



The Effect of Tax Expenditures on Inward FDI: Evidence from OECD Countries

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July 2022

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Abstract

This study analyses the effect of tax expenditures on FDI stocks in OECD countries, using a clustered fixed effects model. The contribution of this study is that FDI is not influenced by the nominal tax rate, but by the special provisions made for the tax levied on companies. Using the newly released GTED database on tax expenditures, this study finds that tax expenditures as a percentage of the tax revenue have a significant effect on FDI stocks held by OECD countries between 2005 and 2020. The effect is robust to the addition of the nominal tax rate and other control variables. The conclusion of this study is that the fiscal environment shaped by national governments and tax agencies significantly impacts the investment decisions of MNEs.

Keywords: Foreign Direct Investment, Tax Expenditures, Taxation, Multinational Corporations.

1. Introduction

The role of multinational enterprises (MNEs) in the economy and the tax policies aimed at attracting and/or retaining these large businesses are a source of political controversy. With a total volume of €7.2 trillion in 2018, Foreign Direct Investment (FDI) to the European Union (EU) is worth around 45% of the Union's collective GDP (Linn Teigland et al., 2020). Given the large volume of FDI relative to the size of the economy, it is vital to understand the investment behavior of MNEs and the policies countries implement to attract foreign capital.

In 2017, for instance, Dutch Prime Minister Mark Rutte defended a plan to abolish the dividend tax (Tweede Kamer, 2017). He feared large corporations based in the Netherlands, such as Unilever, Shell, AkzoNobel, and ING would incorporate their headquarters elsewhere and foreign firms would not want to settle in the country (De Witt Wijnen, 2018). This gave rise to the then newly instated third Rutte cabinet to propose abolishing this tax, which would forego around €1.9 billion (Baarsma & Vrieselaar, 2018). The Dutch PM argued this tax measure was a vital part of keeping MNEs interested in remaining or settling in the Netherlands (Boersema, 2018). Despite the urgency that was felt, the dividend tax was not abolished. Subsequent years saw multinationals Shell and Unilever move their Headquarters to the United Kingdom and chemical firm DSM leaving the Netherlands for Switzerland as recently as May 2022 (Kalse & Leijten, 2022; Tamminga, 2021). The question that arises is what conditions make countries attractive for investment by MNEs.

The Dutch political debate on the dividend tax in 2017 was characterized by a strong push to create an attractive environment for large corporations and therefore stands in line with several important developments that have occurred since the end of the Cold War. The most important of these is the rise in power and size of MNEs vis-a-vis national governments (Babic et al., 2017). Tax policies are important tools for governments to incentivize investment (Jensen, 2006). Such policies are pursued given the existing consensus that Foreign Direct Investment (FDI) has a positive effect on macroeconomic performance (ibid). Given the power MNEs hold over national governments, it is imperative to investigate how governments incentivize MNEs to make investments in their economies and whether these measures are effective. This study, therefore, stands in the macroeconomic tradition of FDI research on locational advantages (Dunning & Lundan, 2008).

Key to this study's relevance is that the rise in power of corporations vis-a-vis governments has been accompanied by steady growth in tax expenditures (Von Haldenwang

et al., 2021). Tax expenditures are a deviation from the regular tax regulations that lower the tax burden on specific individuals or businesses. Tax expenditures most commonly take the shape of exemptions, deductions, credits, or preferential rates (Tax Foundation, n.d.). Previous studies have found that tax policies directly influence the volume of FDI a country receives (e.g. Bellak & Leibrecht, 2009; De Mooij & Ederveen, 2001). Governments often employ tax expenditures to develop specific sectors in the economy (Von Haldenwang et al., 2021). In doing so, expenditures are used to incentivize FDI. Tax expenditures are often costly measures for governments (Redonda et al., 2021). With a lack of transparency about the goals and cost effectiveness of tax expenditures, it is imperative to develop an understanding of whether tax expenditures can be used to incentivize FDI. The research question this study aims to answer is as follows: *What is the effect of tax expenditures on inward FDI in OECD countries?*

The scientific relevance of studying whether tax expenditures comes from a renewed scientific interest in corporate taxes in government policy (Thomas, 2021). Countries that are members of the Organization for Economic Cooperation and Development (OECD) are of particular interest to this study. This is because of their similarities; having a market economy and democratic institutions. The release of the GTED database on tax expenditures in 2021 (Redonda et al., 2021), provides an opportunity to further understand this subject using this new data. I chose to study tax expenditures instead of nominal- or effective tax rates because MNEs often have a lower tax burden due to tax expenditures (Hintošová et al., 2018). Studying tax expenditures instead gives further insight into location decision factors for MNEs, given that many expenditures are used as incentives for such enterprises (Clausing, 2020; Palanský, 2019). This study further contributes to the literature by controlling for the nominal tax rate and various macroeconomic factors that may have an impact on MNEs' investment decisions. Conducting research using tax expenditures instead of tax rates, adding extensive control variables, and making use of the newly published GTED database make this study a novel contribution to the literature on FDI and corporate taxes.

