The relationship between FDI inflows and corporate tax rate in tax competitor countries

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Author: Wilber Puin, 850822-6092

Tutor: Prof. Börje Johansson

Ph.D. Candidate: James Dzansi

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Author: Wilber Puin. wa2p@hotmail.com

Tutor: Professor Börje Johansson and Ph.D. Candidate James Dzansi

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Abstract
This thesis examines whether FDI inflows are related to the corporate tax rate imposed on the firms operating in tax competitor countries within the OECD. Research on economic theory and previous studies is made in order to find the most likely variables explaining FDI inflows, since the corporate tax rate is not the only factor affecting FDI inflows in a country. A model is constructed and then empirically studied with descriptive statistics of the variables included and specifically of FDI inflows and the corporate tax rate. To conclude the empirical analysis a regression is run in the model constructed to verify if the independent variables are in fact related to FDI inflows. The results of the regression are to be used to back or not a relationship between FDI inflows and the explanatory variable of main focus, the corporate tax rate. The findings show that only for a sample of 10 selected tax competitor OECD countries there is a negative relationship between FDI inflows and the level of corporate tax rate, but there is no negative relationship between these variables if a larger set of 20 OECD countries is taken into account. This implies that some governments are able to incentive foreign direct investors by decreasing the corporate tax rate so that more inflows of FDI are attracted into the country, but in overall the two variables are not negatively related within the group of OECD member countries and thus the relationship cannot be generalized so that it only applies for some countries.
Abbreviations

EU = European Union
FDI = Foreign Direct Investment
GDP = Gross Domestic Product
MNE = Multi-National Enterprise
OECD = Organization for Economic Co-operation and Development
UNCTAD = United Nations Conference on Trade and Development
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1 Introduction

FDI has been an important economic issue during the last decades. Its importance grows as globalization increases and the people responsible of economic policies look forward to attract this kind of foreign investments, which favours economic growth and brings other benefits that the society in general can use to generate progress. It is desirable that policy makers are aware of FDI’s impact on the economy.

A foreign investor, which can be a person, a group of individuals or firms, looks for exceptional opportunities that cannot be found on its current location or in the country of the headquarter. If advantages are found abroad, investors will transfer capitals in order to exploit them and therefore gain additional profits. Once an investor is aware of opportunities abroad, it will choose those places that offer the best combination of factors for its purpose. The various geographic and economic areas around the world offer different mixes of resources and factors of production. A location with comparative advantages will receive the inflow of capital from a determined investor who seeks for the opportunity offered. Thus, different motives allocate investments in different countries, depending on what the investor requires. To gain from the opportunities that arise in various locations, production may be established as a parental company with subsidiaries in different countries.

Competition between nations has arisen in order to attract FDI. Governments create policies oriented to offer opportunities of more effective production so that FDI inflows will be lured. Here effectiveness is implying less costly production. More flexible policies, less trade barriers, tax exemptions and lower taxes are some of the suitability factors offered by the recipient countries, in the competition to attract FDI. Such competition has been highly discussed because it may be harmful for some economies. Free trade and open economies are desirable for the flows of capitals, but governmental intervention and cooperation between nations may be necessary to reach a global welfare.

One of the costs that has to do with the operations of multinational enterprises (MNEs) -which are foreign direct investors- is the money to be paid to a foreign government, because of operating in its territory and therefore using its resources and infrastructure. This is paid through transferring a percentage of profits obtained by the MNE, and it is determined as corporate tax rate (Devereux et al, 2002).

Tax competition between countries occurs at a macro level, but it has implications for the firms in the micro level. From a microeconomic point of view, efficiency is implying the reduction in costs in order to gain more profits. Thus, if the costs incurred by a MNE are reduced, due to the decrease in the corporate tax rate that must be paid, then the net profits will be higher. Therefore, if the overall costs of production are less in a foreign location, rather than in the nation of the parental company, the MNE would be incurring an opportunity cost and should establish operations abroad. Undertaking production in the given foreign country will consequently increase the gains of the MNE.

Furthermore, consumers will benefit if the MNE decides to transfer to them, part of the additional benefits gained due to the reduction in costs of production, this thanks to the decrease in the corporate tax rate. The MNE could do so, if it manages to increase income by selling a greater amount than before, at lower prices. Something that would incentive consumers, e.g. in the case of standardised product groups, due to the price level is the principal factor influencing the preferences of the consumer in the choice of products (Johansson & Westin, 1994). However, the MNE can keep all the additional benefits just for itself if it does not reduce the sale price.
To give an insight of the paths followed by FDI flows we can exemplify with the case exposed below. Some decades ago the main destination for FDI inflows was Europe. Nowadays, FDI flows towards almost all the regions worldwide. Thus, the importance of the economies as FDI recipients is shared between different locations around the world. The size of the market together with both, political and economical stability, makes the European countries very attractive for foreign direct investments. However, it is also important for the firms to find the locations where production can be performed more cost-efficiently. Therefore, in some cases low costs of factors of production may be more relevant than the macroeconomic, social or political conditions within the recipient countries. The latter depends on the type of investment to be realized.

In an article titled “Europe needs a more FDI-friendly approach” Guimón and Álvarez wrote about a shortening of FDI occurring in the European Union. These authors say that the share of global FDI inflows in the EU has been falling recently. They think the states forming part of the EU manage the attraction of FDI in a way that should be reconsidered. The inflow of FDI towards the EU has dwindled by around 40 percent in the year 2008, but at the same time, flow has risen by about 17 percent into developing countries. The ravages of the economic crisis caused the flows of FDI to fly into developing economies, but also have caused the importance of the EU’s role to decrease. As an example of what have been happening, reports shows historic records of investment in developing countries, with a high 43 percent share of global FDI inflows. Aversely, the share of global FDI flows towards the EU was reduced from 40 percent in the year 2006 to 30 percent in 2008 (Guimón and Álvarez, 2010). The UK was the best ranked between only four states member of the EU that showed up in a prospectus of the UNCTAD for the short run, which reports the 15 most attractive countries for FDI in the period 2009 – 2011. This is something that should cause concern to EU policy makers (Guimón & Álvarez, 2010).

All the above makes interesting the understanding of what causes redistribution of foreign direct investments. An attractor of FDI inflows seems to be a low corporate tax rate. Research and empirical results are necessary in order to prove whether there is a relationship between FDI inflows and the corporate tax rate.

1.1 Background

Competition between nations arises in order to attract FDI. Some policies are designed to offer opportunities of more effective production and thus with the intention to raise FDI inflows. Here effectiveness is implying less costly production. Lower taxes to be paid are seemingly an incentive offered by the recipient countries in the competition to attract FDI. Tax competition has been highly discussed because it may be harmful for some economies.

Tax competition occurs at a macro level between countries and in the micro level it has implications for the firms seeking efficiency and therefore the reduction in costs. The costs for a MNE decrease if the corporate tax rate to be paid is lowered and this will make the firm’s profits higher. Having lower overall costs of production in a foreign location rather than in the nation of the parental company implies an opportunity cost for the MNE. This means that operations should be undertaken abroad. Producing in the given foreign country will as a consequence increase the gains of the MNE.

Since a lower corporate tax rate seems to be an attractor of FDI inflows, research and empirical results are needed to give support to the existence of the expected relationship between FDI inflows and the corporate tax rate.
1.2 Purpose
The purpose of this thesis is to find out whether the FDI inflows are influenced by the corporate tax rate imposed on the firms by the government in tax competitor countries, while controlling for other variables that explain FDI inflows. Thus the hypothesis is that the corporate tax rate significantly influences FDI inflows.

1.3 Delimitation
Data availability is the main limitation. None of the data sources include complete sets of data to be used straight away in the analysis. The results of the analysis in this thesis are consistent to a reasonable degree, by considering certain assumptions allowing for the construction of the model. This paper analyses a small set of 10 characteristic OECD member countries. Regressions were ran taking into account a larger set of 20 countries with available data out of those in the whole OECD group, however the expected negative relationship between the variables FDI inflows and corporate tax rate was not found in this larger group.

