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Can countries attract more foreign direct investments with a lower corporate tax rate?

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Abstract

This paper examines the relationship between the tax rate and foreign investments by measuring the effect of the effective average corporate tax rate (EATR) on foreign direct investments (FDI). Possible estimations could lead to important policy implications, both on a national level to attract more investments and on an international level to tackle tax avoidance. By using a time-fixed effects model, a significant negative relationship between the EATR and FDI was found. This suggests that a lower tax rate can attract more FDI. However, country-fixed effects were also added to the model to account for the large heterogeneity in country specific characteristics between countries. With this two-way fixed-effects model, no significant relationship between the EATR and FDI was found, with large standard errors. As a result, no direct policy conclusions can be drawn from this paper.

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1. Introduction

Economic growth is one of the most fundamental topics in economics. The classical growth model suggests that economic growth will decrease with an increasing population and limited resources, while the Solow model (Solow, 1963) attributes the differences in economic growth between countries to technological differences. However, both models been proven to have vital deficiencies. Another model, the endogenous growth model (Romer, 1986 & Lucas 1988), states that economic growth is generated internally within the economy, with increasing returns of scale from capital investing in knowledge industries and private sector investments in R&D. This suggests that more capital inflows in certain sectors of an economy are related to more economic growth.

A straightforward argument that follows is that foreign direct investments (FDI) in the economy of the host country could increase economic growth. Hansen & Rand (2005) indeed find a significant positive relationship between FDI and GDP via knowledge transfer and the adoption of new technology. Furthermore, by using a cross-sectional analyses of data from 90 countries, Johnson (2006) also argues that FDI results in economic growth. Primarily through physical capital and spillover effects. Spillover effects happen when FDI flows have an indirect positive effect on other industries and countries, for example when a foreign multinational enterprise (MNE) opens a business in the host country (FDI) and starts to make use of domestic suppliers. Linkage from foreign MNEs to local firms results in the transfer of knowledge of business practices and technology, which increases the local productivity. The inflow of FDI also results in a more competitive market due to more entrants, which in turn could accelerate efficiency and innovations.

Most of the empirical research suggests that FDI are positive linked to economic growth in the economy of the host country. Governments are thus assumed to be interested in attracting more FDI. But which country characteristics are important determinants for FDI location decisions of MNEs? The economic literature does not seem to point to a single factor that seals the deal and suggests a wide range of important determinants. Demography, educational level, infrastructure, the tax rate, economic development, and geographical location, along with other factors, are often mentioned as important determinants for FDI decisions. From this list of determinants, taxes are the only factor that policymakers can directly influence, hence why there is often an emphasis on taxes in their policies. It is easier to change a tax rate than to make a sudden change in demography.

Some countries are indeed internationally known to actively compete with taxes to attract FDI. Empirical data shows that smaller countries like the Netherlands, Ireland and Switzerland win about 39%, 67% and 38% respectively in corporate tax revenue by actively cutting their tax rates, while

Germany, for example, loses about 26% of corporate tax revenue due to profit shifting (Economists without Borders, 2020). A win in tax revenue, however, is not the exactly the same as an increase in FDI. Nevertheless, the International Monetary Fund (IMF) found a significant difference in FDI flows with some very "unusual" FDI patterns after identifying some jurisdictions with a low tax rate or specific tax exemptions that show very high FDI numbers relative to their economic activities (2014).

Because FDI are assumed to be positively correlated to economic growth, some countries actively compete with competitive tax rates to try to attract more FDI. However, there are many other factors that are known to play an important role in FDI location decisions as well. So do taxes even play a significant role when it comes to the FDI location decision? And if so, to what extent? This paper aims to answer these questions with the following research question:

What is the effect of the effective average corporate tax rate on foreign direct investments?

To answer this question, both the inward FDI flows and the outward FDI flows will be regressed on the effective average corporate tax rate (EATR). Inward and outward FDI will both be scaled as a percentage of GDP. Otherwise, this variable will be diluted by countries with a larger GDP, causing a meaningless coefficient.

FDI is a widely used term that could be interpreted differently. To create a more precise formulation, the Organization for Economic Co-operation and Development (OECD) brought out the fourth edition of a report of 254 pages about the Benchmark Definition of Foreign Direct Investments (2008). The current definition of FDI flows of the OECD is as follows: *"Foreign Direct Investment (FDI) flows record the value of cross-border transactions related to direct investment during a given period of time, usually a quarter or a year. Financial flows consist of equity transactions, reinvestment of earnings, and intercompany debt transactions (2021)."*

The effect of the EATR on the FDI flows will be estimated by using a fixed-effects model with panel data from 35 countries over the years 2005-2017. Hereby country fixed effects will be included to account for the heterogeneity between countries. Furthermore, time dummies will be included for time-fixed effects. The variable GDP per Capita will be added to the model, which will be log-adjusted. Furthermore, the variables Government expenditures, General Government Expenditures are added to avoid omitted variable bias.

Possible estimations could lead to important policy implications. On a national level, governments could possibly cut corporate tax rates to attract more FDI, which in turn could endorse economic growth. On an international level, when looking to tackle tax avoidance, policy implications could mean that the OECD could pressures countries to bring their tax rates closer together so that MNEs have

fewer incentives to shift their profits to other countries and base their FDI location decisions on country specific characteristics other than the tax rate.

By using a fixed effects model with only time-fixed effects, a significant negative relationship of *-0.470* between the EATR and the inward FDI flows was found. This suggests that a one percentage point increase in EATR would lead to a 0.470 decrease in inward FDI. However, country-fixed effects were also added to the model to account for country specific characteristics between countries. With this two-way fixed-effects model, no significant relationship between the EATR and both the inward and outward FDI could be found. The coefficients shows large standard errors, indicating imprecise estimations instead of a precise null effect. As a result, no causal relationship between the EATR and the FDI flows could be found.

2. Theoretical framework

The Commission of the European Communities (CEC) indicated that from early on, discussions about tax reforms and harmonization are based on the assumption that MNEs and other firms base their investments decisions on the effective tax rate in different countries (2001). Early literature, such as the neo-classical model, also suggests that there is a significant negative relationship between FDI and corporate tax rate (CEC, 1992). At the start of this millennium, Mooij and Ederveen (2001) used a meta-regression to examine the effect of the corporate tax rate on the FDI. In this study, data from 25 empirical studies were used to compute the tax rate elasticity. This study found a median value of tax rate elasticity of -3.3%, which means a one-percentage-point change in tax rate leads to a -3.3 percentage-point decrease in FDI, suggesting a strong significant negative relationship between the corporate tax rate and FDI. In a later study of Mooij and Ederveen (2006), a tax-rate semi-elasticity of -2.2 was found using a meta-analysis based on 31 empirical studies.

In a study on outward FDI, focused on businesses in Germany during the period 1989-2005, estimated results suggest a tax-rate elasticity of -0.68, with a corresponding semi-elasticity of -2.17 (Overesch & Wamser, 2009). The difference between the elasticity and the semi-elasticity is that, while the elasticity looks at the percentage point change in both the tax rate and the outward FDI, the semi-elasticity is looks at the difference in percentage point of outward FDI as result of a one unit change in the tax rate. Moreover, this study found a higher tax-rate sensitivity for financial service subsidiaries. Since this is a highly mobile sector, the results are in line with the literature that high mobile sectors are more responsive to tax changes. When looking at financial sector FDI, an insignificant but negative relationship between tax effects and FDI was found by Merz, Overesch & Wamser (2017) as well. Furthermore, the study suggest that significant externalities arise from uncoordinated tax policies,

which implies that a change in tax policy in one country does influence the investment probabilities of other countries.

Instead of aggregate data, Bénassy-Quéré, Fontagné & Lahrèche-Révil (2005) used bilateral data to examine the effect of the corporate tax rate on the FDI. In a study of 11 OECD countries between 1984-2000, they found that tax differentials play a significant effect in FDI location discissions. The study found that while lower corporate tax rates do not directly attract more FDI, a higher corporate tax rate does actually discourage FDI. Logical explanation for this is that, while most FDI decisions are based on a multitude of factors, some decisions between countries might be very hard as the countries are very comparable. Then, the tax rate might just give the edge to another country, discouraging FDI in the country with the higher tax rate. So while lowering the tax rate to attract more FDI, ceteris paribus, may only play a marginal role, having a high corporate tax rate can actually discourage FDI. Moreover, the paper finds that low tax differentials do not discourage inward FDI flows by a lot, while high tax differentials do produce significantly more inward FDI flows. Lastly, this paper suggests that market potential and public expenditures also play a significant positive role. Intuition is that, if governments raise corporate taxes, businesses could have a significantly lower after-tax income. However, if the government uses the tax revenues by investing in, for instance, education, healthcare, and infrastructure, businesses could actually benefit from a better economic environment. Subsequently, the loss in after-tax income is actually compensated or even overcompensated by the consequences of the public expenditures.