Societally, this study carries relevance as well. These are twofold. Firstly, policymakers and the public need to understand whether or not tax policies are effective. If policymakers have the goal of attracting FDI through implementing tax expenditures, it is useful to know whether this is an effective and efficient policy to reach said goal. As Bénassy-Quéré et al. (2005) pointed out, economic logic would tend the tax rate levied on companies towards zero due to countries competing for investments. Whether foreign investment increases due to lowering the tax burden with special provisions is therefore relevant for fiscal policy. FDI is found to contribute to technological- and human resource development and FDI increases tax

revenue for host countries (Razin & Sadka, 2001; ResearchFDI, 2021). 20% of worldwide FDI stocks are held by EU countries (Dellis et al., 2017). Countries that receive FDI experience increased levels of competition, particularly between foreign and domestic firms. An increase in competition increases incentives to increase productivity (Ho et al., 2013; ResearchFDI, 2021). These benefits of FDI make it logical for highly developed OECD countries to want to incentivize FDI. Policymakers can use the results obtained by this study to inform further tax measures when the aim is to attract foreign capital. For the public at large, knowing whether the policies proposed by policymakers are effective is a key factor impacting voter behavior. This study, therefore, contributes to societal debates on taxation and foreign investment, by offering evidence for the effectiveness of tax regime changes as a contributor to MNEs' decision-making for investment.

Secondly, this study contributes to transparency and accountability for national governments when it comes to tax expenditures. Knowing what effect tax expenditures have on FDI contributes to public knowledge of how tax expenditures function. The goals of tax expenditures can be vague or undisclosed, and complex structuring of measures and oversight institutions lead to lower accountability of governments (Dessler et al., 2022). It is thus important to assess the effectiveness of tax expenditures, to create accountability for governments when implementing policies that have the purpose of increasing attractiveness to MNEs' capital.

The first chapter of this study has given a broad overview of the importance of studying tax expenditures' effects on FDI. The second chapter of this study sets out to develop a theoretical framework for the subject of taxes and FDI by reviewing the literature on this subject. Several country characteristics and policies are considered. The third chapter describes the data and method that were used. Chapter four analyses the descriptive statistics and the results from the econometric model. In chapter 5, having drawn conclusions from the empirical section of this study, I specify the limitations of the findings and offer recommendations for policy and future studies about tax expenditures and FDI.

2. Theoretical Framework

The literature on FDI is extensive. This chapter develops the theoretical underpinning for the data analysis employed by this study. Firstly, it outlines the perspectives on what factors have an impact on MNE investment decisions. Secondly, it delves into empirical findings on the same subject. This section places a particularly focus on empirical findings that are concerned with FDI and taxation, after which this section covers other factors with regards to governance,

government finances, and macroeconomics. Lastly, the hypothesis to be tested by this study is given.

In the broadest of terms, this study is about the investment behavior of MNEs. MNEs are enterprises that own or control value-added activities in more than one country (Dunning & Lundan, 2008) and therefore engage in FDI. Since the mid-1980s, decreases in transport costs, the abolishment of (non-tariff) trade barriers, and regional specializations in production have led to rapid growth in FDI (Dunning, 1988). Since this decade, the active promotion of FDI has become a common policy (Woodward & Rolfe, 1993). The volume of FDI peaked in the first decade of the 2000s (World Bank, 2022). The largest contributors to FDI are the United States, the United Kingdom, France, Germany, the Netherlands, and Japan. Their share of outward FDI has decreased from over 70% of worldwide FDI in 1980 to under 50% in 2005 (Dunning & Lundan, 2008). Outward FDI contributors on the rise are smaller developed countries such as Austria, Denmark, Israel, and Portugal. Recently, a sharp increase in outward FDI has been observed among developing- and transition countries such as Hong Kong, Singapore, Taiwan, the PRC, Brazil, and the Russian Federation (*ibid*).

The question the following sections aim to answer is as follows: what conditions affect the propensity for countries to receive FDI? In the following sections, I develop the empirical background for this study, particularly finding that market- and efficiency-seeking are important when it comes to the link between tax expenditures and FDI.

2.1 FDI and taxation

This study concerns the effect tax expenditures have on inward FDI. Earlier scholars, when investigating the relationship between taxation and FDI, have focused on the statutory tax rate. It has been observed that the volume of inward FDI a country receives is influenced by the statutory tax rate on corporate income (Bénassy-Quéré et al., 2005; Carstensen & Toubal, 2004; Gropp & Kostial, 2000; Silajdzic & Mehic, 2021). The exact specifications of econometric models and the controls included give different interpretations of the nature of this relationship. The relationship between taxes and FDI is therefore unclear. Particularly the differentials between host- and investor countries are commonly used variables (e.g., Demekas et al., 2007). Other examples of authors who find a relationship between tax rates and FDI are Bellak & Leibrecht (2009), Bénassy-Quéré et al. (2005), and Hartman (1984). These authors generally find that corporate taxes influence of the volume of FDI countries receive. The robustness of the implied relationship is questioned when considering the findings from Silajdzic & Mehic (2021), who show that the effect of corporate tax rates on FDI is conditional

on technological development. Bénassy-Quéré et al. (2005) argue that higher tax rates discourage FDI inflow, while lower tax rates do not make a country more attractive for investment from MNEs. Hintošová et al. (2018) show that for the Višegrad countries, corporate tax rates are not a significant predictor for FDI inflows. Friedman et al. (1992), in a similar vein, find no relationship between corporate tax rates and FDI. The relationship between countries' corporate tax rates and inward FDI is therefore ambiguous.