Since the main discussion around the relationship between FDI inflows and the corporate tax rate is about tax competition, a selection of 10 “tax competitor countries” is made. These 10 countries are the ones meeting the criteria to be a “tax competitor”. The criteria are established in this paper and the details can be found in section 3.1. Tax competition arises due to the desirability of increasing FDI inflows. Therefore, including countries which do not participate in tax competition is likely to reduce the chances of finding a significant negative relationship between FDI inflows and the corporate tax rate. Moreover, applying the analysis to only the tax competitors is considered in this paper as a valid delimitation of the purpose.

The thesis has assumptions on each of the variables included in the model: Therefore, this paper does not yield empirical results useful for interpretations that cannot hold those assumptions. The assumptions are listed in section 3.3.1. Further analyses outside the framework formed by all the above criteria, are out of the purpose of this thesis and therefore are suggested for future studies.

1.4 Method
To address the objective, research on economic theory and previous studies is made in order to find which variables are the most likely to explain FDI inflows, since the corporate tax rate is not the only factor affecting FDI inflows in a country. The findings on that research are later applied in the construction of a model to be empirically studied. This, by analysing descriptive statistics of the variables that were included, getting an insight of what has been occurring between FDI inflows and its explanatory variables, and more precisely between FDI inflows and the corporate tax rate. The empirical analysis is applied to a set of OECD countries selected in this paper as tax competitors. Two exemplary tax competitor countries, Ireland and Slovakia, are analysed in detail. To conclude the empirical analysis, a regression is run in the model constructed, to verify if the independent variables are in fact related to FDI inflows. The results of the regression are to be used to back or reject the existence of a relationship between FDI inflows and the explanatory variable of main focus, the corporate tax rate.

1.5 Outline
The paper has the following organization. Section two includes the theoretical framework on FDI and corporate tax rate, and presents the model to be analysed in the empirical framework. Section three presents the data analysis including the regression output. In section four, the regression results are
analysed. Finally, section five gives the conclusions of the analysis and presents suggestions for future studies.

1.6 Earlier studies
The gathering of information from earlier studies is done to see what have been found and concluded in other papers focused in the same topic as this thesis. The purpose of this is to support the research and construction of the model to be analysed in the empirical section. The model will include other variables, but the level of corporate tax rate as an explanatory variable of FDI inflows is the main target of analysis. Below, the empirical results of various earlier studies are reported.

In his work, Brandmeier (2006) found that taxes have an important influence on FDI. Other explanatory factors are also taken into account in his regression analysis, about determinants of German investments in recently added members of the EU. As proves for his statements, Brandmeier relates the lowered tax rates in countries like Austria due to the tax competition posed by the low rates in countries like Slovakia. This competition gives a light on how the deliberate drop in corporate tax rates levels may influence FDI inflows. Brandmeier mentions the following results, from other studies that show differences in their findings, about how FDI and taxes are related.

DeMooij & Ederveen (2003) calculated the median tax rate elasticity for FDI as about -3.3. The analysis of Bellak and Leibrecht (2005) suggests a median tax rate elasticity of -0.22 which would imply a low effect of taxes on FDI. Bellak and Leibrecht found that decreasing the logarithmic efficient average tax rate would increase the FDI/GDP ratio by 0.0033 percentage points, in a study that includes a panel data set on the bilateral effective tax rates in seven investor countries and five recipient countries during 1996 and 2002. The resulting tax rate elasticity was of 2.93. Brandmeier compares those results to the ones of his analysis, explaining that a reduction of 1 per cent in the efficient average tax rate will increase the FDI stock / GDP ratio in 0.00278 percentage points. The conclusion of Brandmeier is that German investors do care, about the tax rates in other European countries with lower costs of production, at the time of investing. Moreover, the relevance of the changes in the variable “taxes” is important between all the other independent variables or determinants of FDI in his model of study (Brandmeier, 2006).

In other study from Buettner and Ruf (2007) it was found that the statutory tax rate, labour cost and market size, are decisive when choosing where to invest, for German multinationals. The analysis is made using a firm-level panel data set. They concluded that an increase of 10 percent in the statutory tax rate will reduce the probability, of an investment to be in fact executed, by about 25 percent. Between the different influential factors on FDI location decisions, the tests indicate that statutory tax rate is the one that affects the most and that the marginal effective tax rate is not influential. They suggest that a country which wants to attract FDI must focus its efforts in offering efficient statutory tax rate and labour costs (Buettner and Ruf, 2007).

Görg et al (2007) concluded that MNEs take into account the corporate income tax rates in the countries candidates to invest in. As long as the money paid on those taxes is invested by the governments to enhance the efficiency on production processes, foreign investors choose those locations even if the corporate income taxes are quite high, but if they are also able to prove that the taxes are being directed properly and producing general improvements in the recipient countries, something which facilitates the overall conditions for production (Görg et al. 2007).

Ghinamo et al (2009) found that economic volatility would tend to increase corporate tax rates, in a study using a data set of various countries during the period 1983-2003. This increment on corporate taxes may lead to a decrease in FDI inflows, if the receptor country does not offers good infrastructure and other indicators taken into account for the foreign investors. If a firm does not see an equivalent fair relation between the level of taxes to be paid and the investment in the environment
for business activity made by the government, investing in that country may not worth it (Ghinamo et al. 2009).

When talking about how tax competition affects the production and its location within a country and between countries -meaning by tax competition as the strategies that governments implement in order to attract foreign direct investment- Mutti (2003) came to the conclusion that being able to reduce the cost of capital by 1 percent, will in turn increment by 3 percent the operations of multinational corporations, in open economies within the export-oriented sector. The mentioned above prompt then, to a rise of substantial economic growth.

Mutti mentions how there is an interesting focus, within the controversy about tax competition, which considers the reduction in taxes on the rich population, due to the tricks that can be used to avoid the payment of taxes by taking advantage of policies aimed to attract FDI. This thanks to the greater mobility that have the resources of the wealthy. Thus, the distribution of income is affected. The situation may be controlled by a central government if it occurs within regions in a country, but internationally, there is no central government to manage reparation. In the other hand, Mutti also mentions that tax competition works as a tool that counters the intention of an inefficient and exacerbated public sector trying to expand its coffers (Mutti, 2003).

When imposing a source-based tax which means a tax on the capital used to produce, the output is reduced if the investors shift their capital to more convenient locations with obviously more favourable conditions reflected by a cheaper way of production. This, if all other factors affecting production remain the same, i.e. if the new location, provides the same facilities to generate earnings and in addition supposes a less costly option, due to the lower tax on the source of income. All the above is explained following Mutti statements, which emphasize how economists predict a source-based tax equals to zero, having available international mobility of capital, in a world with many small jurisdictions deciding their own tax rates. Mutti refers the tendency of some governments, to gradually remove taxes on mobile capital, induced by the elimination of barriers for international investment that has occurred over the last two decades (Mutti, 2003).

However, according to Mutti it is possible to keep a high statutory corporate income tax rate, amount that is imposed to income derived from operations already established in a country, and at the same time, to ask a low effective rate of taxation for initiatives of expanding production along the same country (Mutti, 2003).

The different taxes that play a significant role, at the time of deciding where and how to allocate production, have different weights in the final choice of investors. Thus, while property taxes have a lower burden of about 5 percent out of the total taxes imposed, Social Security payroll and Value-added taxes suppose larger amounts to be paid, in comparison to the corporate income taxes, in the participation to finance public expenditures. The previous data, accounts for the countries belonging to the OECD and is presented by Mutti. This information allows seeing the importance of the different items in the tax burden and what it reflects about the workers, who have fewer ways to evade taxes, in contrast to capitalists, who are able to relocate in other countries. The average of 5 percent of all taxes represented by aggregate property tax, in part falls on land, which is immobile and therefore this gravamen cannot be easily avoided, differently from a tax on mobile capital (Mutti, 2003).

As explained by the OECD (2001), the most important role of a tax system is to raise revenue, taking into account that there are other policy objectives for which taxes are collected. Redistributing wealth is an important task conducted by the tax systems, carried mainly through income taxation. A tax system is supposed to be designed to work neutrally. Nevertheless, it may be adjusted according to the specific needs of a country and its policy makers, to perform resource allocation. A variety of arguments support the mentioned target of a tax policy, to fairly redistribute income. Especially talking about the international context of investments, in which many market failures can be observed including concerns about the different levels of competitiveness between countries (OECD, 2001).
2 Theory

To be able to empirically analyse a seeming relationship between FDI inflows and the corporate tax rate, theoretical research is made first in order to understand what FDI inflows imply in a country, and what are the factors explaining FDI inflows that should be included in the regression model, together with the corporate tax rate, as explanatory variables.