Stöwhase (2005) also looked into bilateral data between EU countries to examine the relationship of the tax rate and FDI flows. Results from the paper suggests that the tax sensitivity of FDI depends crucially on the sector the investments take place in. The tax sensitivity in the tertiary sector is substantially higher than the tax sensitivity of the primary and secondary sector. Investments in the primary sector are primarily driven by other factors than the tax rate, while investments in the tertiary sector can actually be deterred by high tax rates. These result are in line with the result of Overesch & Wamser (2009), that suggest that highly mobile sectors are more sensitive to tax incentives as the primary sector is much less mobile than the tertiary sector.

The sensitivity of FDI to taxation remains an uncertain empirical issue because of the heterogeneity of tax policies and the fact that dozen other factors could play a role in the investment location decision as well. Hajkova, et al. (2006) questioned the effect of the tax rate on FDI by controlling for both policy factors such as taxation and public expenditures, and non-policy factors such as demography and geographical location. The estimations result suggests that focusing only on taxation and not on other policy factors could lead to a serious overestimation in tax elasticities. Furthermore, this paper

examined the data with proxies for 'tax diversion' of FDI to host countries with similar characteristics as another country with a lower tax rate to which FDI could be converted. As a result, much smaller tax elasticities were found.

To create more homogeneous data on the factors that play a role in choosing FDI, another study used within-country data instead of cross-country data because possible determinants tend to be more homogeneous within a country (Becker et al., 2012). With data from more than 11.000 firms in Germany, the estimated result shows that a one-percent reduction in the corporate tax rate would lead to an increase of 0.45 number of owned foreign firms. This insignificant relationship suggests that the tax rate needs to be reduced by 2.2 percentage points to attract one foreign MNE.

Instead of using aggregate or bilateral data, Baccini, Quan, & Mirkina (2014) created a quasi-experimental design to measure whether corporate tax cuts increase FDI. Hereby they made use of the difference-in-difference estimation and the synthetic control method. This quasi-experimental design was performed in Russian regions where regional governments were granted autonomy to implement corporate tax cuts. In 2002 the government granted 82 regional authorities to cut their taxes. There were three options; no tax cuts, nondiscriminatory tax cuts, and discriminatory tax cuts. This provided an excellent opportunity to measure the different effects of different types of tax cuts on the FDI over the same period of time in the same country, where some regions were used as control groups with no tax cuts and other regions with nondiscriminatory tax cuts or discriminatory tax cuts were used as treatments groups. The study found that discriminatory tax cuts, which are selected tax cuts on government-approved projects of importance, do not have a significant effect on the FDI. In contrast, nondiscriminatory tax cuts do have a significant effect on the FDI relative to the absence of tax cuts, suggesting a lower corporate tax rate does actually attract more FDI. However, the treatment effects vary dramatically from region to region.

This paper aims to find a significant relationship between the tax rate and both the inward and outward FDI flows. Most of the economic literature examined this relationship by either looking at the statutory tax rate or the effective corporate tax rate. To contribute to the current literature, the effective average tax rate (EATR) was used as determinant. This variable is calculated by taking the effective tax rate for different assets and investments. The weight of each asset in this equation was determined by looking at the average investment of 300.000 European corporations.[1] The EATR is thus assumed to be a more representable benchmark of the actual tax rate for real investments applicable to MNEs.

[1] The exact definition of the EATR is given in section 3.1.2.

3. Data

3.1 Variables overview

To answer whether FDI are influenced by the corporate tax rate, this paper uses multiple variables with data extracted from multiple databases. Data on the dependent variable, FDI, was retrieved from The World Databank. The explanatory variable in this research paper is the effective average tax rate (EATR). How the EATR is calculated will be more extensively covered in paragraph 3.1.2. Data on the EATR was found on the database from Oxford University Centre for Business Taxation. Data on the EATR was not available for all countries, thus the data of 35 countries was used.[2] To reduce endogeneity and omitted variable bias, several variables were added to the model. First of all government expenditures were added as control variable. Data on government expenditures were extracted from the OECD database. To account for market size and potential, the control variable GDP was added to the model as well. Data for this variable can be retrieved from The World Bank database. In table 3.1 the descriptions of the statistics are shown. Inward and outward FDI flows seem to have the most extreme values, both positive and negative.

Table 3.1 Description of statistics

		Details			
Variable	**Variable name**	**Mean**	**Median**	**Min**	**Max**
Inward FDI flows (as % of GDP)	*FDI_inward*	5.77%	2.54%	-58.32%	86.59%
Outward FDI flows (as % of GDP)	*FDI_outward*	5.93%	2.33%	-29.25%	140,10%
The effective average tax rate	*EATR*	23.14%	23.27%	9.72%	36,04%
General government expenditures (as % of GDP)	*GenGovExp*	8.17%	8.10%	3.93%	12.65%
Individual government expenditures (as % of GDP)	*IndGovExp*	11.29%	11.21%	4.33%	19.39%
GDP per capita (USD)	*GPDpercap*	38,132.11	38,387.63	5,727.54	118,823.65

[2] The paper consists of data from the following countries: Australia, Austria, Belgium, Canada, Switzerland, Czechia, Deutschland, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Ireland, Iceland, Israel, Italy, Japan, Republic of Korea, Luxembourg, the Netherlands, Mexico, Norway, New Zealand, Poland, Portugal, Russia, Slovakia, Slovenia, Sweden, Turkey, United States and South Africa.

3.1.1 Foreign Direct Investments

The dependent variables in this research paper are inward and outwards FDI flows. Data on FDI was retrieved from the database from The World Bank. The World data bank has data on both the inward and the outward FDI flows. Inward FDI flows can be described as the net inflows of investments to acquire a long lasting relationship in a foreign enterprise; an enterprise that operates in another country than the investor itself. For the investment flows to be labeled as long lasting, a minimum of 10% or more in stocks or voting rights in the foreign enterprise must be acquired. Inward FDI flows show the net investment inflows less disinvestments. Net investment inflows are the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital. Outward FDI flows, on the other hand, show the total of net investment outflows from the reporting country to foreign countries minus the disinvestments in foreign countries from the reporting country. Both the inward and outward FDI flows can be negative when disinvestments are bigger than the net investments.

This paper aims to answer if a lower corporate tax rate could attract FDI, therefore inward FDI is the variable we are most interested in. Nevertheless, literature and empirical research have shown that a higher corporate tax rate could lead to an outflow of domestic capital, therefore is also interesting to look if a lower corporate tax rate could also lead to a lower outward FDI. The World Bank has data on the inward and outward FDI flows from 2005-to 2020 for over 35 countries. This variable will be scaled to FDI as a percentage of GDP so that the results won't be diluted by countries with large FDI because of their GDP.

The evolution of the FDI flows as percentage of GDP over the years 2005-2017 are shown in figure 3.2 The FDI flows seem to be increasing from 2015 to 2017 and between 2012 and 2016. However, the average FDI seems to be downsloping from 2007 to 2012 and show a sharp decrease in 2017. An explanation for the sharp decrease from 2007 should be the financial crisis in which resulted in economic recessions worldwide.

