008), which also shows that the location and the level of investment are affected by tax factors, but their previous study (de Mooij and Ederveen, 2003) does not support the theoretical assumption that investors from tax exemption countries

are more likely to respond to changes in host country taxes than investors from tax credit countries.

An example of the OLI approach is provided by a comprehensive research by Moore et al. (1987). They investigated the impact of tax rates and differences in tax bases on foreign investment and found that the impact of corporate income tax on foreign investment is weak. The authors used three tax variables: statutory marginal tax rate, average effective corporate income tax rate and unitary tax rate. On the basis of regression analysis they concluded that the corporate income tax rate was not significant in the manufacturing sector for any of the five years studied. Results of the research are as follows: business climate, presence or absence of unitary tax structures (tax burden and tax compliance burden) are important determinants of foreign manufacturers' investment decisions. Such effect is more important for new firms. Chen et al. (2005) studied the impact of taxation on FDI in 36 countries and evaluated effective tax rates on capital. Besides the impact of taxes on investments they evaluated the corporate income tax rate that applies to profits.

The empirical study of French researchers Bénassy-Quéry et al. (2005) also evaluated the influence of taxation on FDI, with a special focus on the impact of corporate tax variables, by taking into account tax schemes for avoiding double taxation. They calculated the tax differential of average effective tax rates, marginal effective tax rates and apparent effective tax rates. The influence of third country taxation on multinational companies was tested, and the result is quite clear: higher taxes in the host country relative to the investor defeat FDI, higher taxes in third countries tend to significantly increase FDI in the host country. The results of the investigation are similar to the findings by Hines and Rice (1994): the semi-elasticities to tax differential are significant for both credit and exemption countries. FDI flowing from countries operating under a credit scheme is more sensitive to taxes than FDI flowing from exemption scheme countries. The result suggests that higher tax rates are harmful to inward FDI. Hines (1996), Smith and Florida (1994) and Coughlin et al. (1991) found that the impact of corporate tax differentials on foreign direct investment is negative.

The above-mentioned studies proceed from the assumption of the importance of the policy of decreasing tax rates in the attraction of foreign investments. Multinational enterprises are comparing the advantages of host countries before making an investment decision. Contrary to the studies discussed above, Grubert (2001) is of the opinion that there is no such situation because the income tax rate has not decreased. Similarly to most studies in this field, Globerman and Shapiro (1999) evaluated different variables like GDP in Canada and abroad, exchange rate, investment climate, imports, exports etc. Their most important conclusion was that managers should pay close attention to public policy, including fiscal policy.

A few empirical studies deal with the relationship between taxation and investments in Estonia. There are also a few papers dealing with the importance of taxation on companies' financial decisions in Estonia (Sander, 2006); however, the focus of those is on microeconomic analysis. Hazak (2008a) as well as Avarmaa et al. (2011) also examined the impact of taxation, but the object of their investigation was the capital structure of companies in the Baltic countries. However, there are

numerous papers that deal with FDI of Estonia (e.g. Mickiewicz et al., 2004; Varblane and Roolaht, 2005; Masso et al., 2013)

Empirical studies on the factors influencing foreign investments focus in most cases on economic and resource factors and less on political or taxation aspects. To provide a more systematic picture of the factors influencing FDI the author of the thesis suggests dividing the factors into six groups: economic factors, political factors, market size factors, resource factors, cultural factors and taxation factors. Previous literature reviewed has usually covered the set of different factors from the abovementioned groups. Figure 1 presents an overview of the various factors influencing FDI pointed out in different empirical studies. Similarly to the research of Root and Ahmed (1978), the author divided the factors into economic and political. Cultural factors, such as distance between countries and language and cultural similarities, are treated on the basis of different researches, mainly started by Johhansson and Wiedershheim (1975) and continued by Buckley and Casson (1991) and Folfas (2009). Size of population and GDP are determined as factors belonging to the category of market size similarly to numerous studies (e.g. Winner, 2005). Resources related factors, such as availability of natural resources, public infrastructure and educated labour, evaluated by Bénassy-Quéry et al. (2005), belongs to the fifth category of factors that influence FDI. Additionally to the abovementioned taxation factors, differences between tax rates, tax treaties and taxation schemes, have been objects of evaluation of numerous researches. Most valuable for the purpose of the current research are studies by Bénassy-Quéry et al. (2005), Mooij and Ederveen (2008), Czarny et al., 2010, Julio (2013) as well as earlier researches of Boskin and Gale (1987), Hines and Rice (1994) and de Mooij and Ederveen (2003). However, it can be concluded that corporate taxation and tax treaties are among the factors evaluated by many authors during recent years.

Most of the studies in this field are empirical analyses performed with help of regression models. A separate issue is whether taxation plays an important role in the opinion of CFOs of the parent companies that own a branch or a subsidiary. One of such researches is the survey made by the Ruding Committee of the European Commission. The Ruding Committee (1992) conducted its research asking the respondents from different countries about their views concerning the steps that should be taken towards the convergence of corporate taxes in the European Community. The survey investigates three aspects of the impact of taxation on activities and costs of multinational companies: Does the location choice for activities depend on tax treatment in different countries? Are the legal and financial structures of international companies influenced by taxation? How large are tax planning and compliance costs in respect of international taxation versus domestic?

The results of the above-mentioned survey are quite interesting and support the general opinion about the role of taxation. First, it was recognized that during the choice of the legal structure and determining the location the companies take into consideration the taxation aspects. Of the respondents 47% answered that taxes were always or usually a major factor in the location choice-making for a production plant. In other fields of activity this percentage is smaller: 28% in sales outlet, 57%

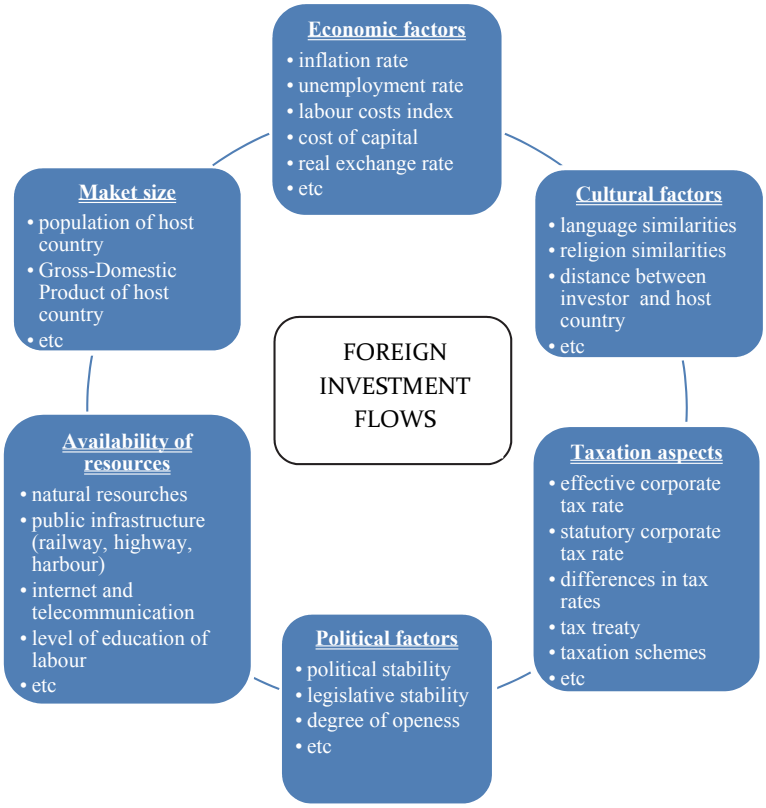

Figure 1. Summary of factors influencing FDI (complied by the author)

Source: author's summary based on previous empirical studies.

for coordination centre and 48% for R&D. As it was mentioned above, taxation has a significant impact on the financial and legal structure of companies. Taxation had always or usually been a major factor in determining the location of the financial centre for 78% of the respondents, whereas 70% of the respondents answered that taxes were always or usually a major factor in financial decision-making. Taxation is an important factor in determining in which form profit will be repatriated to the parent company. It is important to underline that according to the survey taxation is an important aspect in the profit repatriation decision-making.

Another survey, based on questioning respondents about the investment incentives offered to firms' foreign affiliates, became the data source for the statistical analysis of US parent companies made by Loree and Guisinger (1995). In the questions about investment incentives the respondents were asked whether in the host country the affiliate was provided with tax concessions, incl. tax concessions on corporate income, export profits, capital expenditure, sales, exports, licence fees etc. The variable of tax rates was also added into the model, it is an effective tax rate for host countries derived as actual taxes paid divided by net income of majority-owned affiliates. The investment environment variable, cultural distance, various market

characteristics and wage level determinants were also used in their empirical analysis. It was concluded that changes in tax policy stimulate a change in investment, both domestic and foreign, within one or two years.

An example of the latest research in this field is empirical analysis of Bialowski and Weziak-Bialowska (2013) based on a questionnaire among Polish firms. The respondents were asked to evaluate the importance of different factors and to select one answer from among; very high, high, medium small, small, very small. The results show that taxes were important in the investment policy but payment delays were the most important. The importance of tax policy was particularly high for telecommunication companies as well as for companies from manufacturing and the financial service sector. It was especially important for large companies where the number of employees was over 249.

There is substantial literature showing that taxation influences the location of FDI and that strategic decisions and tax decisions are interrelated (see e.g. Collins et al., 1998; Mills and Newberry, 2004; Huizinga and Laeven, 2008; Dharmapala and Riedel, 2012; Grubert, 2013). Numerous empirical studies in the field of the impact of corporate taxation on FDI give strong evidence of this impact.

Tax base and tax rate are not the only factors that companies take into consideration while making investment location decisions. Foreign investments are in most cases subject to corporate income tax in the host country. It is important to understand the issue of taxation of the gains from investment. Gains from investment may be an object of taxation in both host and home country, and therefore it is important to adopt either a credit system or an exemption system to avoid double taxation. Many countries have joined an international convention for the avoidance of double taxation, according to which they share the tax revenue based on the place of taxation.

Regression analysis of Weyzig (2013) confirms that tax treaties are a key determinant of FDI. Similarly to Mintz and Weichenreider (2008), this analysis examines the relevance of international tax policies using micro data of the particular country. In accordance with Barthel et al. (2009) double taxation treaties are expected to affect bilateral foreign investments positively. The main goal of politicians in signing a double taxation treaty with a partner country is to ensure the investors that double taxation is avoided.

A research by Wilson (1999) using an interview methodology identified several examples of corporate investment location decisions that were largely driven by tax factors. Most of the EU countries use the worldwide income approach as the basis of multinational resident company taxation. This is in contrast to the territorial approach of some countries such as France and the Netherlands, which normally exempt dividends received from a foreign subsidiary of a domestic corporation from home-country taxes (Wilson, 1999).

To sum up it can be stated that the OLI approach is generally considered the basis for the FDI research, location-specific advantages and differences between host and investor countries affect multinational enterprises in extending their international activities. Corporate taxation is an important factor among different investment incentives that affect foreign investments.

2. DATA AND METHODOLOGY

The empirical analysis in the thesis is based on panel data extracted from various databases. Data covered in the papers on which the thesis relies are macro-level data of investment flows. All the author's papers appended to this thesis deal with foreign direct investment as a category of international investments in which a company resident of one country owns at least 10% of interest in a company resident of another country. Empirical analysis is performed on FDI flows of European Union countries (see Table 1). The first paper covers the aggregated flows into the manufacturing sector of European Union countries, the second paper treats bilateral flows into the Baltic States and the third paper discusses bilateral flows into European Union countries without specification of sector involved (Studies I–III).

Table 1. Data covered

Dependent variable	Region/industry covered	Period covered
FDI aggregated flows	EU countries, manufacturing	1998–2008
FDI bilateral flows	Baltic States	2000–2008
FDI bilateral flows	EU countries	1998–2011

In the first empirical work (Study I) the panel data set contains time series of 11 observations per each of the 23 countries. Thus, the total number of observations of all variables is 253. The period under examination is 1998−2008 with the sample consisting of 23 investment host countries (11 new Member States and 12 old Member States). Manufacturing foreign direct investment data as a set of aggregated FDI were obtained from the database of Eurostat. The main objects of the study are tax variables, i.e. the nominal corporate tax rate, the implicit tax rate in the field of corporate income and number of double tax treaties in the host country for which data were obtained from various databases. The data concerning the nominal corporate income tax rate were extracted from the intermediate report of the European Commission written in October 2009 (European Commission, 2009). The influence of the real corporate income tax variable was checked with the implicit corporate income tax rate extracted from the database of TAXUD of the European Commission. The implicit tax rate is calculated by dividing the revenues from taxes on a special activity or good by an appropriate corresponding aggregate tax base from national accounts statistics. The calculation of implicit tax rates is relatively straightforward and requires less statistical input than, for example, microeconomic or marginal tax rates. The usage of effective tax rate would be more appropriate but it was impossible because of unavailability of data.

The variable measuring the investor's possibility of avoiding double taxation of the earned income is the number of tax treaties signed by the host country. Data on the tax treaties were extracted from the UNCTAD database (2011), where the texts of all tax treaties in the world are available. Most of the EU member states are also members of the OECD and the adoption of the OECD model agreement is obligatory for its members. In the sample 16 countries were members of the OECD in 1998 and 17 in 2008.

For the second study (Study II) FDI flows into the Baltic States Estonia, Latvia and Lithuania were estimated over the period 2000–2008. The investor countries were selected from the investor list and they are EU countries plus the United States and Norway. This group accounted for more than 80 per cent of the FDI inflows to the Baltics during the time span covered. Tax variables covered in the second paper were extracted from different sources. Most importantly, we assess the relevance of the difference in nominal corporate income tax rate between host countries and investor countries. The data were obtained from the intermediate report of the European Commission compiled in cooperation with consultants from the Oxford University Centre for Business Taxation, the Centre for European Economic Research (ZEW) and PricewaterhouseCoopers and published in October 2009.

Besides the influence of the nominal corporate income tax rate that of the effective statutory profit tax rate on FDI is also tested. This tax rate was extracted from an Intermediate Report (European Commission, 2009), where the tax rate is calculated on the base of nominal corporate income tax rate taking into consideration local profit tax rate (nominal) and surcharge used in the methodology of Devereux and Griffith (European Commission, 2009). The main question is whether the effective tax rate affects the investment decision in the same manner as nominal corporate tax rate.

Data of bilateral flows of foreign direct investments were obtained from the database of Eurostat and missing data were collected from databases of central banks. Indexes of economic freedom are available on the website of the Economic Freedom Network of Fraser Institute. Data of GDP per capita were extracted from the OECD statistics database, other economic variables were derived from the database of Eurostat.

The third, empirical paper (Study III) testing the taxation variables of FDI, is based on a panel of bilateral inward FDI flows of EU countries. We employ data on FDI flows from 40 economies to 27 recipient economies from 1998 to 2011. Each observation point determines a FDI flow in euro between an investor country and selected host countries. The number of observations is over 500. In our sample the host countries are European Union countries. The investor countries are the major suppliers of the foreign direct investment flows. This group accounted for more than circa 90 per cent of the FDI inflows to the EU during the time span covered. The data show that in 2011 the United States, Germany, the United Kingdom, the Netherlands and Luxembourg gave almost 60 per cent of EU FDI.

For the third study (Study III) the data of bilateral flows of foreign direct investments were obtained from the database of Eurostat. Data concerning taxation burden were extracted from the World Bank database. Corporate income tax rate variables were mainly from the OECD database and other variables from the Eurostat, UNCTAD and World Bank databases. In the FDI data extracted from Eurostat plenty of values are missing. In the sample the number of observations fell to 11 881 while the preliminary sample included 15 498 observations. Despite the missing values the sample is large enough because it contains many observation points.

All three papers use the method of statistical analysis to empirically confirm the relationships between tax determinants and volumes of foreign direct investments. In regression analysis we use two approaches: general log-linearized equation and gravity approach. We used for estimation fixed effect models. Economists have used the concept of the gravitation force to explain the volume of trade, capital flows and migration issues between different countries in the world. Tinbergen (1962) was the first who introduced the gravity model and showed the importance of "border effect" in trade theory. Bilateral FDI flows were explained with the help of gravity models by Brainard (1997) and Frenkel et al. (2004), who were the first authors to apply the gravity equation to FDI flows.

Some of the variables have time effects and some of them only cross-section effects. In this situation the choice of a proper estimation method is the next issue. Adoption of a typical panel data based approach, such as a fixed or a random effect model, is the usual way. However, the main problem for the data we use is including time-invariant variables, for example distance, which is one of the fundamental variables for the gravity model. In this situation the Hausmann-Taylor (1981) estimation method is appropriate. The results of the Hausmann test indicate that the random effects model is not appropriate. The fixed effect model was used with different estimated intercepts for each pool member as it was done in the study of Czarny et al. (2010). The likelihood ratio test indicates that the model has a cross-section fixed effect.

3. RESULTS

In this chapter the research and the results of three articles reproduced in Appendixes 1 to 3 of the thesis are briefly discussed. The first aspect of the thesis, covered by Sections 3.1 and 3.3, focuses on the examination of the impact of the policy of decreasing tax rates, in particular statutory corporate tax rates in host countries. In order to take into consideration the aspects of the taxation mechanism the influence of effective tax rate, reflecting the real situation, was examined in the study described in Section 3.1. The set of the two papers reproduced in Sections 3.1 and 3.3 examine also the second aspect of this thesis: the impact of tax treaties on foreign investments. The third aspect – the differences in taxation advantages in host and investor countries affecting parent companies to expand the activity into host countries – is the main object of examination in the study reviewed in Section 3.2. All the studies investigate the factors that affect foreign direct investment flows. The conducted studies deal with issues important in the context of the European Union.

3.1. Corporate taxation and European manufacturing FDI

The first study on which this thesis is based covers the sensitivity of European manufacturing FDI to the changes in taxation. The research presents an empirical analysis of aggregated FDI inflows into EU countries from all over the world. The paper examines the impact of corporate taxation in host countries on the FDI inflow into European Union countries and addresses two related questions. The first question is how sensitive foreign investors are to the corporate income tax differences across European Union countries. The second question is whether the smaller economies are forced to choose a lower tax rate for the attraction of foreign capital.

The choice of variables in the econometric model was supported by empirical research of Winner (2005). Similarly to Root and Ahmed (1978), the independent variables assessed are the market size, the level of unemployment, infrastructure and tax rate variables, including corporate tax rate, implicit tax rate and tax treaty variable measured as the number of double taxation treaties signed by the host country.

The variable concerning the nominal corporate income tax rate, the data on which were extracted from the intermediate report of the European Commission published in October 2009, is the most important in this study. According to the report, the average corporate income tax rate in 2008 was 23 per cent, which is approximately 7 percentage points less than in 1998. The statutory corporate income tax rate was reduced during the period under examination by 9 percentage points in small countries and by 11 percentage points in large countries. Despite the changes in the statutory tax rate, the mean of real corporate income tax rate measured as implicit tax rate, which is calculated by dividing the revenues from taxes on a special activity or good by an appropriate corresponding aggregate tax base from national account statistics, was 23.6 per cent in 1998 and 23.3 per cent in 2008.

It is well known that the countries of the European Union are in a sense competing with each other. This is also revealed in their tax policy behaviour. Statutory corporate tax rates have declined over the last 30 years in most of the EU countries (see Table 2). An important question of this study is whether the decrease of corporate tax rate as a result of a "race-to-the-bottom" affects the FDI flows into European Union countries. An extreme example here is Ireland, which being the leader in such "race" lowered the corporate tax rate from 45 per cent in 1980 to 12.5 per cent in 2005.

Table 2. Statutory corporate income tax rates in the EU

Country	**Statutory corporate income tax rates (incl. local taxes and surcharge)**					
	1980	**1990**	**1995**	**2000**	**2005**	**2010***
Austria	55	39	34	34	25	25
Belgium	48	41	40.17	40.17	33.99	33.99
Cyprus	n.a.	n.a.	25	29	10	10
Denmark	n.a.	40	34	32	28	25
Estonia	n.a.	n.a.	26	26	24	21
Finland	59	41	25	29	26	26
France	50	37	36.67	36.67	34.93	34.43
Germany	52.8	57.7	56.8	51.63	38.29	30.2
Greece	43.4	46	40	40	32	24
Hungary	n.a.	50	19.64	19.64	17.68	19
Ireland	45	43	40	24	12.5	12.5
Italy	36.3	41.8	52.2	41.25	37.25	27.5
Latvia	n.a.	n.a.	25	25	15	15
Lithuania	n.a.	35	29	24	15	15
Luxembourg	n.a.	39.4	40.9	37.45	30.38	28.6
Malta	n.a.	32.5	35	35	35	35
Netherlands	48	35	35	35	31.5	25.5
Poland	n.a.	40	40	30	19	19
Portugal	n.a.	36.5	39.6	35.2	27.5	26.5
Slovak rep.	n.a.	n.a.	40	29	19	19
Slovenia	n.a	n.a.	25	25	25	20
Spain	33	35	35	35	35	30
Sweden	n.a.	40	28	28	28	26.3
United Kingdom	52	34	33	30	30	28
Small EU MS average	n.a.	n.a.	31.33	29.03	22.53	21.41
Large EU MS average	n.a.	41.27	38.91	35.86	30.64	27.10
EU-15 average	n.a.	40.4	38	35.3	30.4	26.9
New MS-10 average	n.a.	n.a.	30.6	24.8	19.96	19.22

Source: Nicodeme (2006), EU Commission, OECD Tax Database, KPMG International.

Note: *The data of this column (except Cyprus, Latvia, Lithuania, Malta), extracted from OECD Tax Database, show the basic combined central and sub-central (statutory) corporate income tax rate given as the adjusted central government rate plus the sub-central rate. Data of Cyprus, Latvia, Lithuania and Malta were extracted from Corporate and Indirect Tax Survey 2012 made by KPMG International.

Since the manufacturing sector, followed by services, kept the position as one of the dominant investment sectors, this study offers a possible explanation for the effect of corporate taxation in investment decisions. In 1999 direct investment into EU manufacturing amounted to 24 billion euro, which was a 22 per cent of the investments made into the EU in 1999. In 2000 the value of inward FDI was critically low because of the crisis. In 2008 manufacturing FDI still comprised one of the largest categories, being 1.548 billion euro.

For the purposes of measuring the impact of significant changes that have occurred in the EU economic environment during the last decades, i.e. the enlargement of the EU and EMU, the dummy variables concerning euro and EU membership were included. The dummy variable concerning the adoption of euro proved to be nonsignificant. The variable of European Union membership and the variable of development of infrastructure were significant at the 10 per cent level.

Table 3 gives an overview of estimation results for small member states (population below 10 million) in comparison to large member states. It is interesting to note that corporate tax rate and the number of tax treaties have a greater impact on manufacturing FDI in the small EU countries. For the large EU countries the nominal corporate income tax rate variable is also significant and relatively close to the coefficient of tax variable of small countries but it is two times smaller.