When considering tax expenditures, a large pool of theoretical- and empirical works can be considered. Very generally speaking, governments use tax expenditures to stimulate inward FDI (Hunya, 2000; Redonda et al., 2021). Traditional economic theory has one expect that tax incentives increase investment, given that lower costs make a country more attractive for MNEs to operate in (Brauner, 2013). Andersen et al. (2017) argue that tax incentives are effective in attracting specifically efficiency-seeking FDI. This type of FDI is mostly done by MNEs that seek to lower production costs (Dunning, 2000). Nevertheless the empirical findings on the effect of tax expenditures on FDI are inconclusive. Woodward & Rolfe (1993), for instance, find no effect of tax holidays on investment decisions. The general effectiveness of tax incentives on FDI is doubted by Redonda et al. (2021), who argue that tax incentives are mainly a tool for tax competition between countries, without having a significant impact on investment. Similarly, Fakile et al. (2012) argue that tax expenditures are not an effective policy tool for attracting FDI due to the high likelihood of misuse and high costs of forgone tax revenues. Given the diverse findings on the effect of tax rates and -expenditures on FDI, the empirical evidence is inconclusive. Nevertheless, economic logic implies a negative correlation between tax rates and -expenditures. The following section discusses a range of factors that may mediate the relationship between taxes and FDI.

2.2 FDI and other indicators

Apart from the tax rate and tax expenditures, numerous factors are shown by earlier studies to affect countries' level of inward FDI. This section considers market size, various macroeconomic indicators, government finances, governance and corruption, and education as explanatory factors for inward FDI.

2.2.1 Market size

Dunning's (1981) influential work describing a developmental approach to FDI outlines a four-stage process of development underlying the levels of FDI a country receives. Dunning

describes a developmental trajectory from developing countries with little investment from abroad moving toward higher levels of FDI due to growing domestic markets and governments stimulating investment. Having developed a functioning internal market, countries progress to the next stage. Here, there is a fall in FDI and an uptick in the competitiveness of domestic firms vis-a-vis MNEs. The last stage of development has lower inward- and higher outward FDI, due to growing domestic wages. Domestic companies start investing abroad because of lower competitiveness of the domestic labor market. It is clear from these developmental steps that market size is a principal factor in explaining the amount of inward FDI. This is corroborated by Bevan & Estrin (2004) who find that GDP is positively related to FDI inflow in transition countries. Examples of similar results showing the positive relationship between market size- and growth and FDI are by Demekas et al. (2007) in their study on the Baltic states, Alshamsi et al. (2015) for the United Arab Emirates, Asiamah et al. (2019) for Ghana, and Majocchi & Strange (2007) for Central- and Eastern European countries. Dellis et al. (2017) find a strong correlation between market size and FDI inflows for Euro countries. GDP growth is also found to be a positive influence on inward FDI for OECD countries (Alam & Zulfiqar Ali Shah, 2013).

2.3.2 Macroeconomic indicators

This section considers inflation and labor costs as macroeconomic indicators affecting FDI.

Inflation is also a metric used regularly in research on explanatory factors for inward FDI. The findings in the literature show that the direction of this linkage can differ, however. Some authors find a positive correlation between inflation and FDI (Rathnayaka Mudiyansele et al., 2021b; Sato, 2012), while others establish a negative impact of inflation on FDI (Anyanwu & Erhijakpor, 2004; Asiamah et al., 2019; Benacek et al., 2013; Demirhan & Masca, 2008; Woodward & Rolfe, 1993). To add to the inconsistency in these results, Alshamsi et al. (2015) find no significant correlation. Sato (2012) describes a dynamic that may explain the different directions this theoretical link can go, arguing that FDI is positively related to inflation given that inflation comes about when an economy is growing. Nevertheless, rapid inflation can indicate economic instability, which may inhibit FDI (ibid).

The link between labor costs and inward FDI is ambiguous. Dunning (1981) theorizes that increases in labor costs make FDI less lucrative for MNEs. This theory is corroborated by the literature, showing that higher unit labor costs are associated with lower inward FDI (Bevan & Estrin, 2004; Carstensen & Toubal, 2004; Demekas et al., 2007; Goldsbrough, 1979). Hintošová et al. (2018), have different findings, namely that higher wages lead to more FDI in

transition countries, which is corroborated by Gorbunova et al. (2012). This could indicate that the sectoral orientation of FDI impacts whether labor costs are relevant in influencing investment decisions (Hintošová et al., 2018). It may also be the case, as suggested by (Benacek et al., 2013) that the impact of wages on FDI has declined in recent years, particularly in transition economies.