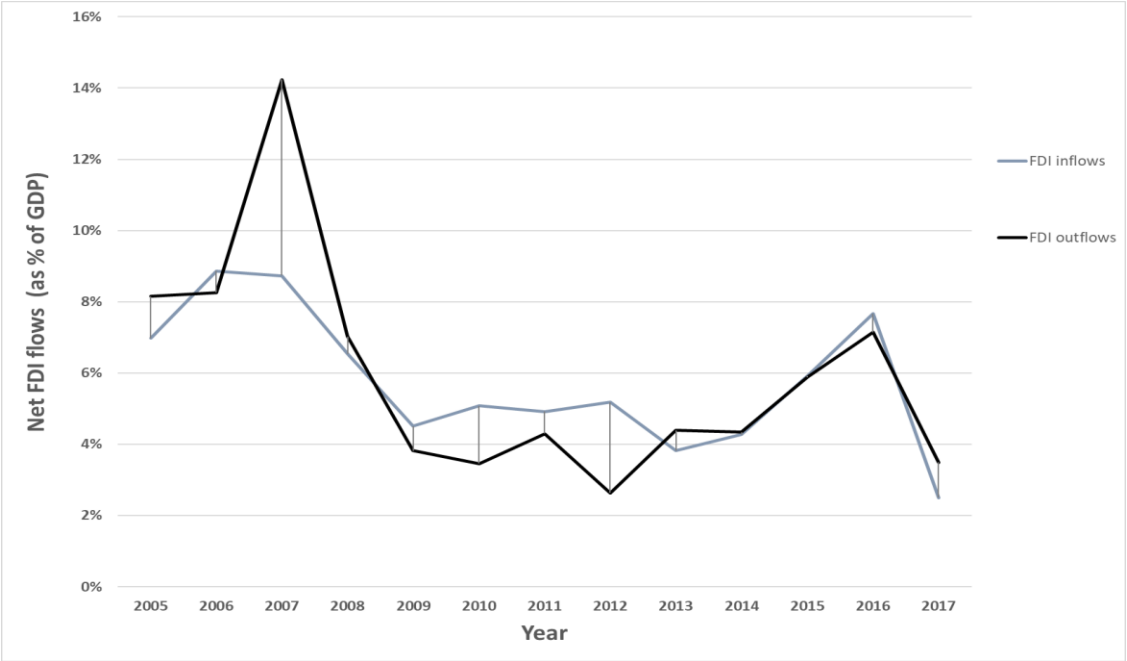

Figure 3.2. Net FDI flows across all countries as percentage of GDP between 2005-2017. Reproduced from the FDI data from The World Databank.

Notable is that outward FDI flows seem to be more extreme, both upwards and downwards, compared to the inward FDI flows. Furthermore, the inward and outward FDI flows seem to follow the same pattern. This is not entirely surprising; when the net inflows in a certain country reduce, so must the net outflows in other countries. Since almost all developed countries are accounted for in this data, an average reduction in inward FDI flows between these countries should suggest a reduction in outward FDI flows for these same countries, since developed countries are assumed to account for most of the outward FDI flows. Figure 3.3 shows a scatterplot between the inward and outward FDI flows. When drawing a line between these points, one would get an almost perfect 45 degree line (with the exemption of a one outlier from Luxembourg in 2007 with an net FDI outflow of 1.4 times GDP).

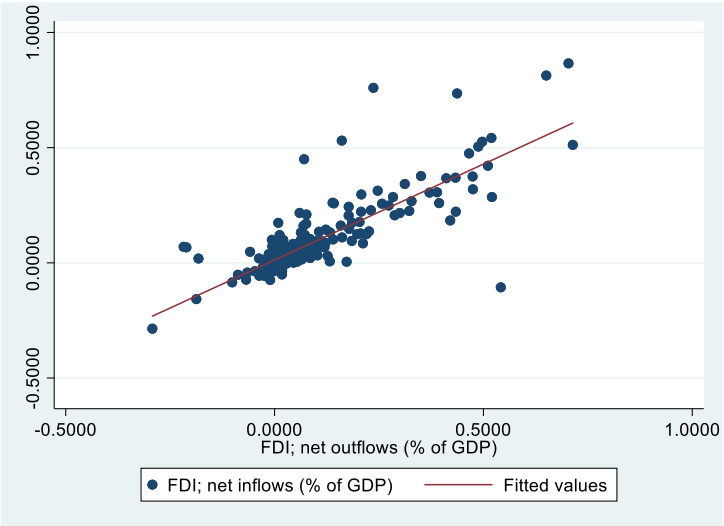

Figure 3.3. Scatterplot between the inward and outward FDI flows. Reproduced from the data.

When taking a closer look inside the data of the FDI, there are a few things that stand out. First of all, countries with a high percentage of FDI inflows compared to their GDP also tend to have a high percentage of FDI outflows. When looking at table 3.2, the five countries with the highest average FDI inflows also seem to have the highest FDI outflows. A possible explanation for this comes when looking at special purpose entities (SPEs). SPEs are entities set up by big multinational enterprises that do not conduct typical FDI operations such as mergers and acquisitions or greenfield investments but rather funnel capital flows (Virginia di Nino, 2018). As a result, the FDI flows do not generate much profit for the country itself because the final destination of this investment lies elsewhere. The economies where these cashflows pass through become transit economies, and these FDI-flows can be seen as transit-FDI. In the euro area, these SPEs are primarily located in The Netherlands, Luxembourg, Ireland and Belgium (European Central Bank, 2018). When looking at the data, the countries with the highest average inward FDI are by no surprise these countries (with the exception of Hungary). Moreover, these countries also see the highest average outward FDI flows. This suggests that transit-FDI could play a major role in the amount of FDI flows compared to GDP. This could partly take away the positive effects of FDI for economic growth since the country for which these flows are destined for are different. Because these flows often account for more than 10% of ownership or voting rights in institutions, these are accounted for in both the inward and outward FDI flows. As a result, possible policy implications with lowering the EATR to attract more FDI to promote economic growth, would partly be taken away since the final destinations of these flows lies elsewhere.

Table 3.4 Countries with the highest average FDI inflows as a percentage of FDI

Country	***Average inward FDI***	**Average outward FDI**
1. The Netherlands	*33.01%*	*38.41%*
2. Luxembourg	*26.71%*	*39.71%*
3. Ireland	*26.02%*	*23.32%*
4. Hungary	*14.21%*	*12.21%*
4. Belgium	*11.42%*	*12.21%*

When looking at the size of these countries, one may notice that these are all relatively small countries (especially population wise). Small countries tend to have a competitive advantage with tax competition in regard to bigger countries since their pre-existing tax base is a lot smaller. When a small country lowers its tax rate, its pre-existing tax base will pay lower taxes, which will lower the countries tax revenues. However, the lower tax rate will attract firms into moving their capital to that country so that the tax base grows and the government can collect more tax revenues. Since the pre-existing tax

base of small countries is a lot smaller than the tax base of big countries, the first-mentioned negative effect will be relatively smaller for small countries.

Slemrod & Wilson (2006) indeed prove that the smaller countries, rather than the bigger countries, choose to become tax-havens. This could be a possible explanation as to why The Netherlands, Luxembourg, Ireland and Belgium are the countries were these SPEs are primarily located. However, when looking at the EATR for these countries, only Ireland stands out with an EATR of 11,09% compared to the mean EATR of 23.14% (see table 3.4). The EATR of The Netherlands is three percentage points lower than the mean, while Luxembourg and Belgium have an EATR higher than the mean.

3.1.2 The effective average tax rate

The variable of interest in this paper is the corporate tax rate. Most of the early empirical research on taxation and FDI was focused on the relationship between FDI and the statutory tax rate. This paper, however, focuses on the EATR. Most large MNEs have at least one department (often multiple) within their corporate structure that is focused on taxation. Therefore, this paper makes the assumption that companies and investors are well aware of the difference between the statutory tax rate and the effective tax rate. The statutory tax rate represents the tax rate imposed by the law. The effective tax rate represents the percentage of income actually paid by the company after taking into account special deductions, exemptions, etc. Some countries with relatively high statutory tax rate can have many special exemption laws causing a lower effective tax rate than countries with a relatively low statutory tax rate. To account for the actual tax being paid, this paper uses the effective average tax rate (EATR).

The EATR is not calculated by using the effective corporate income tax only, but with multiple effective tax rates on which investment decisions of MNEs depend. To calculate the EATR, annual reports from around 300.000 European companies in ORBIS where analyzed. The different components of the average investments can be examined with the help of this data. The weights of the different components from the average investment are as follows: plant and machinery 25.6%, buildings 24.0%, intangible assets 8.7%, and inventories 41.7%, whereof 35.0% is financed by debt.

Afterwards, the cash flow associated with a one-year period investment is applied to calculate the pre-tax and the post-tax net present value of the investment in each country. Here, the same given rate of return is assumed for every country. This way, the difference between pre-tax and post-tax present value can be calculated. The EATR is defined by the difference between the pre-tax and post-tax scaled values of the income stream. With this measure of the effective tax rate, a more diverse effective tax

rate will be taken into account that also depends on the tax on properties, land and depreciation for example.