Table 3. Overview of the evaluation of the impact of the tax variables

Observations	Tax variables			No of observations
	Corporate income tax	Implicit tax rate	Double tax treaty	
All observations	–0.0258***	0.0014	0.0142***	204
Small countries	–0.0397***	0.0012	0.0137*	109
Large countries	–0.0169**	0.0006	0.0138**	95

Source: author's calculations.

Note: ***– significant at the 1% level, **– significant at the 5% level, *– significant at the 10% level.

The results of the research clearly indicate that the corporate tax rate and international taxation policy are statistically significant for manufacturing foreign direct investments. The findings of this paper are some of the first evidence on the existence of a connection between international taxation and FDI. Indeed, the results may also lead to the evidence of a connection between the country size and taxation policy. Nonetheless, the empirical analysis shows that the elasticity of foreign capital in comparison to the corporate tax is more extensive in small European Union countries. In general, the study discovered that a one per cent decrease in the statutory corporate tax rate increases foreign direct investment by 0.02 per cent of

the GDP in an EU country. These results point to the importance of further refining corporate tax policy with the purpose of increasing the attractiveness of the investment environment. The results are close to those of Winner (2005).

It is important to mention that the influence of the implicit tax rate was examined to find out whether the real tax rate has an impact on the manufacturing aggregated FDI. The influence of the implicit tax rate on the manufacturing FDI was nonsignificant. The reason for the result lies probably in the informational content of the statutory tax rate. Foreign investors check the legislation of a potential host country before making the investment decision. This is in line with investment theory according to which multinational companies are acquiring information about host country and comparing location-specific advantages before extending their activities.

Evaluation of FDI to EU countries indicated the significance of the market potential of the host country and European Union membership. Contrary to Bénassy-Quéry et al. (2005), according to whom higher provision of public goods increases the attractiveness of the country for FDI, the level of infrastructure development was found to be nonsignificant for the large member states. The adoption of euro and unemployment are also nonsignificant for the large member states. However, the countries with small economies are more sensitive to the level of unemployment: its growth impacts negatively manufacturing FDI. The EU membership is a statistically significant variable for large member states, probably because of the massive enlargement of the EU in 2004. The

The paper shows that corporate taxation has an impact on foreign direct investments into the manufacturing sector of the EU and that its impact is greater in smaller EU countries. The EU policymakers should have a strong incentive to search for new instruments for keeping the efficiency and welfare of the whole EU and to insist on tax competition or tax harmonization as advocated by large members. The expanding of the study results to Estonian manufacturing (Raudonen, 2009) as a whole suggests that the benefits of reducing corporate tax rates could be very large. For Estonian policymakers this means finding ways to improve the implementation of taxation policy in the manufacturing sector and to avoid the implementation of EU harmonization policy in the field of corporate taxation.

Considering that the changes in infrastructure do not affect manufacturing FDI in large EU countries and have a negative relationship in small EU countries, it was suggested that higher taxes can be partly compensated for by an increase in the building up of public infrastructure. The policy implication of this is that the EU authorities should consider additional ways to enable smaller countries to build up public high-quality infrastructure for the purpose of attracting additional investments into their manufacturing sector.

3.2. Determinants of FDI inflows into the Baltic States

In the second study of the theme the impact of corporate taxation was explored with the help of the gravity model. The relevant research paper (Study II) examines whether the bilateral FDI flows in a particular region are affected by tax rates and international tax policy. The Study II is based on the gravity approach used in the

examination, in particular of FDI flows to the Baltic States. Differently from the first research paper (Study I), this study evaluates the factors of bilateral FDI, not aggregated FDI. The data sample covers FDI flows from 20 countries, which account for approximately 80 per cent of all foreign direct investments into the Baltic States.

According to the statistics, the worldwide direct investment in the Baltic States amounted to 1.282 million euro in 2000, consisting of 425 million euro of the Estonian inflow, 447 million euro of the Latvian inflow and 410 million euro of the Lithuanian inflow. By 2008 the inflow of foreign direct investment to the Baltic States increased 2.7 times in comparison with 2000. Large jumps were made in 2004, 2005 and 2007.

Besides the influence of the nominal corporate income tax rate, that of the effective statutory profit tax rate on FDI is tested. Most importantly, the relevance of the difference in tax rates between host countries and investor countries is assessed in this research. This approach is used similarly with Folfas (2011), who focused on tax differences between host and investor countries.

The countries covered in the sample of the period 2000–2008 apply very different tax rates. For example the lowest corporate tax rate during the investigation period was in Ireland and the highest corporate tax rate was in Germany. Four countries had a corporate tax rate below 20 per cent, namely Cyprus, Ireland, Latvia and Lithuania. The corporate tax rate of four countries was over 30 per cent; these are Austria, Spain, France and the Netherlands. The corporate tax rates of other countries were between 25 and 30 per cent. In 2008 the average corporate income tax rate in the Baltic States was 17 per cent while in 2000 it had been 25 per cent. Statutory corporate income tax rate in investor countries under examination decreased over the period 2000–2008 by 6 percentage points. The greatest fall in the corporate tax rate can be observed in Germany, Poland and Cyprus. During the period examined, Ireland raised the statutory corporate tax rate from 10 to 12.5 per cent. France, the United States, Norway and Sweden did not change the tax rate during that period. Finland reduced the tax rate only by 3 percentage points.

According to the gravity model first applied to FDI flows by Brainard (1997) and Frenkel et al. (2004), different determinants such as distance, market size measured by gross domestic product, the index of economic freedom, different levels of inflation, infrastructure development and cultural similarities are evaluated besides the tax variables.

The factor of cultural similarities is considered because of the argument that investors from European countries as well as from elsewhere seek host countries that are similar with respect to their language and religion. The similarities in culture reduce the costs of entrance to the market. In addition to the cultural aspect, the institutional setting, e.g., economic freedom, the rule of law and other governance aspects as factors of influence on FDI flows are examined. Investors want to invest in a secure environment with reasonably priced factors of production. Thus, the degree of economic freedom as an explanatory variable, expecting a positive influence of economic freedom on FDI, was also included.

As a consequence of the relevant theoretical considerations, this study set first the hypothesis that differences in corporate tax rates of the investor and the host

country affect the size of foreign direct investment flows positively. Secondly, the paper answers the question whether a long distance, either geographical or cultural, between the investor and the host country would be deterring FDI. And finally the research examines whether high economic freedom in the Baltic States promotes the inflow of foreign direct investments from other developed countries.

The study shows that the differences in corporate tax rates appear to be the most important factor in the investment decisions. Panel data analysis revealed a positive correlation between tax differences and FDI flows. Moreover, a larger difference between the tax rates of the investor and host countries was found to attract bigger investment into the Baltic States. In general, the study suggests that a one per cent increase of the differential between the statutory corporate tax rate of the investor and host countries raises foreign direct investment flows by 0.033 per cent. The impact of the effective profit tax rate differential is greater than the role of the nominal corporate tax rate. The empirical calculations show that the effective tax rate affects FDI generally in the same manner.

It was concluded that the level of investments from an investor country to a host country depends on the difference in corporate tax rates between the two. A high differential of tax rates affects FDI flows positively. A larger distance between the host and investor countries affects the investments negatively. Also the size of the investor country, measured by its GDP, has a positive relationship with the bilateral FDI inflows into the Baltic States. In addition, as a high level of economic freedom increases the potential to attract investors from partner countries, the Baltic States have a great potential to attract foreign investments probably because taxation incentives and liberal legislation provide good possibilities for businesses to invest.

There are two possible policy considerations. Firstly, policymakers should pay more attention to the peculiarities of the business climate and try to find ways for more liberal legislation for foreign investors. Secondly, policy based on the argument that a higher tax rate in the investor country in comparison with the tax rate implemented in the host country serves as the base for special tax rates could be implemented for foreign investors to attract additional capital to the country.

3.3. Taxation and bilateral FDI into the EU

The third study of the thesis focuses on the examination of the relationship between bilateral FDI flows in the EU and corporate taxation. Valuation of the applicability of the gravity model in the investigation of the impact of taxation aspects on the FDI flows to the EU is related to the question of the attractiveness of EU taxation policy to investors. The relevant paper (Study III) continues the discussion about the fundamental role of the gravitation force in the financial flows and the importance of taxation in these flows by an expansion of the examination of the application of the gravity model to EU countries. In comparison with the previous paper (Study II), the variable of tax treaty was added to the factors. Its significance for the investment allocation decisions in EU countries is checked in the course of empirical analysis. Instead of differences of tax rates, the variable of corporate tax rate in the host country is examined.

Literature supports the use of the following determinants to explore bilateral FDI: country size, economic potential of the country, distance factor and tax determinants. Based on the research by Hines (1996) indicating that host country taxes play a greater role, two main assumptions were tested in the paper. Firstly, it was assumed that low tax rates would influence the level of FDI flows positively. Secondly, the signing of the double taxation treaty between the investor country and the host country was expected to affect positively FDI inflows into the EU countries. Similarly to Grubert and Mutti (2004), who concentrated on differences in taxation in host countries, the focus of this paper is on the tax burden in host countries.

The empirical part tests the determinants of FDI based on a panel of bilateral inward FDI flows of EU countries. Data on FDI flows from 40 economies to 27 recipient economies from 1998 to 2011 were used in analysis. Júlio et al. (2013) used the same methodology to study determinants of inward bilateral FDI to Portugal. In contrast to the author's results, the gravity model indicated that the influence of the effective average tax rate is nonsignificant. According to the results of that study, among business regulations the administrative burden measured as frequency of tax payments influences FDI to Portugal.

In contrast to Porcano and Price (1996) but in line with the study of the World Bank (2012), the total tax rate was additionally included into the model. Tax burden, measured as the percentage of all taxes of the commercial profit of a company, has also a negative relationship with foreign investments. Comparison of the total tax rates in EU economies shows that the average is 28.3 per cent of the commercial profit, the lowest total tax rate, 20.8 per cent, is in Luxembourg and the highest rate, 68.5 per cent, is in Italy. A larger tax burden causes damage to the companies and affects negatively investors' location decisions. In accordance with Choi (2003), a negative coefficient of the tax rate variable was found. The research shows that both a large total tax burden and a high corporate income tax rate have negative impacts. Differently from Barthel et al. (2009) but in line with the results of Blonigen and Davies (2002), the variable of double taxation treaties was found to be statistically nonsignificant for bilateral foreign investments.

To explore how sensitive particular investor countries are to the corporate taxation in the EU, additional tests were made. Table 4 presents the results of the analysis of the sensitivity of FDI to changes in taxation and gives an overview of the correlations between FDI from investor country groups and corporate tax in the host country. The calculations indicate that the FDI inflows to the EU from Norway, Iceland and Asian countries are not responsive to changes in corporate taxation. In addition to investments from North America, Balkan countries and the former Soviet Union, the influence of corporate taxation on the investment flow is also greater for investors from Switzerland and Lichtenstein than from the other countries under examination. Most of the investor countries are not sensitive to double taxation treaties, except North America, Asian countries and former Soviet Union countries, probably because of higher corporate tax rates in those countries.

Considering that double taxation treaties do not impact FDI from EU countries, policymakers should find ways for further free movement of capital within EU countries. Based on the principle that the main goal in concluding a double taxation treaty with a partner country is to ensure investors that double

taxation shall be avoided, policymakers should pay attention to the content of incentives provided by the parent subsidiary directive and improve the incentives of double taxation avoidance first of all with the main investor partners. The policy

Table 4. Impact of taxation for different groups of investor countries

Region of investor country	Model 1 (corporate income tax)	Model 2 (total tax)	Model 3 (double taxation treaty)
North America	–0.0325**	–0.0401***	–0.7951**
Asian countries	nonsignificant	–0.0262**	2.0978***
Former Soviet Union	–0.0566***	nonsignificant	0.8114**
Switzerland/Lichtenstein	–0.0299**	–0.0325***	nonsignificant
Norway/Iceland	nonsignificant	–0.0243**	nonsignificant
Balkan countries	–0.0443*	nonsignificant	nonsignificant
EU-15	–0.0221***	–0.0153***	nonsignificant
EU-12	–0.0188**	nonsignificant	nonsignificant

Source: author's calculations.

Note: ***– significant at the 1% level, **– significant at the 5% level, *– significant at the 10% level. EU-15 includes old EU countries. EU-12 includes new EU countries. North America includes Canada and the United States. Balkan countries include Bosnia-Herzegovina and Croatia. Asia includes China and Hong Kong. Former Soviet Union includes Ukraine, Russia and Belarus.

implication based on the argument that total tax burden and corporate tax affect negatively FDI into the EU should force government institutions to search innovative tax instruments for increasing welfare and economic efficiency by attracting foreign investors.

3.4. Discussion of the results of three studies

The current section concludes the results of previous subsections and explains the results of three studies in a broader context. First, all the studies evaluate corporate taxation factors that affect foreign investments. Table 5 presents a summary of the taxation factors examined in this thesis. Study I covers corporate tax rates, including statutory and implicit tax rates, and DTA variable measured as the number of double taxation agreements of the host country. Study II covers differences in corporate tax rates, in particular nominal and effective rates. Study III examines total tax burden, statutory corporate tax rate and the effect of double taxation treaty in force between the investor and the host country.

Secondly, the studies are connected with one another through continuous discussion done on the base of various data samples of European Union FDI. In addition to the taxation-related factors, every study pays attention on the numerous factors such as economic, market-related, resource-related, political and cultural. Because of changes in the world economy that influence fiscal policy of governments worldwide, companies have become increasingly mobile; the

economies need more qualified labour and more novel technological solutions, which need quite large investments. This process of economic globalization gives a push to fiscal policy changes. In particular, there is a huge pressure on national fiscal policies across the EU countries where much influence has been exerted by free movement of capital, goods and labour. On the one hand, a government implementing the policy of reducing tax rates gives a good example for other countries that also are forced to reduce tax rates to protect the economy of their own country. On the other hand, there are the pressure of common revenue policy and the wish to collect enough revenue for economic growth. By reducing tax rates the state will force its neighbouring countries to make the same decision in order to preserve their position in the global economy and make budget revenue. "Race to the bottom" reduces tax rates or forces to implement partial deduction schemes in order to increase the tax base, attract capital and improve the business environment. The thesis explains how the reducing tax rates influence foreign investment and its effect in large EU member states in comparison with small member states.

Table 5. Summary of tax effect examinations

Tax effects examined	Area examined	Comment on data
Nominal corporate tax rate, implicit tax rate, DTA	EU manufacturing sector, EU non-manufacturing sector	macro data, aggregated flows
Differential in nominal corporate tax rates and effective corporate tax rate	Baltic States	macro data, bilateral flows
Government statutory corporate income tax rate, total tax cost, double taxation treaty	European Union, selected countries	macro data, bilateral flows

Thirdly, all three studies deal with a similar period, characterized as a period of global economic growth, which was suddenly ended in 2008 by the collapse of the finance systems of many countries. This period, which starts in the current thesis from 1998, offers interest to a wider scientific society as well as to practitioners.

The results of Study I provide a clear indication that the corporate tax rate and international taxation policy are statistically significant for foreign direct investment flows of the EU. The taxation policy in the host country, including its corporate income tax rate and total tax, is statistically significant as is the distance between the capitals of the host and the investor country. The total tax burden and corporate income tax rate have negative impact. Similarly to Choi (2003), who added to the basic gravity equation the corporate tax rate variable of the host country, the coefficient of corporate tax rate is negative and its size is 0.02. The size of the coefficient of the total tax burden variable is next to corporate income tax rate and its impact on FDI is similar. The results of empirical study show that the Double Taxation Treaty signed between the governments of the investor and the host country does not affect the inflow of foreign direct investments into the EU. One explanation of this result may be that the issue of double taxation is regulated by the

savings directive and other EU legislation besides the Tax Treaty. Secondly, almost all countries under examination belong to the OECD and have the same regulations concerning double taxation according to the OECD model agreement.

According to Study II, which was made on the base of the Baltic States, difference in corporate tax rates appears to be the most important factor in the investment process. This means that a larger difference between the tax rates of investor and host countries would attract bigger investments into the Baltic countries. The coefficient of the differential in corporate tax rate is 0.033. In general, Study II suggests that an increase in the differential between the statutory corporate tax rate of the investor and the host countries raises foreign direct investment flows by 0.033 per cent. The impact of the effective profit tax rate differential is greater than the role of the nominal corporate tax rate. The empirical calculations show that the effective tax rate affects FDI in the same manner.

Table 6. Significance of the tax determinants examined

Tax determinant	**Investment field/ region**	**Level of significance**	**Reference**
Corporate income tax rate	EU manufacturing	significant at 1%	Raudonen and Listra, 2011 (Study I)
Implicit tax rate	EU manufacturing	nonsignificant	Raudonen and Listra, 2011 (Study I)
Double taxation treaty	EU manufacturing	significant at 1%	Raudonen and Listra, 2011 (Study I)
Nominal corporate income tax rate	EU non-manufacturing	nonsignificant	Raudonen and Listra, 2011 (Study I)
Implicit tax rate	EU non-manufacturing	nonsignificant	Raudonen and Listra, 2011 (Study I)
Nominal corporate tax rate differential between investor and host countries	Baltic States	significant at 10%	Raudonen and Freytag, 2013 (Study II)
Effective statutory profit tax rate differential between investor and host countries	Baltic States	significant at 10%	Raudonen and Freytag, 2013 (Study II)
Government statutory corporate income tax rate	EU countries	significant at 1%	Raudonen, 2013 (Study III)
Total tax cost (%)	EU countries	significant at 1%	Raudonen, 2013 (Study III)
Double taxation treaty	EU countries	nonsignificant	Raudonen, 2013 (Study III)

Source: author's calculations.

It was discovered in the course of the evaluation of bilateral flows to the EU manufacturing that the coefficient of corporate tax rate is –0.0258; this is the measure of the elasticity of foreign direct investments to corporate tax. However, empirical analysis shows that the elasticity of foreign capital in comparison to the corporate tax is more extensive in small European Union countries. The study discovered that a one per cent decrease in the statutory corporate tax rate increases the foreign direct investment by 0.02 per cent of the GDP in an EU country. These results point to the importance of further refining corporate tax policy with the purpose of increasing the attractiveness of the investment environment. The findings of this paper are some of the first evidence on the existence of a connection between international taxation and foreign direct investments in the EU manufacturing industry. Study III pointed to the importance of the corporate tax policy in making the investment environment more attractive. The influence of the implicit tax rate on the manufacturing FDI was found to be insignificant. The reason for the result is probably in the informal content of the statutory tax rate. Foreign investors check the legislation of a host country before making the investment decision. Table 6 presents conclusions of the statistical significance of different determinants examined in the course of the research.

Table 7. Elasticity of the tax determinants examined

Tax determinant	Elasticity	Reference
Nominal corporate income tax rate	–0.0258	Raudonen and Listra, 2011 (Study I)
Double taxation treaty	0.0142	Raudonen and Listra, 2011 (Study I)
Nominal corporate tax rate differential between investor and host countries	0.0332	Raudonen and Freytag, 2013 (Study II)
Effective statutory profit tax rate differential between investor and host countries	0.0345	Raudonen and Freytag, 2013 (Study II)
Government statutory corporate income tax rate	–0.0208	Raudonen, 2013 (Study III)
Total tax cost (%)	–0.0196	Raudonen, 2013 (Study III)

Source: author's calculations.

Table 7 gives an overview of how the elasticity of tax variables differs in different studies made in the course of the research. In line with the literature, it was found that a tax treaty does not influence bilateral foreign investment flows and the correlation between taxation and FDI is negative while the elasticity of tax determinants (see Table 6) is relatively small. However, the message of the results is rather clear: the factors related to corporate taxation and international taxation affect foreign direct investments to the EU.

4. CONCLUSION

The current thesis concludes the results of three research papers that evaluate location-specific factors, namely corporate tax factors, influencing FDI flows to the European Union countries. The first paper (Study I) enclosed in the Appendices, examines such factors affecting EU FDI as statutory and implicit tax rates and number of tax treaties. The object of evaluation is aggregated FDI flows to the manufacturing sector of EU countries. The second paper (Study II) examines the influence of double taxation treaties and differences in corporate tax rates on bilateral FDI flows to the Baltic States. The third paper (Study III) analyses the impact of statutory and effective tax rates and tax treaties on bilateral FDI to the European Union countries.

The main results of the thesis are summarised in Figure 2. The results indicate that the taxation factors as location-specific factors that comprise tax rates and double taxation agreements are statistically significant factors influencing FDI flows.

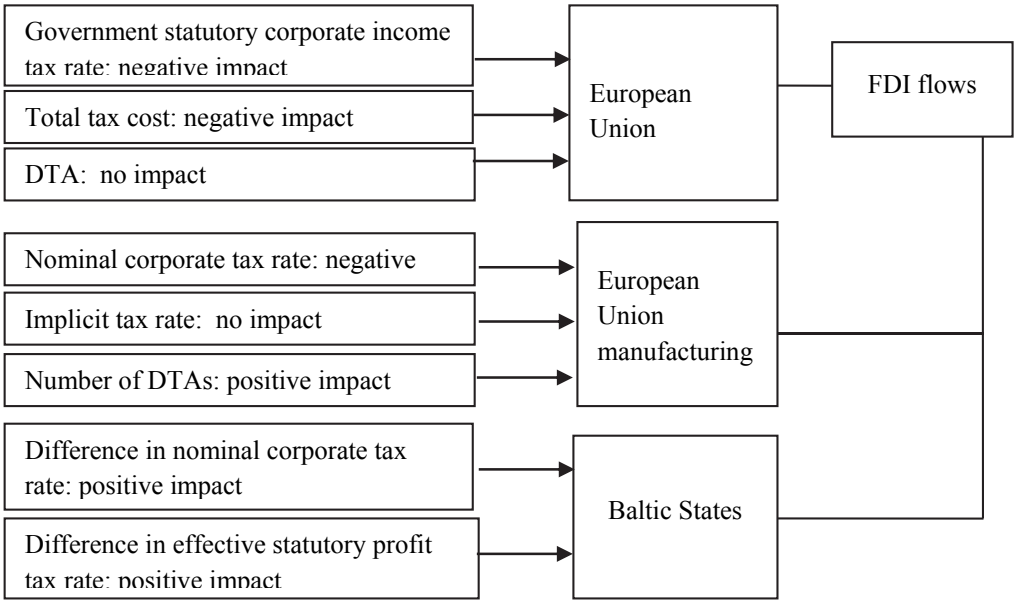

Figure 2. Summary of results of the thesis.

This thesis provides evidence of the influence of corporate taxation on the inflow of foreign investments in the European Union from three aspects. Briefly, the first aspect concentrates on the impact of the policy of decreasing corporate tax rates on FDI, the second on the sensitivity of bilateral FDI to changes in tax rates and tax treaty and the third on that of differences in corporate taxation of the host and investor countries. The statutory and implicit corporate tax rates were examined on

the base of aggregated and bilateral flows. Location advantage arising from the difference between the tax rate of the host and the investor country was explored in the course of empirical analysis of bilateral flows into the Baltic States. The double taxation agreement and the number of agreements signed by the host country were examined on aggregated data of EU manufacturing flows and bilateral data of EU flows.