2.3.3 Governance, institutions, and corruption

The functioning of institutions and the level of corruption in countries are important factors that determine the investment decisions of MNEs (e.g. Dunning, 1993; Su et al., 2018). Democratic countries are more attractive for FDI (Resmini, 2000), as are countries that have a market economy with privatized industries (Carstensen & Toubal, 2004). Furthermore, countries that are part of supranational institutions have higher inward FDI (ibid). This is due to reduced trade costs because of the abolishment of tariffs and transaction costs. Similarly, countries that manifest high certainty in doing business are found to be more attractive for investment by MNEs, as is found by Wernick et al. (2009) and Kraay et al. (1999).

Corruption is also a relevant influence on FDI inflow. For instance, Hunya (2000) argues that MNEs experience higher legal risks due to corruption, which makes investment less attractive. Empirical findings corroborate this, showing that more corruption leads to lower levels of inward FDI (Benacek et al., 2013; Su et al., 2018; Wei, 2000). There are exceptions to this theoretical link, however. While greenfield investment becomes less attractive in countries with high levels of corruption, joint ventures tend to remain somewhat unaffected. This is because local actors can more easily cut through corrupt and bureaucratic structures (Hunya, 2000). Some ambiguity comes about when considering Demekas et al. (2007), Noorbakhsh et al. (2001), and Asiedu (2002) who find that corruption is not a significant influence on FDI inflow in Southeastern Europe and the Baltic states, and developing countries, respectively.

2.3.4 Government finances

Keynesian economics is a avenue of theorization on whether government debt and the budget deficit influence growth and FDI. Simply put, according to Keynes, government spending is required to proliferate growth (Keynes, 1936; Palmer et al., 2014). Interestingly, a chronic government deficit in the budget balance is found to increase financial risk, decreasing FDI attractiveness (Hayakawa et al., 2013). Whether the Keynesian theoretical linkage between government debt and its balance of payments with FDI is still unclear. Tanna et al. (2018) argue

that national debt is a relevant factor predicting FDI in developing countries, while this linkage is not present in more financially developed countries. Evidence for this link may be sparse, given the debt and deficit stipulations in the Maastricht treaty Alamá-Sabater et al. (2016), limiting the amount of deficit and debt for many countries under analysis.

2.3.5 Education

The literature shows a positive statistical relationship between countries' education levels and inward FDI. For instance, Carstensen & Toubal (2004) found that among the CEECs, workers' skill level attracts FDI. Similarly, the Višegrad countries have a positive correlation between education attainment and FDI (Hintošová et al., 2018; Su et al., 2018), which is further corroborated by the case of Romania (Rathnayaka Mudiyansele et al., 2021b).

2.4 Hypothesis

From the literature review, it becomes clear that earlier studies identify a large number of factors that impact FDI inflows in countries. This study primarily finds a link between tax expenditures and FDI. Previous literature on this subject has shown a negative effect of corporate taxes on inward FDI. In extension to this theoretical link, I expect a positive effect of tax expenditures on FDI. Given that tax expenditures create a decrease in taxes paid by MNEs, this expectation is in line with the literature and economic theory. The main hypothesis this study uses is as follows:

An increase in tax expenditures is associated with an increase in inward FDI stocks.

3. Methodology and data

3.1 Data

This study uses annual panel data from 2005 through 2020. Countries under study were OECD members (OECD, n.d.-c) and OECD candidate members (OECD, n.d.-a).

This study uses FDI stocks as % of GDP as the dependent variable, obtained from the OECD. FDI stocks are the value of foreign investors' equity in and net loans to enterprises that are operating in a host country (OECD, n.d.-b). FDI flow is the yearly influx of capital into a country. This study does not consider FDI flows. This is because FDI flows as a percentage of GDP is a far smaller figure than FDI stocks. FDI flows therefore has a smaller range of values than FDI stocks. An increase or decrease of FDI stocks also accounts for MNEs already present in the country changing size or leaving altogether. Therefore, FDI stocks is a more appropriate and relevant metric for this study to use.

The main independent variables, forgone revenue as % of GDP and forgone revenue as % of taxes, were obtained from the newly published GTED dataset (Redonda et al., 2021). The GTED dataset includes over one hundred countries from 1990 through 2020, though only countries that are members or candidate members of the OECD are included in the analysis. Both variables are an aggregate of the forgone revenue of each tax measure by year. These variables were made by counting the forgone revenue by measure by year. The individual measures did not have a year of first implementation attached to them in the dataset. Because of missing data, it was impossible to discern whether the first instance when forgone revenue for each measure was present in the data was the year of first implementation. It was therefore not possible to use the number of measures as the independent variable. I also considered the number of beneficiaries by year. Unfortunately, this variable contained a great deal of missing data. Neither the number of individual tax measures nor the number of beneficiaries could therefore be used.