2.1 FDI

The following description of Foreign Direct Investment is done by the UNCTAD which takes into account the definitions established in the Balance of Payments Manual from the IMF and the Detailed Benchmark Definition of FDI from the OECD (UNCTAD, 2002).

Investments catalogued as FDI are those destined to obtain lasting interest in enterprises located in a nation different from that of the investor. The investor can be a person, company, or groups of them, and it is denominated a foreign investor if its purpose is to participate in the decisions making of the foreign enterprise. To be able to participate in the management of the foreign enterprise and therefore be counted as a foreign direct investor, at least 10 per cent of equity must be acquired by the investor. The foreign enterprise can be incorporated or unincorporated, meaning a subsidiary or a branch, respectively, and is called a direct investment enterprise (IMF, 1993).

In the Balance of Payments Manual, the principal characteristic of FDI is the lasting interest, meaning investments in business operations lasting at least years. Investments listed as FDI are: equity capital, reinvestments of earnings and also loans between parent and affiliate enterprises (IMF, 1993).

The Detailed Benchmark Definition establishes the main characteristic of FDI as the intention of the investor to obtain part of the control in the enterprise. This power of control is gained when owning at least a 10 percent of the ordinary shares or voting power of the enterprise. The 10 per cent is a benchmark valid unless another one is stated (OECD, 1996).

2.1.1 Benefits of FDI

Since productivity and returns to capital are different between countries, some countries attract more FDI than others. There are also distinct motivations to undertake direct investments abroad. Therefore, some countries receive more capital destined to a certain sector of production and other countries receive more capital in other sectors. The due distinction and explanation of FDI determinants is done further on in this paper.

Among others, direct investments in foreign countries are undertaken looking forward to more efficient ways of production. Being able to produce more efficiently favours the MNEs, but might also increase the welfare of the consumers if the producer has motives to share the gains from increased productivity. The latter happens if increased productivity leads to lower sale prices, so that consumers experience an increase in purchasing power, ceteris paribus.

There are beneficial effects from FDI inflows in a country, such as the spillover of technology and knowledge, useful to be adopted in order to implement more efficient ways of production (Johanson et al, 2005). When foreign direct investors establish operations abroad, the knowledge and technology used in their methods of production can be learned and implemented by the local producers in the host country (Mansfield & Romeo, 1980). Also, the labour force can develop new skills. The transferred knowledge and technology can be applied and diversified in many sectors of the national industry (Krugman, 1979).
The units of production established by foreign direct investors would increase the demand for local factors of production, something that may help reducing unemployment but also increasing income from the sales of natural resources and others. However, cases of exploitation of the workforce and inadequate use of natural resources must not happen, in order to obtain an optimum welfare.

Foreign direct investors can be the generators of capital flows supposing the fulfilment of the local lack in this factor of production. Some countries need more capital than what can be currently obtained within its borders. Capital is necessary to invest in production and thus generate progress. Therefore, it is important to understand what is influencing FDI inflows and policy makers should be aware of this in order to do a good management of FDI promoting issues, so that the capital that is required to increase local economic growth is obtained from foreign investors. The latter is to be done in order to compensate for the lack of capital from national investors.

The current amount of FDI inflows that a country receives may not be an optimum one. An inefficient management of resources can also occur. In these cases, governmental intervention should be considered and intervene if necessary (Blalock & Gertler, 2007). In the cases of inefficient redistribution of capital, intervention is contemplated as necessary to obtain a global optimum of capital allocation and therefore general welfare (OECD, 2001).

2.2 Corporate tax rate

The government of a country requires the payment of a percentage from the profits generated by a firm, in order to let the latter operate within its territorial jurisdiction. As mentioned by Block, “The US Congress imposes a direct tax on both personal and corporate incomes. Corporate profits are subject to a corporate level tax under the law of the International Revenue Code” (Block, 2004).

The features of the corporate tax base differ from country to country and are of considerable complexity everywhere. According to Devereux et al, “The corporate tax base is determined according to a huge set of laws that takes into consideration everything, including: allowances for capital expenditure, deductibility of contributions to pension reserves, the extent to which expenses can be deducted, the valuation of assets, and so on” (Devereux et al, 2002).

Due to the complexity in the determination of corporate tax rates, a definition of basic combined central and sub-central (statutory) corporate income tax rate, is used in the analysis of this paper. The adjective ‘basic’ means non-targeted. Here, targeting is implying the classification of certain income, in order to impose a different tax rate. The targeting depends mainly on the size of the enterprise, so the classification is done e.g. taking into account the turnover of the enterprise. The targeting, generally deals with small business, meaning that special rates apply to small enterprises, which is typically not the case of FDI where considerable investments and volume of production are undertaken (OECD Tax Database, 2010).

The above definition of basic corporate tax rate is taken from the OECD, and has the following structure:
Table 1: Corporate tax rate structure

1. This rate is the combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government statutory corporate income tax rate plus the sub-central statutory corporate income tax rate

2. The adjusted central government statutory corporate income tax rate is the net rate, including the deduction that the central government provides (if applicable) when a sub-central statutory corporate income tax rate is levied

3. The sub-central statutory corporate income tax rate includes state/regional and local corporate income taxes imposed in addition to the central statutory corporate income tax rate

4. In the cases where a progressive (as opposed to flat) rate structure applies, the top marginal rate is shown

5. The rates are inclusive of surtaxes

Taken from: OECD Tax Database (2010)

This detailed explanation on the structure of the basic corporate tax rate is done since this is the Corporate Tax Rate to which the author refers through the paper, something important to take into account, especially in the empirical analysis. The above explained basic combined central and sub-central (statutory) corporate income tax rate is the one to be used in the empirical analysis of this thesis.

2.2.1 Tax competition

During the last decades it has been highly discussed how the level of corporate tax rate may influence foreign direct investment into a country. Some countries try using the reduction of the corporate tax rate as a method to attract more FDI inflows. This practice has opened the way for tax competition which is criticized and mentioned as a factor that harms other countries, particularly those with traditionally good levels of FDI inflows. The countries starting the tax competition force others to considerably alter their tax systems and so decreasing tax revenues. Then, some countries wishing more inflows of FDI start decreasing the corporate tax rate, procedure that forces other countries to also decrease their corporate tax rate in order to be competitive and do not loose FDI inflows, due to, a reduced corporate tax rate implies a reduction in costs for producers, which is profitable for the multinational enterprises interested in offshore investments.

According to the publication Harmful Tax Practices from the OECD, “Competitive forces have encouraged countries to make their tax systems more attractive to investors. However, some tax practices are anti-competitive and undermine fair competition and public confidence in tax systems”. The document also mentions the role that the OECD claims in the matter of tax competition: “The OECD seeks to encourage an environment in which fair competition can take place. In the tax area this means promoting principles that enable each country to apply its own tax laws without interference of practices that undermine the fairness and integrity of each country’s tax system. The OECD does not seek to dictate to any country what its tax rate should be, or how its tax system should be structured. Instead, it works to build support for fair competition so as to minimise tax induced distortions and to increase taxpayer confidence in the even handed application of tax rules” (OECD, 2011).
In the EU, the Council of Economics and Finance Ministers (ECOFIN) aims to engage in the development and embracement of measures to promote fair competition. The code of conduct on Harmful tax competition, from the European Commission, states that the countries which adopt the code are agreeing to roll back any tax policy meaning harmful tax competition, and also abstain from incurring in applying the harmful policies. The Finance Ministers of the EU member states have set “the criteria for identifying potentially harmful measures” (EU Commission, 2010). These criteria are:

Table 2: Criteria for identifying potentially harmful measures

<table>
<thead>
<tr>
<th>Criteria for identifying potentially harmful measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>- An effective level of taxation which is significantly lower than the general level of taxation in the country concerned.</td>
</tr>
<tr>
<td>- Tax benefits reserved for non-residents.</td>
</tr>
<tr>
<td>- Tax incentives for activities which are isolated from the domestic economy and therefore have no impact on the national tax base.</td>
</tr>
<tr>
<td>- Granting of tax advantages even in the absence of any real economic activity.</td>
</tr>
<tr>
<td>- The basis of profit determination for companies in a multinational group departs from internationally accepted rules, in particular those approved by the OECD.</td>
</tr>
<tr>
<td>- Lack of transparency.</td>
</tr>
</tbody>
</table>

Taken from: EU Commission (2010)

This paper will empirically analyze data from European countries listed by the OECD, thus the occurrence of tax competition in Europe is revised. According to the Center for Tax competition, “there is currently present: massive budget deficits, government debt and financing gaps in welfare programs, in the European states”. They also argue that tax competition makes it difficult to establish more taxes and therefore increases the interest of some countries in the setting up of a centralization and standardization of personal and corporate taxation, which is referred to as harmonization (CTC, 2010).