The first aspect, evaluation of the effect of reducing corporate tax rates on the aggregated FDI, indicated the necessity of creating incentives within the corporate taxation in general and in the manufacturing industry in particular to further attract foreign investments into EU economies.

The examination of the second aspect, the influence of double taxation agreement, in particular the number of agreements signed by the host country and the agreement between the investor and the host country, on the bilateral FDI gave mixed results. The analysis of bilateral flows showed a positive impact of DTA on FDI; however, the results of the evaluation of the effect of the double taxation agreement in force between investor and host countries did not indicate a relationship between the agreement and FDI flows.

The study of the third aspect, evaluation of the impact of corporate tax differences on bilateral FDI flows into EU economy, showed that corporate taxation is extremely important in making investment decisions. After the 2004 enlargement of the European Union, tax policy has become a key issue of attracting resources and capital; therefore relevant strategies are being worked out. On the one hand, we have land resources in the allocation to which it is not possible to choose the location. On the other hand, there are mobile resources such as qualified labour force, cheap storage and work space in the manufacturing process or the service sector. When looking for a location for the latter, an entrepreneur would behave rationally. In that case one of the criteria will be the national tax policy. This thesis explains how location-specific advantages, including corporate taxation policies, affect investment into manufacturing. Provided a good level of host country's economic resources, highly developed commercial infrastructure, available low-price human resources and investor-oriented government policy inward investment will continue to grow.

The third main topic of the thesis is the examination the importance of tax variables for bilateral FDI flows with the help of the gravity model. This aspect is covered by a two-step approach: firstly the Baltic States as host countries were examined to assess the sensitivity of their FDI to the changes of corporate taxation and, secondly, the list of host countries was expanded to the EU. As expected and in line with the literature, it turned out that tax rate differentials are a strong driver of FDI inflows: Baltic States are efficient in attracting FDI due to differences in the tax rates between investor and host countries. The Baltic example also shows that countries with a high level of economic freedom have a great potential to attract foreign investments. Business-friendly incentives and liberal legislation provide more possibilities for businesses to invest. Domestic and foreign firms can make use of these opportunities.

The results of the EU study support the suggestion that the "gravitation force" plays the main role in the attraction of foreign investments. Accordingly, the FDI of EU countries are influenced by the spending power, the size of the economy

and its growth potential, which are expressed by the GDP of the investor country. FDI flows are bigger between larger economies. It is shown that in addition to the size of the economy and distance between the countries the level of the tax rate in the host country, especially that of corporate tax, has an important role in the FDI flows between the investor and host countries.

Table 7 (in section 3.4) gives an overview of how the elasticity of tax variables differs in different studies made in the course of the research. In line with the literature, it was found that a tax treaty does not influence bilateral foreign investment flows and the correlation between taxation and FDI is negative while the elasticity of tax determinants (see Table 7) is relatively small. However, the message of the results is rather clear.

To conclude, this thesis is based on previous researches, e.g. Mooij and Ederveen (2008), Grubert (2013), Weizig (2013), Weichenreider and Mintz (2008), the study of the literature about theories and practice of location-specific determinants of FDI, research on manufacturing FDI reported in Study I, arranging and conducting research concerning bilateral FDI flows into the EU reported in Study II, and the experience of the evaluation of the gravity model for FDI and conducting research on the same reported in Study III.

The research reported in the current thesis had certain limitations. First, not all EU countries were included into the study because of the lack of relevant data. Second, the set of variables should be larger for further research. Third, the period under examination is relatively short and further analysis needs to cover a longer period of time. Fourth, despite the statistical significance of the results, their economic significance is relatively low. In particular, the FDI gravity model faces a number of additional obstacles. Firstly, data of bilateral FDI flows are available only for selected countries and a limited period. Certain countries under examination have also limited availability of other data. No data concerning the total tax rate variable are available for 1998–2004. Still, the missing data do not damage the final result because the sample consists of many observation points. Besides, one also needs to keep in mind that the results were achieved on the base of European Union data and might not be adequate for other countries.

The empirical results of the thesis indicate that it is essential for politicians to pay attention to the aspects of corporate taxation to attract investments. Not only statutory tax rates but also effective tax rates are factors that affect investors in their decision-making process. The differences in the results of industries showed that politicians should take this aspect into consideration. The author's suggestion is that additional incentives should be implemented for the attraction of more investments to the strategically important industries of a country. The mixed results of the evaluation of double taxation agreement are in the author's opinion an indication of a questionable benefit of these agreements. This also could mean that the content of the agreement and its implementation procedure are not clear or inapplicable for investors in the European Union.

To sum up, policy-makers should have a strong incentive to insist on tax competition within the European Union. Apart from other advantages of tax competition such as that it forces governments to search for efficiency and welfare, tax policy can be instrumental in attracting investment from abroad and in particular

in increasing the attractiveness of manufacturing or other sectors of the EU economy.

There are several possible ways to elaborate research on the topic of the current thesis. Firstly, in order to obtain more comprehensive results of the influence of corporate taxation factors on foreign investments the sample could be expanded to involve a larger number of countries or other research methods could be used, for example interviewing, field studies etc. For the purpose of better describing the phenomenon of interest, a case study could be also undertaken. To explain investment attitudes of the companies, in-depth interviews could be carried out. The aim of case studies is to provide a comprehensive picture of the situation concerning entry strategies of foreign investors and specific characteristics of their decision-making process. Prediction of the outcome of changing the system and forecasting the behaviour of an examined indicator with the help of experts would give an answers to following questions "what, who and in what ways". Interviewing experts and asking them how one or another change of the taxation system would affect investment-making decisions provides an opportunity to compare the results of written questionnaires of decision-makers with experts' positions. The current research focuses on macro data and uses qualitative analysis. An interesting aspect of future research could be in-depth analysis of company data, namely evaluation of the consequences of the decision-making process of multinational companies and the impact of the taxation aspect on corporate operations. The possible harmonisation of corporate taxation and its influence on small and large countries needs also deeper examination. In addition, the author is of the opinion that further research is needed to evaluate the importance of corporate taxation and incentives of corporate taxation for different industries with a wider selection of variables.

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APPENDICES

Appendix 1. The Impact of Corporate Income Taxation on Foreign Direct Investment into European Union Manufacturing Sector (Study I)

THE IMPACT OF CORPORATE INCOME TAXATION ON FOREIGN DIRECT INVESTMENT INTO EUROPEAN UNION MANUFACTURING SECTOR

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Abstract

This paper investigates the impact of corporate taxation on the location of foreign direct investments in European Union countries. Significant changes have occurred in EU economic environment during last decades: enlargement of European Union (EU) and European Monetary Union (EMU), decreasing the tax levels due to the tax competition, deep economic crisis followed the period of growth, and the FDI flows have increased considerably during the period. The analysis was conducted based on the aggregated manufacturing foreign direct investments world flows into 23 European Union countries. The main result from estimated econometric model based on a cross-section data of country variables is that effects of taxation on manufacturing foreign direct investment are statistically significant. The results show that increase of nominal corporate income tax by one per cent is associated with decrease of manufacturing FDI by 0.03 percentage points. Considerable differences were discovered in the behaviour of FDI flows into small and large countries. Larger countries face lower elasticity of FDI to the tax rate. The results suggest that tax policy aimed to increase FDI is particularly important for smaller countries.

Keywords: foreign direct investment, European Union, corporate taxes, manufacturing

Introduction

The income flows generated by foreign direct investments (FDI) are subject to corporate income tax in most of the host countries. The expected cash flows from investments and the value of investments are heavily influenced by the level and mechanism of taxation influencing in turn the investors' readiness to invest into particular country. The question of how corporate taxation influences FDI is a major research question both from the scientific and policy viewpoint.

Despite the fact that number of studies have been carried out to clarify the problem, it remains topical. The empirical study is motivated by the following facts: (1) economic conditions and business motivation in many countries have been changed due to the enlargement of European Union (EU) and European Monetary Union (EMU) during last

decades; (2) intensive process of tax competition has been present in EU during the same time; (3) it covers the period from 1998 to 2008, starting with the end of last crisis and ending with the approximate peak of last big economic crisis; and (4) the FDI flows have increased considerably during recent years.

The paper draws from two main strands of literature. First, increased attractiveness of countries for FDI resulting from lower tax burden is treated in literature on the tax competition. The choice of variables in this paper is partly based on some results of these articles. Second, the preliminary choice and expected influence of variables is based on studies about the factors influencing inward FDI.

The theory of tax competition suggests that capital mobility and country size have impact on the taxation policy. Krongstrup (2002) pointed that larger countries face lower elasticity of capital to tax rate and therefore choose higher tax rates compared to smaller countries. The asymmetry described by Bucovetsky (1991) implies the following: when a large country changes its tax rate, more capital will move out of the country than when a small country increases its tax rate by the same amount. However, the investment decisions depend on the perspectives of the host country's economy and its openness, on growth rate, quality of institutions and on many other factors.

The tax competition model explains partly the behaviour of European countries whereby they introduce tax policy measures to compete for mobile factors. Small open economies are not able to influence the capital flows considerably. They lower taxes on capital income for the purpose to affect the costs to overcome the problem. As a result of free movement of capital other countries are forced to decrease tax rate too. The asymmetry described by Kongstrup (2002) implies that larger countries tend to have higher tax rates on capital compared to smaller countries when capital is mobile across countries.

Winner (2005) examined the tax competition empirically using a sample of 23 OECD countries. He assessed the impact of two components of tax competition − capital mobility and country size − on the taxation of factor incomes on the basis of period 1965-2000 and concluded that the tax rates in large countries are bigger than in a small countries. A paper by Benassy-Query, Fontangne and Lahreche-Revil (2005) evaluated the influence of taxation on FDI, with a special focus on the impact of corporate tax variables, by taking into account tax schemes for avoiding double taxation. Empirical results of research on China suggest that tax rates and incentives are important determinants of FDI (Tung and Cho 2001). In their regression analysis, FDI is dependent on infrastructure, tax incentives, wage rates, unemployment rate and population. It was found that the wage effect and unemployment effects are insignificant. The focus was on tax and infrastructure variables. According to the results of regression analysis, zones and cities with lower tax rates and greater tax incentives attract more foreign direct investments than other areas.

In recent years some comprehensive researches concerning the influence of corporate taxation policy on foreign direct investments have been done. One of them is the empirical analysis of the European Commission's Directorate for Taxation and Customs Union written by Fatica, where she examines the asymmetric effect of taxation on FDI. Fatica (2009) found that FDI respond significantly to the taxation in countries with low quality of institutions. The effective tax rate was not important enough to attract foreign investments in other countries.

To summarize, the results of previous works indicate that tax policies have significant impact on the investment location decision. Size of the economy influences the level of the tax rates supporting the theory of asymmetric tax competition. It is important to understand that the level of taxation impacts the gains from investment. Past empirical work, which focused on the relationship between foreign direct investments (hereinafter FDI) and corporate tax rate has found mixed evidence about the influence of taxes on the level of FDI flows. Studies undertaken before 1990 show that FDI flows are not sensitive to the changes of tax rates; later studies indicate that the taxation in a country impacts the FDI flows.

The impact of taxation on FDI has been subject of a sizeable literature, as reviewed for example by de Mooji and Everdeen (2006) and Devereux and Mattini (2007). Nicodeme (2009) claimed that home-country taxation is relatively unimportant. Ruding Committee (1992) questioned the firms' managers asking the importance of taxation in the firm's investments decisions. The results supported the view of importance of taxation. Our own earlier empirical studies support the idea that foreign direct investment is sensitive to the changes in corporate income tax rates, especially in the sector of manufacturing and wholesale and retail trade.

The current paper presents an empirical analysis of aggregated FDI inflow into EU countries from all countries in the world. The paper examines the impact of corporate taxation in host country on FDI inflow into the European Union countries and attempts to address two related questions. The first question is how sensitive foreign investors to the corporate income tax differences across European Union countries. Answering to the above-mentioned question requires the determination of corporate income tax differences between EU's countries and ability of EU open economy to attract FDI. Second question is whether the smaller economies are forced to choose a lower tax rate for attraction of foreign capital. The hypothesis is that there is a connection between the size of the country and taxation policy for the attraction of foreign direct investment.

We examine what influences investors' choice on the location for FDI into EU. The analysis follows the empirical research of regional investment decisions in China (Tung and Cho (2001)); according to the results of which zones and cities with lower tax rates and greater tax incentives attract more foreign direct investments than other areas.

The choice of variables in the econometric model was supported by empirical research of Winner (2005). According to his regression equation and statistical evaluation, the impact of

capital mobility on capital tax burden is significantly negative. The statistical equation shows that increase of capital mobility by one percentage point is associated with decrease of capital tax burden by 0.18 percentage points. Positive effect of capital mobility on capital taxation, in case the country size is identified, has the expected sign for capital taxes.

The research conducted by Moore, Steece and Swenson (1987) on determinants investigated the impact of tax rates on foreign direct investment concluded that corporate income tax has a small impact on foreign direct investment. The analysis was also restricted to foreign direct investment in manufacturing. Similarly to Root and Ahmed (1978), the authors assessed the different scopes of independent variables. These are availability of essential resources like level of electricity prices and natural gas prices, economic determinants such as unemployment rate, manufacturing wage rate, corporate tax rate and business climate variable. Significant variables are infrastructure development factors like number of airports, length of railway lines, port facilities, and roadways. Size of the country evaluated with the help of population number, average number of sunshine days, average number of heating days were also among the significant determinants. The authors used three tax variables: statutory marginal tax rate, average effective corporate income tax rate and unitary tax rates. Final choice of variables included into this study was made in the course of empirical modelling.

The paper is organized as follows. This overview serves as a basis for the econometric model presented in the section three. In the second section the overview of data is given and in the last section a summary and conclusions are presented.

Data

The period under examination is 1998–2008 with the sample consisting of 23 investment host countries (11 new Member States and 12 old Member States). The panel data set contains time series of 11 observations per each of the 23 countries. Thus, the total number of observations of all variables is 253. Manufacturing foreign direct investment data were obtained from the database of Eurostat. Since data concerning tax rates and some other variable became available only for the period of 1998–2008 the sample was limited to the mentioned period.

Whether the host country is a member of the Euro zone is expected to be significant for the location choice with expected positive influence. The dummy EURO is equal to one in the case if particular country used common EU currency. Another dummy (EU) with expected positive influence on FDI is equal to one when the examined country is an EU member state. During the period under investigation, the number of EU member states increased from 15 to 27.

The main objects of the study are the tax variables. Nominal corporate tax rate, implicit tax rate in the field of corporate income and number of double tax treaties in the host country are

the tax variables expected to affect foreign direct investment. Double taxation is avoided with help of the agreements between home and host country. Also, the openness of the country toward the foreign investments is partly measured by activity of the country in the international agreements. The variable measuring the possibility of investor to avoid double taxation of earned income is the number of tax treaties signed by the host country (*DTA*). Most of the EU member states are also members of the OECD and the adoption of OECD model agreement is obligatory for its members. 16 countries of the sample were members of OECD in 1998 and 17 in 2008. Data on the tax treaties is extracted from the IBRD database, where the texts of all tax treaties in the world are available.

Table 1. Nominal corporate tax rates in 1998-2008, EU-23.

Country	*1998*	*2000*	*2003*	*2005*	*2008*	*Mean*
Austria	*34*	*34*	*34*	*25*	*25*	*30.73*
Bulgaria	*30*	*25*	*23.5*	*15*	*10*	*19.09*
Cyprus	*25*	*25*	*15*	*10*	*10*	*17.73*
Czech Republic	*35*	*31*	*31*	*26*	*21*	*28.82*
Germany	*45*	*40*	*26.5*	*25*	*15*	*28.77*
Denmark	*34*	*32*	*30*	*28*	*25*	*29.45*
Estonia	*26*	*26*	*26*	*24*	*21*	*24.73*
Spain	*35*	*35*	*35*	*35*	*30*	*34.32*
Finland	*28*	*29*	*29*	*26*	*26*	*27.73*
France	*33.33*	*33.33*	*33.33*	*33.33*	*33.33*	*33.33*
Hungary	*18*	*18*	*18*	*16*	*16*	*17.09*
Ireland	*10*	*10*	*12.5*	*12.5*	*12.5*	*11.36*
Italy	*37*	*37*	*34*	*33*	*27.5*	*34.23*
Lithuania	*29*	*24*	*15*	*15*	*15*	*19.18*
Latvia	*25*	*25*	*19*	*15*	*15*	*19.64*
Netherlands	*35*	*35*	*34.5*	*31.5*	*25.5*	*32.33*
Poland	*36*	*30*	*27*	*19*	*19*	*25.27*
Portugal	*34*	*32*	*30*	*25*	*25*	*28.82*
Romania	*38*	*25*	*25*	*16*	*16*	*24.09*
Sweden	*28*	*28*	*28*	*28*	*28*	*28*
Slovakia	*40*	*29*	*25*	*19*	*19*	*25.73*
Slovenia	*25*	*25*	*25*	*25*	*22*	*24.54*
United Kingdom	*31*	*30*	*30*	*30*	*28*	*29.91*

***Source**: European Commission (authors' calculation).*

The variable concerning the nominal corporate income tax rate (CORT) is most important in this study. The data are extracted from the intermediate report of the European Commission written in October 2009 (European Commission) (Table 1). In 2008 the average corporate income tax rate was 23% that is approximately 7% less than in 1998. Statutory corporate

income tax rate was decreased during the period under examination by 9 per cent in small countries and by 11 per cent in large countries (European Commission, author's calculation).

The influence of real corporate income tax variable was controlled with the implicit corporate income tax rate extracted from the database of TAXUD of European Commission. An implicit tax rate is calculated by dividing the revenues from taxes on a special activity or good by an appropriate corresponding aggregate tax base from national accounts statistics. The calculation of implicit tax rates is relatively straightforward and requires less statistical input than, for example, microeconomic or marginal tax rates. The usage of effective tax rate would be more appropriate but it was impossible because of unavailability of data. Implicit tax rate is expected not affect very much the FDI flows into EU manufacturing because the tax rate during the period under examination did not change. The mean of implicit tax rate in 2008 was 23,3% and in 1998 – 23,6%. (European Commission, authors' calculation). The influence of implicit tax rate was checked to be sure if it has impact on manufacturing FDI.

The other independent variables in the study are the level of economic development in the country measured by gross domestic product, unemployment rate, the level of development of the country's infrastructure by length of railway lines and length of motorways and number of internet users, market size variable measured by number of inhabitants, expensiveness of labour measured by labour costs index. These country-specific factors are expected to impact local factor costs and factor supply. Some of the above-mentioned variables were used in basic estimation and some of them for robustness checks.

The host market potential is measured by size of host country, unemployment rate and level of infrastructure development. The size of host country, measurable by the (log of) number of inhabitants (POP) that is expected to have positive sign because large countries have to be with large market potential than smaller. Second, the (log of) unemployment rate (UNEM) is used. An increase in unemployment will lower the direct investment as the indicator of slowdown of economic activity on the country level. On the other hand, unemployment is connected with general economic development, which probably will be expressed in the negative coefficient of correlation between growth of gross domestic product and unemployment rate.

According to the Ernst & Young European Attractiveness Survey (2008), international investors claim that provision of physical infrastructure is one of the valuable factors (54% of respondents). The level of development is measured by length of railway lines and roads. The infrastructure variables as the (log of) level of development of motorways and rail lines (LENGTH) are expected to have positive impact on FDI.

Econometric model and results

Based on the earlier research it was assumed that manufacturing foreign direct investments depend on taxes and other macroeconomic variables

$$INV_{it} = \beta_0 + A\ TAX_{it} + B\ X_{it} + u_{it} + \varepsilon_t \quad (1)$$

where INV_{it} represents FDI inflows to country i in the period t divided by nominal GDP and multiplied by 100, TAXit is a vector of tax variables in the host country, and Xit is a vector of macroeconomic control variables. The term uit allows for fixed effects that may be across countries, i, and/or periods, t, and εit is the error term.

After several attempts we decided on the following log-linearised equation to be estimated:

$$\log INV_{it} = \beta_0 + \beta_1 \log POP_{it} + \beta_2 \log UNEM_{it} + \beta_4 \log LENGTH_{it} + \beta_6\ EURO_{it} + \beta_7\ EU_{it} + \beta_8\ CORT_{it} + \beta_9\ DTA_{it} + \varepsilon_t \quad (2)$$

The tax variables included are the number of tax treaties (DTA) and corporate tax rate (CORT). The dummy variables concerning Euro and EU membership are included. A dummy variable (EURO) takes value 1 when particular country is the member of European Union. Additionally, the dummy variable (EU) describes whether the country has adopted the euro.

The results of Hausmann test indicate that random effects model is not appropriate. The fixed effect model was used with different estimated intercepts for each pool member. The likelihood ratio test indicates that the model has cross-section fixed effect. Cross Section Weights method was used for estimation and according to that, cross-section residual variances were the estimated. The tax rate variables are statistically significant while the variables of international taxation, corporate income tax rate, size of the market, measured by population, at the 1% level and level of unemployment at the 5% level. EU membership variable became statistically significant at 10% level. The expected signs are reported in Table 3 together with the regression results.

Table 2. Regression results for the manufacturing foreign direct investments (INV).

	Exp. sign	All observations	Small countries	Large countries	All observations	Small countries	Large countries
Population (LGPOP)	+	2.1616*** (2.8036)	2.2605 (1.2896)	2.9377*** (3.6351)	2.0509*** (2.6092)	2.4670 (1.5067)	2.4541*** (2.8047)
Unemployment (LGUNEM)	-	-0.1304** (-2.5880)	-0.1177 (-0.8447)	-0.0579 (-0.7969)	-0.1376** (-2.4029)	-0.3374*** (-2.9511)	-0.0411 (-0.4992)
Infrastructure development (LGLENGTH)	+	-0.3600* (-1.7121)	-0.7151 (-1.3827)	-0.1944 (-0.9523)	-0.2962 (-1.4543)	-1.1943** (-2.4208)	-0.2082 (-0.8815)
Corporate tax rate (CORT)	-	-0.0258*** (-5.6574)	-0.0397*** (-4.2280)	-0.0169*** (-4.3517)	-	-	-
Implicit tax rate (ICT)	-	-	-	-	0.001077 (0.5350)	0.0053 (1.3893)	-0.0007 (-0.3248)
Number of DTA	+	0.0142*** (3.4265)	0.0137* (1.8024)	0.0138** (2.4535)	0.0308*** (9.4023)	0.0280*** (5.6792)	0.0263*** (5.3401)
Euro zone (EURO)	+	-0.0359 (-0.6827)	-0.0588 (-0.5096)	-0.0353 (-0.6369)	-0.0620 (-1.1934)	-0.0926 (-1.0061)	-0.0353 (-0.5571)
European Union (EU)	+	0.0471* (1.9639)	0.0704 (0.7359)	0.0401** (2.0000)	0.1130*** (2.8485)	0.1177 (0.2852)	0.0833** (2.0035)
R-squared		0.8976	0.8693	0.9664	0.8813	0.8407	0.9583
DW statistic		1.2877	1.3395	1.0614	1.2248	1.3135	0.8894
Observations		204	109	95	204	109	95

Source: authors' calculations.

*Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *-significant at the 10% level.*

Graphical analysis and calculations confirm that the log-linear specification appears to be appropriate for the data. Estimated coefficients, summary statistics, p-values and t-statistics are reported in Table 2. The dummy variables concerning the adoption of Euro became insignificant. The European Union membership and development of infrastructure variable became significant on the 10% level of significance whereas the nominal corporate tax rate and number of tax treaties became statistically significant variables on 1% level. The market size variable became also statistically significant in the model.

The final model describes the relationship between the inflow of manufacturing foreign direct investments in the member state, the market size, the level of unemployment, infrastructure and tax rate variables. The amount of foreign direct investments depends on the corporate tax rate that negatively impact the level of investments and the variables measured by market potential level in the host country influenced positively. The model fits

well with the data (p< 0.0000, R^2 = 0.9) and the variables are significant at the 10% level, except Euro variable. The model shows that the level of foreign direct investments into manufacturing depends on corporate tax rate, openness of country for foreign investors, measured by the number of tax treaties, and level of unemployment and market size of country. The number of tax treaties also impacts the level of manufacturing foreign direct investments. The growth of unemployment impacts negatively the investments.

It was also examined how appropriate is the baseline model (2) for the small countries and large countries. The estimation results for small member states (population below 10 million) show that corporate tax rate and number of tax treaties are significant. For the large EU countries the nominal corporate income tax rate variable is also significant. Additionally to the tax variables the market potential of the country and EU variable are significant. The level of infrastructure development, adoption of Euro and unemployment are non-significant for the large member states. The taxation has an impact on foreign direct investments into manufacturing.

The coefficient of corporate tax rate is -0.0258 that measure the elasticity of foreign direct investments to corporate tax. The mentioned coefficient for large countries is -0.0169 and for small countries the coefficient is equal to -0.0397. The elasticity is bigger in the case of small countries. In general, the study discovered that a 1% decrease in statutory corporate tax rate increases the percentage of foreign direct investments of country GDP by 0.03%. This seems to be a quite marginal result, but in nominal values this means that 1% decrease of corporate tax rate will attract additional 18 billion euro in year into manufacturing sector of European Union countries. These results point to the importance of the corporate tax policy of making the investment environment more attractive. The results are close to those of Winner (2005).

The influence of implicit tax rate to the manufacturing FDI was insignificant. The reason for the result is probably in the informational content of statutory tax rate. Foreign investors control the legislation of host country before the investment decision.

To control for the robustness of the results the manufacturing foreign direct investments were compared with others sectors and the same estimation model was used for some non-manufacturing sectors (financial intermediation and wholesale trade). All estimated tax elasticity's are summarized in Table 3.

The impact of the degree of human capital as a control variable was checked via Human Development Index (*HDI*). Additionally, the labour cost index (*LABCOI*) was included that is expected to affect manufacturing foreign direct investment. Increase in the labour cost index is expected to have a negative effect on foreign direct investment. Low labour costs are also an important determinant for attracting new investments into the country. The human development index variable has probably positive impact on manufacturing FDI, since more skilled labour attract more FDI (Table 4). Surprisingly, the cost of labour does not affect FDI

significantly. The results show that degree of human capital development affects FDI positively.

Table 3. Overview of the influence of the country size.

	Tax rate elasticity		
Observations	*Corporate income tax*	*Implicit tax rate*	*No of observations*
All observations			
Manufacturing	*-0.0258****	*0.0014*	*204*
Non-manufacturing			
Whole sales	*-0.0087*	*-0.0264*	*76*
Financial intermediation	*-0.0175*	*0.0450****	*178*
Small countries			
Manufacturing	*-0.0397****	*0.0012*	*109*
Non-manufacturing			
Whole sales	*0.0163*	*0.01373*	*44*
Financial intermediation	*0.0109*	*0.0629***	*88*
Large countries			
Manufacturing	*-0.0169***	*0.0006*	*95*
Non-manufacturing			
Whole sales	*na*	*na*	*na*
Financial intermediation	*-0.0445*	*0.0490***	*90*

Source: authors'' calculations.

*Note: ***- significant at the 1% level, **- significant at the 5% level, *-significant at the 10% level.*

The development of IT-sector has intuitively significant impact on the further development of manufacturing in European Union. It is examined through the level of IT expenditures as percentage of GDP of the country under investigation (ITEX). The impact of the tax and other variables remains unchanged. The information of level of internet access by households and enterprises is available in Eurostat data base from the year 2002. The results suggest that the higher IT expenses do not affect the amount of manufacturing foreign direct investments significantly. The estimated coefficients are not significant (Table 4).

Table 4.Robustness tests: adding control variables.

	GDP growth (1)	GDP (2)	HDI (3)	Labour cost (4)	Internet users (5)	IT expenditure (6)
Population (LGPOP)	2.5543*** (3.2186)	2.0352** (2.4926)	1.2793 (1.5134)	2.4750*** (2.7694)	1.4139 (1.3814)	-2.6092 (-1.5565)
Unemployment (LGUNEM)	-0.1042* (-1.9584)	-0.1278** (-2.0437)	-0.0789 (-1.4702)	-0.1620*** (-2.8770)	-0.1189** (-2.3188)	-0.1246 (-1.3137)
Length of ways (LGLENGTH)	-0.3860* (-1.7208)	-0.3311 (-1.5423)	-0.4212** (-2.0555)	-0.2203 (-0.9768)	-0.4255* (-1.9597)	-0.0504 (-0.1823)
Corporate tax rate (CORT)	-0,0246*** (-5.3531)	-0.0254*** (-5.2716)	-0,0249*** (-5.5511)	-0.0248*** (-5.3594)	-0,0255*** (-5.5994)	-0.0264*** (-3.1213)
Number of DTA (DTA)	0.0138*** (3.3673)	0.0134*** (2.6076)	0.0062 (1.1714)	0.0153*** (3.3676)	0.0109** (2.1564)	0.02136 (0.5817)
Euro zone (EURO)	-0.0237 (-0.4532)	-0.0333 (-0.6055)	-0.0426 (-0.8328)	-0.0416 (-0.7524)	-0.0331 (-0.6297)	-0.2202*** (-3.5874)
European Union (EU)	0.0509* (1.7692)	0.0405 (1.3230)	-0.0059 (-0.1874)	0.0617** (2.2495)	0.0247 (0.8054)	-0.0448 (-0.9698)
GDP (LGGP)	-	0.0262 (0.2276)	-	-	-	-
GDP growth (GGDP)	0.0095* (1.6196)	-	-	-	-	-
Labour cost index (LABCOI)	-	-	-	0.2006 (-1.1058)	-	
Human Development index (HDI)	-	-	3.9608** (2.3572)	-	-	-
IT expenditures (ITEX)	-	-	-	-	-	0.0078 (-0.1736)
Internet users (INTUSER)	-	-	-	-	0.0013 (1.1218)	-
R-squared	0.8974	0.8976	0.8975	0.8976	0.8978	0.8935
DW statistic	1.2845	1.2876	1.2576	1.2968	1.2912	1.6818
Number of observations	204	204	204	204	204	204

Source: authors' calculations.

*Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *-significant at the 10% level.*

GDP growth is also fairly important as it directly determines the dynamics of foreign direct investments. The economic growth (GGDP), measured as percentage growth of GDP, is expected to be important factor for the attracting of investors. The country with greater potential is more attractive for investors and the sign is expected to be positive. Higher expected growth should attract more FDI inflows. The result shows that the higher GDP per capital has not impact on the amount of manufacturing foreign direct investments. The variable of GDP growth is significantly important on 10% level (Table 4).

Conclusions

The analysis of manufacturing foreign direct investment flows and macroeconomic indicators across the European Union countries during the period of 1998–2008 demonstrates that the policy of reducing the tax burden encourages foreign investors to invest into the sector. Two main questions were examined: the impact of changes of taxation on the foreign direct investment, and the importance of country's size on this impact. Taxation of corporate investments is important for attracting foreign direct investments.

The coefficient of the corporate tax rate in the model is significant and negative. The number of agreements for the avoidance of double taxation signed by the host country with different investor countries was also found to be significant. According to the regression estimation, the corporate income tax rate is significantly important for the inflow of manufacturing foreign direct investments into the European Union countries regardless of the size of the country. But also a development of infrastructure is attracting foreign direct investment.

The results of the study give a clear indication that corporate tax rate is statistically significant for manufacturing foreign direct investments. In general, the study discovered that a 1% decrease in statutory corporate tax rate increases the percentage of foreign direct investments of GDP of EU country by 0.02%, approximately by 18 billion euro in Europe. The mentioned coefficient for large countries is -0.0169 and for small countries the coefficient is equal to -0.0397. The elasticity is bigger in the small countries. These results point to the importance of the corporate tax policy with the purpose of making the investment environment more attractive particularly for the smaller countries.

Benassy-Query, Fontangne and Lahreche-Revil (2005) have suggested that a higher provision of public goods increases the attractiveness of the country for FDI, and the authors suggested that higher taxes can be partly compensated for by an increase in the building up of public infrastructure. The impact was found to exist also in this study.

However, some limitations are worth of mentioning here. First, not all countries were included into the study because of the lack of relevant data. Second, the set of variables should be bigger for the further research. Third, a new variable should be constructed based on the human development index excluding the influence of unemployment and labour cost index to avoid possible problems of multicolinearity. Fourth, in order to simplify the model the tax exemptions were not taken into account that may distort the results in small scale. Fifth, the economic significance of results is relatively low.

Further research is needed for the purpose to evaluate the importance of corporate taxation and incentives of the corporate taxation for the different industries with the wider selection of variables. It's in necessary to stress that usually non-manufacturing sector is driven by different factors, but the robustness checks where run with the variables of the base model.

Some results of present study mot included here indicated that asymmetries may of the influence of tax regime exist between the different types of countries and that the influences studied in this paper may be dependent on the phase of economic cycle. The further research of these questions has to be based on bilateral data.

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Appendix 2. Determinants of FDI Inflows into the Baltic Countries: Empirical Evidence from a Gravity Model (Study II)

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Determinants of FDI Inflows into the Baltic Countries: Empirical Evidence from a Gravity Model

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Abstract: The article analyzes FDI inflows into Baltic countries using a gravity approach. The results of the empirical estimation allow us to explain how the difference in corporate taxation between countries, geographical and cultural distance, institutions such as regulations and the size of the economy as well as its economic development affect FDI inflows into the Baltic countries. The influence of corporate taxation on FDI flows, expressed as corporate tax rate differences between investor and host countries is statistically significant. Larger geographical distance between the countries reduces FDI flows, and institutional variables such as the economic freedom index have significant impact and affect positively FDI into the Baltics. Finally, the size of economy, measured by GDP, impacts positively the FDI flows into Baltic countries.

Key words: gravity model; foreign direct investments; corporate tax; Baltic countries

JEL codes: E2, F2, H2

1. Introduction

The objective of this paper is to evaluate the determinants of bilateral FDI flows to Baltic countries and particularly the effects of changes of regulation of credit, labour and businesses, including changes of corporate tax rate in both the investor and the host country on bilateral FDI flows. The period under examination is 2000-2008. We use a gravity equation to evaluate the importance of differences between corporate tax rates in the investor country and the host country as well as other determinants of bilateral FDI flows such as distance, market size measured by gross-domestic products, the index of economic freedom, different levels of inflation, infrastructure development and cultural similarities.

The present paper differs from previous studies by using a concept of the law of gravitation to explain regional integration in the field of capital flows, in particular inflows into the Baltics, and including an important aspects of economic development of the Baltics, namely the level of economic freedom and corporate tax rate. Not many attempts have been made to explain FDI flows using a gravity approach. Frenkel et al. (2004), Brainard (1997) have implemented a gravity equation used more than fifty years for the explanation of trade flows (Czarny et al., 2010) to describe FDI flows. In recent years, some comprehensive analyses of the influence of corporate

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taxation policy on foreign direct investments have been done. One of them is Bellak and Leibrecht (2009), who examine the impact of taxation on FDI empirically with the help of a gravity model and found that FDI flows are positively related to the size of the investor and host country markets respectively and negatively related to the distance between the countries and to the corporate tax burden. We employ their idea for the Baltic countries, which is motivated by the following facts: (1) the success of Baltic countries in economic development was generally remarkable during the last two decades; (2) the interest for low tax policy has been growing in the world during the same time; (3) the openness of the Baltic economies is higher than in many developed countries; (4) the FDI flows to the Baltic countries have increased considerably during the time span covered in this study, and (5) the study covers the period from 2000 to 2008, including two economic crises.

The paper is organized as follows: section two gives a short overview about theoretical drivers of FDI, focusing on the role of taxation. We will present four hypotheses about the drivers of FDI inflows into the Baltic countries. In section three we review the systems of corporate taxation in the Baltic countries and section four describes the gravity model, explains the empirical examination and presents the main results of the estimations. Section five is dedicated to a number of robustness tests and the last section concludes.

2. Theoretical Considerations

Firms have different motives for investing abroad, which makes it complicated to derive a clear and straightforward theory. The enormous width of motives is very difficult to handle in a concise approach. Dunning's eclectic approach can be seen as the origin of the theoretical debate on FDI. The OLI-paradigm (Dunning, 1977) states that a firm usually has a competitive ownership (O) advantage (e.g., tangible asset like natural resources, intangible assets like technology, brand name, and innovation) in its home market that can be transferred abroad. Second, the firm may see the location (L) as an advantage, e.g. market size, cheap inputs and low transportation cost etc., political advantages like policies attracting foreign firms, social and cultural advantages like the low physical and psychic distance between two countries. It may also include low corporate taxes. Finally, the internalization (I) advantages of superior commercial benefits in intra-firm transactions as against arm's length transactions may also motivate FDI.

These incentives are difficult to operationalize for an empirical analysis. Thus, we generalize these thoughts and distinguish four general motivations for an FDI: (1) resource seeking FDI (natural resources and labor), (2) market seeking FDI, (3) efficiency seeking FDI, and (4) asset seeking FDI. Given the small market size and low abundance of natural resource, it seems plausible that neither the market seeking motive nor the resource seeking motivation for FDI in the Baltic countries are very relevant. Rather, the abundance of well qualified labour (assets), the quality of institutions and policies, and the efficiency of processes can generate a motivation for an investment in Estonia, Latvia or Lithuania. Thus, we concentrate on differences in taxation, cultural similarity and spatial distance.

As for taxation, we look at the tax rate differentials between host and investor countries. Bénassy-Quéré et al. (2005) evaluate the influence of taxation on FDI, with a special focus on the impact of corporate tax variables and found a negative relationship between taxation burden and foreign direct investments flows to OECD countries. Hartman (1994), Grubert and Mutti (1991), Hines (1996), Boskin and Gale (1987) find that corporate income tax has a significant negative effect on attracting FDI flows. However, Root and Ahmed (1979), Porcano and Price (1996) conclude that taxes do not have a significant effect on FDI. Swenson (1994) reports a positive effect, which is surprising indeed. Based on the expectation that higher taxes reduce investment, we expect the negative effect of

tax burden on foreign direct inflows that will be investigated by the empirical evidence for Baltic countries. To be sure, this analysis cannot be used to distinguish pull-effects from push effects, i.e., we are not able to give evidence of whether the Baltics attract foreign capital because they have so attractive tax regimes or the investor countries deter investment and drive capital out of their countries because their location is rather unattractive. Given the manifold motives of FDI and given that the Baltics are rather small, we do not consider this distinction further.

Despite dealing with small countries, we still assume that the larger host county has the greater potential for FDI. The coefficient of market size variable (GDP) is expected to be positive. The positive sign is also expected for the estimated investor market size (GDPI). In similarity to the previous research (Egger et al., 2009) we use real GDP in EUR. The distance between host and investor country is expected to be important in bilateral FDI flows. Larger distance reduces FDI due to high costs, discrepancy in culture, lack of information concerning local legislation, investor climate and other factors. This variable is thus expected to have a negative effect on FDI.

Next, we consider cultural similarities. Here, the argument is that investors from Europe and other OECD countries seek host countries that are similar with respect to their language, religion and other aspect.

Close to cultural aspect, we see the institutional setting, e.g., economic freedom, the rule of law and other governance aspects. Investors want to invest in a secure environment with reasonably priced factors of production. Thus, we also include the degree of economic freedom as an explanatory variable, expecting a positive influence of economic freedom on FDI.

As a consequence of the theoretical thoughts and in relation to the existing empirical research, we derive four hypotheses:

- The first hypothesis claims that differences in corporate tax rates of investor and host country affect the size of foreign direct investment flows positively.
- Secondly, geographical distance between investor and host country is deterring FDI. Baltic countries have developed more active relations with foreign investors from neighbouring countries.
- Our third hypothesis is that high economic freedom and other institutions in the Baltic countries promote the inflow of foreign direct investments from other developed countries.
- Finally, according to the basic assumptions of the gravity model Baltic countries promote more active relations with investors from countries with bigger GDP.

3. Corporate Taxation in the Baltic Countries

The Baltic countries have a quite similar history of corporate taxation, since all of them are post socialistic countries that after the collapse of Soviet Union had re-created governmental institutions, including tax authorities and tax legalization. However, the basics of taxation remained almost the same in the three countries. Later on the taxation systems became different.

According to the Latvian tax law, corporate income tax was reduced in 2003 from 25 percent to 19 percent and to 15 percent in 2004. As of January 1st, 2001, if a foreign investment plan approved by the government exceeds more than Ls 10 million within three years it may be eligible to corporate income tax holiday of 40 percent of the amount invested. There is a withholding tax rate of 10 percent for dividends, 10 percent for interest, 10 percent for management (consultation) fee and 15 or 5 percent for royalties. For resident companies tax is imposed upon their worldwide income; for non-resident it is limited only to Latvian-source income. The corporate tax in Latvia in 2008 still was 15 percent.

Corporate tax in Lithuania was also 15 percent in 2008. Companies that are specialized in rendering services to agriculture and producing agricultural products have special incentives—they are exempt from income tax. For non-residents withholding tax from dividends is 15 percent, 10 percent from interest, 10 percent from royalties and 10 percent from payments for leased and sold immovable properties. In general in Lithuania income tax is levied and withheld at a rate of 20 percent from interest and 29 percent from the dividends. As in Latvia, assets imported by foreign investors for incorporation or development of a company are exempted from customs duties.

The Estonian corporate income tax system was changed in 2000. Since then, companies pay income tax only in the case of profit distribution. According to the Estonian Income Tax Act, the income tax should be paid on distributed profits, including gifts, donations and costs of entertaining guests, profit distributions, and expenses and other payments not related to business. The tax rate of the mentioned subjects is specified 26 percent in 2000 and as result of reducing policy the corporate income tax was 21 percent in 2008. This is a special incentive for legal persons to reinvest earned profits. Reinvested profits are tax free. The subject of taxation includes distributed profit as dividends and other profit distributions that will be paid to shareholders of the company, except the provision of EU subsidiary directive that is common for all EU countries.

4. Empirical Application

4.1 The Model

The aim of empirical part of the study is to test the four hypotheses, namely that the bilateral FDI inflows into the Baltic States are influenced by corporate tax policy (in particular differences in tax rates), the geographical and cultural distance between investor and host countries, institutional quality in the Baltic States, including the level of economic freedom, and finally the size of the economy in the investor country.

Our theoretical hypotheses will be tested with a gravity model, which is based on Newton's law. It explains the gravitation force (GF_{ij}) between two objects i and j that is expressed by equation

$$GF_{ij} = \frac{M_i M_j}{D_{ij}}, i \neq j \tag{1}$$

Where M is representing mass and D stands for distance,

The model, estimated in terms of natural logarithms, is expressed as:

$$\ln GF_{ij} = \ln M_i + \ln M_j - \ln D_{ij} + \varepsilon_{ij} \tag{2}$$

Economists have used the concept of the gravitation force to explain the volume of trade, capital flows and migration issues between different countries in the world. Tinbergen (1962) has introduced the gravity model and has shown the importance of "border effect" in trade theory.

There are some empirical papers dealing with FDI flows. Only recently, bilateral FDI flows have been explained with the help of gravity models. Frenkel et al. (2004) and Brainard (1997) were the first authors to apply the gravity equation to FDI flows. According to the model, the investment flow from one country to another is explained by economic development of the countries, their market size, direct geographical distances and other variables determining common economic development. In case of capital flow from country i to country j, equation 2 of gravity model changes into:

$$\ln FDI_{ij} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln D_{ij} + \varepsilon_{ij} \tag{3}$$

The mass (M) in equation 2 is measured by the gross domestic product (GDP) of the countries. Distance between two objects (D) is measured by the geographical distance between the countries.

Bilateral FDI flows of the Baltic countries are estimated over the period 2000-2008. In our sample the host countries are Estonia, Latvia, and Lithuania. The investor countries are selected from the investor partners listed in the statistics and they are mostly developed EU countries plus United States and Norway. Poland, Malta, Latvia, Lithuania, Estonia are transition countries belong to the sample of investor countries. This group accounted for more than 80 percent of the FDI inflows to the Baltics during the time span covered. The estimated gravity equation is specified as:

$$\ln FDI_{ijt} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 GDP_{jt} + \beta_3 \ln D_{ij} + A_{ijt} + u_{ijt} \quad (4)$$

Where FDI_{ijt} is representing FDI flows from country i to country j in period t,

GDP_{it} and GDP_{jt} denote the GDP of countries i and j respectively in period t,

D_{ij} indicates geographic distance between capitals of countries i and j, and

A_{ijt} represents other factors adding or preventing FDI flows between countries (for example inflation, corporate taxation, development of infrastructure, dummy variable of common language).

Because of the correlation problem the variables of unemployment, IT development variable, measured as number of internet users, inflation, the development of infrastructure are not included into the basic equation. These variables are controlled for in the robustness analysis, which is presented in Table 4.

Additional variables in our specification encompass variables linked with cultural similarities, in particularly measured as common language variable, economic freedom and corporate taxation. Some of them are dummy variables (Table A1).

$$\ln FDI_{ijt} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln D_{ij} + \beta_4 DCIT_{ijt} + \beta_5 EFW5_{ijt} + \beta_6 COMLANG_{ij} + u_{ijt} \quad (5)$$

Where $DCIT_{ijt}$ indicates the differential of corporate tax rate between countries i and j in period t,

EFW_{jt} indicates the degree of economic freedom (Gwartney et al., 2010) in area 5 of regulation in country j period t, and

$COMLANG_{ij}$ (dummy variable) indicates the situation when the languages of countries i and j belong to common language family.

4.2 Methodical Issues

Some of the variables have time effects and some of them only cross-section effects. In this situation the choice of proper estimation method is the next issue. Adoption of a typical panel data based approach, such as fixed or random effect is the usual way. However, the main problem for the data we use is including time invariant variables—for example distance that is one fundamental variable for the gravity model. The random effect approach is available also for models with time invariant variables. In this situation the Hausmann-Taylor (1981) estimation method is appropriate. It allows for the use of both time-varying and time invariant variables, according to the mentioned method a few of them can be endogenous in the sense of correlation with individual effects but still stay exogenous with respect to error term as it was done in study of Czarny et al. (2010).