Initially, Denmark and Greece had fewer than five years of GTED data, while Japan and Switzerland had no GTED data. Similarly, Bulgaria, Finland, Romania, and Peru had five years or fewer of data on FDI. I interpolated the dataset, filling in missing values bordered by non-missing observations, using the linear method. In this way, I assumed a smooth growth or decline between the existing values. The number of values for each variable that were filled in can be found in [Appendix 1](#). Having interpolated the data, more observations were available for Switzerland, Japan, and Greece. Having interpolated the FDI- and GTED data, forty countries were included in the analysis. I conducted the data analysis both with and without interpolation to ensure no bias emerged because of interpolation. There was no change in significance of any of the variables, nor did the direction of any of the results change.

The control variables used are the nominal corporate tax rate, inflation, unemployment, GDP per capita, unit labor costs, government debt, government deficit, control of corruption, GDP, GDP growth, education spending, and tertiary education attainment. All right-hand side variables used are in a yearly panel format. I chose to use the nominal corporate tax rate instead of the effective tax rate because the effective tax rate is informed in part by tax expenditures. This could lead to a spurious correlation between the tax rate and tax expenditures. I included the variable control of corruption from the World Bank's World Governance Indicators over the other indicators from the WGI for two reasons. Firstly, the other variables from the WGI had stronger correlations with several of the other control variables than control of corruption. Secondly, control of corruption also has a strong positive correlation with each of the other variables in the WGI, making this indicator a strong proxy for governance.

Controlling for these variables allows for isolation of the effect of tax expenditures on FDI. Taking data from all OECD countries makes the identification of an effect more likely as well. Given that the countries that are members of the OECD are generally countries that are democratic and have a market-based economy (European Commission, 2022). These similarities between countries allow for more general inferences to be drawn.

3.2 Methodology

This study uses a fixed-effects panel regression. This method corrects for any time-invariant factors that may affect the amount of FDI stocks a country has. Having conducted a Wald test for heteroskedasticity and a Wooldridge test for autocorrelation, both were found to be present in the model. To correct for heteroskedasticity and autocorrelation, I used robust standard errors clustered on the country variable. I also included dummy variables for the year of each observation to account for any time trends. I also tested for unit roots in the dependent- and independent variables. The tests showed that the dependent- and independent variables were stationary processes. All right-hand side variables were so found to be strictly exogenous.

GDP and GDP per Capita were added to the regressions in the form of a natural logarithm. I used the natural logarithm of these variables to decrease their range, mitigate any skewness, and aid in interpretation. The independent- and control variables were included with a one-period lag. The only exception to this is the control variable unit labor costs since this variable is measured as a percentual change in the previous period. This accounts for the time that it takes MNEs to change their foreign investment strategies after a change in the tax rate and/or tax expenditures a country implements. Adding the right-hand-side variables with a one-period lag therefore makes the interpretation of the effect closer to causal.

3.2.1 Equations

$$FDI \ddot{stocks}_{it} = \beta_0 + \beta_1 * TE \text{ as \% of } \ddot{tax \ revenue}_{it} + \beta_2 * \ddot{date}_{it} + \beta_k * \ddot{X}_{it} + \ddot{u}_{it}$$

$$FDI \ddot{stocks}_{it} = \beta_0 + \beta_1 * TE \text{ as \% of } \ddot{GDP}_{it} + \beta_2 * \ddot{date}_{it} + \beta_k * \ddot{X}_{it} + \ddot{u}_{it}$$

β_0 is the constant, β_1 as the effect of tax expenditures either as a percentage of GDP or as a percentage of the tax revenue on FDI stocks, and β_2 representing effect of the time trend. X_{it} represents the effect of the control variables. The time-constant factors, normally depicted as a_i are removed because of the chosen fixed effects model. Finally, u_{it} is the idiosyncratic error term.

3.2.2 Variables

Concept	Source	Variable	Expected sign
Taxation	OECD	Nominal corporate tax rate	-
Market size	OECD	GDP in USD	+
	OECD	GDP growth %	+
Macroeconomic indicators	OECD	Inflation %	-
	OECD	Unemployment %	-
	OECD	GDP/c PPP in USD	+
	OECD	Unit labor costs: % change previous period	+
Government finances	OECD	Government debt as % of GDP	-
	OECD	Government deficit %	+
Governance	WB	Control of corruption %	+
Education	OECD	Education spending as % of GDP	+
	OECD	Tertiary education attainment %	+

Table 1: expected signs for control variables

4. Results

4.1 Descriptive statistics

Before conducting a full regression, I created a correlation matrix between all right-hand-side variables. This matrix is reported in [appendix 2](#). This correlation matrix shows that there is no perfect multicollinearity between any of the right-hand-side variables. The strongest correlations between two control variables are between control of corruption and GDP per capita or between tertiary education attainment and GDP per capita. The coefficients for these correlations are 0.74 and 0.68, respectively. A full overview of the descriptive statistics for each of the variables can be found in [appendix 3](#). Interesting to note is that on average 24.79% of tax revenue is forgone by countries using expenditures for all observations. The spread of this variable is large, with a minimum of 0.71% and a maximum of 94.75%. It is therefore clear that countries employ vastly different strategies when it comes to tax expenditures. The average forgone revenue as a percentage of GDP is 4.545%.