Another way to measure the effects of the tax rate on FDI, can be done by using the effective marginal tax rate (EMTR). This is the effective amount of addition tax paid for every additional dollar earned as income. An 40% EMTR would result in forty cents of addition tax for every last dollar earned. The EMTR could also be taken as the variable of interest instead of the EATR. However, empirical research suggests that the marginal effective tax rate has no predictive power for the destination of FDI and other location decisions (Devereux & Griffith, 1998 and Buettner & Ruf, 2007). On average, the EATR lies somewhere between the effective marginal tax rate (EMTR) and the statutory tax rate, but tends more to the statutory tax rate.

Data on the EATR can be found on the CBT database of the Oxford University Centre for Business Taxation. This database consists of data from 43 countries and covers the years 1983-2017. However, for the EATR, less data is available. Therefore only data between 2005-2017 could be retrieved from the CBT database on the EATR.

Figure 3.5 shows a scatterplot between the net FDI inflows and the EATR. Fitted values line is down sloping, suggesting a negative relationship between the EATR and the net FDI inflows. However, for the highest EATR observations, FDI still seems to be around zero. This suggest that when the EATR is relatively high, the inward FDI seems to go towards zero, however, not much below zero. Since panel data is being used, there are multiple observations for every country. For most countries the EATR remained the same. This is illustrated in the scatterplot with the vertical observations at the same EATR, which seem to form vertical lines. The two vertical observations lines that stand out most are the one on the far left side and on the right side of the graph. The vertical observations on the right are observations from Ireland with an EATR of 11.09% and 11.30% from 2014 onwards. The vertical observations near the right are observations from Belgium with a EATR of 28.08% and in the latter years 28.27%.

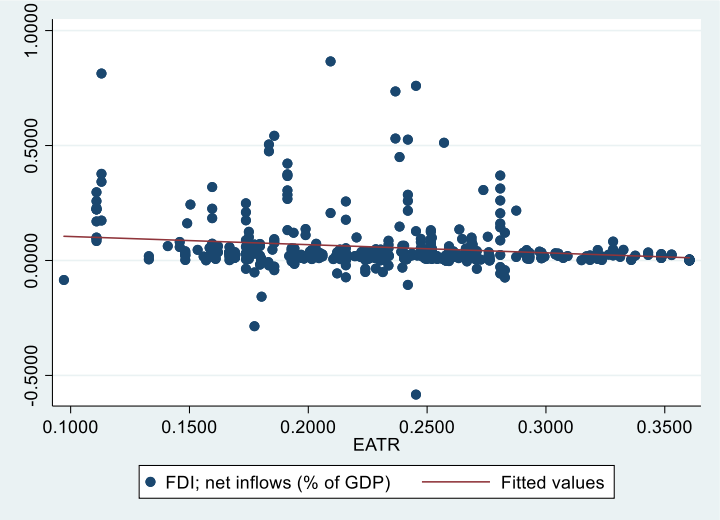

Figure 3.5 Scatterplot of the inward FDI on the EATR. Reproduced from the data.

3.1.3 Government Expenditures

Previously quoted empirical research shows that, even though the tax rate is of importance, government expenditures play a significant higher role on the FDI location decision than the tax rate (Bénassy-Quéré, Fontagné & Lahrèche-Révil, 2005). There are different kinds of government expenditures. Not all public expenditures are equally productive for the economic climate. This paper will therefore include a difference in types of government expenditures. The paper of Devarajan et al. (1996) was one of the first to make a distinction between productive and non-productive government expenditures and their impact on the long-run economic growth of a country. Furthermore, Chu, Hölscher & McCarthy (2018) describe that government spending on social protection can have a negative impact on economic growth. In this paper, examples of productive government spending are education, healthcare, housing and general public services. FDI and economic growth are not the same. However, FDI decisions are also heavily based on market potential, and economic growth is positively correlated with market potential (Bénassy-Quéré, Fontagné & Lahrèche-Révil, 2005).

It is possible to distinguish government spending by destination. On the on hand, there are general government expenditures (like defense, justice, etc.). These labeled as non-productive government expenditures by Devarajan et al. (1996) and Chu, Hölscher & McCarthy (2018). On the other hand, there are expenditures for individual consumption (like health care, housing, education, etc.). These individual government expenditures are labeled as productive by the same papers. Individual government expenditures should thus have a more positive effect on the corporate tax rate than the general government expenditures. The database of the OECD consist of data for both the general and the individual governments expenditures.

By making this distinction between both types of government expenditures, these variables are more precise to certain arears. Higher individual government expenditures could for example be positively correlated with the education level and health care system of that country. Therefore, general government expenditures might also act as a proxy for other factors that are important in FDI location decisions. However, this likely is not a perfect proxy and will just partly take the effect of education level into account (if there even is an effect of educational level).

However, for both general government expenditures and individual government expenditures to reduce endogeneity and avoid omitted variable bias, these variables should also be correlated with the explanatory variable. Government expenditures and taxation are related in different ways. First of all, taxation has multiple functions for countries such as an allocation, regulation, control, and incentivization function. Another important function is the fiscal one. Besides natural resources, tax revenues are often the main and sometimes even the only source of income for governments.

Therefore, taxation are a necessary income source to finance governments expenditures and the realization of national state programs. A low EATR could therefore be related to a relatively low government expenditures as there is no substantial income stream. On the other hand, high government expenditures could be correlated to a high EATR because of the need of financial resources for these expenditures.

Government expenditures could thus be positively correlated with both the inward FDI flows and the EATR and negatively correlated to the outward FDI flows. Vice versa, low government expenditures in a certain country could result in more outward FDI flows to countries with a better economic climate, as a result of higher government expenditures. When explanatory variables that are correlated to the explanatory variable EATR are excluded, this will lead to omitted variable bias. Therefore, it is necessary to control for this variable and reduce omitted variable bias.

3.1.4 Market size

To measure market size, GDP per capita is used in this paper. GDP per capita is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products divided by the population. Artige and Nicolini (2005) state that market size, when measured as GDP per capita, seems to be the most important and robust determinant for FDI. A few years later, Kok and Ersoy (2009) came to the same conclusion. The market-size hypothesis also supports the idea that a large market is necessary for an efficient utilization of recourses. With further expansion, FDI will increase as well (Charkrabarti, 2001). This paper also suggests that market size is the most important determent for FDI. Data on GDP can be extracted from the world data bank. GDP per capita is not directly related to the EATR. One could argue that countries with a high GDP per capita are developed countries with an complex tax system. However, this does not mean per se that this more advanced tax system leads translates in a higher EATR. Therefore, no real relationship between GDP per capita and the EATR was assumed. As a result, adding market size, in the form of GDP per capita, is not assumed to counter omitted variable bias. However, since market size is often referred to as the most important determinant of FDI, the variable will still be added to measure this effect.

4. Methodology

In this paper, cross-sectional data from multiple countries was used over a period of twelve years. With panel data, both time series and cross-sectional data are combines to look at how the FDI changes over time for the different countries. Countries are very heterogeneous. There are, for example, many differences between Germany and even its neighbor country Denmark. Differences can be in size (market and geographical), in educational level, infrastructure, geographical location, political stability, trade agreements, etc. These are all import factors in FDI decisions. Without taking these differences into account and just using EATR as explanatory variable, all these differences between countries will be incorporated in the coefficient of the EATR. As a result, this coefficient will be incorrect and will have no real explanatory power over the FDI flows, as it takes these country specific characteristics into account and attributes it to the tax rate. To avoid this, country-fixed effects are added to the model. With country-fixed effects, any time-invariant parts of the error term are absorbed. These time-invariant parts are attributable to individual characteristics of countries. With accounting for country-fixed effects, the omitted variable bias that is attributable to these characteristics is mostly absorbed. Furthermore, with a fixed-effects model, the specific country fixed effects are assumed to not vary in time and are corrected for in the regression.

Country fixed-effects being incorporated into the model will result in every country having its own constant which is unrelated to the EATR. These different intercepts are attributable to the country specific characteristics. Since every country has its own constant, every country has the same slope coefficients. As a result, the coefficients can be interpretated the same for every country.