4.3 Data Sources

The worldwide direct investment in Baltic countries amounts to 1,282 million EUR in 2000, consisting of 425 million EUR of Estonian inflow, 447 million EUR of Latvian inflow and 410 million EUR of Lithuanian inflow (Table 1). In 2008 the inflow of foreign direct investment to Baltic countries increased 2.7 times in comparison with 2000. Large jumps were made in 2004, 2005 and 2007. The lion's share of total FDI inflow is from the countries of the current sample, which includes Austria, Cyprus, Germany, Denmark, Spain, Finland, France, Ireland, Italy, Luxemburg, Netherlands, Portugal, Sweden, Malta, Poland, Estonia, Lithuania, Latvia,

United Kingdom, United States, Norway (Table A2). According to the data the sample covers approximately by 80 percent of the whole foreign direct investments into the Baltic countries.

Table 1 FDI Flows to Baltic Countries from All Countries of the World and Countries under Examination

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total inflows World (MEUR)									
Estonia	425	603	307	822	771	2 307	1 432	1 991	1 180
Latvia	447	148	270	272	517	573	1 339	1 704	862
Lithuania	410	498	771	160	623	826	1 448	1 473	1 396
Total inflows Sample countries (MEUR)									
Estonia	373	585	224	733	677	2 218	1 339	1 982	1 016
Latvia	286	114	198	180	393	334	1 067	1 528	685
Lithuania	374	468	572	111	412	490	2 472	1 146	1 153

Source: Eurostat. Authors' calculations.

Most importantly, we assess the relevance of the difference in nominal corporate income tax rate (*CIT*) between host countries and investor countries. The data are extracted from the intermediate report of the European Commission published in October 2009 in cooperation with consultants of the Oxford University Centre for Business Taxation, the Centre for European Economic Research (ZEW) and PricewaterhouseCoopers. The tax parameters of nominal corporate tax rates were extracted for the period 2000-2008. The sample consists of a limited number of investor countries including the EU countries plus Norway and United States. According to the data the lowest corporate tax rate was in Ireland. Four countries have a corporate tax rate below 20 percent, namely Cyprus, Ireland, Latvia and Lithuania. The corporate tax rate of four countries is over 30 percent; these are Austria, Spain, France and the Netherlands. The corporate tax rates of other countries are between 25 and 30 percent. These tax parameters form the basis of the computations of tax rates that are presented in Table 2. In 2008 the average corporate income tax rate in the Baltic countries was 17 percent; that is approximately 8 percentage points less than in 2000. Statutory corporate income tax rate in investor countries under examination decreased during the period under examination by 6.7 percentage points. The biggest fall in corporate tax rate can be observed in Germany, Poland and Cyprus. During the period of examination, Ireland has increased the statutory corporate tax rate from 10 to 12.5 percent. France, United States, Norway, Sweden did not change the tax rate during the period in question. Finland has decreased tax rate only by percentage points. The increase of differences in corporate income tax rate between investor and host country is expected to have positive impact on the FDI. However, we cannot distinguish pull-effects due to tax decline in host countries from push-effects, which may be rooted in smaller tax decreases or even tax increases in the investor countries.

Besides the nominal corporate income tax rate, the effective statutory profit tax rate influence to FDI is also tested. This tax rate is extracted from an Intermediate Report (2009), where the tax rate is calculated on the base of nominal corporate income tax rate taking into consideration local profit tax rate (nominal) and surcharge used the methodology of Devereux and Griffith (Intermediate Report 2009). The main question is whether the effective tax rate affected the investment decision in the same manner as nominal corporate tax rate.

Data of bilateral flows of foreign direct investments are obtained from the database of Eurostat and missing data were collected from the databases of central banks. Data concerning tax rates are extracted from reports by

the European Commission's Directorate-general for Taxation and Customs Union. Indexes of economic freedom are available on the website of the Economic Freedom Network of Fraser Institute. Data of GDP per capital is extracted from the OECD Statistics database, other economic variables are derived from the database of Eurostat. Table A1 provides the descriptive statistics of all variables used in the empirical analysis.

Table 2 Nominal Corporate Tax Rate in 2000-2008

Country	2000	2003	2005	2008	Change
Host countries					
Estonia	26	26	24	21	-5
Lithuania	24	15	15	15	-11
Latvia	25	19	15	15	-10
Average	25.00	20.00	18.00	17.00	-8
Investor countries					
Austria	34	34	25	25	-9
Cyprus	25	15	10	10	-15
Germany	40	26.5	25	15	-25
Denmark	32	30	28	25	-7
Spain	35	35	35	30	-5
Finland	29	29	26	26	-3
France	33.33	33.33	33.33	33.33	0
Ireland	10	12.5	12.5	12.5	2.5
Italy	37	34	33	27.5	-9.5
Luxemburg	30	22	22	22	-8
Netherlands	35	34.5	31.5	25.5	-9.5
Portugal	32	30	25	25	-7
Sweden	28	28	28	28	0
Malta	35	35	35	35	0
Poland	30	27	19	19	-11
Estonia	26	26	24	21	-5
Lithuania	24	15	15	15	-9
Latvia	25	19	15	15	-10
United Kingdom	30	30	30	28	-2
Unites States	NA	NA	35	35	0
Norway	NA	NA	28	28	0
Average	30.02	27.15	25.49	23.85	-6.16

Source: European Commission (author's calculation).

The economic development of the countries in the sample has been different during the examination period. In comparison with investor countries the average gross-domestic product in the host countries was small with 15,270 Euro per capita. However, GDP per capita of the host countries have increased by approximately 2.7 times. The degree of economic freedom increased in Estonia by 13 percent, in Latvia by 11 percent, and in Lithuania by 18 percent. The development of the infrastructure took place in the opposite direction, the length of highways and railways decreased in total in 2001 by 236 kilometers in the Baltic countries in comparison with 2000. The renewal the infrastructure was not so successful and the level of development still has not achieved the scale of 2000.

In countries in transition the changes in regulations, inefficiency of the money market, barriers to international trade will influence foreign investors' choice of location abroad. For this reason we include the degree of economic freedom in the list of independent variables. We chose it from the components of economic

freedom that in our opinion seem to be more important. These are the index of the area 3 (access to sound money), index of the area 5 (general regulatory questions) as well as its subcomponents 5a (regulation of credit) and 5b (regulation of labor), indexes 4A (taxes on international trade) and 4E (international capital market controls) and the indexes belonging to the area 4D (black market exchange rates). The data concerning the degree of freedom was calculated by Fraser Institute until 2000 in interval of 5 years, before it became available annually (Gwartney et al., 2010). For this reason the data is extracted for this study from 2000 until 2008. We expect a positive relationship between economic freedom and FDI flows. Economic freedom slightly increased between 2000 and 2008 with a peak in 2005. The highest rank in overall economic freedom can be observed in Estonia (top 20), whereas the other Baltic countries rank between 40 and 50.

4.4 The Results

We have analyzed different models including the basic model (equation (5)) described previously. The estimated parameters on variables derived from the basic version of the gravity equation are statistically significant and have the expected signs (see Table 3). Our hypotheses cannot be rejected.

To start with the fourth hypothesis: the positive sign behind the variable of investor country's GDP shows that FDI inflows increase with the size of the investor country. Investor country's GDP is statistically significant at the 5% level. The sign of the parameter for home country's GDP is also positive, while it is bigger than for the investor country's GDP. This difference may be related to the fast economic development of Baltic countries attracting FDI inflows. The positive sign of home country's GDP can then be interpreted as larger interest of investors in countries with fast economic development.

Next, we have tested six different components of the economic freedom index, which include the access to sound money, taxes on international trade, international capital market controls and general regulatory questions as well as its subcomponents 5a (regulation of credit) and 5b (regulation of labor). Access to sound money, taxes on international trade and international capital market controls are insignificant[1]. All three variables connected with economic freedom in the field of regulatory questions are significant and have a positive sign. The higher the degree of economic freedom regarding regulation (component 5 as well as subcomponents 5a and 5b of the Fraser index respectively), the higher the FDI inflows into the Baltic countries are.

Third, the distance between investor and home countries has a significant negative coefficient. Distance reduces the attractiveness of a country for foreign investors. When measuring institutional and cultural distance, we find that the common language variable is also statistically significant at the 1% level. This does not hold true for other measures of cultural distance. The impact of the language similarities as a control variable is cross-checked via a language dummy (*COMLANG*). The language dummy through language similarities is calculated on base of following methodology. The countries are divided into subgroups according to the language family, to which the official language of the country belongs (see Table A3 in Appendix). The dummy variable is equal to one if both states belong to the same group and zero otherwise. The method used is very similar to the approach used by Folfas (2011). This variable linked with cultural similarities has no positive impact on FDI inflows. This may suggest that individual characteristics of host and investor countries are specified wrongly and the mentioned dummy variables do not reflect the real situation in culture similarities. According to the descriptive statistics we have only five countries with similarities in language family. The dummy variable of language similarities has a quite marginal effect to FDI flows that shows the coefficient equal to -2.03. The size of

[1] We do not report the results for the subcomponents 3, 4a and 4b in Table 3.

coefficient means that if in the pair of countries dominates same language the FDI inflow will decrease to 2.03 percentage point otherwise the FDI remain unchanged.

Finally difference in corporate tax rates appears the most important factor in the investment process. Therefore, a larger difference between tax rates of investor and host countries attract bigger investment into the Baltic countries. As the estimation results in Table 3 document, we cannot reject this important hypothesis: the difference in corporate tax rates between investor and host country is statistically significant. The coefficient of the differential in corporate tax rate is 0.033. In general, the study suggests that an increase of the differential between the statutory corporate tax rate of the investor and the host countries raises foreign direct investment flows by 0.033%. The impact of the effective profit tax rate differential is bigger than the role of the nominal corporate tax rate. The empirical calculations show that the effective tax rate affects FDI in the same manner.

To sum up: the basic model describes the relationship between the inflow of foreign direct investments into the Baltic states, the host and investor countries' GDP, geographical distance between the countries, the degree of economic freedom of the host country, the difference in corporate tax rates and common language. The inflow of foreign direct investments from the investor country to the host country depends on the difference in corporate tax rates between investor and host countries that impact the level of investments. A high differential of tax rate affects FDI flows positively. The distance affects the investments negatively. Moreover the common language has a negative impact on bilateral FDI. Also the size of the investor country, measured by its GDP, has influenced the bilateral FDI inflows into the Baltics positively. In addition, a high level of economic freedom increases the potential to attract investors from partner countries: The index of economic freedom has a positive impact on FDI inflows.

Table 3 Model: Differences between Tax Rates—Regression Results for the Foreign Direct Investments (log FDI)

	Model 1 (language similarities)	Model 2 (language similarities)	Model 3 (regulation of credit, labor and business)	Model 4 (regulation of credit, labor and business)	Model 5 (credit market regulation)	Model 6 (credit market regulation)	Model 7 (labor market regulations)	Model 8 (labor market regulations)
Host country GDP (LGGDP)	1.9005*** (11.5084)	1.8903*** (11.50211	1.3940*** (6.5048)	1.3597*** (6.3638)	1.4985*** (6.8973)	1.4488*** (6.6396)	1.5946*** (6.7782)	1.5801*** (6.7386)
Investor country GDP (LGGDPI)	0.1614** (2.0823)	0.1603** (2.0677)	0.1502** (2.0152)	0.1484** (1.9936)	0.1533** (2.0140)	0.1510** (1.9869)	0.1571** (2.0257)	0.1560** (2.0101)
Distance between countries (LGDIST)	-1.4105*** (-6.7669)	-1.4049*** (-6.7388)	-1.3882*** (-6.9179)	-1.3806*** (-6.8874)	-1.3960*** (-6.8164)	-1.3870*** (-6.7803)	-1.3953*** (-6.6867)	-1.3895*** (-6.6539)
Corporate tax rate differential between investor and host countries (DDCIT)	0.0332* (1.8982)	-	0.03662** (2.0878)	-	0.0428** (2.3947)	-	0.0329** (1.8754)	-
Effective tax rate differential (DDEATR)	-	0.0345* (2.0194)	-	0.0424** (2.4713)	-	0.0485** (2.7432)	-	0.03461** (2.0271)
Economic freedom index (EFW)	-	-	0.57036*** (3.5952)	0.6009*** (3.7688)	0.2961*** (2.8014)	0.3252*** (3.0275)	0.2167* (1.8258)	0.2202*** (1.8562)
Common language (COMLANG)	-2.1641*** (-3.5878)	-2.1586*** (-3.5577)	-2.0369*** (-3.5952)	-2.0219*** (-3.4904)	-2.0914*** (-3.5317)	-2.0756*** (-3.5087)	-2.1226*** (-3.5154)	-2.1162*** (-3.5016)
Constant	-7.3019*** (-3.5082)	-7.2291*** (-3.4806)	-6.4427*** (-3.1472)	-6.3589*** (-3.1175)	-6.1555*** (-2.9354)	-5.9787*** (-2.8588)	-5.6468*** (-2.4866)	-5.5539*** (-2.4507)
R-squared (unweighted)	0.3318	0.3328	0.3992	0.4025	0.3735	0.3778	0.3477	0.3488
DW statistic	0.7770	0.7749	0.8727	0.8750	0.8299	0.8323	0.7955	0.7925
Number of observations	371	371	371	371	371	371	371	371

Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *-significant at the 10% level.

On the base of these first results, we conclude that the gravity model explains the changes in FDI flows considerably well. In the next section, we perform some robustness tests.

4.5 Robustness and Stability Analysis

The goal of this section is to check the stability of the results received in the gravity estimation, in particular the impact of index of economic freedom and differences in corporate taxation on FDI flows. We check the robustness of the estimations and the impact of control variables. Testing of common language dummy variable done in the previous section shows that cultural similarities, in particular common language did not lead to stronger FDI relationships between host and investor countries,

Table 4 Robustness: Adding Control Variables

	Model 1 (common religion)	Model 2 (labor cost)	Model 3 (inflation)	Model 4 (development of infrastructure)	Model 5 (GDP per capita)
Host country GDP (LGGDP)	1.4053*** (6.1507)	-	-	-	-
Investor country GDP (LGGDPI)	0.1757** (1.9948)	-	-	-	-
Distance between countries (LGDIST)	-1.0623*** (-5.1792)	-1.2102*** (-6.0004)	-1.2129*** (-6.0042)	-1.2294*** (-6.0308)	-1.2411*** (-6.3326)
Corporate tax rate differential between investor and host countries (DDCIT)	0.0376** (2.1399)	0.0302* (1.6397)	0.0381** (2.0896)	0.0353* (1.9233)	0.03229* (1.8021)
Economic freedom in area of regulation (EFW5)	0.5517*** (3.2704)	0.7609*** (4.1994)	0.9359*** (6.5706)	1.0054*** (6.7195)	0.4339** (2.3436)
Common language (COMLANG)	-	-1.8290*** (-3.0439)	-1.8231*** (-3.0246)	-1.8972*** (-3.1115)	-1.8415*** (-3.1555)
Common religion (COMREL)	-0.2030 (-0.6004)	-			
Labor cost (LABCOST)		0.0370*** (3.9347)			
Inflation (INF)	-	-	0.0922*** (4.9739)	-	-
Development of infrastructure (LGLENGTH)	-	-	-	0.6812 (1.5284)	-
GDP per capita (GDPPC)		-			0.0002** (5.0448)
Constant	-9.1356*** (-4.4133)	5.8108*** (3.0828)	4.4866*** (2.5960)	-0.9465 (-0.2395)	7.0948*** (3.9339)
R-squared (unweighted)	0.2852	0.3504	0.3517	0.3575	0.3785
DW statistic	0.7333	0.8625	0.8531	0.8623	0.8434
Number of observations	371	371	371	371	371

Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *-significant at the 10% level.

This result may be driven by misspecification (see above). Thus, we test whether other cultural similarities such as religion could have an impact on the inflow of investments. A common culture dummy-variable (*COMREL*) is considered in addition to language and is expected to impact positively on the flow of foreign direct investments. Forms of Christianity have dominated religious life in the countries under examination. The largest religion in Estonia and Latvia is Evangelical Lutheranism, in Lithuania 79% of the population belongs to the Roman Catholic Church. The dummy is equal to one when the host and investor countries have the same religion dominating in the

country; otherwise it is zero. This variable of common religion is significant at the 5% level, however with negative marginal effect to FDI flows. Language and religion variables appeared to be correlated; thus we test in model (see column 1) common religion dummy variable instead common language variable and present the results of the religious variable in Table 4. The problems with cultural distance are not solved. We assign this to the fact that the Baltics and the investor countries are rather similar with respect to their cultural heritages.

Secondly, the level of inflation in the host country is checked, via annual change of the consumer price inflation (*INF*). The inflation has significant effect on foreign direct investment. Labour costs are also an important determinant for attracting new investments into the country. Results are presented in column 2 and 3 of Table 4. The positive sign behind variables of inflation and labour costs is an unexpected result. One explanation of the result may be that inflation and labour costs in investor countries has the same tendency as in host countries. Inflation is related to the level of GDP for that reason the both of variables have similar effect on FDI.

Thirdly, the impact of the infrastructure development as a control variable is assessed via an infrastructure variable (LENGTH). Infrastructure development that intuitively seems to have significant impact on FDI flows is examined through the length of railways and motor high way in the host country. It is expected to have a positive impact on bilateral flow. The results presented in column 4 of Table 4 show that the impact of infrastructure variable on FDI flow is not significant. Firstly it may suggest that other variables are more important for bilateral FDI into Baltic countries. Secondly it may suggest that the governmental expenditures into infrastructure development are not enough for the attraction of foreign investments and that the mentioned variable does not reflect the real situation of infrastructure, because the quality of infrastructure is more important than quantity. The impact of the tax and other variables remains unchanged.

In addition, variables of political freedom are examined. According to the methodology used by Freedom House (2008) the countries are assigned a numerical rating on a scale of 1 to7 for political rights; a rating of 1 indicates the highest degree of freedom and 7 the least amount of freedom. Political rights refer to the possibilities to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives. The political freedom in Baltic countries is on higher level. During the sample period the index remained nearly unchanged and equal to 1. By the end of examination period the index of Latvia changed from 1 to 2 that mean appearance in the country of such factors as political corruption, violence, political discrimination against minorities, and foreign or military influence on politics. In 2004 the index also was 2 in Lithuania, but this held only one year. Examination shows that political right index variable (POLRIGHT) is non-significant (not reported in the table), thus we do not present the results of estimation in Table 4.

The year dummy variable (YEARDUM) capturing deviations from the trend ("seasonal" fluctuations) has also been examined. According to the trend mentioned before the large jumps of FDI flows were made in 2004, 2005 and 2007, therefore the dummy variable has been added to the model. Examination shows that year dummy variable is statistically significant (not reported in the table) and designate the more important periods in the economic development of Baltic countries, accession to EU and last year of economic growth period.

The stability of the coefficients on tax differential and economic freedom is checked by combining the independent variables with additional control variables. The checks show that the effect of the tax differential and the index of economic freedom of regulation are not significantly different from the basic model. In a nutshell, the gravity model is robust.

5. Conclusions

In this paper we have investigated the effect of tax differentials between investor and host counties and the degree of economic freedom on bilateral FDI of Baltic states using a gravity model. As expected and in line with the literature, it turns out that tax rate differentials are a strong driver of FDI inflows: Baltic countries are effective in attracting FDI due to differences in the tax rates between investor and host country. The Baltic example also shows that countries with a high level of economic freedom have a great potential to attract foreign investments. Business friendly incentives and liberal legislation provide more possibilities for businesses to invest. Domestic and foreign firms can make use of these opportunities.

The results of study also support the notion that the size of economy, which is expressed by the total GDP of investor country, is still relevant, even in the Baltics. FDI flows are bigger between larger economies and Baltic countries are preferable for the investors from larger countries.

The gravity approach of foreign direct investments between Baltic countries and their main investor partners also shows that indicators of distance between two countries and cultural differences have considerable influence on the bilateral flows. Interestingly, the cultural variables do not show the expected signs, which may hint to a problem with the specification of the model and/or to the problem that the cultural differences within the sample of OECD countries and the Baltics are too small. We leave the answer to these questions to further research.

In any account, for policymakers in the so-called European periphery the message of the results is rather clear. They should have a strong incentive to insist on tax competition within the European Union, rather than agree to ex-ante harmonization as advocated by big members, Apart from other advantages of tax competition such as that it forces governments to search for efficiency and welfare, tax policy can be instrumental to attract investment from abroad.

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Appendix

Table A1 Data Description for Years 2000-2008

Variable	Description of variable	Source	Expected sign	Mean	Max	Min	Std.Dev
FDI	Foreign Direct Investment flows (Net, MEUR)	Eurostat, Latvian Central Bank, Lithuanian Central Bank, Estonian Central Bank		40.77	1875	-248	146.18
GDP	Host country size measured as GDP (MEUR)	Eurostat	+	15270.81	32203	6160	6579.44
GDPI	Investor country size measured as GDP (MEUR)	Eurostat	+	777925	10654030	259.00	1611192
DIST	Distance between capitals of countries (in kilometers)	Own calculation	-	1568.12	8268	89	1302.41
CIT	Nominal corporate tax rate in host country (in percentage)	European Commission's Directorate-General for Taxation and Customs Union.	-	19.68	26	15	4.58
CITI	Nominal corporate tax rate in investor country (in percentage)	European Commission's Directorate-General for Taxation and Customs Union.	+	27.17	40	10	7.33
EATR	Effective statutory profit tax rate in host country (in percentage)	Intermediate Report	-	19.89	26	15	4.45
EATRI	Effective statutory profit tax rate in investor country (in percentage)	Intermediate Report	+	29.06	52.35	10	8.34
LENGTH	Infrastructure development (in kilometers)	Eurostat	+	1863.14	2331.0	1024.0	509.02
EFW5	Degree of economic freedom (regulations) in host country (index, scale from 0 to 10)	Gwartney J. et al (2010)	+	6.91	7.83	5.65	0.58
POLRIGHT	Political right index	Freedom house	+	1.07	2	1	0.26
COMLANG	Common language family (dummy)	Own calculation, including groups of countries: Scandinavian countries (SE, DK, NO) Uralic (EE, FI) Slavic (LT, LV, PL) Others	+	0.087	1	0	0.28
COMREL	Common religion (dummy)	Own calculation, including main forms of Christianity have dominated in region: Evangelical Luthernism; Roman Catolic Church Orthodox Church.	+	0.43	1	0	0.50
GDPPC	GDP per capita	OECD stat	+	6713.95	12200	2900	2589.34
LABCOST	Unit labor costs	OECD Stat	-	8.49	28.19	-7.31	9.07
YEARDUM	Year (dummy)	Own calculation, including years of large jumps: 2004, 2005 and 2007	+	0.35	1	0	0.48
INF	Inflation (annual change in CPI)	Eurostat	-	4.40	15.30	-1.10	3.60

Table A2 The Share of the Partner Countries in Total FDI Net Flow into Baltic States in 2000-2008, %.