2.3 FDI Determinants

The explanation of the factors that may determine FDI inflows is necessary for the empirical analysis, but it is important to also understand the effects that FDI inflows cause. The potential increase in welfare within the recipient country, such as the technology spillovers, is related to reasons for which the projects of investment in foreign locations are undertaken.

A particular factor that may influence decisions of direct investments abroad is the ownership conditions. Some authors explain ownership advantages, as something that determines FDI inflows in a country (Dunning, 1980). This applies when a foreign location offers resources of safeness for property rights, and if the company has some kind of competitive advantage over rivals in its own country. The competitive advantage implies a technological superiority, intrinsically expressed within the ownership advantages (Driffield & Love, 2007).
Apart from the particular factor mentioned above, all the other motivations to launch operations abroad can be generalized within three categories. To differentiate between the motivations that the MNEs may have when thinking about investing in foreign countries, a classification of foreign direct investments is made according to the rationale of operations established abroad. The classification is as follows:

Table 3: The rationale of FDI

<table>
<thead>
<tr>
<th>Rationale of FDI</th>
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<tbody>
<tr>
<td>- Market seeking FDI: are investments undertaken with the purpose of supplying markets in other countries. It is also called demand oriented FDI.</td>
</tr>
<tr>
<td>- Resource seeking FDI: are investments made with the purpose of exploiting natural resources available in foreign locations. It is also referred to as supply oriented FDI.</td>
</tr>
<tr>
<td>- Efficiency seeking FDI: are investments oriented to improve the division of labour or the specialization of portfolios of assets.</td>
</tr>
</tbody>
</table>

Taken from: Dunning (2000)

2.3.1 Main determinants of FDI inflows

Following a selection of main determinants of FDI from the Directorate for Financial, Fiscal and Enterprise Affairs of the OECD, in this section a classification of the most important determinants of FDI inflows is made below. Not all the determinants briefly described below are to be included in the regression model that will be analysed in the empirical framework. The purpose of explaining the globally main determinants is to be aware of all the factors that may account for the explanation of FDI inflows, apart from those included in the model proposed in this thesis. The restrictions in the regression model are due to the existing limitations, including the scarce availability of data.

2.3.1.1 Size and growth of the economy

Selling goods and services in a foreign market by establishing operations in there, is the target of market-oriented FDI. This type of FDI is also realized when the objective is to exploit new markets. However, a common reason for which market-oriented FDI is undertaken is to avoid tariff barriers. The size and growth of the economy together with the level of development in the recipient country, count as decisive characteristics taken into account by market-oriented FDI. Host countries with a more developed economy, higher economic growth and a greater market size, are more likely to attract market-oriented FDI because they may offer more and better opportunities. Moreover, the market size of the recipient countries is taken into account by export-oriented FDI since larger economies can offer larger economies of scale and spill-over effects (OECD, 2000).

2.3.1.2 Resource endowments

Possessing greater but at the same time of good quality labour force and natural resources, gives an advantage to attract FDI. Regarding the labour force, the degree of development in recipient countries, accounts as an enhancer since it is very likely to reflect the level of education of the labour force and also the level of entrepreneurship (Dzansi, 2005). If the investment is intended merely to cut costs, low labour costs are decisive.

It is important to take into account that export-oriented FDI, looks for cheaper ways of production in foreign economies, in order to later send the product back to the home country, or to third countries. Thus, the most important location factors for export-oriented FDI are low cost factors of production (OECD, 2000).
2.3.1.3 Physical and technological infrastructure
More and better highways, railways and interior transport waterways, stimulate FDI inflows. Also, a better endowment of telecommunication systems permits a better and possibly cheaper communication and information gathering. Therefore, production will be carried on more easily and efficiently. Investments in technology are important. The better the infrastructure the higher will be the incentive to invest in the country (OECD, 2000).

2.3.1.4 Openness to international trade and access to international markets
MNEs will find more convenient to establish operations in countries that offer preferential tax policies and openness to international trade e.g. undertaking bilateral trade agreements, reducing tariff barriers, offering duty exemptions, providing accessibility to international markets and everything aimed to facilitate international business.
Strategic geographic location provides accessibility to other markets. A large territory may also be important (OECD, 2000).

2.3.1.5 Investment protection and promotion
It is important for foreign investors to prevent cases of expropriation. Investments must be protected (Dzansi et al, 2010). Business partners should be allowed to find own solutions to their conflicts, but in case it is not possible, the legal rights of the parties involved in contracts must be enforced.
Investment promotion encourages FDI inflows. This can be done by: giving tax incentives; offering free ports and bonded zones; offering reductions in natural and local income taxes; offering reductions in land fees; offering reductions in import and export duties; encouraging reinvestment of profits; and opening new investment sectors (OECD, 2000).

2.3.1.6 Regulatory framework and its coordination with the market
A country should make efforts in enforcing a transparent legal framework and environment for business e.g. improving laws and regulations. The legal system should be friendly to FDI inflows e.g. relaxing restricted investment. The legal system must enable an efficient performance of the market.
Policies promoting economic growth generate good expectations on economic performance (OECD, 2000).

2.4 The model
In the empirical analysis of this thesis, the factors that are influencing the choice of variables included in the regression model are the availability of data and the incidence of variables included in the models of previous studies. Furthermore, adjusting the regression model, to include only some of the factors described above as main determinants of FDI, is considered in this paper as a part of the delimitation of the purpose.

The proposition of this thesis is to find out whether the level of corporate tax rate influences the flows of FDI into a country. The main discussion about this topic is centred in the policies that some governments adopt in order to attract FDI. There is a sound criticism towards those policies given that other countries traditionally preferred by MNEs, have been affected seeing how MNEs decide to relocate operations, in countries with especially low corporate tax rates. The latter countries are also mentioned in this paper as tax competitor countries.
In order to support the hypothesis which establishes a relationship between FDI inflows and the corporate tax rate, an econometric model will be analysed. If there is a relationship between FDI inflows and the corporate tax rate, it is expected to be negative, so that the sign of the coefficient explaining the relationship between those variables is expected to be negative.
Corporate tax rate refers to the percentage of the profits, that a firm is obliged to pay to the government of the country in which it is operating. The equation (1) below was designed to analyse an
econometric model including other explanatory variables that, together with the corporate tax rate and supported by the theory and previous studies, have shown to be the most influential factors when explaining the inflows of FDI in a country (represented in the equation by $FDI$).

Those factors that accompany the corporate tax rate ($TAX$) in explaining FDI inflows are: GDP, population size ($POP$) and the level of infrastructure ($INF$). GDP is included since it is assumed to be a global indicator of how an economy is performing. Population size is included because it gives an insight of labour force availability. The level of infrastructure is included because it shows the facilities the MNEs can use while operating in the country. In the analysis of this thesis the variable Infrastructure is referred to the road network of a country, representing transportation facilities. Thus, in the equation below $INF$ is the name for the variable embodying the total length of all roads in country $i$ at time $j$. The sub-indexes in each variable are: $i$, indicating the country for which the observation is reported, and $j$ showing the year for which the observation is reported. The econometric equation (1) analysed in the empirical section is:

$$FDI_{ij} = \beta_0 + \beta_1 GDP_{ij} + \beta_2 POP_{ij} + \beta_3 INF_{ij} + \beta_4 TAX_{ij} + u$$

The main focus of analysis, the dependent variable FDI inflows and the independent variable corporate tax rate, have been explained in detail already. Below are listed the motives of why the remaining explanatory variables are included in the regression equation (1).