Another way to measure the effects with panel data is done with the random-effects model. To test whether the fixed effects or the random effects model is more fitting, a Hausman test was performed. With inward FDI flows as the dependent variable, the test showed a p-value of 0.0223. This p-value is enough to reject the null hypotheses, which suggests that the fixed effects model is statistically preferred over the random-effects model. Although some degrees of freedom are lost, economically, a fixed-effects is also preferred. With the random effects model, the correlation between the EATR and the country individual effects is assumed to be zero. Without accounting for country fixed-effects, the model would likely be prone to omitted variable bias because the previously mentioned fixed differences between countries are not accounted for.

Besides country-fixed effects, time-fixed effects are also included to account for general events that happen and influence all countries similarly. Since the data includes the years 2005-2017, an example of such an event can be the financial crisis of 2008. Figure 3.2 showed that the average FDI flows

declined after the financial crisis of 2007-2008 until 2012. These time-fixed effects are added by using time dummies. This way, the model becomes a two-way fixed effects model.

With normal standard errors (SE), the model assumes that there is no correlation between any of the errors. This is very uncommon with panel data. With cross-sectional data with countries, the errors are often clustered within the countries. To test this hypotheses, a fixed effects model was run with normal SE. Afterwards, the residuals were collected for each country. The residuals showed a big difference in errors between countries (results are shown in table 1 of the Appendix). As a result, clustered SE are used in the model to control for the correlation between the SE. This way, the SE are assumed to be correct so that these, and the 95% confidence interval, can be interpreted properly.

The regressions in this panel data fixed-effects model can be presented as follows:

$$FDI_{inward_{it}} = a + \beta_1 * EATR_{it} + \beta_2 * GenGovExp_{it} + \beta_3 * IndGovExp_{it} + \beta_4 * Ln(GDPpercap)_{it} + i.YEAR + \partial \mathrm{i} + \varepsilon_{it}$$

And

$$FDI_{outward_{it}} = a + \beta_1 * EATR_{it} + \beta_2 * GenGovExp_{it} + \beta_3 * IndGovExp_{it} + \beta_4 * Ln(GDPpercap)_{it} + i.YEAR + \partial \mathrm{i} + \varepsilon_{it}$$

In this equation, the *FDI_inward* and *FDI_outward* are scaled to percentage of GDP so that the results won't be diluted by countries with a high GDP. The GDP of the U.S. compared to the GDP of Iceland is 790 times higher in 2017. Without scaling FDI to percentage of GDP, the coefficients would not be meaningful and would only represent an average effect for all countries, not coefficients that are representative to all individual countries. The same thing holds for both the *General Government Expenditures* and the *Individual Government Expenditures*, both are therefore scaled as a percentage of GDP. The *EATR* is stated in a rate and thus automatically presented in percentages.

GDPpercap is log-adjusted. Although GDP per capita accounts for the size of nations, by dividing GDP by the population, it is still desirable to take the natural logarithm of this variable to provide a more meaningful coefficient that is representative for all countries. When log-adjusted, the coefficient can be interpretated for every country as percentage point increase instead of in absolute numbers. For countries this will lead to more useful implications; a five hundred dollar increase in GDP er capita might be just one percent increase for the Netherlands, this will translate into an eight percent increase for Mexico. So with the coefficient being log-adjusted, every country has the same interpretation of a one-percentage point increase in their own GDP per capita. Lastly, for this model to create meaningful

assumptions, it is assumed that there is no simultaneous equation bias. The EATR is not assumed to be dependent on FDI so there is no reverse causality. However, this will thoroughly be discussed in paragraph 6.

The coefficients from the variables are represented by β_x. Since *EATR*, *General Government Expenditures* and the *Individual Government Expenditures* are stated in percentages, the coefficient could be interpreted as follows; a one percentage point change in variable *x* leads to a β_x * percentage point change in FDI (*y*). *LN(GDPpercap)* is log-adjusted. The coefficient divided by one hundred, gives us the percentage point change in FDI (*y*) of a one percentage point change in *LN(GDPpercap).* The i represents the countries and the t represents the year. Because these coefficients have both i and t, these coefficient can be interpreted the same for every country in every year. The time-fixed effects are represented by $i.YEAR$. The intercept is given by a and varies per country to account for the country-fixed effects. The errors related to the country-fixed effects are captured with ∂i . Finally, to account for the incompleteness of this model, an general error term ε_{it} is added.

5 Results

The fixed-effects results are shown in table 5.1.When only accounting for time-fixed effects instead of both time-fixed and country-fixed effects, the EATR does seem to negatively impact inward FDI with a coefficient of *-0.470*. This coefficient is significant at a p<0.01. So the assumption can be made that a one-percentage-point increase in the EATR would lead to a 0.459 percentage-point decrease in inward FDI flows, which is a strong correlation. Furthermore, However, without accounting for country-fixed effects, the country characteristics are not accounted for, which makes the correlation amendable for omitted variable bias.

The results of the panel data two-way fixed effects model are with inward FDI as the dependent variable are shown in the second column of table 5.1. First of all, the EATR seems to be negatively correlated with inward FDI, as the empirical research suggests. A one-percentage-point increase in EATR would lead to a *-0.169* percentage point change in inward FDI. However, the coefficient EATR is not significant at any p-value. Furthermore, the confidence intervals are very big, which suggests a very inaccurate estimation. Since zero lies within the 95% confidence interval, the effect could even be zero or could be very big. This does not results in any economic significance on which assumptions can be made about the effect of the EATR on the inward FDI.

The other control variables do not seem to show a significant relationship with the inward FDI as well. Individual government expenditure does seem to suggest a large negative relationship with inward

FDI. However, with a 95% confidence interval, the coefficient for inward FDI can be anywhere between *-4.651* and *1.439*. So no assumptions can be made for a positive or negative relationship between the general government expenditures and FDI. General government expenditures suggest a small but negative relationship with inward FDI flows. However, with a standard error almost seven times as big as the coefficient, the estimator seems to be very inaccurate. As a result, the effect might be very small, zero, or even very large, however, no interpretations can be made from this coefficient.

GDP per capital is the only variable that suggests a positive correlation in regard to the inward FDI flows. Without country-fixed effects this relationship is significant. The coefficient does not seem to differ a lot with or without account for country-fixed effects. However, when accounting for country-fixed effects, the coefficient is no longer significant. Although the coefficient is not statistically significant, it does seem to estimate an accurate null-effect. With country-fixed effects, a one percentage point increase in GDP per capita is correlated with an increase of inward FDI flows of an 0.036% increase in inward FDI flows. Even with the upper bound of the 95% confidence interval, inward FDI flows would only increase by 0.089% with a one percentage point increase in GDP per capita.

Table 5.1 Fixed effect regression results

Dependent variable: Inward FDI	Coefficients	
Variable	Inward FDI	Inward FDI
EATR	-0.470***	-0.169
	(0.082)	(0.210)
GenGovExp	-0.287	-0.142
	(0.307)	(0.960)
IndGovExp	-0.043	-1.606
	(0.291)	(1.499)
LnGPDpercap	0.038**	0.036
	(0.013)	(0.026)
Constant	-0.199	-0.067
	(0.113)	(0.385)
R-squared (within)	0.138	0.078
Year F.E.	Yes	Yes
Country F.E.	No	Yes
Observations	455	455

Note: Standard errors are in parentheses, ***=P<0.01, **=P<0.05, *=P<0.1

The results of the panel data with two-way fixed effects on the independent variable Outward FDI flows are presented in table 5.2. Without accounting or country-fixed effects, the EATR again seems to be negatively correlated with the dependent variable. An one percentage point increase in the EATR will results in a *-0.412* percentage point decrease in outward FDI flows (significant at p<0.01). However, especially without accounting for country fixed effects, this by no means can be interpreted as a causal relationship. In the case, the country characteristics are again not accounted for, which makes the correlation amendable for omitted variable bias.

When accounting for country-fixed effects, the variable of interest, the EATR, does show a small but negative coefficient on the outward FDI. A one percentage point increase in the GDP per capital suggest a 0.117 percentage point increase in outward FDI. Like in table 5.1, however, this coefficient does not seem to be significant. Moreover, EATR has a big 95% confidence interval with a standard error of *0.299*, which suggests an inaccurate estimation. As a result, no conclusions can be drawn from this coefficient.