Country	FDI 2000	FDI 2003	FDI 2005	FDI 2008
Austria	-1.79	1.52	1.11	0.12
Cyprus	0.00	0.88	-0.38	4.59
Germany	4.60	4.07	3.80	4.70
Denmark	6.08	0.48	6.21	3.91
Spain	0.08	0.56	0.16	0.26
Finland	16.85	41.15	12.06	-6.73
France	1.09	0.32	0.92	3.94
Ireland	0.16	0.72	0.40	-0.06
Italy	0.39	1.20	-1.40	0.26
Luxemburg	0.00	1.44	-1.30	3.32
Netherlands	2.89	-2.39	-0.11	7.29
Portugal	0.00	0.00	1.43	-0.06
Sweden	34.87	25.28	53.99	34.92
Malta	0.00	0.08	0.89	1.53
Poland	1.64	-0.72	0.43	1.03
Estonia	11.31	-5.42	4.21	13.20
Lithuania	-0.08	0.56	2.08	-0.56
Latvia	0.86	1.67	0.19	1.18
United Kingdom	1.95	2.79	0.24	0.94
United States	-3.59	4.70	-3.91	0.82
Norway	5.23	2.15	-0.13	4.59

Source: Eurostat. Authors' calculations.

Table A3 Language Family

Language	Language family	Subdivision
Lithuanian	Indo-European	Balto-Slavic
Latvia	Indo-European	Balto-Slavic
Estonian	Uralic	Finnic
Swedish	Indo-European	Germanic
Slovenian	Indo-European	Slavic
English	Indo-European	Germanic
Portuguese	Indo-European	Italic
German	Indo-European	Germanic
Dutch	Indo-European	Germanic
French	Indo-European	Italic
Danish	Indo-European	Germanic
Maltese	Afro-asiatic	Semitic
Polish	Indo-European	Balcan-Slavic
Norwegian	Indo-European	Germanic
Finish	Uralic	Finnic
Italian	Indo-European	Italic
Greece	Indo-European	Hellenic
Luxembourgish	Indo-European	Germanic
Spanish	Indo-European	Italic

Appendix 3. Role of Taxation in Investments Allocation Decisions: Using a Gravity Approach for Exploring Bilateral FDI into the EU (Study III)

ROLE OF TAXATION IN INVESTMENTS ALLOCATION DECISIONS: USING A GRAVITY APPROACH FOR EXPLORING BILATERAL FDI INTO THE EU

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ABSTRACT

The article analyses the impact of taxation on the FDI flow to European Union countries using a gravity approach. The aim of the research is to examine the applicability of the gravity model to FDI between EU countries and their main investor partners and measure the importance of tax variables to bilateral flows. We found a negative relationship between the tax burden and the amount of FDI for EU countries over the period from 1998 to 2011. The variable of double taxation treaty is nonsignificant; therefore, the treaty does not affect EU FDI. The results provide strong evidence of the importance of corporate taxation and total tax burden for inward FDI in EU countries.

Keywords: gravity model, foreign direct investments, corporate tax, European Union countries

1. INTRODUCTION

The study contributes to the discussion about the fundamental role of gravitation force in the financial flows into EU countries and the importance of taxation in these flows. Inward foreign direct investments (FDI) to EU economies have included considerable flows from the EU countries, mainly from the United Kingdom, the Netherlands, Germany and Luxembourg, and from third countries, mainly from the United States. The European Union has become one of the most important economic regions due to its favourable location, high economic development and high level of economic freedom, including free

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movement of capital, goods and labour. The relation between foreign investment flows and economic, social, political and other factors has been an object of interest of economists for many years. The literature on FDI emphasizes the impact of tax treaties, investment and free trade agreements. The general purpose of these treaties and agreements is to ensure that the investments will be promoted and protected and that the profit earned will be exempted from double taxation. However, the actual effect of tax treaties on FDI flows is questionable. As the effect of low tax rate policy, which may enhance, stimulate or damage investments, is examined in numerous studies, we investigate the relationship between inward FDI and EU taxation because these announcements may influence FDI flows into the EU countries both from other EU economies and from third countries.

However, the investment decisions mainly depend on the perspectives of the host country's economy, its openness, degree of growth, institutional quality and many other political, economic and social factors. The differences in economic conditions, political climate and legislation of countries have a significant impact on the decision-making process concerning the allocation of investments. For example, let us have a look at the neighbouring EU countries the Republic of Lithuania and the Republic of Poland, which have almost the same geographical advantages, but different economic conditions. From the point of view of economic geography, their position is very good: the Russian Federation is on one side and old Europe on the other. This has enhanced economic growth in both countries. At the same time, Poland has more natural resources and a cheaper labour force. Lithuania has more qualified specialists and from the perspective of tax policy, allocation of capital into Lithuanian companies is more beneficial because the income tax rate is lower. Hence, the Lithuanian government competes with Poland by offering lower tax rates instead of natural resources. The dilemma is how much the flows are influenced by the level and mechanism of taxation. The single European market offers companies located in any EU country the opportunity to relocate production to countries with lower tax rates. Moreover, the regulations concerning corporate taxation, which are different in EU countries, may be observed as a potential advantage because the regulations concerning indirect taxation are harmonized in the EU countries. Third countries' investors may be interested in investing in a EU country and relocating the production from third countries because this provides the opportunity to avoid customs duties on goods imported to the EU. Moreover, the possibility of deducting expenses, especially payable taxes as part of corporate income, may be viewed as a potential

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preference of a particular host country because the customs union[29] provides identical rules for all EU countries in matters concerning tariffs and customs duties. Therefore, besides various types of taxation policy that may affect investors the particular object of our interest is corporate taxation because of its variations in EU countries.

The concept of the gravitation force has been used by economists to explain the volume of trade, capital flows and migration issues. The gravity model was introduced in 1962 by Tinbergen (1962), who showed the importance of the gravitation force in trade theory. The first authors who applied the gravity equation to FDI flows were Brainard (1997) and Frenkel et al. (2004).

During the last decade the gravity model has been widely used in empirical researches concerning changes in foreign investments flows in order to find the main factors influencing bilateral FDI (Stone and Jeon, 1999; Buch et al., 2003; Kumar and Zajc, 2003; Bevan and Estring, 2004; Roberto, 2004; Portes and Rey, 2005). In addition to the standard variables used in the gravity model, such as the GDPs of the host and investor countries and geographical distance between the two countries, economists are interested in the independent variables that affect the FDI. Substantial changes in legal systems and tax competition between countries are also objects of remarkable studies and have been widely discussed and developed (Egger and Pffaffermayr, 2004; Milner et al., 2004).

The aim of the paper is to check the applicability of the gravity model to foreign direct investments between EU countries and their main investor partners and to evaluate the importance of corporate taxation and tax treaty for the investment allocation decisions in EU countries.

In section two we review the existing theoretical and empirical literature and draw some conclusions about how to use the gravity approach. In section three we describe the data set, explain the empirical examination and present the main results of the estimations. Section four is dedicated to the robustness test. The last section presents conclusions.

2. THEORETICAL CONSIDERATIONS

[29] EU countries form a customs union, whose regulations are harmonized according to the Customs Code.

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According to the classical gravity model, which will be the base for our theoretical approach, the gravity force (GF_{ij}) between two objects *i* and *j* is expressed as the proportion of their respective masses M_i and M_j to the distance D_{ij} between these objects. In terms of natural logarithms the gravity model is expressed as:

$$\ln GF_{ij} = \ln M_i + \ln M_j - \ln D_{ij} + \varepsilon_{ij} \quad (1)$$

Gravity theory has been used for describing social phenomena in population migration, tourist travel, trade and information flows and traffic movements. The gravity model has been broadly used for the estimation of FDI. During the last decade economists[30] have paid great attention to the flows from Japan and China, to the flows between NAFTA countries, between China and Europe and between Central and Eastern European countries as well as to China and Asian countries and to the countries in transition.

According to the model, the investment flows from one country to another are explained by the economic development of the countries, their market size, direct geographical distances between the investor and host countries and other variables determining common economic development. In case of the capital flow from country *i* to country *j*, Equation 1 of the gravity model changes into:

$$\ln FDI_{ij} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln D_{ij} + \varepsilon_{ij} \quad (2)$$

The gross domestic product (*GDP*) of the countries is expressed as the mass and the geographical distance (*D*), which isa factor that indicates transportation costs, cultural differences and historical relationships between the countries, is expressed as the distance between the two objects in accordance to the classical gravity model.

Similarly to the formulation applied by Frenkel (1997), the flow of capital is estimated as a function of countries' population, income per capital and distance. This approach was used by Choi (2003) in the estimation of FDI flows specified as:

$$\ln FDI_{ij} = \alpha + \beta_1 \ln POP_i + \beta_2 \ln POP_j + \beta_3 \ln GDP_i + \beta_4 \ln GDP_j + \beta_5 \ln D_{ij} + \varepsilon_{ij} \quad (3)$$

[30] Cieślik and Ryan (2004), Roger and Noel (2004), Keiko and Kyoji (2005), Demekas et al. (2007), Raymend (2007), Hidemi and Yasuyuki (2010), Resmini and Siedschlag (2013), Tatsui (2013)

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In recent years special attention was paid to effective corporate tax rates (Mutti and Grubert, 2004) and corporate taxation policy (Folfas, 2011). Using the gravity approach Folfas (2011) focused on tax differences between host and investor countries. One problem that such approach does not take into consideration is the taxation differences between host countries that describe tax competition. Still Mutti and Grubert (2004) concentrated on differences in taxation in host countries. However earlier research generally indicates that host country taxes play a greater role (Hines, 1997).

As for taxation, we look at the tax burden in host countries. According to Root and Ahmed (1979), taxes do not have a significant effect on FDI. Contrary to them Swenson (1994) reports a positive effect of taxation on foreign investments. Considering the suggestion that higher taxes reduce investment a negative effect of a high tax burden on FDI is expected. The expectation will be investigated by the empirical evidence for EU countries. Similarly to the previous research (Raudonen and Freytag, 2013), this analysis cannot be used to distinguish pull effects from push effects, i.e. we are not able to give evidence of whether EU countries attract foreign capital because they have so attractive tax regimes or because the investor countries deter investment and drive capital out of their countries because their location is rather unattractive. In the course of our analysis we assume that pull effects dominate the decisions on average and do not consider this distinction further; our assumption is connected with the manifold motives of FDI and the rather small size of the EU countries.

Based on the theoretical considerations and the existing empirical research, we test the hypothesis that the bilateral FDI flows of EU countries are influenced by preferences conditioned by tax policy. Bearing in mind the formulated aim and the gravity approach, the following hypotheses will be tested:

1) Incentives and low tax rates influence the level of FDI flows positively. The European Union has harmonized tax policy in the field of indirect taxation and the member states have independent tax policy in the field of corporate taxation. According to the results of the European Commission's study (Ruding Committee, 1992) and Paying Taxes Report (World Bank, 2011) concerning the convergence of corporate taxes in the European community and tax burdens, the taxation aspects are important in the allocation and profit repatriation decisions.

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2) Increasing the FDI inflow into the EU depends on the investor country. The signing of the Convention for Avoidance of Double Taxation between the investor country and the host country affects positively the FDI inflows into the EU countries.

3) The size and level of growth of an investor country's economy affect the FDI flow to the country. A country with a high GDP is preferable as a partner country in the investment into the EU economy to a country with a small economy. Long distances between the investor and host countries impact FDI negatively due to high transportation costs, differences in culture, lack of information concerning local market and other factors.

Several studies show that investors are sensitive to tax rates. The study conducted by Bénassy-Quéré et al. (2000), which also applied the gravity approach, shows that the size of the country has a major impact on the share of investments because larger states have a greater economic potential. The influence of taxation on FDI with the focus on the impact of corporate tax variables was examined by Bénassy-Quéré et al. (2005), who found a negative relationship between the taxation burden and FDI flows to OECD countries. Similarly, Boskin and Gale (1987), Grubert and Mutti (1991), Hartman (1994) and Hines and Rice (1994) found that a high corporate income tax rate has a significant negative effect on attracting FDI flows.

As a consequence of the theoretical thoughts and in relation to the set hypotheses the suggested gravity equation is as follows:

$$\ln FDI_{ijt} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln D_{ij} + \beta_4 TAX_{jt} + \mu_{ij} + \lambda_t + u_{ijt} \quad (4)$$

Tax variables in our equation include those variables linked with taxation aspects in the host country, in particular corporate income tax rate, tax burden and tax treaty.

In our model the distance that is one fundamental variable for the gravity model does not change over time. We used the Hausmann-Taylor (1981) estimation method for solving the problem for the data concerning time-invariant variables. According to this method, a few of the variables can be endogenous in the sense of correlation with individual effects but still be exogenous with respect to the error term as it was done in the study of Czarny et al. (2010). This approach allows us for the use of both time-varying and time-invariant variables.

3. MODELLING BILATERAL FDI FLOWS OF EU COUNTRIES

3.1. Data set

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FDI flows of EU countries are coming mainly from developed economies, mostly from the United States and the European Union countries (UNCTAD, 2011). According to the World Investment Report 2012, the index measuring FDI potential includes market attractiveness, availability of low-cost labour, presence of natural resources and infrastructure. Therefore, the prospective spending power and the growth potential of the market are expected to be important factors for attracting FDI. Policy measures such as corporate taxation changes, concluded double-taxation treaty and cultural proximity between the investor countries and the host region may be important determinants of FDI.

The empirical part testing the taxation variables of FDI is based on a panel of bilateral inward FDI flows of EU countries. We use data on FDI flows from 40 economies to 27 recipient economies from 1998 to 2011. Each observation point determines a FDI flow in euros between an investor country *i*, i.e., EU-27 and other selected countries, and host country *j*. In our sample the host countries are EU countries. The selected investor countries are the major suppliers of the FDI flows (see Table 1 of Annex). This group accounted for more than 90 per cent of the FDI inflows to the EU during the time span covered. Figure 1 of Annex provides a regional breakdown of EU FDI, by the reporting countries for which data are available. The data show that in 2011 the United States, Germany, the United Kingdom, the Netherlands and Luxembourg made almost 60 per cent of the EU FDI. In contrast, Ukraine with its share of less than 0.01 per cent in the EU FDI has been relatively unimportant for the European Union.

Literature supports the use of the following variables to explore bilateral FDI: country size, economic potential of the country, distance factor and tax determinants. The choice of the method measuring country size usually raises many questions and economists are widely discussing this (Paas, 2002; Folfas, 2011). Many economists use GDP as the variable of economic size of host and investor countries (Buch et al., 2003; MacDermott, 2007; Hidemi, 2010). Some prefer to measure country size by population (Portes and Rey, 1999; Choi, 2002).

Initially we use GDP to represent market size because we assume that a larger host country has a greater potential for attracting FDI. The coefficient of the market size variable is expected to be positive. The positive sign is also expected for the estimated investor market size. Similarly to Egger et al. (2008) we use real GDP in euros. The distance between the host and the investor country is expected to be important in bilateral FDI flows. Longer distance reduces FDI due to high transportation costs, discrepancy in culture, lack of information

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concerning local legislation and investor climate and other factors. This variable is thus expected to have a negative relationship with FDI.

In accordance with Choi (2003), we expect a negative coefficient of tax rate variable. However, in contrast to Porcano and Price (1996) but in line with our reasoning in Introduction and Paying Taxes study (World Bank, 2012), the total tax rate was additionally included to the model. Central government corporate income tax rate as the basic central government statutory corporate income tax rate is expected to have a negative relationship with the FDI. Tax burden measured as percentage of all taxes to the commercial profit of a company is also expected to have a negative relationship with foreign investments. Comparison of the total tax rates in EU economies shows that the average is 28.3 per cent of the commercial profit, the lowest total tax rate, 20.8 per cent, is in Luxembourg and the highest rate, 68.5 per cent, is in Italy. The larger burden causes damage to the companies and affects negatively investor location decisions.

Using the data set, we estimate the impact of the Double Taxation Treaty on bilateral inward FDI. Moreover we investigate whether signing the Double Taxation Treaty affect FDI. We use a dummy variable to explore the significance of the treaty (see Table 1 of Annex). In accordance with Barthel et al. (2009), Double Taxation Treaties are expected to affect bilateral foreign investments positively. Politicians' main goal in concluding a Double Taxation Treaty with a partner country is to ensure investors that double taxation shall be avoided. Table 1 gives an overview of the expected signs of variables.

Table 1. Expected signs of variables

Variable	Expected sign
Corporate income tax rate	-
Total tax rate	-
Double taxation treaty	+
Gross Domestic Product	+
GDP growth	+
Distance	-

Data on bilateral flows of FDI were obtained from the database of the Eurostat. Data concerning taxation were extracted from the World Bank database. Data on GDP came from the Eurostat and UNCTAD statistical databases, corporate income tax rates mainly from the

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OECD database and other variables from the database of the World Bank. Table 1 of Annex provides the descriptive statistics of all variables used in the empirical analysis.

Among the FDI data extracted from the Eurostat numerous values are missing. According to the sample the number of observations reduced to 11 881 in comparison with the preliminary sample of 15 498 observations. Despite the missing values, the sample is large enough because it contains many observation points.

3.2. Empirical analysis

We focused on the impact of tax burden on investment inflows. The empirical analysis proceeded in two steps. First we evaluated the significance of tax variables on inward FDI flows. The influence of three tax variables, corporate tax rate, total tax rate and tax treaty, on FDI was estimated separately. Secondly we explored how sensitive particular investor countries were to the taxation in the EU, For this purpose we estimate the model for various samples of countries.

In the basic version of the model, we used a gravity specification of the bilateral FDI inflow, where we included tax variables (CORPTAX, TOTALTAX and DTA). We analysed different models including the basic model (4) described previously. Models estimated within fixed country-pair and fixed time effects. The variable of geographical distance is time-invariant and this variable is affected only by fixed country-pair effect. We applied a test on a sample with a fixed effects panel data estimator (Wooldridge, 1995). We ran fixed-effect regression with GDP, GDP growth and tax variables. Similarly to the study of Bevan and Estrin (2004), the results were very poor, indeed $R^2 = 0.36$. After the inspection of the data we added population variable. A similar approach was used by Portes and Rey (1999), who estimated a gravity model of equity flow including population variables that represent the openness of the country. The coefficients they received for population in their regression are very close to ours. The goodness of this equation rises: from initial $R^2 = 0.36$ to $R^2 = 0.49$. We therefore used model (3) as our baseline for further examination.

Table 2. Model. Different tax variables. Regression results for the foreign direct investments (log FDI)

	Model 1 (corporate income tax)	Model 2 (total tax)	Model 3 (double taxation treaty)

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Corporate income tax rate (CORPTAX)	-0.0208*** (-5.1310)	-	-
Total tax rate (% of commercial profits) (TOTALTAX)	-	-0.0196*** (-6.6157)	-
Double Taxation Treaty (DTA)	-	-	0.0531 (0.6769)
Host country GDP (LGGDP)	0.9449*** (29.8392)	0.8872*** (21.0872)	0.8764*** (30.3461)
Investor country GDP (LGGDPI)	1.5285*** (62.2451)	1.6066*** (43.0832)	1.5233*** (61.9353)
Population of host country (LGPOP)	-0.5020*** (-15.1917)	-0.3803*** (-7.5836)	-0.4678*** (-14.4332)
Population of investor country (LGPOPI)	-0.9426*** (-39.8088)	-1.0703*** (-30.0014)	-0.9416*** (-39.2437)
Distance between countries (LGDIST)	-0.8343*** (-33.2956)	-0.7123*** (-20.3332)	-0.8274*** (-31.6909)
GDP per capita growth (GDPGROWTH)	0.02790*** (2.9920)	0.03110*** (2.8008)	0.03461*** (3.7411)
Constant	3.9313*** (10.8546)	3.2921*** (6.3581)	3.6121*** (10.0739)
R-squared	0.4935	0.4527	0.4916
Number of observations	7010	3830	7010

Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *- significant at the 10% level.

The estimated parameters of the variables derived from the basic version of the gravity equation are statistically significant and have the expected signs (see Table 2). The positive sign before the variable of investor country GDP shows that the FDI flows from larger countries are bigger. It also indicates that a larger investor country has more potential to invest to the host country and its FDI flows will became larger. Similarly to the previous research by Folfas (2011), the sign before the host country GDP is also positive, which shows that countries with greater spending power are more attractive for investors. The positive sign of the host country GDP is most likely connected also with greater interest of the investor in the countries with high economic growth. The above-mentioned allowed us to conclude that FDI flows are bigger between countries with larger GDPs. The distance as a factor expressing cultural differences and transportation costs has a significant effect on bilateral FDI inflows. As we expected, a long distance between the investor and the host countries influences negatively the attractiveness of a country for investors. This is proved by the sign of the coefficient before the distance variable.

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Next the impact of GDP growth was examined. As a country with a great potential is more attractive for investors, the sign was expected to be positive. Higher expected growth should attract more FDI inflows. The results presented in Table 2 show that GDP growth affects the amount of the FDI flow. The positive sign before the variable of GDP growth shows that FDI flows from countries with higher level of economic growth are bigger.

Finally, tax rate appears to be an important factor in the investment decisions. Low tax rates of host countries attract more investments, particularly into EU countries.

To sum up: the basic model describes the relationship between the inflow of foreign direct investments into the EU member states, the host and investor countries' GDP, geographical distance between the countries, level of economic growth and tax rate in the host country. The inflow of FDI from the investor country to the host country depends on the tax rate in the host country. A high tax rate has a negative impact on the FDI flow. Also a long distance and a high level of the total tax burden have negative impacts on bilateral FDI.

As the estimation results in Table 2 indicate, we cannot reject the first hypothesis: the taxation policy in the host country, incl. the corporate income tax rate and the total tax burden, is statistically significant. A large total tax burden and high corporate income tax rate have negative impacts. Similarly to Choi (2003), who added to the basic gravity equation the corporate tax rate variable of the host country, we found the coefficient for corporate tax rate to be negative and its size is 0.02. In general, the study suggests that an increase of the tax rate in host countries by one per cent will decrease FDI flows by 0.02 per cent, which is broadly in line with previous research. The size of the coefficient of the total tax burden variable comes next after income tax rate, and its impact on FDI is similar. However, as concerns our second hypothesis, empirical calculations show that the Double Taxation Treaty signed between the investor and the host country governments does not impact on the inflow of FDI into the EU. One explanation of the result may be that double taxation is regulated by the saving directive and other legislation acts in the EU additionally to the Tax Treaty. Besides, almost all countries under examination belong to the OECD and have the same regulations concerning double taxation according to the OECD model agreement. As hypothesised, the host country's GDP, the investor country's GDP and geographical distance between the countries are statistically significant at the 1 per cent level.

The above-mentioned results suggest that FDI flows into EU countries respond to the changes in taxation differently or that differences in the details that our measure did not cover cause

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the differing effects. One could imagine that a tax break on reinvested profits would contribute to FDI inflows. Further research is necessary to identify the drivers of these differences.