4.2 Panel fixed effects regressions

[Appendices 4 and 5](#) display scatter plots of the relationship between FDI stocks and forgone revenue as a percentage of GDP and as a percentage of tax. From these scatter plots it can be observed that there is a positive relationship between FDI stocks and tax expenditures. Subsequently, fixed effects regressions of FDI stocks on forgone revenue as a percentage of GDP and as a percentage of tax were conducted and reported in [appendices 6 and 7](#). These

regressions add one group of control variables for each regression. Without any control variables, the effect of a one percentage point increase in forgone revenue as percentage of GDP is associated with a 4.840%-point increase in FDI stocks. This effect is not robust to the addition of the nominal corporate tax rate, which has a negative relationship with FDI. This relationship is in line with the theoretical expectations. When adding each group of control variables, it becomes clear that the relationship between tax expenditures as a percentage of GDP and FDI stocks is not robust to the addition of most sets of control variables, apart from the regression that includes education. Tax expenditures as a percentage of GDP has a smaller range than the tax expenditures as a percentage of tax revenue. The two dependent variables are also positively correlated. Given these two facts, I will use forgone revenue as a percentage as the independent variable for the full statistical model.

Further investigating the results from [Appendix 8](#), which contains the effect of forgone revenue as a percentage of the total tax revenue on FDI stocks. The effect of a one percentage point of change in tax expenditures as a percentage of tax revenue is associated with a 0.905%-point increase in FDI stocks in the next period. The effect is significant at the 95% level. The effect of tax expenditures as a percentage of tax revenue is robust to the addition of each group of control variables. This robustness to the addition of the groups of control variables is the main difference between the effect of tax expenditures as a percentage of GDP and tax expenditures as a percentage of tax on FDI stocks. Another observation from these two sets of regressions is that the nominal corporate tax rate mediates the effect of tax expenditures as percentage of GDP on FDI stocks, mediating the effect of the main independent variable. The effect of tax expenditures as a percentage of tax revenue is robust to the addition of the nominal tax rate as a control.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forgone revenue as % of tax	0.858* (0.363)	0.859* (0.365)	0.915* (0.383)	1.005* (0.420)	1.092* (0.426)	1.094* (0.429)	0.905* (0.361)
Corporate income tax rate		Yes	Yes	Yes	Yes	Yes	Yes
Market size			Yes	Yes	Yes	Yes	Yes
Macroeconomic factors				Yes	Yes	Yes	Yes
Government finances					Yes	Yes	Yes
Governance and corruption						Yes	Yes
Education							Yes
Dummy years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	412	412	412	325	319	319	277
Number of ID	37	37	37	32	32	32	32
Adjusted R-squared	0.169	0.167	0.208	0.268	0.341	0.340	0.615

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 2: Full statistical model

The full statistical model shows that tax expenditures, when this is measured as a percentage of the tax revenue, has a statistically significant relationship with FDI stocks in the next period. The effect is robust to the addition of the control variables. As such, the model shows that when countries increase their tax expenditures by one percentage point of the total tax revenue this leads to an increase in FDI stocks in the next period, *ceteris paribus* on the control variables. The coefficient with all control variables included is 0.905, which is a strong statistical relationship. The effect is significant at the 95% level.

Analyzing the correlations between FDI stocks and the control variables, three points are worth noting. First off, the lack of a correlation between the nominal corporate tax and the dependent shows that there is no mediation of the effect of tax expenditures as a percentage of tax on FDI stocks. Given this lack of mediation of the effect of tax expenditures on FDI stocks, there is evidence that it is tax expenditures and not the nominal corporate tax rate which influences FDI stocks. Secondly, the percentage deficit on the budget has a strongly significant positive correlation with FDI stocks. A theoretical explanation for this effect is that MNEs are invest in countries that have a balanced budget or a budget surplus. A deficit is measured as a negative number, with positive values indicating a budget surplus. Third, GDP growth and inflation have significant coefficients in the regressions that build up to the full model. Nevertheless, in the full model these significant effects disappear. When accounting for all the control variables the correlation between FDI and GDP growth and inflation is not significant.

The F-statistic for the regression model including all control variables is 130.44, which is significant for $p < 0.001$. The adjusted within R-square of the model is 0.615, which means that the variables in the model account for 61.5% of the variance in FDI. The adjusted R-squared increases with the addition of the control variables, showing that the fit of the model improves upon the addition of the controls. The only group of controls that does not improve the fit of the model is control of corruption. The lack of a correlation and the slight decrease in the goodness of fit when adding control of corruption is not a significant hindrance FDI in OECD countries. Notwithstanding, it may be the case that the levels of corruption among OECD (candidate) countries are not different enough or do not significantly change over time to affect FDI. Overall, the variables included in the model are jointly significant, explaining a substantial percentage of the variance in FDI stocks among the countries included in the analysis.