As in table 5.1, no assumptions can be made about individual public expenditures. This coefficient again shows a large standard error, resulting in a big 95% confidence interval. General government expenditures seem to show a negative relationship with outward FDI as well. However, again not significant. With a big standard error resulting in a large 95% confidence interval, no conclusions can be made about whether the relationship is positive or negative. GDP per capita, however, shows a significant correlation in regard to the outward FDI flows (with a p<0.01 without country-fixed effects and *p<0.05* with country-fixed effects). The coefficient even suggests a higher positive correlation with outward FDI when controlling for country-fixed effects. Nevertheless, a one percentage point increase in GDP per capita will still only result in a 0.11% increase in outward FDI flows.

Table 5.2 Fixed effect regression results Outwards FDI Flows

Dependent variable: Outward FDI	Coefficients	
Variable	Outward FDI	Outward FDI
EATR	-0.412***	-0.117
	(0.111)	(0.299)
GenGovExp	-0.266	-0.250
	(0.253)	(0.848)
IndGovExp	0.014	-0.423
	(0.196)	(1.111)
LnGPDpercap	0.054***	0.106**
	(0.007)	(0.046)
Constant	-0.382***	-0.899*
	(0.064)	(0.474)
R-squared (within)	0.091	0.120
Year F.E.	Yes	Yes
Country F.E.	No	Yes
Observations	455	455

Note: Standard errors are in parentheses, ***=P<0.01, **=P<0.05, *=P<0.1

6. Robustness analyses

For a regression to result in outputs that are suitable for policy implications, the model has to be exogeneous. If this is not the case, the coefficients of explanatory variables cannot be interpreted as causality. The main concern for many models thus is endogeneity. Endogeneity occurs when the error term is correlated with the explanatory variables. As a result, parameters are biased and inconsistent and often overstated. There are multiple situations in which endogeneity can occur, the most common however are omitted variable bias and simultaneity bias.

To counter omitted variable bias, time-fixed effects and country-fixed effects were added to the model, along with general and individual government expenditures. However, there are probably other factors that influence both the FDI flows and the EATR and that are not accounted for in this model. With including country fixed effects, most of factors that are attributable to time-invariant differences countries are absorbed in the model. However, there is no certainty that all of these factors are fully absorbed. When they are not fully absorbed, there will still be omitted variable bias. Omitted variable

bias for these specific unobservable factors is only fully absorbed if the changes in time *within each country* are uncorrelated with changes over time in the EATR. This is a questionable assumption. Certain countries could, for example, sign trade agreements or join international organizations such as the OECD, for which they need to change the tax rate. If so, then the unobservable factors within a country is correlated with the EATR and omitted variable bias is still present.

Because it is very hard to account for these changes, another regression was performed of countries with roughly the same characteristics, such as demography, education level or geographical location. Because the assumption is made that the countries are very similar, there is no need to add country fixed-effects. To test this, a model was used in which only countries from only North-West Europe were used, with comparable education level, roughly the same geographical location (exactly the same would be impossible) and approximately the same GDP per capita of around 55.000 US dollars.[3] The model thus assumes that the country characteristics are the same, therefore no country fixed effects were used. In the first column of table 6.1 the results are shown. The first thing that stands out; all the coefficients are significant. Moreover, general government expenditures (which should be the non-productive government expenditures) seem to be very positively correlated with inward FDI flows. As the literature would suggest, the variable of interest, the EATR, seems to be negatively correlated with the inward FDI flows.

When accounting for country fixed effects, however, none of the coefficient are significant (again). This suggest that, even though these countries might me somewhat comparable in some characteristics, the differences between these countries are non-negligible. As a result, although they might not perfect to account for factors that change within countries, country-fixed effects are still necessary to reduce omitted variable bias. However, even with country-fixed effects, one cannot be fully confident that omitted variable bias is fully eliminated. There still could be many variables that effect both the EATR and the FDI that country-fixed effects cannot account for.

[3] The countries being used are: Austria, Switzerland, Germany, Denmark, Ireland, Luxembourg, The Netherlands, Norway and Sweden

Table 6.1 Fixed effect regression results

Dependent variable: Inward FDI	Coefficients	
Variable	Inward FDI	Inward FDI
EATR	-1.684***	-0.419
	(0.306)	(1.195)
GenGovExp	7.151**	0.503
	(2.449)	(4.513)
IndGovExp	-1.177***	-4.701
	(0.288)	(3.159)
LnGPDpercap	0.153**	0.019
	(0.071)	(0.151)
Constant	-1.543**	0.563
	(0.851)	(1.891)
R-squared (within)	0.139	0.104
Year F.E.	Yes	Yes
Country F.E.	No	Yes
Observations	117	117

Note: Standard errors are in parentheses, ***=P<0.01, **=P<0.05, *=P<0.1

Simultaneity bias is also a common cause of endogeneity. Simultaneous equation bias happens when the independent variable is also influenced by the dependent variable. In the methodology the assumption was made that there was no simultaneous equation bias in the model. Resulting in an absence of reverse causality. However, the EATR could also be influenced by the FDI flows. Both variables might thus influence each other at the same time. There are multiple explanations as to why the FDI flows can influence the EATR. When the FDI inflows are declining, policymakers can lower the tax rate with the purpose of attracting more FDI. So as a result of declining FDI inflows, the EATR, a variable that can be directly changed by regulatory, is being set lower. Now, the dependent variable is the EATR and the independent variable are the FDI inflows.

In the model used in this paper, there could be simultaneity bias as the FDI flows can indeed influence the policy and thus the EATR. As a result, the slope coefficient is likely to be prone to upwards bias. There might be upward bias because both the influences of the EATR on the FDI flows and the influences of the FDI flows on the EATR are being attributed only to EATR as explanatory variable for FDI flows. The coefficient thus accounts for both the effects that variable has on de dependent variable,

as well as the effects the dependent variable has on the independent variable. As a result, the coefficient slope is likely to be overstated and upward biased. This causes endogeneity to the model.

When looking at the descriptive statistics in table 3.1, the extreme values in both the inward and outward FDI flows stand out. These outliers are actual observations and do not indicate errors in the data. Therefore, these datapoints were not removed of the initial model. However, these outliers increase the variability in the data and decrease the statistical power. If outliers are removed, the data is more likely to be statistically significant. To test if the coefficients are statistically significant when removing outliers, the most extreme values were removed. The top one percent and the lowest one percent of observations of both the inward and outward FDI flows were removed. Table 6.2 shows the regression results. Inward FDI flows is the dependent variable in column one, while outward FDI flows is the dependent variable in column two. However, table 6.2. shows that even when removing outliers, the coefficient do not seem to be statistically significant.

Table 6.2 Fixed effect regression results without outliers

Dependent variable: Inward FDI flows and outward FDI flows	Coefficients	
Variable	Inward FDI	Outward FDI
EATR	-0.889	-0.288
	(0.148)	(0.211)
GenGovExp	0.123	0.270
	(0.705)	(0.725)
IndGovExp	-0.345	0.426
	(0.962)	(0.879)
LnGPDpercap	0.037	0.085*
	(0.039)	(0.043)
Constant	-0.262	-0.778
	(0.470)	(0.464)
R-squared (within)	0.089	0.142
Year F.E.	Yes	Yes
Country F.E.	No	Yes
Observations	444	441

Note: Standard errors are in parentheses, ***=P<0.01, **=P<0.05, *=P<0.1

In this paper, the variable of interest is the EATR. The EATR is calculated by combining and weighting multiple instruments. This is believed to result in a more comprehensive estimator of the effective tax rate MNEs are liable to. However, because the EATR is relatively complex, the data was not abundantly available. As a result, data of only 35 countries over a period of just 12 years could be used. For some countries the EATR over this period did not change, for most other countries, the EATR changed by just a bit. With country-fixed effects, only the variation within countries were taken into account, not the variation between countries. So although there is some variation of the EATR within countries over the period of these years, when accounting for country-fixed effects, there is not much left to explain. This could also explain all the insignificant results when adding county-fixed effects, even when removing outliers or examining comparable countries (like in table 6.2).

Many earlier studies had already researched the relationship between the statutory or effective corporate tax rate and the FDI flows. This paper aimed to attribute to the current literature by examining the EATR, as this is a more representable benchmark of the actual tax rate for real investments. Had a more simplified tax rate been used, observations over a longer period of time could be examined. This would probably result in more variation of the EATR within countries, which could lead to significant result.