### 2.4.1 GDP

The gross domestic product of a country (GDP) was included in the right hand side of the regression equation, since it is very likely to be related to the amount of inflows of FDI in a country. The model assumes that the GDP is in fact a global and reliable indicator of how the economy is performing, something that foreign direct investors surely take into account.

### 2.4.2 Infrastructure

The level of infrastructure was included as an independent variable in the econometric equation, since it is believed it shows the facilities that the MNEs can use when operating in the country. Therefore, MNEs interested in establishing operations abroad, will be more attracted by a country with a higher level of infrastructure than others, all else equal. In the analysis of this thesis, the variable Infrastructure is referred to the road network of a country, representing transportation facilities. Thus, in the regression equation Infrastructure is embodying the total length of all roads in a country. During the collection of data, the total length of all roads was the most reliable indicator found, to represent the level of infrastructure. Therefore it was chosen out of those indicators with enough data reported.

### 2.4.3 Population size

It is important to include the variable population size since the labour market condition may determine FDI flows. However, it is clarified that the assumption of population size being equal to the labour force is taken into account in order to make a feasible analysis, due to the complexity to which an analysis in this topic may suppose. Moreover, labour market condition is referred to the number of labourers only. This analysis does not take into account labour costs or efficiency of labourers. These are assumed to be constant over time and between countries. All this is part of the analysis delimitation in the paper.
3 Empirical framework

Before starting with this section it is important to clarify that for the group of OECD member countries with data availability for the purpose of this thesis, regressions were run on the model in different ways and even controlling for years, countries and both with dummies. None of the tries yielded results indicating a significantly negative relationship between FDI inflows and the corporate tax rate within this large group of 20 countries. Consequently, it was decided to tackle the search for a relationship congruent to what is expected which is a negative relation between FDI inflows and corporate tax rate. This by analysing a smaller group of 10 countries that are denominated in this paper as tax competitors, since all the other regression analysis carried on in the large group did not cast results supporting a negative relationship between the variables. It is then expected that by using the sample of tax competitor countries, a negative relationship will be more likely to appear. If the latter is not considered, then a negative relationship between FDI inflows and the corporate tax rate cannot be supported by the analysis of this thesis. The regression outputs for the large group are shown in the appendix.

The negative relationship suggested up to this point, by the theoretical research and previous studies, about the incidence of the corporate tax rate level on FDI inflows in a country, will be tried to be exemplified in a graphical analysis and confirmed by a regression analysis. Most of the empirical analysis in the previous studies consulted found that FDI inflows in a certain country are likely to rise when the corporate tax rate is reduced. In this empirical section the purpose is to confirm that in fact a significant negative relationship can be found between FDI inflows and the corporate tax rate.

The author believes that FDI inflows are negatively related to the corporate tax rate, given certain assumptions and in countries of certain characteristics. The research made in the theoretical framework of this paper, has yielded results that motivate to believe that those characteristic countries, attracting FDI inflows by reducing the corporate tax rate, are countries that used to have high corporate tax rates and low FDI inflows. Furthermore, these countries are not historically the most important industrialized economies (even if wealthy in some cases), e.g. Ireland and Slovakia.

Therefore, and after the exclusion of some countries with very scarce data reported, the criteria to select the countries analyzed in the regression analysis, is to include only those that have significantly decreased their corporate tax rate levels, during the period 1993-2008, down to a maximum rate. The countries that considerably decreased the rate, down to a point established in this thesis as the maximum for the corporate tax rate to be considered low, are called in this paper as “tax competitors”. The data is described in brief in the following section.

The period is chosen after reviewing the data available (from the countries reported by the OECD) and finding out that it is the most actual period, with an extension back in time as long as the availability of data makes it possible. Data scarcity makes it only possible to go back from the year 2008 until 1993. The data analyzed is from the countries reported by the OECD since it is the entity that contains the most complete database for the purpose of this thesis.

3.1 Data
The data set used in this empirical framework has the characteristics described as follows. The number of observations taken into account for the regression analysis is 160. The observations come from 10 countries during a period of 16 years, therefore the total number of observations which is equal to \( n \times m \); \( n \) being the number of countries and \( m \) the number of years. The period analysed is from 1993 to 2008.

The research conducted in the theoretical framework reflects that the main discussion, around the relationship between FDI inflows and the corporate tax rate, is about tax competition. Because of
this, the countries included in the data set used to run the regression, are those selected in this paper as “tax competitor countries”. The latter definition applies to the countries that have significantly decreased their corporate tax rate during the period 1993-2008 and at the same time had a corporate tax rate of maximum 25% by year 2008. A significant decrease in the corporate tax rate is assumed to be a net reduction of at least 5% from 1993 to 2008. The following are the explanations to how these criteria are adopted.

From the OECD countries with sufficient data reported, most of the observations correspond to corporate tax rates between 35% and 15%, during the period 1993-2008. The average of 35% and 15% is 25%. Furthermore, in 2008 which is the last year of the period taken into account, the highest corporate tax rate was 39.5% and the lowest was 12.5%, thus their average is 26%. Therefore, in this paper, 25% is the point from which the corporate tax rate is assumed to be low. Countries with corporate tax rates equal to or lower than 25%, are denominated as countries with a low corporate tax rate or countries with a competitive corporate tax rate.

The countries that in year 2008 had a corporate tax rate of maximum 25% are: Austria, Czech Republic, Denmark, Greece, Iceland, Ireland, Poland, Slovakia, Switzerland and Turkey. From these countries, the one that had the smallest total reduction in its corporate tax rate from 1993 to 2008 was Austria. The corporate tax rate in Austria was 30% in year 1993 and 25% in year 2008. In 1993, the highest corporate tax rates from the 10 countries above mentioned, were 45% in Czech Republic, 45% in Slovakia, 40% in Ireland and 40% in Poland. By the last year of the period (2008), the corporate tax rates were of 21% in Czech Republic, 19% in Slovakia, 19% in Poland and 12.5% in Ireland. Thus, the 10 countries mentioned above are characterised by having a maximum corporate tax rate of 25% in year 2008, and this rate has been reduced by at least 5% since 1993. Therefore these 10 countries are referred to as “tax competitor countries”, this denomination and its assumptions hold throughout this paper.

To support the above assumption and be able to rely in consistency, the conclusion from the criteria adopted to select the tax competitor countries, is backed by a statement from the Swedish government agency Invest Sweden, which is managed by the Ministry for Foreign Affairs. Invest Sweden mentions that “Corporate income tax in Sweden is low by international standards at 26.3 percent” in a publication in January 2011 about why is it worth investing in the country (InvestSweden, 2011). Nevertheless, note that the corporate tax rate (referring to the same as the corporate income tax) in Sweden was always between 57.8 and 28 percent during the period 1993-2008, and therefore no very competitive as the one reported by January 2011. The benchmark of 25% established in the thesis, is lower and considerably different than international standards at 26.3%.

Table 4: Descriptive statistics

<table>
<thead>
<tr>
<th>Count: 320</th>
<th>FDI</th>
<th>Corporate tax rate</th>
<th>GDP</th>
<th>Population</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>16275.25</td>
<td>33.37</td>
<td>715235.77</td>
<td>32989.22</td>
<td>242.93</td>
</tr>
<tr>
<td><strong>Std. Error</strong></td>
<td>1572.51</td>
<td>0.47</td>
<td>60809.74</td>
<td>2030.12</td>
<td>17.03</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>6635.59</td>
<td>34</td>
<td>256361.23</td>
<td>10619.37</td>
<td>101.46</td>
</tr>
<tr>
<td><strong>Std. Deviation</strong></td>
<td>28130.01</td>
<td>8.49</td>
<td>1087797.8</td>
<td>36316.01</td>
<td>304.77</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>791297752</td>
<td>72.18</td>
<td>1.18E+12</td>
<td>1318852574</td>
<td>92888.34</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>227425.36</td>
<td>47.5</td>
<td>5241483.7</td>
<td>127188.52</td>
<td>1202.98</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>-29148.85</td>
<td>12.5</td>
<td>6126.46</td>
<td>262.39</td>
<td>6</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>198276.51</td>
<td>60</td>
<td>5247610.1</td>
<td>127450.91</td>
<td>1208.98</td>
</tr>
</tbody>
</table>
The data of the variables FDI inflows, GDP and Population size comes from the UNCTAD (UnctadStat, 2011). The data from the variables Infrastructure and Corporate tax rate comes from the OECD (OECD, 2011). FDI inflows are the total inward flows of foreign direct investment in a country, expressed in millions of dollars. GDP is the total gross domestic product in a country, expressed in millions of dollars. Population size is the total population of a country, expressed in thousands of inhabitants. Infrastructure is the total length of all roads in a country, expressed in thousands of kilometres. Corporate tax rate is the combined central and sub-central (statutory) corporate income tax rate, which explanation is given above in Table 1. The descriptive statistics of the variables can be seen above in Table 4.