3.3. Results and discussion

Empirical examination was done on the basis of panel data of bilateral FDI of the EU countries. The impact of the tax rate variables on bilateral EU FDI is high and the coefficients of the tax rates are indeed negative. There is a strong correlation between the corporate income tax rate and investment flow from the countries in the sample. To explore how sensitive particular investor countries are to the corporate taxation in the EU we performed additional tests with various samples. We formed the samples by the regions to which the investor countries belong and excluded other investor countries for the purpose of testing the sensitivity of investors from the various regions to the tax variables in the EU host countries. Table 3 shows that there is a significant correlation between investor country groups FDI and corporate tax in the host country. Generally speaking, in the EU the FDI flows from North America, the former Soviet Union and Balkan countries are sensitive to the corporate tax rate. However, it appears that investors from Norway, Iceland and Asian countries are not sensitive to corporate taxes in the EU countries.

Table 3. Impact of taxation for investor countries. Estimation results of tax variables

Region of Investor country	Model 1 (corporate income tax)	Model 2 (total tax)	Model 3 (double taxation treaty)
North America	-0.0325**	-0.0401***	-0.7951**
Asian countries	insignificant	-0.0262**	2.0978***
former Soviet Union	-0.0566***	insignificant	0.8114**
Switzerland/Lichtenstein	-0.0299**	-0.0325***	Insignificant
Norway/Iceland	Insignificant	-0.0243**	Insignificant
Balkans countries	-0.0443*	insignificant	Insignificant
EU-15	-0.0221***	-0.0153***	Insignificant
EU-12	-0.0188**	insignificant	Insignificant

Notes: The Table presents the sensitivity analysis of FDI on changes in taxation. The EU-15 includes old EU member countries. The EU-12 includes new EU member countries. North

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America includes Canada and United States. Balkans countries include Bosnia-Herzegovina and Croatia. Asia includes China, Hong Kong. Former Soviet Union includes Ukraine, Russia and Belarus.

Source: Authors' calculations.

In addition to investors from North America, Balkan countries and the former Soviet Union the influence of corporate taxation on the investments flow is greater also for investors from Switzerland and Lichtenstein than from the other countries under examination. The FDI inflows to the EU from Norway, Iceland and Asian countries are not responsive to changes in corporate taxation.

The following hypotheses were proved in the course of the estimation of the gravity equation:

1) Being countries with taxation incentives the EU countries have great potential for the attraction of investors from partner countries; a low tax burden has a positive impact on FDI. The Double Taxation Treaty is nonsignificant for FDI flows.

2) The EU countries have preferred to achieve good relations with investors from large countries with a high level of economic growth. The economic potential of the investor country, measured by GDP, has a positive influence on the bilateral FDI flows to the EU.

3) The distance between investor and host countries impacts on bilateral FDI flows. The shorter distance increases FDI flows and a longer distance decreases FDI flows into EU countries. Cultural differences, transportation costs and historical relationships between countries measured as the geographic distance between the countries influence the foreign investments flows.

The above-presented modelling showed that the use of the gravity approach in the examination of FDI flows explains changes in FDI flows considerably well.

4. ROBUSTNESS AND STABILITY ANALYSIS

In this section we perform several robustness tests. The goal of this section is to check the stability of the results received in the gravity estimation, in particular the impact of tax rate on FDI flows. Differently from Folfas (2011), who checked the importance of the usage of offshore financial centres in investment location decision, we exclude tax haven regions from the sample in checking the stability of results, especially the impact of taxation variables. For

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testing the sensitivity of the results, firstly we perform a robustness experiment for Model 1, which excludes the offshore financial centres such as Cyprus, Luxembourg and Malta from the estimation, and Model 2, which excludes all non-European economies from the sample as investor country. As a result of these changes not all the countries are included in the sample tested. Due to the above-mentioned changes the number of observations in corporate income tax rate estimations falls from 7010 to 6316 according to Model 1 and from 7010 to 4747 for Model 2. The results of the experiment are presented in Table 4.

Next we check the robustness of the estimations and the impact of control variables. Firstly, the level of inflation in the host country is checked via annual change of the consumer price inflation (*INF*).

Table 4. Robustness experiment

	Corporate income tax rate		Total tax rate		Double taxation treaty	
	Model 1 (without offshore centres)	Model 2 (European economies)	Model 1 (without offshore centres)	Model 2 (European economies)	Model 1 (without offshore centres)	Model 2 (European economies)
Corporate income tax rate (CORPTAX)	-0.0183*** (-4.0002)	-0.0281*** (-5.8438)	-	-	-	-
Total tax rate (% of commercial profits) (TOTALTAX)	-	-	-0.0107*** (-3.3753)	-0.0145*** (-4.1076)	-	-
Double Taxation Treaty (DTA)	-	-	-	-	-0.0005 (-0.0062)	-0.3481*** (-3.0154)
Host country GDP (LGGDP)	0.7545*** (21.6087)	0.9194*** (23.1209)	0.6209*** (13.6309)	0.7923*** (11.3102)	0.6665*** (21.8713)	0.8087*** (22.6814)
Investor country GDP (LGGDPI)	1.6460*** (63.4725)	1.9595*** (52.6418)	1.6653*** (43.7480)	2.0563*** (38.0228)	1.5995*** (63.5538)	1.9163*** (52.6649)
Population of host country (LGPOP)	-0.1334*** (-3.3295)	-0.4455*** (-10.8672)	0.0529 (0.9196)	-0.2989*** (-4.8663)	-0.0765** (-1.9761)	-0.3736*** (-9.4404)
Population of investor country (LGPOPI)	-1.0532*** (-42.5277)	-1.5522*** (-37.4047)	-1.1280*** (-31.1900)	-1.6781*** (-28.4842)	-1.0078*** (-41.2245)	-1.5044*** (-36.9397)
Distance between countries (LGDIST)	-0.8167*** (-32.0678)	-1.0421*** (-28.0476)	-0.7155*** (-20.3856)	-0.9078*** (-17.4072)	-0.8256*** (-31.1183)	-1.0603*** (-28.2418)
GDP per capita growth (GDPGROWTH)	0.0315*** (3.3430)	0.0125 (1.1111)	0.0281*** (2.5923)	0.0167 (1.2501)	0.0359*** (3.8542)	0.0196* (1.7597)
Constant	0.2397 (0.5489)	9.5573*** (17.2519)	-0.8812 (-1.4914)	8.5865*** (11.3102)	-0.1243 (-0.2879)	9.2883*** (16.8145)

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R-squared	0.5169	0.5307	0.4756	0.4919	0.5147	0.4909
Number of observations	6316	4747	3588	2628	6339	4774

Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *- significant at the 10% level.

Low inflation as a determinant of macroeconomic stability matters positively affects FDI. However, most empirical studies ignore this variable. The study performed by Akinkugbe (2003) shows that inflation rate is a nonsignificant variable for the estimation of FDI inflows in developing countries. Udoh and Egwaikhide (2008) report that the effect of inflation rate uncertainty on FDI is negative. According to the gravity model of Lada and Tchorek (2008), inflation has a significant impact on FDI. Our results are presented in Model 1 of Table 5. The positive sign before the inflation coefficient is an unexpected result. One explanation of the result may be that the inflation in investor countries has the same tendency as in host countries. Inflation is probably related to the consumer spending power and therefore the variable has a positive effect on FDI.

Secondly, the impact of the unemployment level as a control variable is assessed via the percentage of unemployed persons in the host country (UNEMP). According to Roberto (2004), investors avoid in their location decisions distressed regions with high unemployment rates, according to his study the unemployment rate has a negative sign and it affects negatively foreign acquisitions. Therefore unemployment is expected to have a significant impact on FDI flows. The results presented in Model 2 of Table 5 show that the impact of unemployment on the FDI flow did not show persistence and is mainly not significant. This may suggest that other variables are more important for bilateral FDI into EU countries as well as that the governmental expenditures on labour development are not sufficient for the attraction of foreign investments and thatthis variable does not reflect the real situation of the labour market, because the quality of employment is more important than quantity. The impact of the tax variables remains unchanged.

Table 5. Robustness: adding control variables

	Corporate income tax rate		Total tax rate		Double taxation treaty	
	Model 1 (inflation)	Model 2 (unemployment)	Model 1 (inflation)	Model 2 (unemployment)	Model 1 (inflation)	Model 2 (unemployment)
Corporate income tax rate (CORPTAX)	-0.0203*** (-4.8582)	-0.0213*** (-5.2194)	-	-	-	-

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	Corporate income tax rate		Total tax rate		Double taxation treaty	
Total tax rate (% of commercial profits) (TOTALTAX)	-	-	-0.0192*** (-6.4096)	-0.0209*** (-6.2554)	-	-
Double Taxation Treaty (DTA)	-	-	-	-	0.0513 (0.6546)	0.0638 (0.8103)
Host country GDP (LGGDP)	1.0244*** (29.1054)	0.9910*** (26.9074)	0.9909*** (19.6997)	0.8325*** (18.0052)	0.9608*** (28.1491)	0.8836*** (26.7335)
Investor country GDP (LGGDPI)	1.5712*** (61.7068)	1.5772*** (62.2618)	1.6341*** (42.4221)	1.6602*** (40.0978)	1.5253*** (62.0986)	1.5278*** (61.9408)
Population of host country (LGPOP)	-0.5709*** (-15.8221)	-0.5491*** (-14.0184)	-0.4669*** (-8.3550)	-0.3127*** (-28.4798)	-0.5435*** (-14.9833)	-0.4767*** (-12.6554)
Population of investor country (LGPOPI)	-0.9841*** (-40.2673)	-0.9897*** (-40.6703)	-1.0951*** (-29.8075)	-1.1166*** (28.4798)	-0.9439*** (-39.3854)	-0.9462*** (-39.3189)
Distance between countries (LGDIST)	-0.8299*** (-32.9769)	-0.8296*** (-33.0894)	-0.7154*** (-20.2115)	-0.7070*** (-18.4411)	-0.8251*** (-31.3854)	-0.8268*** (-31.6228)
GDP per capita growth (GDPGROWTH)	0.0323*** (3.4429)	0.0302*** (3.2215)	0.0326*** (2.8937)	0.0288** (2.3615)	0.0368*** (3.9835)	0.0348*** (3.7532)
Inflation, consumer prices (INF)	0.0348*** (0.3459)	-	0.0503*** (2.9559)	-	0.0505*** (4.6211)	-
Unemployment (UNEMPL)	-	0.0088 (1.3049)	-	0.0065 (0.5991)	-	0.0029 (0.4435)
Constant	3.9936*** (10.9823)	4.1240*** (11.1843)	3.2558*** (6.2036)	2.9296*** (5.0976)	3.6523*** (10.1977)	3.6491*** (10.0294)
R-squared	0.4945	0.4938	0.4517	0.4501	0.4932	0.4916
Number of observations	7010	6989	3830	3822	7010	6989

Note: t-statistic in brackets. ***- significant at the 1% level, **- significant at the 5% level, *- significant at the 10% level.

The stability of the coefficients of tax rate is checked by combining the independent variables with additional control variables. The checks show that the tax rate is not significantly different from the basic model and in comparison with the basic model the gravity model is also appropriate.

5. CONCLUSIONS

The results of the study show that the gravity approach could be used for the estimation of FDI flows in EU countries. The gravity approach for analysing the flows of foreign direct investments between EU countries and their main investor partners reveals that the indicator of distance between two countries, based on the transportation costs and cultural differences, has considerable influence on the bilateral flows. The results of the study support the

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principle that the gravitation force plays the main role in the attraction of foreign investments, accordingly, the FDI of EU countries are influenced by the spending power, the size of the economy and its growth potential, which are expressed by the GDP of the investor country. FDI flows are bigger between larger economies. Further testing showed that additionally to the size of the economy and distance between the countries the level of the tax rate in the host country, especially in the field of corporate taxation, has an important role in the FDI between the investor and host countries. Nonetheless, the FDI gravity model faces a number of additional obstacles. Firstly the data of bilateral FDI flows are available only for selected countries and a limited period. Certain countries under examination have also limited availability of other data, but missing data do not damage the final result because the sample consists of many observation points. No data concerning the total tax rate variable are available for 1998-2004. Over time, however, the sample will become longer, which may resolve the problem concerning the sample.

In this paper we have investigated the effect of taxation policy on bilateral FDI of EU countries using a gravity model. Foreign investors tend to be attracted by host countries that have tax incentives and liberal legislation. The results suggest that EU countries are effective in attracting FDI due to low tax rates in host countries. The study shows that increasing the corporate income tax rate by 1 per cent will decrease the FDI inflow into a country by 0.02 per cent. Inward FDI reflect the changes in tax policy, in particular in the corporate income tax rate, but we did not examine the principles of taxation and exemption rules. With almost 7000 observations on bilateral inward FDI, we consider that these results are robust. Combining the various control variables confirms the stability of results. These findings are similar to the results of Demekas et al. (2007), according to whose estimation the coefficient of statutory corporate income tax rate is equal to -0.02. In line with the results of Blonigen and Davies (2002) we found that a tax treaty does not influence foreign investments flows. Our empirical work is strong evidence that international investment location decisions are affected by corporate taxation in force in the potential investment region. The result agrees with most previous empirical studies. However, our specific focus on EU tax rates and on tax treaties leads to additional conclusions. The study suggests that politicians should look for new regulations of common corporate tax policy in the European Union and to improve the incentives of tax treaties. Apart from other advantages of tax competition such as that it forces governments to search for efficiency and welfare, tax policy can be instrumental to attract investment from abroad. This paper does not pay attention on the specific deduction schemes

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and does not simulate a model in order to decrease the tax base. Such analysis has to be left for further research.

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APPENDIX

Table 1. Data source and definition

Variables	Sources
Foreign Direct Investment flow (MEUR) Direct investment flows in the host economy from investor country Host country coverage: The sample includes Austria, Bulgaria, Belgium, Czech Republic, Cyprus, Germany, Denmark, Estonia, Spain, Finland, France, Ireland, Italy, Luxemburg, Netherlands, Portugal, Sweden, Malta, Poland, Estonia, Lithuania, Latvia, United Kingdom, Slovakia, Slovenia, Romania, Hungary. Investor country coverage: We have Austria, Bulgaria, Belgium, Czech Republic, Cyprus, Germany, Denmark, Estonia, Spain, Finland, France, Ireland, Italy, Luxemburg, Netherlands, Portugal, Sweden, Malta, Poland, Estonia, Lithuania, Latvia, United Kingdom, Slovakia, Slovenia, Romania, Hungary, United States, Canada, China, Japan, Ukraine, Russia, Bosnia, Belorussia, Switzerland, Turkey, Croatia, Lichtenstein, Iceland and Norway countries in the sample.	Eurostat
Gross domestic product (at current prices, MEUR). Real Gross Domestic Product	Eurostat, UNCTAD stat
Population Total number of inhabitants on 1 January	Eurostat, World Bank databank
Gross domestic product per capita growth (annual %)	World Bank databank
Distance Distance (in kilometres) is theoretical air distance between capitals of host and investor countries.	Own calculation based on web application http://www.timeanddate.com/worldclock/distance.html
Corporate income tax rate (%) Central government corporate income tax rate as basic central government statutory corporate income tax rate expected to have negative effect. Where surtax applies, the statutory corporate rate exclusive of surtax is used.	European Commission's Directorate-General for Taxation and Customs Union, OECD stat
Tax burden Total tax cost (% of commercial profits)	World Bank databank
Double Taxation Treaty signed (dummy variable) Equal to 1 after Double Taxation Treaty has been signed, 0 otherwise	UNCTAD
Unemployment (% of total labour force) Annual average	Eurostat, World Bank databank
Inflation, consumer prices (annual %)	World Bank databank

Table 2. Descriptive statistics for the period 1998-2011

	N	Mean	Median	Max	Min	Std.dev.	Kurtosis
Foreign direct investment flows	11881	450.13	3.00	94507.00	-40687.00	3065.95	249.92
GDP in host country	15498	389821.30	145057.40	2534311.00	3426.27	600359.70	5.42
GDP in investor country	15444(*)	709760.70	164699.10	11169589.00	2215.68	1680819.00	4.36

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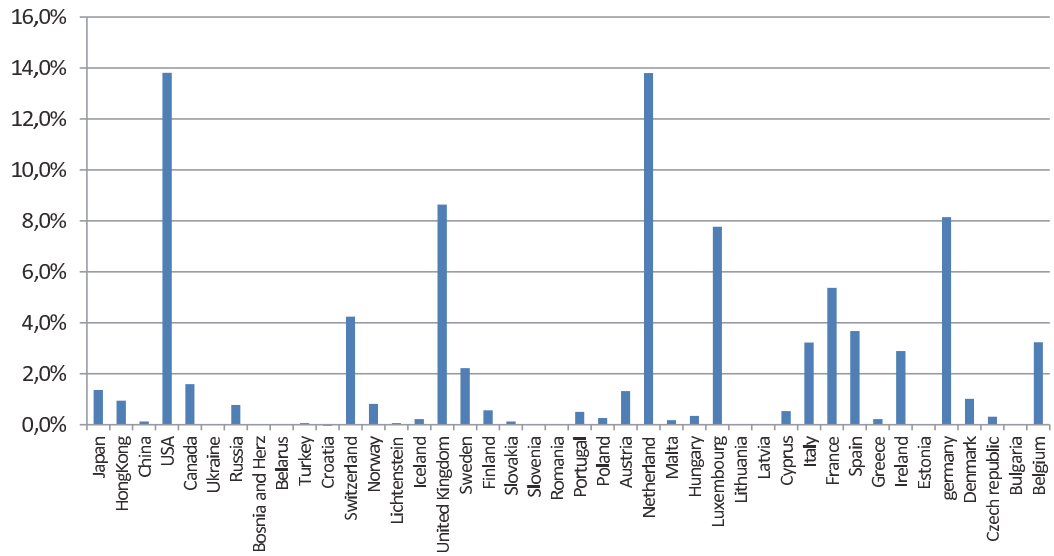
Population in host country	15489	18011722.00	8993531.00	82534176.00	377516.00	22348313.00	4.01
Population in investor country	15498	61517589.00	9473000.00	1.34E+09	31320.00	2.03E+08	33.95
Gross domestic product per capita growth in host country	15498	2.42	2.56	12.85	-17.54	3.80	6.69
Distance between host and investor countries	15498	2252.69	1486.00	11168.00	56.00	2317.93	6.38
Corporate income tax rate in host country	15498	25.74	26.00	45.00	10.00	7.61	2.29
Tax burden in host country	7284(**)	46.05	47.20	77.50	20.00	12.01	3.02
Double Taxation Treaty	15498	0.83	1.00	1.00	0.00	0.37	3.97
Unemployment in host country	15361(***)	8.33	7.50	21.70	1.80	3.95	3.76
Inflation in host country	15498	3.75	2.54	59.10	-4.48	5.33	55.14

Notes: (*) there was no data of GDP for Lichtenstein for the period: 2010-2011; (**) there was no data of total tax rate and number of tax payments available for the period: 1998-2004; (***) there are missing values in unemployment data for Cyprus for 1998 and Malta for 1998-1999;

Figure 1. Regional structure of inward FDI into EU by investor countries in 2004-2011, average %.



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Notes: The Figure presents the regional structure of EU FDI in percentage of total FDI.

Source: Eurostat. Authors' calculations.

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Appendix 4. ELULOOKIRJELDUS

1. Isikuandmed
Nimi: Svetlana Raudonen
Sünniaeg ja -koht: 02.09.1977, Eesti, Kohtla-Järve
E-mail: svetlana.raudonen@mail.ee

2. Hariduskäik

Õppeasutus (nimetus lõpetamise ajal)	**Lõpetamise aeg**	**Haridus (eriala/kraad)**
Tallinna Tehnikaülikool	2014	doktorikraad, finantsökonoomika
Tartu Ülikool majandusteaduskond	2004	majandusmagister
Tartu Ülikool majandusteaduskond	1999	bakalaureusekraad (ärirahandus ja investeeringud; raha ja pangandus)

3. Keelteoskus (alg-, kesk- või kõrgtase)

Keel	**Tase**
Eesti keel	kõrgtase
Vene keel	emakeel
Inglise keel	kõrgtase
Saksa keel	algtase
Prantsuse keel	algtase

4. Teenistuskäik

Töötamise aeg	**Tööandja nimetus**	**Ametikoht**
2013 - praeguseni	Välisministeerium	tollipoliitika nõunik Eesti Alalise Esinduse juures Brüsselis
2011 - praeguseni	Maksu- ja Tolliamet	tollipoliitika rakendamise talituse juhataja
2010-2011	Helmes AS	finantsjuht
2008-2009	Tallinna Tehnikaülikool	osakoormusega lektor
2008-2010	Swedbank AS	privaatpanganduse riskijuht
2004	Sisekaitseakadeemia	maksuõiguse lektor
2004-2008	Maksu- ja Tolliamet	rahvusvahelise infovahetuse talituse juhataja
2002-2004	Maksuamet	maksudeosakonna peaspetsialist
2001-2002	Eesti Põlevkivi AS	ökonomist
1998-2001	Kohtla-Järve Soojus AS	finantsanalüütik

5. Teadustegevus, sh tunnustused ja juhendatud lõputööd.

Juhendatud väitekirjad
Jelizaveta Novikova, magistrikraad, 2010, (juh) Svetlana Raudonen, Оценка эффективности капиталовложения в недвижимость на примере строительства торгово-развлекательного центра (Kinnisvara investeeringu efektiivsuse hindamine kaubandus-lõbustuskeskuse ehitamise näitel), Tallinna Tehnikaülikool, Majandusteaduskond, Rahanduse ja majandusteooria instituut

Ruslan Teplikov, magistrikraad, 2010, (juh) Svetlana Raudonen, Влияние мирового финансового кризиса 2007-2010гг. на биржевые индексы (на примере S&P 500, FTSE 100 И NIKKEI 225), Tallinna Tehnikaülikool, Majandusteaduskond, Rahanduse ja majandusteooria instituut

Ivan Zahharenko, magistrikraad, 2009, (juh) Svetlana Raudonen, Influence of External Factors on a Commercial Bank‘s Profit from Non-resident Business (Välisfaktorite mõju kommertspanga kasumile offshore struktuuri teenindamisel), Audentes Ülikool

Teadustöö põhisuunad 2. Ühiskonnateadused ja kultuur, 2.12. Majandusteadus, S181; Rahandus (fiskaalpoliitika, välisinvesteeringud)

Appendix 5. CURRICULUM VITAE

1. Personal data
Name: Svetlana Raudonen
Date and place of birth: 02.09.1977, Estonia, Kohtla-Järve
E-mail: svetlana.raudonen@mail.ee

2. Education

Educational institution	Graduation year	Education (field of study/degree)
Tallinn University of Technology	2014	Financial Economics (PhD)
Tartu University	2004	Master degree, economics
Tartu University	1999	BBA, Investments and banking

3. Language competence/skills (basic, average, fluent)

Language	Level
Estonian	fluent
Russian	mother tongue
English	fluent
German	basic skills
French	basic skills

4. Professional Employment

Period	Organization	Position
2013 – present	Ministry of Foreign Affairs	counselor for customs policy in Permanent Representation of Estonia to the EU
2011 – present	Estonian Tax and Customs Board	head of customs policy application division
2010-2011	Helmes AS	CFO
2008-2009	Tallinn University of Technology	lector
2008-2010	Swedbank AS	risk manager of Private Banking
2004	Estonian Academy of Security Sciences	Lector of tax law
2004-2008	Estonian Tax and Customs Board	head of the division of international information exchange
2002-2004	Estonian Tax Board	chief specialist of tax department
2001-2002	Estonian Oil shale Ltd	economist
1998-2001	Kohtla-Järve Soojus Ltd	financial analyst

5. Research activity

Dissertations supervised
Jelizaveta Novikova, MBA, 2010, (sup) Svetlana Raudonen, Оценка эффективности капиталовложения в недвижимость на примере строительства торгово-развлекательного центра (Kinnisvara investeeringu efektiivsuse hindamine kaubandus-lõbustuskeskuse ehitamise näitel), Tallinn University of Technology

Ruslan Teplikov, MBA, 2010, (sup) Svetlana Raudonen, Влияние мирового финансового кризиса 2007-2010гг. на биржевые индексы (на примере S&P 500, FTSE 100 И NIKKEI 225), Tallinn University of Technology

Ivan Zahharenko, MBA, 2009, (sup) Svetlana Raudonen, Influence of External Factors on a Commercial Bank‘s Profit from Non-resident Business (Välisfaktorite mõju kommertspanga kasumile offshore struktuuri teenindamisel), Audentes International University

Field of research 2. Culture and Society, 2.12. Economics, S181 Financial science (public policy, foreign investments)

KOKKUVÕTE

Riigi fiskaalpoliitika küsimused, sh maksupoliitika, on muutunud seoses majanduse globaliseerumisega aktuaalseks. Sihtriike valivad investorid hindavad muude faktorite hulgas ka madalate maksumäärade ja muude maksusoodustuste ulatust. ELis on muutunud oluliseks, eriti peale viimast Euroopa Liidu laienemist, liikmesriikide võimekus maksukonkurentsis. Palju on räägitud vajadusest lisaks käibemaksule harmoniseerida Euroopa Liidus ka tulumaksusüsteemi. Vastavalt Euroopa Liidu asutamislepingule soodustab kapitali vaba liikumise poliitika investeerimist teistesse liikmesriikidesse. Sel põhjusel on riikide valitsused sunnitud võtma tarvitusele meetmed, mis suurendavad investorite jaoks riigi majanduse atraktiivsust, sh maksumäärade ja maksukoormuse vähendamise näol. Nii tekibki riikidevaheline võistlus maksumäärade vähendamise üle, et saavutada paremat ärikliimat välisinvestoritele.