7. Conclusion and Discussion

This paper aimed to answer if and possibly how the effective average tax rate has an effect on foreign direct investments. To answer this question, a fixed-effects model was used on panel data from the years 2005-2017 containing 35 countries. In this paper, no significant relationship between the EATR and both the inward and outward FDI could be found. Due to a big standard error the estimations do not seem to point to a null-effect either. Although the coefficient is negative, this cannot be interpreted in any way since it is an inaccurate estimation. For the countries examined, there seems to be no effect in changing the EATR to attract more FDI. The only significant coefficient when looking at outward FDI flows is the log of GDP per capita. This suggests that a one percentage point increase in GDP per capita leads to an increase in a 0.106 percentage point increase in outward FDI.

With the fixed-effects model, the country-specific characteristics are assumed to be constant over time. Indeed, geographical location, for example, does not change over time. However, the level of education, political stability and healthcare system can significantly change over a period of twelve years. Although individual government expenditures include expenses in those categories, not all changes in these determinants are accounted for. When using a mixed-effects model with country-random effects and time-fixed effects, these characteristics are allowed to change over time. When using random effects, the EATR does so seem to be significantly negatively correlated with the inward FDI flows (Table 2, Appendix). However, when using random effects, the country-specific effects are not properly accounted for, making it prone to omitted variable bias.

Without accounting for country fixed effects, a negative correlation between the EATR and the FDI with a significant coefficient of *-0.470* can be found as well ($P<0.01$). Suggesting that lowering the EATR can actually attract more FDI. This result could, however, be overstated because the coefficient partly overtakes the effect of variables not accounted for in the model. The results without country-fixed effects, however, are in line with the research since many of the early empirical research also did not account for country-fixed effects. As a result, the effect of the tax rate on the FDI was fairly overstated. Later research tried to account for the huge amount of heterogeneity between countries by, for example, including country-fixed effect. As a result, significantly lower relationships were found, or even no relationships at all. As in this research paper, no significant negative correlation between the EATR and the FDI can be found when using country fixed effects.

Before drawing policy implication on the results of a paper, one must first be certain the results of the paper are not prone to homogeneity. An important cause of homogeneity is omitted variable bias. This happens when a variable that influences both the dependent and the independent variable is not

accounted for, which will lead to biased and inconsistent coefficients. Although country and time-fixed effects are accounted for in the model, there is no certainty that there is no omitted variable bias. As said previously, many of the country-fixed effects could change over the period of twelve years. Furthermore, there are many possible factors not accounted for with the fixed effects model used in this paper that can influence both the EATR and de FDI, resulting in omitted variable bias. Simultaneity is another common cause of endogeneity. This happens when the dependent variable also influences the independent variable so that both variables influence each other. This happens when FDI flows influence the EATR. This could happen if policymakers are aware of the effect the tax rate has on the FDI. As a result of lower inward FDI, governments could actually lower their EATR in the hope of receiving more FDI. Both omitted variable bias and simultaneity bias cannot be assumed to be fully absent in this paper. Therefore, the results of this paper should be taken with caution.

One of the assumptions that was made in the introduction of this paper was that FDI could attribute to the economy of a country. FDI in de form of a large MNE opening a subsidiary in a country could lead to sustainable employment. As a result, it can be beneficial for countries to lower their tax rate to attract more FDI. The results of this paper, however, show no significant relationship between the EATR and FDI when accounting for country fixed effects. The implications of this paper for governments to lower their EATR to attract more FDI might thus not be beneficial. Moreover, the data shows that countries with high levels of inward FDI flows also show high levels of outward FDI flows. Possible explanation for this has to do with SPEs. These entities channel big cashflows through countries with favorable tax systems. As a result, these FDI flows will barely attribute to the economy of the relevant country because the final destinations of these cashflows lie elsewhere. So even if a significant relationship was found, a breakdown of FDI is needed to quantify whether a reduction in the tax rate would actually contribute to the wealth of a country and not just a higher level of FDI. To obtain results that could be used for policy implications, further research on this topic could take a closer look at the different types of FDI and which types of investments contribute most to the economy. Then look at how the most beneficial types of FDI are influenced by the tax rate.

On an international level, the OECD is much concerned with international tax policies. One of the main pillars of the OECD is tackling tax avoidance. In the past, the focus was on bringing tax rates closer together so that MNEs would not base their FDI location on the tax rate. The results of this paper, however, show that the EATR plays no significant role in FDI location decisions. However, the data does show that there are certain countries with a lot more FDI flows than others. Not by surprise, most of these are also internationally known as tax havens. The emphasis on the OECD for tackling tax avoidance should thus possibly be on the tax systems, including tax exemptions and another arrangement to tackle tax avoidance rather than just the tax rate. The only problem is that there might

be problems with national sovereignty as countries would not be willing to change their whole tax systems so it corresponds better with the norm. However, this should be a subject to look into besides the tax rate to convergence taxes between countries and tackle tax avoidance.

As said before, a shortcoming by using favorable taxes to obtain more FDI is that the tax rate might only play a marginal role compared to other determinants of FDI. Demography, economic development, and geographical location, along with other factors, are often mentioned as important determinants of FDI decisions. In this paper, data from 35 countries was used to obtain the regression results and to thus calculate the effect of the EATR on the FDI. A possible deficiency hereby is that the countries examined in this paper do vary a lot when it comes to the above-mentioned determinants. Examining countries with more homogeneous characteristics might lead to a higher correlation between the EATR and the FDI since there are fewer determinants of FDI that play a role in the investment decision as the countries are more identical. Looking at competitive countries could lead to a more accurate and significant coefficient. In the robustness analyses, the same model was tested with comparable countries from North-West Europe. Without accounting for country-fixed effects, a significant negative relationship between the EATR and the inward FDI was found. However, when including country-fixed effects on these 'comparable' countries, none of the coefficients remained significant. Possible explanation hereby is that when accounting for country fixed effects, only the within variation of countries is being taken into account. For most countries, the data did no show significant differences in the EATR over the period of twelve years. Therefore, there was probably just little left to explain.

Whether taxation has an influence on the FDI was the main point of interest of this paper. However, there is more to taxation than just the tax rate. Many countries have big differences in their tax system. For example, Luxembourg with 24.19%, has one of the highest effective tax rates in Europe, but still attracts relatively large FDI inflows. With the EATR used in this paper, some tax exemptions and other instruments that could lead to firms paying less taxes are accounted for. However, there is no certainty that all instruments, such as tax exemptions or other dispensations, are accounted for. As a result, this paper fails to give a complete answer on how taxes can influence FDI since it only takes this effective average tax rate into account. The actual effect of the taxes on the FDI could thus be bigger than estimated in this paper. If further research can quantify tax exemptions and other taxes arrangements and could incorporate this in the EATR, a more complete coefficient for the EATR can be obtained. This seems necessary to obtain a clear understanding of a possible relationship between the effective average tax rate and foreign direct investments.

References

Artige, L., & Nicolini, R. (2005). *Evidence on the Determinants of Foreign Direct Investment: The Case of Three European Regions*. Unitat de Fonaments de l'Anàlisi Econòmica (UAB) and Institut d'Anàlisi Econòmica (CSIC), UFAE and IAE Working Papers 655.05.

Asen, E. (2022, 23 januari). *Corporate Income Tax Rates in Europe. Tax Foundation*. Geraadpleegd op 23 januari 2022, van https://taxfoundation.org/2021-corporate-tax-rates-in-europe/

Baccini, L., Li, Q., & Mirkina, I. (2014). *CORPORATE TAX CUTS AND FOREIGN DIRECT INVESTMENT*. Journal of Policy Analysis and Management, 33(4), 977–1006.

Becker, S. O., Egger, P. H., & Merlo, V. (2012). *How low business tax rates attract MNE activity: Municipality-level evidence from Germany*. Journal of Public Economics, 96(9–10), 698–711.

Belastingwetten 2021 (1ste editie). (2021). Wolters Kluwer.

Bénassy-Quéré, A., Fontagné, L., & Lahrèche-Révil, A. (2005*). How Does FDI React to Corporate Taxation?* International Tax and Public Finance, 12(5), 583–603.

Buckley, P. J., Clegg, L. J., Cross, A. R., Liu, X., Voss, H., & Zheng, P. (2007). The determinants of Chinese outward foreign direct investment. Journal of International Business Studies, 38(4), 499–518.