5. Conclusion and Discussion

With the EU striving towards the implementation of a common minimum corporate tax rate (European Commission, n.d.), tax expenditures may be a key arena for countries to create locational advantages for MNEs. Particularly considering the potential deepening and strengthening international trade and business, tax expenditures are an important part of fiscal conditions that cannot be ignored by researchers. This study has extrapolated whether tax expenditures, rather than the nominal corporate tax rate have an impact on the gross amount of FDI OECD countries receive. Overall, the empirical model has shown that tax expenditures are relevant in informing FDI stocks. The effect is positive, which is in line with the theoretical expectations. Specifically, one percentage point increase in tax expenditures as a percentage of tax revenue increases the FDI stocks held by countries in the next period with 0.905%-points. This effect is robust to the addition of the tax rate and several control variables measuring market size, macroeconomic conditions, government finances, and education.

5.1 Limitations

This study has some limitations, particularly with regards to the nature of the data and the completeness of the model. This section considers these limitations and outlines the remedies that I took to mitigate any issues present. Firstly, it is important to note that the GTED database on tax expenditures directly uses data provided by national governments and -tax agencies (GTED, n.d.). As such, there are methodological shortcomings in the levels of reporting and national benchmark systems of forgone revenue estimations. This study's cross-country, longitudinal approach, therefore bear the limitation that data may not be entirely consistent. In a similar vein, multiple countries had missing data on tax expenditures. Especially Switzerland, Denmark, Japan, and Greece had fewer unknown. Particularly of interest is if missingness is correlated to any country-specific factor(s). The amount of missing data for the measurement of the number of beneficiaries decreased the representativeness of this indicator. The number of beneficiaries may have yielded useful insights. Nevertheless, because of missing data, this factor could not be taken up in the analysis.

Another limitation of this study is the fact that not all indicators that have an impact on MNE's location choices could be included in a singular model. In line with Dunning's (1988) argumentation for the eclectic paradigm in the economic groundworks of international production, various factors have been included in the analysis, particularly location advantages in macroeconomics, government policy, and education. Notwithstanding this study's aim of developing a broad conclusion on the effect of tax expenditures on FDI, there may be relevant

omitted variables. Capturing the full scope and nuance of MNE investment decisions and accounting for all controls is not viable.

5.2 Research- and policy implications

Future scholars should consider tax expenditures as a factor explaining locational advantages for the settlement of MNEs. The nominal corporate tax rate is not a relevant predictor of inward FDI stocks, while tax expenditures as a percentage of tax revenue is. Future studies may consider the differentials in tax expenditures between the host- and target countries on top of other country interactions. Such insight may give a more nuanced picture of the decisions of MNEs. Another valuable addition to the literature would be more detailed studies on how different sectors react to tax expenditures. A broader set of control variables should also be included to account for more factors influencing MNE investment decisions.

The societal implications of this study are twofold. Firstly, it is important to emphasize that fiscal conditions do matter for countries. As such, merely creating fertile ground for MNEs by improving institutions and education, for instance, may not be enough. Policymakers should consider the fiscal conditions of their country if attracting FDI is a policy goal. Lowering the corporate income tax is not a suitable strategy for attracting FDI. Instead, tax expenditures are strong predictors for the volume of FDI a country is to receive. Secondly, policymakers need to consider a multitude of factors in attracting foreign capital. Pursuing a larger volume of FDI by implementing tax expenditures may lead to various problems. Tax expenditures can be costly and opaque.

The conclusion of this study is not an argument in favor of creating a liberal fiscal climate. Policymakers and the public must consider what MNEs provide benefit for the local economy and whether they improve the welfare and prosperity of communities. The public interest must be at the forefront of decision making on tax policies. I found that abolishing taxes such as the Dutch cabinet proposed in 2017, or lowering corporate taxes are not effective ways of attracting FDI. This study has found tax expenditures to be a strong predictor for inward FDI stocks. Governments must make rational decisions on tax policies. In doing so they must be cost-effective, efficient, and transparent, as is argued by Dessler et al. (2022). Accountability and rational decision making are imperative in decision making on costly tax expenditures.

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Appendix 1: Interpolation

Variable	Before interpolation		After interpolation		Δ
	No. missing	% Missing	No. missing	% Missing	
Country	0	0.00	0	0.00	0
Year	0	0.00	0	0.00	0
Forgone revenue as % of tax revenue	174	27.19	154	24.06	20
Forgone revenue as % of GDP	141	22.03	121	18.91	20
FDI stocks as % of GDP	122	19.06	120	18.75	2
Log GDP in mln USD	17	2.66	17	2.66	0
Log GDP/c PPP in USD	18	2.81	18	2.81	0
GDP growth %	16	2.50	16	2.50	0
Inflation %	77	12.03	77	12.03	0
Government debt as % of GDP	113	17.66	113	17.66	0
Government deficit	88	13.75	88	13.75	0
Corporate tax rate	0	0.00	0	0.00	0
Percent unemployment	88	13.75	88	13.75	0
ULC as % change in previous period	107	16.72	107	16.72	0
Control of corruption	0	0.00	0	0.00	0
Education spending as % of GDP	230	35.94	166	25.94	64
Tertiary education attainment %	89	13.91	79	12.34	10