Maksusüsteemi mõjust äriühingute investeerimisaktiivsusele on tehtud vaid mõned uurimistööd, s.h. Euroopa Liidu tulumaksuga seotud maksuseaduste harmoniseerimise teemal. Samuti on vähe teada viimaste 25 aasta maksude vähendamise poliitika ja ettevõtte tulumaksu tegelikust mõjust investeerimisele, rahvusvaheliste firmade tegevusele, selle mõju ulatusest erinevates riikides ja investeeringute efektiivsusest soodsa maksukliimaga riikidesse. Mõned uurimistööd on tehtud maksumäärade, maksuskeemide ja muude maksustamisfaktorite mõjust investeeringutesse, tuntumad nendest on Hartmani (1985), Boskin ja Gale (1987), Grubert ja Mutti (1991), Hines ja Rice (1994) tööd.

Välisinvesteeringute maht Eesti majandusesse on kõrge tähelepanu all juba viimased 14 aastat nii Euroopa Liidus kui ka väljaspool. On välja kujunenud üldine arvamus, et 2000.a. valitsuse maksupoliitika on stimuleerinud välisinvesteeringute kasvu. Paljud riigid pöörasid tähelepanu Eesti sarnasele maksusüsteemile, paljud nendest on viimastel aastatel juba vähendanud ettevõtte tulumaksu määra. Kõik Balti riigid on Euroopa Liidu riikide hulgas pööranud tähelepanu maksumäära vähenemise poliitikale, mille tulemusena on ettevõtte tulumaks Eestis, Leedus ja Lätis alanenud vastavalt 21, 15 ja 15-ni.

Vastavalt Iirimaal kehtiva tulumaksuseadusele on tähelepanu all olnud töötleva tööstuse arendamine ning soodsama ärikliima loomine, sh maksustamise vaatenurgast. Iirimaa valitsus on vähendatud tulumaksumäära 12,5 protsendini, mille tulemusena on riiki tulnud täiendavad investeeringud. Teised Euroopa Liidu riigid ja nende teadlased seisavad küsimuse ees, kas järsk maksumäärade vähendamine on aidanud majandusele kaasa ja toonud täiendavaid investeeringuid ning kuidas muuta tulumaksusüsteemi nii, et mitte vähendada regiooni atraktiivsust välisinvestorite jaoks. Autor seab eesmärgiks hinnata maksupoliitika mõju ja eriti ettevõtte tulumaksu määra vähendamise mõju välisinvesteeringutele. Samuti on oluline uurida kas välisinvesteeringute stimuleerimine maksumäärade vähendamisega terves Euroopa Liidus annab kiire majanduskasvu efekti ning eriti välisinvesteeringute mahu kasvu ja kuidas erinevad sektorid reageerivad sellistele muutmistele.

Euroopa Liidu laiendamine mõjutas välisinvesteeringute suunda - uute liikmesriikide liitumine võimaldas suurendada riigi atraktiivsust investoritele ja mõned neist vähendasid ettevõtte tulumaksu Iirimaal kehtiva määrani. Vastavalt

UNCTAD (2012) poolt tehtud uuringule selgus, et madalad palgad, madal tulumaksu määr ja juurdepääs Euroopa Liidu toetustele suurendasid uute liikmesriikide atraktiivsust nii teiste liikmesriikide kui ka kolmandate riikide välisinvestorite jaoks.

Käesolev töö uurib ettevõtte tulumaksusüsteemi olulisust otseste välisinvesteeringute otsuste vastuvõtmisel. Otsesed välisinvesteeringud annavad võimaluse täiendada majandust tootliku kapitaliga mõjutamata sisemaiseid hoiuseid, mis omakorda soodustab kõrgemat tootlikust. Välisinvesteeringud suurendavad SKP mahtu, sellest tuleneb teenuste ja kaupade tootmise kasv sihtriigis, mis omakorda suurendab töökohtade ja töötajate arvu investeeringute sihtriigis.

Kõige laiemas mõistes põhineb käesolev doktoritöö kaasaaegsel otseste välisinvesteeringute teoorial, mis on alguse saanud juba 1960.aastal. Hymer (1960) ja tema järglased panid nurgakivi asukohaspetsiifiliste faktorite mõju uuringutele rahvusvaheliste firmade otsustele. Dunning (1972) selgitas rahvusvaheliste ettevõtete juhtide käitumist mitte ainult asukoha- vaid ka omanikespetsiifiliste faktorite mõjuna ning vajadusena omandada tütarettevõtete üle kontrolli ning osaleda toimuvates protsessides. Kaasaaegses investeerimisteoorias vaadeldakse samuti rahvusvahelistumise faktoreid. 1970-1980.aastatel on seisukohad pisut muutunud ning lisaks ülalmainitule hakati võtma arvesse rahvusvaheliste ettevõtete ülevõtmisi ja liitumisi puudutavat spetsiifikat (nt. Hofstede, 1980; Kogut ja Singh, 1988; Buckley ja Casson, 1991). 1990-ndatel analüüsiti maksustamise aspekte ja nende mõju välisinvesteeringutele (nt Altshuler et al., 1997; Wilson, 1999; Mooij and Ederveen, 2003).

Doktoritöö laiemaks eesmärgiks on uurida maksutegurite mõju välisinvesteeringutele. Käesolevas dissertatsioonis keskendutakse ettevõtte tulu maksustamisega seotud aspektide analüüsimisele. Autori arvates on olulisemateks teemadeks nii efektiivse kui ka seadusejärgse tulumaksumäära ning topeltmaksustamise vältimise lepingute mõju hindamine. Erilist tähelepanu pöörab autor maksufaktorite mõjule töötleva tööstuse valdkonnas. Tuginedes empiirilistele uuringutele otsitakse töös vastust küsimusele, kas ja kuidas tulumaksumäära vähendamise poliitika ja erinevate tööstusharude eristamine sobib üldiselt Euroopa Liidu konteksti. Kuigi empiirilised uuringud põhinevad enamuses Euroopa Liidu andmetel, on autori panus seotud finants- ja fiskaalpoliitika valdkonna teaduskirjandusega. Doktoritöö eesmärk on leida ja kirjeldada ettevõtte tulumaksu valdkonda kuuluvaid tegureid mis mõjutavad välisinvesteeringuid ning aitavad säilitada Eurooa Liidu riikide atraktiivsust investorite jaoks, samas suurendades investeeringute mahtu.

Autor püstitas järgmised uurimisülesanded, mis on täidetud doktoritöö lahutamatuteks osadeks olevates kolmes artiklis:

- uurida, kui tundlik on Euroopa Liidu otseste välisinvesteeringute sissevool, eriti töötleva tööstuse investeeringud, ettevõtte tulumaksu erinevuste suhtes Euroopa Liidu liikmesriikides (uurimus I);
- uurida, kas otseste välisinvesteeringute bilateraalsed vood Baltimaadesse on mõjutatud siht- ja lähteriigi tulumaksumäära erinevuste poolt, sh hinnata ettevõtte nominaalse tulumaksu ja efektiivse maksumäära erinevuse mõju (uurimus II)

- uurida, kuidas sihtriigi poolt allkirjastatud topeltmaksustamise vältimise lepingute arv mõjutab välisinvesteeringute sisevoolu Euroopa Liidus, sh töötleva tööstuse valdkonnas (uurimus I);
- välja selgitada, kas siht- ja asukohariigi vahel sõlmitud topeltmaksustamise vältimise leping mõjutab nimetatud riikide vahelisi otseseid välisinvesteeringuid Euroopa Liidus (uurimus III).

Uurimistöö koosneb neljast osast. Esimene osa kirjeldab investeerimisteooriat ja selles valdkonnas tehtud uuringuid erinevate tegurite mõjust välisinvesteeringute mahule. Teine peatükk annab ülevaate uurimismeetoditest ning uuringus kasutatud andmetest. Kolmas osa on empiiriline, mis kirjeldab doktoritöö käigus tehtud uuringuid ning nende seoseid. Kokkuvõttes esitatakse järeldused ja pakutakse lugejatele resümee maksuteemalistest faktoritest, mis mõjutavad välisinvesteeringuid ning soovitustest ettevõtte tulumaksusüsteemi muutmiseks riigi atraktiivsuse suurendamise eesmärgil.

Eelkõige kasutatakse töös regressioonianalüüsi. Euroopa Liidu agregeeritud välisinvesteeringute näitel, mille raames analüüsitakse töötleva tööstuse välisinvesteeringute paneelandmeid aastate 1998-2008 kohta. Selle analüüsi raames tehakse võrdlus töötleva tööstuse investeeringute mahule avaldavate faktorite mõjust muude tegevusvaldkondade investeeringutele. Seejärel laiendati analüüsi kõikidele välisinvesteeringutele. Paneelandmed põhinevad bilateraalsete välisinvesteeringute voogudel aastate 2000-2008 ja 1998-2011 jooksul. Analüüsitakse välisinvesteeringuid Balti riikidesse ning teistesse Euroopa Liidu riikidesse. Erinevate andmete valimite kasutamisel tehakse maksustamisaspektide analüüs ja mõju hinnang välisinvesteeringute mahule erinevates riikides. Samuti kirjeldab autor sisulist seost majandus-, kaugus-, poliitiliste, ressursside ja maksustamisaspektide ning välisinvesteeringute vahel.

Eesmärgiga iseloomustada uuritavat nähtust teeb autor erinevatest investorriikidest pärit investeeringuid mõjutavate faktorite analüüsi, kus hinnatavateks faktoriteks on lisaks sihtriigi maksumääradele ka sihtriigi ja lähteriigi ettevõttetulumaksu määrade erinevused. Erinevate tulumaksusüsteemide eripärasid arvesse võttes hinnatakse ka kogu maksukoormuse mõju välisinvesteeringutele. Lisaks ettevõtte tulumaksusüsteemi aspektidele hindab autor topeltmaksustamise lepingute mõju välisinvesteeringute mahule. Hindamisel ning regressioonianalüüsi läbiviimisel kasutatakse nii sihtriigi poolt sõlmitud topeltmaksustamise vältimise lepingute arvu kui ka siht- ja lähteriigi vahel lepingu olemasolu mõju hindamisel bilateraalsete investeeringutele.

Käesolev töö põhineb järgmistel kolmel artiklil, mille ühendatavaks osaks on uurimisobjekt, milleks on ettevõtte tulumaksu ja rahvusvahelise maksustamise mõju välisinvesteeringute analüüsimine.

I Raudonen, S., Listra, E. 2011. The Impact of Corporate Income Taxation on Foreign Direct Investment into European Union Manufacturing Sector.

Esimene uurimus, millel põhineb väitekiri, hõlmab maksustamise mõju Euroopa töötleva tööstuse investeeringutele. Artiklis vaadeldakse välismaiseid

otseinvesteeringud ELi riikidesse ajavahemikus 1998-2008. Artiklis käsitletakse ettevõtete maksustamise mõju välisinvesteeringute sissevoolule Euroopa Liidu riikides ning lahendatakse kaks omavahel seotud küsimust. Esimene küsimus on, kui tundlikud on välisinvestorid ettevõtte tulumaksu erinevuste suhtes Euroopa Liidu riikides. Teine küsimus on see, kas väikese majandusega riik on sunnitud madaldama maksumäära, et kaasata rohkem väliskapitali.

Uuringu tulemused näitavad selgelt, et sihtriigi ettevõtte tulumaksu määr ja rahvusvahelise maksustamise poliitika on statistiliselt olulised ja avaldavad mõju otsestele välisinvesteeringutele.

II Raudonen, S., Freytag, A. 2013. Determinants of FDI inflows into the Baltic countries: Empirical evidence from a gravity model.

Teises artiklis uuritakse ettevõtete maksustamise mõju gravitatsiooni mudeli abil. Uuritakse (uuring II), kas bilateraalseid otseinvesteeringud konkreetses piirkonnas on mõjutatavad maksumäärade ja rahvusvahelise maksupoliitika poolt. Uuring põhineb gravitatsiooni mudelile, objektiks on otsesed välisinvesteeringud Baltimaadesse. Erinevalt esimesest uuringust hindab see uuring tegurite mõju bilateraalsetele investeeringutele mitte agregeeritud investeeringutele. Andmete valim sisaldub otseinvesteeringuid 20 riigist, mis moodustavad umbes 80 protsenti kõigist välismaistest otseinvesteeringutest Baltimaades.

Selgus, et erinevused ettevõtte tulumaksu määrades on olulisteks teguriteks mis mõjutavad investeerimisotsuseid. Paneelandmete analüüs näitas positiivset seost tulumaksu erinevuste ning välismaiste otseinvesteeringute voogude vahel. Lisaks meelitab suurem vahe maksumäärades lähte- ja sihtkohariikide vahel suuremaid investeeringud Baltimaadesse. Üldiselt näitas uuring, et ühe protsendiline kasv ettevõtte tulumaksu erinevustes lähte- ja sihtkohariikide vahele suurendab välismaiste otseinvesteeringute voogu 0,033 protsenti. Kasumi maksumäära erinevuse mõju on suurem kui ettevõtete nominaalse tulumaksu määra erinevuse mõju. Empiirilised arvutused näitavad, et tegelik kasumi maksumäär mõjutab välisinvesteeringuid samamoodi.

III Raudonen, S. 2013. Role of Taxation in Investments Allocation Decisions: Using a Gravity Approach for Exploring Bilateral FDI into the EU.

Kolmas uurimus (uuring III) keskendub seoste uurimisele ELi bilateraalsete välismaiste otseinvesteeringute ja sihtriigi ettevõtte tulumaksu vahel. Uuring tehakse gravitatsiooni mudeli abil maksustamise aspektide mõjust välismaistele otseinvesteeringutele Euroopa Liidus. Erinevalt eelmisest uuringust lisati analüüsi topeltmaksustamise vältimise lepingu muutuja. Selle tähtsus investeerimisotsuse vastuvõtmisele kontrolliti empiiriliste andmete analüüsi käigus EL riikide näitel. Maksumäärade erinevuste muutuja asemel uuritakse ettevõtte tulumaksu määra mõju investeeringu sihtriigis.

Paneelandmete analüüs näitas, et bilateraalsetele investeeringutele avaldab mõju ettevõtte tulumaksu määr. Uuringus leiti negatiivne korrelatsioon kogu maksukoormuse, mõõdetuna protsendina kasumist, ja otseinvesteeringute mahu

vahel ELi riikides ajavahemikus 1998-2011. Topeltmaksustamise vältimise lepingu muutuja ehk jõustunud lepingu olemasolu siht- ja lähteriigi vahel on statistiliselt ebaoluline, mis tähendab, et lepingud ise ei mõjuta ELi otseinvesteeringuid. Tulemused pakuvad tõendeid, et ettevõtete maksustamine ning kogu maksukoormuse mõju on oluline ELi riikide välisinvesteeringute seisukohalt.

On mitmeid võimalusi kuidas edasi arendada doktoritööd käesoleva väitekirja teemal. Ettevõtte tulumaksu süsteem erinevates riikides, sh Euroopa Liidu liikmesriikides, on erinev ning paljuski sõltub maksustamise mehhanismist ja rakendatavatest skeemidest, mis kindlasti vajab edasisest uurimist nii Balti riikide kui ka Euroopa Liidu kontekstis. Maksusüsteemide kohta süstemaatiliste andmete kättesaadavuse raskuste tõttu sai autor analüüsida ainult ettevõtte tulumaksu määrasid ning siht- ja lähteriikide vaheliste erinevuste mõju välisinvesteeringutele. Parima tulemuse saavutamiseks võiks tulevased uuringud hõlmata ka maksustamise mehhanismi eripärsid.

Selleks, et analüüsida ettevõtete maksustamise tegurite mõju välisinvesteeringutele sügavamalt võiks laiendada valimit ja kaasata suurem arvu riike. Võiks teostada analüüsi muude meetoditega, näiteks intervjueerimise, juhtumite põhise või sektori analüüsi abil. Investorite hoiakute uurimiseks võiks ka läbi viia intervjuud ettevõtete juhtidega. See võimaldab saada tervikliku ülevaade olukorrast, sh välisinvestorite riiki sisenemise strateegiatest ja otsuste tegemise protsessi eripäradest. Ekspertide intervjueerimine, nendelt informatsiooni pärimine kuidas üks või teine muutus maksusüsteemis mõjutab investeerimisotsuste vastuvõtmist, annab võimaluse võrrelda tulemusi. Kuna käesolev uurimus keskendub makronäitajatele ning kasutab kvantitatiivse analüüsi meetodit võiks teiseks huvitavaks aspektiks tulevastes uuringutes olla mikroandmete analüüs, mis sisaldaks ettevõtte andmeid, mille raames võiks hinnata millised on rahvusvaheliste ettevõtete otsustusprotsessi tagajärjed ning maksustamise aspektide mõju ettevõtete tegevusele. Kolmandaks on vajalik uurida ettevõtte tulumaksu harmoniseerimist ja selle mõju väikestes ja suurtes riikides. Täiendavad uuringud võiks hinnata kui tähtis on ettevõtete maksustamise ja ettevõtete maksustamise eriskeemide mõju eri tööstusharudele.

ABSTRACT

The thesis is based on three independent research papers connected by a common theme: the influence of corporate taxation on foreign investments. The studies focus on investments into European Union (EU) countries, particularly into the Baltic States and selected EU countries. The first aspect of the research, related to the policy of decreasing tax rates, suggests that the effects of changes in corporate taxation policy on foreign investment are important. The policy of decreasing corporate income tax rate has had a positive influence on the inflow of foreign investment. Using the panel data of foreign investment across EU countries, it is demonstrated that the policy of reducing the tax burden will encourage investors to increase their participation in the EU economy and in particular in the manufacturing sector.

The second topic of the thesis focuses on the evaluation of the impact of double taxation treaties on FDI. The sensitivity of host country FDI to the number of DTAs signed by the host country government shows that the legal possibility of avoiding double taxation becomes important for the attraction of additional investments. The increasing activity of a host country to sign more double taxation treaties is associated with the growth of FDI into this particular country.

The third main topic of the thesis is related to the evaluation of the impact of changes in corporate taxation on the aggregated FDI into the EU. The study investigates the impact of corporate taxation on the location of foreign direct investments in European Union countries. Significant changes have occurred in the EU economic environment during the last decades: enlargement of the European Union and European Monetary Union (EMU), decreasing tax levels due to the tax competition, deep economic crisis followed by a period of growth. The analysis was conducted based on the aggregated manufacturing foreign direct investment flows into 23 European Union countries. The main result from the econometric model based on cross-section data of country variables is that effects of taxation on manufacturing foreign direct investment are statistically significant. The results show that an increase of nominal corporate income tax by one per cent is associated with a decrease of manufacturing FDI by 0.03 percentage points. Considerable differences were discovered in the behaviour of FDI flows into small and large countries. Larger countries show lower elasticity of FDI to the tax rate. The results suggest that tax policy aimed to increase FDI is particularly important for smaller countries.

The third aspect is related to the evaluation of the gravity model for the examination of the sensitivity of bilateral FDI flows to changes in tax rates and tax treaty. In econometric analysis a two-step approach is applied. Firstly, FDI inflows into the Baltic States are analysed. The results of the empirical estimation allow explaining how the difference in corporate taxation between countries, geographical and cultural distance, regulatory institution and the size of the economy as well as its economic development affect FDI inflows into the Baltic States. The influence of corporate taxation on FDI flows, expressed as corporate tax rate differences between investor and host countries, is statistically significant. Larger geographical distance between the countries reduces FDI flows, and institutional variables such as the

economic freedom index have a significant impact and are positively correlated with FDI into the Baltic States. The size of the economy, measured by the GDP, affects positively the FDI flows into the Baltic States. Secondly, the impact of taxation on the FDI flows to EU countries was examined. We found a negative relationship between the tax burden and the amount of FDI for EU countries over the period from 1998 to 2011. The variable of double taxation treaty is nonsignificant; this means that the treaty does not affect EU FDI. The results provide strong evidence of the importance of corporate taxation and total tax burden for inward FDI in EU countries.

The results point to the importance of further changing the EU tax policy with the purpose of making the investment environment more attractive. The author is of the opinion that incentives within the corporate taxation of the manufacturing industry are necessary for the further growth of the EU economy.

The general conclusion of the studies reported in this thesis is that the comparison of particular economic sectors is one step further in terms of analysing business climate and in stressing the need to focus on increasing tax incentives besides the profitability of industry. The second step is to explore the attractiveness of a particular region for the investors with cultural similarities and openness of the economy. And the third and the most important step is the examination of business climate in the whole of the European Union where in addition to free movement of goods, labour and capital the taxation climate has become a factor of competitiveness in the attraction of investments.

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