3.2 Graphical data analysis
A graphical analysis is made with data from two exemplary tax competitor countries, Ireland and Slovakia. Below it is shown how those countries have apparently managed to increase FDI inflows by reducing their levels of corporate tax rate. This graphical analysis is an indication of something going on between the corporate tax rate and FDI inflows. Nevertheless, a regression analysis is applied further on in the paper, in order to give empirical support to the hypothesis that in fact FDI inflows and the corporate tax rate have the suspected relationship.

3.2.1 A clear example of a tax competitor country: Ireland
The case of Ireland is one of the most controversial when talking about tax competition, the country has been very criticized due to the way it has allegedly attracted FDI inflows through the reduction in the corporate tax rate. Irish policy makers argue that they cannot stop using a tool that has greatly benefitted their economy. During almost the last two decades Ireland has experienced a persistent decrease in the corporate tax rate at the same time than an increase in FDI inflows. Nevertheless, the situation changed from the preceding years to the economic crisis around 2008.

In Graph 1 below it is possible to see how, around the time of the international financial crisis, a high level of FDI inflows went suddenly down to levels very close to zero and with values even negative. Those negative values make the FDI line to drop down to the bottom of the scale. The vertical axis is established in a logarithmic scale in order to make it possible to compare the movements of each of the variables to be included in the regression equation. This setting of the axis, due to the set of values from a variable such a FDI contains very high values, and another variable such as the corporate tax rate contains a set of very low values. The negative values in FDI inflows represent cases of divestment, which means that the amount of foreign capitals in the form of FDI moving away from the country, were larger than those coming into the country. The period of divestment around 2004-2006 is placed at the bottom of Graph 1. It is important noting the negative values since this situation of divestment in Ireland occurred after a long period of persistent high investment. Divestment occurred in the previous years to the international financial crisis, then the inflows of FDI in Ireland went back to a high level during 2007 just before they fell drastically again, reaching divestment in 2008.
The infrastructure (road network) in Ireland has been in an almost constant growth during the period 1993-2008. There was 243 thousand kilometres of roads in year 1994, the lowest point registered, and the road network increased up to a maximum of 1495 thousand km in 2006. GDP has also had a persistent growth, from about USD 50900 millions in 1993, to USD 272000 millions in 2008. An important share of this great increase in income was surely motivated by the heavy load of foreign investment that landed in Ireland during the last two decades. The population of Ireland has risen from 3.5 million people in 1993 to 4.4 million in the year 2008, with no drastic changes during the whole period.

Graph 1 above gives a global perspective of the situation in Ireland, when observing the paths of all the variables to be included in the regression model. Narrowing the focus to the purpose of this thesis, only the variables FDI inflows and corporate tax rate are pictured together in Graph 2 below. The thin (red) bars are representing the corporate tax rate in Ireland. Here is clearly seen how the rate has significantly decreased from 40% in 1993 to 12.5% in 2008. The opposite has occurred with the inflows of FDI in Ireland, the thick (blue) bars in Graph 2. FDI has increased very significantly during the 90s and then kept a good average until 2003. The peak of FDI inflows was on 2002 with about USD 29000 millions. In the previous years to the financial crisis around 2008 the inflows of FDI worsen extremely except for year 2007.
Graph 2: Ireland, FDI inflows vs. corporate tax rate

In Graph 1, the fluctuations of each of the variables are being observed together, which makes it convenient to set the vertical axis in a logarithmic scale, as mentioned before, so that it is possible to compare the fluctuations of all the variables at the same time. Thus, the cases of negative FDI inflows cannot be represented and therefore they are not observed in Graphs 1 & 2 above. Nevertheless, if an illustration with cases of divestment is of particular interest for the reader, this can be observed further on in Graph 7 in the Appendix, which shows the FDI flows into Ireland and Denmark.

3.2.2 An East European tax competitor: Slovakia
The case of Slovakia has been similar to the one of Ireland, a considerable and constant reduction in the corporate tax rate, along with a substantial increase in FDI inflows. Slovakia has decreased its corporate tax rate from 45% in year 1993 to 19% in 2008. On average, the inflows of FDI in Slovakia have experienced a strong growth. During the period 1993 – 2008, FDI inflows in Slovakia had the lowest level in 1993 with less than 180 million dollars and reached a maximum recorded of about 4700 million dollars in 2006.
However, looking at Graphs 3 & 4 it is possible to see how Slovakia did not suffer severely during the previous years to the 2008 financial crisis, a different situation to the one of Ireland which is, by the way, an economy somehow more wealthy. Graph 4 below shows how, in general, the curves of FDI inflows and corporate tax rate open out as the time passes. The corporate tax rate goes downwards while FDI inflows follow an upward trajectory. It is also noticeable that the curves of infrastructure and GDP reflect a persistent growth for the period 1993 – 2008 in Slovakia. Infrastructure arose from 56 thousand kilometres of road network in 1993, to 730 km in 2008, quite an accelerated increase in infrastructure. GDP was USD 13500 millions in 1993 and by 2008 had risen to USD 95000 millions.
Apart from the other variables, the population of Slovakia did not have any considerable variation during the period from 1993 to 2008. The population has just changed from 5.3 million in 1992 to 5.4 million of people in 2008.

Now it can be seen somehow clearer, with the help of the descriptive statistics presented above, what has been previously mentioned in the theoretical section, about how Slovakia and other east European countries suppose a fearsome competence to other historically more industrialized and richer countries which struggle to keep their FDI inflows.

3.3 Regression analysis

The regression analysis is made with panel data, which includes observations for different countries across a period of some years. This kind of analysis contains observations combined from the dimensions of a cross-sectional and a time series data set. Having a cross-sectional set of $n$ countries and a time series set of $m$ years, the result will be then a unified data set, which is referred to as pooled cross-sectional time series data, with $n \times m$ observations.

There will be multiple observations on each country over the years. Studying this type of mixed data suppose a broader analysis which in turn yields heavier results for this case. Therefore, performing regressions from a pooled cross-sectional time series panel data set involves complex tasks starting from the gathering and organization of the data. Using panel data allows including variables with very low or zero variability for country $i$ from year to year. This, thanks to variation happens in the cross-sectional dimension from country to country or in the time series dimension from year to year. A mix of both variations is very likely to happen.

In the regression model analysed in this paper the corporate tax rate is included as an explanatory variable (this independent variable being a principal focus of study for this thesis). After analysing the data on corporate tax rate it was found out that the rate does not vary much from year to year when looking at a single country and also some countries establish very similar or the same corporate tax rate than others. Therefore, the importance of using a panel data set which implies a more notable variability, because of the mixture of time series and cross section variation.

However, in special cases significant changes in the corporate tax rate are made, which may be due to tax competition in order to attract FDI into the country. There are many critics to this kind of policies applied by some governments trying to increase the investments in the country. Some of those governments highly criticised are Ireland and also some of the transition countries in east Europe, which have considerably increased the inflows of FDI thanks to the inclusion into the European Union and with the catalysis impact of reducing the corporate tax rate, so that the MNEs find the location somewhat more convenient due to less costs.