Buettner, T., & Ruf, M. (2005*). Tax Incentives and the Location of FDI: Evidence from a Panel of German Multinationals*. SSRN Electronic Journal.

Chakrabarti, A. (2001*). The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-Country Regressions*. Kyklos, 54(1), 89–114.

Chu, T. T., Hölscher, J., & McCarthy, D. (2018). *The impact of productive and non-productive government expenditure on economic growth: an empirical analysis in high-income versus low- to middle-income economies*. Empirical Economics, 58(5), 2403–2430.

Cobham, A., & Loretz, S. (2014). *International Distribution of the Corporate Tax Base: Implications of Different Apportionment Factors Under Unitary Taxation*. SSRN Electronic Journal.

Cobham, A., & Janský, P. (2018*). Measuring misalignment: The location of U.S. multinationals' economic activity versus the location of their profits*. *Development Policy Review*, *37*(1), 91–110.

Commission of the European Communities (CEC). (2001*). "Company Taxation in the Internal Market,"*COM(2001)582, Brussels

De Mooij, R. A., & Ederveen, S. (2001). *Taxation and Foreign Direct Investment: A Synthesis of Empirical Research.* SSRN Electronic Journal.

De Mooij, R., Ederveen, S., & Directorate-General for Economic and Financial Affairs. (2006). *What a difference does it make? Understanding the empirical literature on taxation and international capital flows.* Economic Papers, 261.

Demirhan, E., & Masca, M. (2008). *Determinants of foreign direct investment flows to developing countries: a cross-sectional analysis.* Prague Economic Papers, 17(4), 356–369.

Devereux, M., & Griffith, R. (1998). *Taxes and the location of production—evidence from a panel of U.S. multinational*s. Journal of Public Economics, 68, 335–367.

Dharmapala, D. (2014). *What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature.* SSRN Electronic Journal. Published.

Dunning, J. H. (2006). *European Union and the Race for Foreign Direct Investment in Europe*. Journal of International Business Studies, 37(4), 569–571. https://doi.org/10.1057/palgrave.jibs.8400211

European Central Bank. (2019, 8th August*). Euro area foreign direct investment since 2018: the role of special purpose entities.* Geraadpleegd op 23 januari 2022, van https://www.ecb.europa.eu/pub/economic-bulletin/focus/2019/html/ecb.ebbox201905_03%7E9ea9063965.en.html

Feld, L. P., & Heckemeyer, J. H.. (2011). FDI AND TAXATION: A META-STUDY. Journal of Economic Surveys, 25(2), 233–272.

Frontpage. (2021, 23 augustus). Economists without Borders. Geraadpleegd op 23 januari 2022, van https://missingprofits.world/

Fuest, C., Peichl, A., & Siegloch, S. (2018). *Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany*. American Economic Re

Hansen, H., & Rand, J. (2006). On the Causal Links Between FDI and Growth in Developing Countries. The World Economy, 29(1), 21–41, 108(2), 393–418.

Hajkova, D., Nicoletti, G., Vartia, L., & Yoo, K. Y. (2006). Taxation, Business Environment and FDI Location in OECD Countries. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.930071

Heckemeyer, J. H., & Overesch, M. (2017b). *Multinationals' profit response to tax differentials: Effect size and shifting channels*. Canadian Journal of Economics/Revue canadienne d'économique, 50(4), 965–994.

Keen, M., & Konrad, K. A. (2012*). International Tax Competition and Coordination*. SSRN Electronic Journal.

Kok, R., & Acikgoz Ersoy, B. (2009). *Analyses of FDI determinants in developing countries. International Journal of Social Economics*, 36(1/2), 105–123.

Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3–42.

Ministerie van Financiën. (2021, 28 oktober). Vliegbelasting. Milieubelastingen | Rijksoverheid.nl. Geraadpleegd op 23 januari 2022, van https://www.rijksoverheid.nl/onderwerpen/milieubelastingen/vliegbelasting

Moore, P. J., & Ruane, F. (2005). *Taxation and the Financial Structure of Foreign Direct Investment.* SSRN Electronic Journal.

Muhammad Muazzam Mughal, M. A. (2011). *Does market size affect FDI? The Case of Pakistan*. Economics.

OECD. (2008). OECD Benchmark Definition of Foreign Direct Investment (4th edition).

Overesch, M., & Wamser, G. (2009). Who Cares About Corporate Taxation? Asymmetric Tax Effects on Outbound FDI. World Economy, 32(12), 1657–1684.

ProPublica. (2021, 28 September). *The Secret IRS Files: Trove of Never-Before-Seen Records Reveal How the Wealthiest Avoid Income Tax*. ProPublica. https://www.propublica.org/article/the-secret-irs-files-trove-of-never-before-seen-records-reveal-how-the-wealthiest-avoid-income-tax

Romer, P. M. (1986). Increasing Returns and Long-Run Growth. Journal of Political Economy, 94(5), 1002–1037.

Slemrod, J., & Wilson, J. D. (2009*). Tax competition with parasitic tax-havens*. Journal of Public Economics, 93(11–12), 1261–1270.

Solow, R. M. (1963). Heterogeneous Capital and Smooth Production Functions: An Experimental Study. Econometrica, 31(4), 623.

Stöwhase, S. (2005). Tax-Rate Differentials and Sector-Specific Foreign Direct Investment: Empirical Evidence from the EU. FinanzArchiv, 61(4), 535.

The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-Country Regressions

Tavares-Lehmann, A. T., Coelho, Â., & Lehmann, F. (2012). Taxes and Foreign Direct Investment Attraction: A Literature Review. New Policy Challenges for European Multinationals, 89–117.

Trabandt, Mathias; Uhlig, Harald (2011). "The Laffer Curve Revisited". Journal of Monetary Economics. 58 (4): 305–327. doi:10.1016/j.jmoneco.2011.07.003.

Tørsløv, T., L. Wier and G. Zucman, 2018. *The missing profits of nations*. NBER Working Paper No. 24701.

What you need to know about tax avoidance. (2020, 4 oktober). Leiden University. Geraadpleegd op 23 januari 2022, van https://www.universiteitleiden.nl/en/news/2017/07/what-you-need-to-know-about-tax-evasion

Appendix

group(COUNTRYCODE)	Summary of Residuals		
	Mean	Std. Dev.	Freq.
AUS |	-.04013674	.02711054	13
AUT |	-.02681306	.08366468	13
BEL |	.1088112	.13454204	13
CAN |	-.01094228	.01565077	13
CHE |	-.10576906	.08681515	13
CZE |	-.02046828	.02705744	13
DEU |	-.0294083	.0244138	13
DNK |	.03467852	.02893209	13
ESP |	-.0176357	.0214789	13
EST |	.03764307	.0575352	13
FIN |	.01740391	.04083139	13
FRA |	.02755452	.01731925	13
GBR |	.00051073	.02579831	13
GRC |	-.0560421	.01926789	13
HUN |	.0977369	.22625979	13
IRL |	.15427082	.17693133	13
ISL |	.03236021	.13007945	13
ISR |	-.00701229	.02040697	13
ITA |	-.04555075	.01256486	13
JPN |	-.04449247	.02610837	13
KOR |	-.10789815	.01965205	13
LUX |	.14422216	.36059848	13
MEX |	-.07709709	.02370065	13
NLD |	.336041	.18653391	13
NOR |	-.02151831	.03099731	13
NZL |	-.03701188	.01631269	13
POL |	-.02386252	.01215493	13
PRT |	-.01017825	.03045569	13
RUS |	-.05282551	.01676956	13
SVK |	.05094825	.01876267	13
SVN |	-.03675807	.01633839	13
SWE |	.06447449	.029614	13
TUR |	-.10854618	.01251284	13
USA |	-.1159774	.01588514	13
ZAF |	-.00881489	.0228033	13
Total |	**1.098e-10**	**.12575431**	**455**

Table 2 Mixed effect regression results

Dependent variable: Inward FDI	Coefficients
Variable	Inward FDI
EATR	-0.300*
	(0.175)
GenGovExp	-0.385
	(0.791)
IndGovExp	-0.366
	(0.403)
LnGPDpercap	0.044*
	(0.023)
Constant	-0.237
	(0.259)
R-squared (within)	0.052
Year RE	Yes
Country F.E.	Yes
Observations	455

Note: Standard errors are in parentheses, ***=P<0.01, **=P<0.05, *=P<0.1