TSCS (time series cross-section analysis) helps to get rid of problems arising in other methods of comparative research i.e. time series or cross-sectional analysis. One of those problems and very important in the case of this thesis, is the lack of data leading to a small number of observations (Podestà, Federico). With a TSCS data set, we have $n \times m$ observations instead of only $n$ (e.g. number of years) from a time series set on a single country, or only $m$ observations (e.g. number of countries in a single year) from a cross-section data set. In general and as explained above, TSCS analysis implies a tedious task, in comparison to simple time series or simple cross-sectional analysis. Nevertheless, the increased complexity in the empirical analysis, with a more robust data set, brings more reliable results.
3.3.1 Regression output

A regression model is constructed based upon the research about what can influence FDI inflows. It is expected to observe a positive relationship between the dependent variable FDI inflows (the flows of FDI into a country) and the following independent or explanatory variables: GDP (the gross domestic product of a country), Population size (of a country), and Infrastructure (the level of infrastructure in a country, represented by its road network and measured as the total length of roads in thousands of kilometres). In the other hand, it is expected to observe a negative relationship between the variable FDI inflows and the remaining explanatory variable called corporate tax rate (embodying the percentage of the profits that a firm is obliged to pay to the government of the country in which it is operating).

A positive relationship will mean an increase in FDI inflows when the respective explanatory variable increases. A negative relationship will show a decrease in FDI inflows as an explanatory variable increases. If the results are significant it is fairly demonstrated that with the available data resources at hand, FDI inflows in a country is influenced by its GDP, population size, level of infrastructure and the corporate tax rate imposed to firms operating in the country. All the above is consistent to a reasonable degree, by considering certain assumptions allowing for an analysis up to the level of this thesis. The assumptions in this thesis are: 1. the corporate tax rate is applied with the same rigor to all firms in all the countries, which means no tax exemptions or incentives are granted; 2. the GDP is a reliable indicator of how the economy is performing; 3. the level of infrastructure is well represented by the total length of roads of a country; 4. the population size of a country is equal to the labour force.

At the same time, it is also assumed that the dependent variable FDI inflows, is evenly affected by the explanatory variables, regardless the source and purpose of the investment made by foreign firms in the country. Therefore, this paper does not yield empirical results usable to understand how the relationship, between FDI inflows and the corporate tax rate (or another explanatory variable), is affected by the kind of FDI inflows. In this empirical analysis the data of FDI inflows collected, are simply the reported observations of the total inflow of FDI in country for year . Further analyses outside the framework formed by these assumptions, are out of the purpose of this thesis and therefore are suggested for future studies.

<table>
<thead>
<tr>
<th>Table 5: Regression output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Corporate tax rate</td>
</tr>
<tr>
<td>Ln GDP</td>
</tr>
<tr>
<td>Ln Infrastructure</td>
</tr>
<tr>
<td>Ln Population size</td>
</tr>
</tbody>
</table>

Dependent variable: FDI inflows
Number of observations: 160
Adjusted R Square = 0.111
R Square = 0.133

All the VIF statistics for the coefficients are between 1.2 and 3.1. This indicates there is no presence of multicollinearity. The DW statistic is 1.8, indicating there is no problem of autocorrelation. Since the degrees of variation between the independent variables are nonuniform, these variables are analysed in the log-form (the natural logarithm of the variable, represented in Table 4 above as Ln). However, the variable corporate tax rate does not present abrupt variation in neither the time series nor cross-sectional dimension, and therefore is not set in the log-form.
4 Analysis

The analysis of the regression output starts taking into account that apart from the case of Population size, changes in all the explanatory variables included in the model are related to changes in FDI inflows in a country, with a significance level of 13.7%. Only GDP and Corporate tax rate are significant at a 7.6% level of significance. And only GDP is significant at the 2.8% level of significance. Nevertheless, the regression was run again without the variable Population size and the R squared decreased from 0.133 to 0.127, therefore this variable is not removed from the analysis.

4.1 Coefficients interpretation

The output of the regression is summarized in Table 4 above. After running the regression the results are interpreted as follows.

4.1.1 The corporate tax rate

The main target in the paper, the investigation of the relationship between FDI inflows and the Corporate tax rate, is complemented with the outcome on the coefficient of this explanatory variable. The estimated coefficient implies that a reduction of a 1 percentage point in the corporate tax rate (e.g. from a rate of 20% to 19%) leads to an increase of FDI inflows of about 167.6 million dollars.

The negative relationship encountered in the research about the incidence of the corporate tax rate level on FDI inflows in a country, has been exemplified in a graphical data analysis and confirmed by a regression analysis applied to tax competitor countries members of the OECD. The hypothesis of the thesis (i.e. corporate tax rate significantly influences FDI inflows) can therefore be supported by the empirical results of this paper but importantly taking into account that it is only valid for some OECD member countries selected in this paper as tax competitor ones. Otherwise, for the full sample of OECD member countries with availability of data, a significant negative relationship was not found.

The fact, that the majority of the previous studies consulted predict a negative relationship between FDI inflows and the level of corporate tax rate in a country, motivated the author of this thesis to gather considerable empirical support, to believe that the theory investigated, about the relationship between the corporate tax rate and FDI inflows, could be demonstrated with an econometric analysis.

The results of the regression in the countries sample indicate that the relationship FDI inflows and corporate tax rate is significant, at a 7.6% significance level while using the model proposed in this paper. The analysis of the model yielded results that are in line with previous studies researched. Summarizing, the empirical results of this thesis give support to demonstrate that tax competitor countries have managed to attract FDI inflows through the reduction in the level of the corporate tax rate.

4.1.2 GDP

The gross domestic product of a country (GDP) was included in the right hand side of the regression equation, since it is very likely to be related to the amount of inflows of FDI in a country. The model assumes that the GDP is in fact a global and reliable indicator of how the economy is performing.
The output of the regression indicates that a relationship between FDI inflows and GDP was encountered at a 2.8% level of significance. GDP and FDI inflows have in fact the most significant relationship within the model, according to the regression results. The coefficient of GDP implies that an increase of 1% in GDP, leads to an increase of FDI inflows of about 21.4 million dollars. *FDI inflows and GDP* are both expressed in millions of dollars.

### 4.1.3 Infrastructure

The level of infrastructure was included as an independent variable in the econometric equation, since it is believed it shows the facilities that the MNEs can use when operating in the country. Therefore, MNEs interested in establishing operations abroad, will be more attracted by a country with a higher level of infrastructure than others, all else equal. In the analysis of this thesis, the variable Infrastructure is referred to the road network of a country, representing transportation facilities. Thus, in the regression equation Infrastructure is embodying the total length of all roads in a country. During the collection of data, the total length of all roads was the most reliable indicator found to represent the level of infrastructure. Therefore it was chosen out of those indicators with enough data reported.

If allowing for a significance level of 13.7% then the relationship between FDI inflows and the level of infrastructure would be significant. The regression output for the coefficient of infrastructure is interpreted as follows, even when it is not strongly significant, taken into account that the most common levels of significance are 10 and 5%.

From the regression results, the coefficient of *Infrastructure* can be interpreted as implying that an increase of 1% in the amount of kilometres of the road network in a country, leads to an increase of FDI inflows of about 17.8 million dollars. Here the road network is the total length of roads in a country, expressed in thousands of kilometres.

### 4.1.4 Population size

The coefficient of *Population size* is not significant, since its p-value is 31.6%. This implies that, in overall, the population size of a nation within the group of OECD countries classified in this paper as “tax competitors” is not related to the changes in FDI inflows in a country. However, it is important to note that contrary to what was initially expected in the analysis, the coefficient for the explanatory variable *Population size* showed up to be negative. This negative relationship is confusing at a first glance, but is backed by a graphic analysis when illustrating the indicators Population size and FDI inflows on the same chart. There are a number of small countries with high FDI inflows and countries like Poland and Turkey with considerable larger populations and lower FDI inflows, over the period analysed (1993–2008). Nevertheless, the situation started to change in the previous years to the 2008 global economic crisis, and FDI inflows considerably shifted to less wealthy countries, description which fits with the case of this analysis when comparing Denmark and Ireland to Poland and Turkey.
The apparent shift that occurred towards those countries may be explained by the explosion of speculative bubbles in most developed economies during the financial crisis. Therefore, there was subsequent search for not exacerbated markets in developing and transition economies, countries where the crisis did not affect so severely as in the richer ones. Many of the emerging economies offer to investors, good returns in the short run and even better expectations for the long run. In the comparison, the less wealthy countries (Poland and Turkey) represent larger populations than the richer (Denmark and Ireland), which exemplifies the results of the regression analysis, having a negative relationship between FDI inflows and population size, but at the same time being a not actually
significant relation. A determination of a 31.7% significance level would be necessary to consider the relationship significant in the model of this thesis. However, and outside this research, it is worth noting that not always less wealthy countries represent large populations, e.g. USA, with a large population and high GDP and FDI inflows, or Brazil, China and India with large populations and high FDI inflows but not very high income per capita.

Other facts to remark are that the population of a country does not vary greatly in the short-medium term, and that the growth of population tends to be always positive. Only big wars, pandemics and huge migration flows may affect population size very notably. But it is still important to study the variable since labour market conditions may determine FDI flows. However, it is clarified that the assumption of population size being equal to the labour force is taken into account in order to make a feasible analysis, due to the complexity to which an analysis in this topic may suppose. In general, all economic studies and models include many assumptions, something that shows the impossibility of shaping the whole reality in a feasible study. Thus, in this paper the goal is pursued while allowing for fairly understandable assumptions. Therefore the relative simplicity of the variables included in the econometric model. Further explanations to the insignificant but yet negative relationship between FDI and the population size may deal with the fact that export-oriented FDI is encouraged by low labour costs translated into low production costs. Countries with large populations are more likely to offer lower labour costs than countries with small populations. However this is a hypothesis that does not always hold, e.g. Germany and the UK have relatively large populations but not low labour costs. In the other hand, market-oriented FDI is encouraged by high consumption potential. The hypothesis here is that a high market potential is more related to a high level of income regardless of the population size per se. Given any explanation, the extent of this thesis limits the analysis until this point. Nevertheless, it is suggested for future researchers to deepen into this part of the topic.
5 Conclusion

This paper examined whether FDI inflows are related to the corporate tax rate imposed on the firms, while controlling for other variables that explain FDI inflows. A group of 10 “tax competitor countries” was selected out of those in the OECD list after it was found that a negative relationship does not hold for the whole set of OECD members. The definition of tax competitor country was applied to those economies that have significantly reduced their corporate tax rate during the chosen period of 1993-2008.

The findings show that only for the sample of 10 selected tax competitor OECD countries there is a negative relationship between FDI inflows and the level of corporate tax rate, but there is no negative relationship between these variables if the whole set of OECD countries is taken into account. This implies that some governments are able to incentive foreign direct investors by decreasing the corporate tax rate so that more inflows of FDI are attracted into the country, but in overall the two variables are not negatively related within the group of OECD member countries and thus the relationship cannot be generalized so that it only applies for some countries.

5.1 Future studies

The author suggests that extended research and analysis should done making use of upcoming broader data. Having a larger amount of data available, e.g. being able to include observations of more years and economies, will enforce the results for this topic on the relation between FDI inflows and the corporate tax rate. Enhancing and collecting new data will definitely permit to set upon further analyses.

In this paper the conclusions were drawn on a particular set of economies designated by the author as “tax competitor countries”. Therefore the analysis was somehow more likely to yield expected results supporting the hypothesis FDI inflows and corporate tax rate level are related. However, the definition of “tax competitor countries”, established in this thesis, applies to those countries that have significantly reduced the corporate tax rate during the period 1993-2008. Thus, the conclusion of this thesis has reservations for discrepancies with the results of other similar models with data sets of different characteristics. Further analyses outside the framework formed by the assumptions adopted in this thesis, are out of the purpose of this paper and therefore are suggested for future studies.

It would be worth applying the analysis to a broader range of years and countries but also to other data sets including groups of economies differentiated by particular characteristics. The author suggests it will be interesting being able to analyse how the relationship, between FDI inflows and the corporate tax rate, differs from region to region. Geographical differences, e.g. vast cultural differences, may be important factors influencing the relationship FDI inflows – corporate tax rate. The latter is out of the purpose of the present thesis, but those extended analyses could be conducted doing further research.
6 References


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Appendix

The regression outputs taking into account the set of available data on 20 OECD members during the 16 year period of 1993-2008 are shown below. The 20 countries analysed are: Austria, Belgium, Czech Republic, Denmark, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, Poland, Portugal, Slovakia, Spain, Switzerland, Turkey, and United Kingdom.

Controlling for years

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-67639.150</td>
<td>-3.580</td>
<td>.000</td>
</tr>
<tr>
<td>Corporate tax rate</td>
<td>462.129</td>
<td>1.894</td>
<td>.059</td>
</tr>
<tr>
<td>In GDP</td>
<td>9593.087</td>
<td>3.977</td>
<td>.000</td>
</tr>
<tr>
<td>In Infrastructure</td>
<td>-2326.268</td>
<td>-1.941</td>
<td>.053</td>
</tr>
<tr>
<td>In Population size</td>
<td>-3953.854</td>
<td>3.854</td>
<td>.000</td>
</tr>
</tbody>
</table>

Dependent variable: FDI inflows

In the table above it is seen that the coefficient for the Corporate tax rate is significant at a 10 percent significant level but the sign is not the expected negative one. A possible explanation for this is that large economies such as Germany and the UK may be able to keep relatively high corporate tax rates without losing investors. This might happen because these important economies offer big opportunities for stable business operations, something that is essential for foreign direct investors who pursue long term operations in offshore locations.

The variable GDP has the expected positive coefficient and the relationship with FDI inflows is statistically significant even at a 1 percent significant level. This coefficient implies that an increase of 1% in GDP leads to a rise of FDI inflows of about 95.9 million dollars. FDI inflows and GDP are both expressed in millions of dollars.

The relationship between the variables FDI inflows and Infrastructure is not significant in this analysis. The coefficient of the variable Population size is significant at a 10 percent significant level but its sign is negative which does not correspond to what is expected. This result may be influenced by the presence of small countries in the data set which includes countries with small populations and relatively high inflows of FDI.

Controlling for countries

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-737359.671</td>
<td>-1.439</td>
<td>.151</td>
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<tr>
<td>Corporate tax rate</td>
<td>265.030</td>
<td>.948</td>
<td>.344</td>
</tr>
<tr>
<td>In GDP</td>
<td>10565.043</td>
<td>1.639</td>
<td>.102</td>
</tr>
<tr>
<td>In Infrastructure</td>
<td>111132.364</td>
<td>2.557</td>
<td>.011</td>
</tr>
<tr>
<td>In Population size</td>
<td>-1688.198</td>
<td>-.032</td>
<td>.974</td>
</tr>
</tbody>
</table>

Dependent variable: FDI inflows

When controlling for countries by including dummies it is possible to see that only the variable Infrastructure is significant, at a 5 percent significant level. We can interpret the coefficient of the variable Infrastructure saying that an increase of 1% in the number of kilometres of the road network in a
country will lead to a rise of approximately 1111.3 millions of dollars in FDI inflows. The road network is taken as the total length of roads in a country in thousands of kilometres.

Controlling for years and countries

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>969489,603</td>
<td>1,688</td>
<td>.093</td>
</tr>
<tr>
<td>Corporate tax rate</td>
<td>809,832</td>
<td>2,647</td>
<td>.009</td>
</tr>
<tr>
<td>In GDP</td>
<td>-5634,439</td>
<td>-657</td>
<td>.512</td>
</tr>
<tr>
<td>In Infrastructure</td>
<td>45132,984</td>
<td>1,042</td>
<td>.298</td>
</tr>
<tr>
<td>In Population size</td>
<td>-99717,929</td>
<td>-1,910</td>
<td>.057</td>
</tr>
</tbody>
</table>

Dependent variable: FDI inflows
Number of observations: 320

If we use dummies to control both years and countries, a significant relationship is found between the variable FDI inflows and the corporate tax rate. However the sign of the coefficient is again unexpected since this paper studies a supposed increased in FDI inflows when the corporate tax rate is reduced.

The coefficient of the variable Population size is also significant and with unexpected sign.

Given the regression results shown above, we can conclude that using the model proposed in this paper and with the data set taken into account, a negative relationship between FDI inflows and the corporate tax rate cannot be supported empirically on the set of 20 OECD countries that reported enough data as to be used for the purpose of this paper.

Thus, the findings about these 20 countries do not back what the research on tax competition predicts which is a reduction in FDI inflows when the level of corporate tax rate is increased.

Graph 7:

Denmark & Ireland, FDI inflows vs. Population