Appendix 2: Correlation matrix control variables

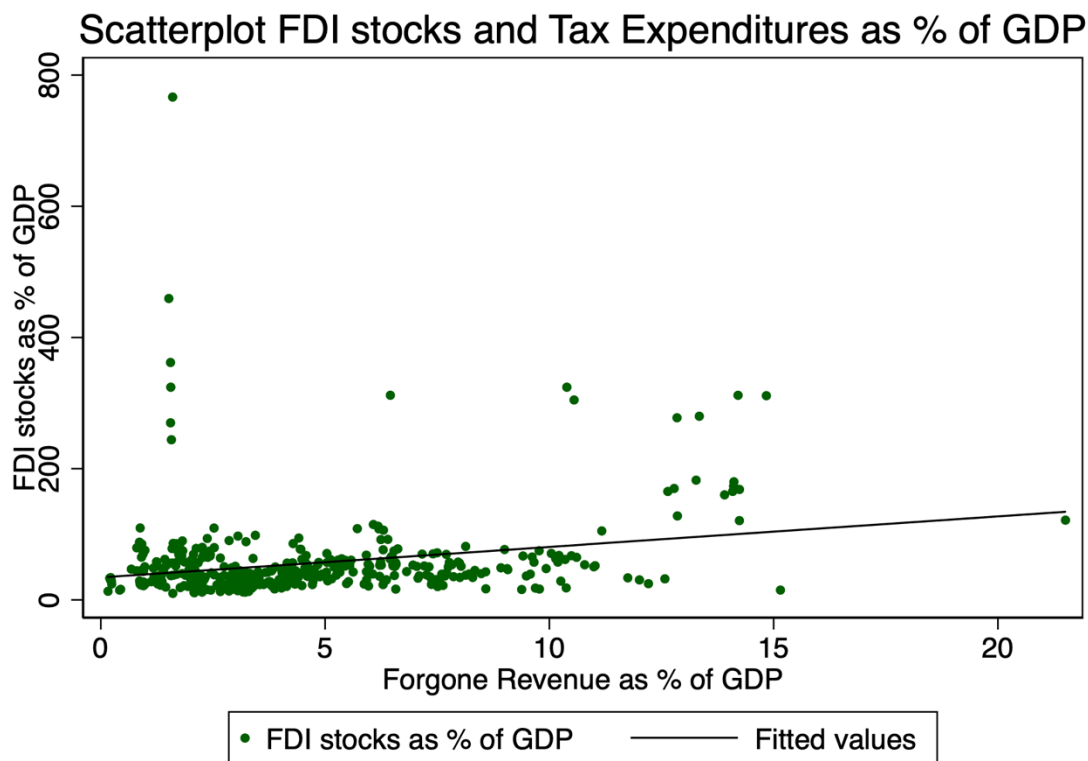
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Corporate income tax rate	1											
(2) Ln GDP in mln USD	0.52	1										
	(0.00)											
(3) GDP growth %	-0.11	-0.11	1									
	(0.00)	(0.00)										
(4) Inflation %	-0.01	0.01	-0.02	1								
	(0.90)	(0.82)	(0.63)									
(5) Percent unemployed	-0.04	-0.03	-0.15	-0.02	1							
	(0.39)	(0.51)	(0.00)	(0.60)								
(6) Ln GDP/c PPP in USD	0.09	0.08	-0.16	-0.33	-0.35	1						
	(0.03)	(0.04)	(0.00)	(0.00)	(0.00)							
(7) ULC as % change in previous period	-0.16	-0.25	-0.02	0.46	-0.32	-0.27	1					
	(0.00)	(0.00)	(0.59)	(0.00)	(0.00)	(0.00)						
(8) Government debt as % of GDP	0.33	0.49	-0.28	-0.32	0.23	0.28	-0.29	1				
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)					
(9) Government deficit %	0.02	-0.19	0.37	0.04	-0.44	0.16	0.21	-0.41	1			
	(0.59)	(0.00)	(0.00)	(0.30)	(0.00)	(0.00)	(0.00)	(0.00)				
(10) Control of corruption %	0.06	-0.10	-0.07	-0.32	-0.25	0.74	-0.19	0.07	0.20	1		
	(0.13)	(0.01)	(0.09)	(0.00)	(0.00)	(0.00)	(0.00)	(0.13)	(0.00)			
(11) Education spending as % of GDP	0.22	-0.16	-0.19	-0.07	-0.19	0.18	0.06	0.03	0.18	0.36	1	
	(0.00)	(0.00)	(0.00)	(0.12)	(0.00)	(0.00)	(0.20)	(0.59)	(0.00)	(0.00)		
(12) Tertiary education attainment	-0.06	0.02	-0.06	-0.32	-0.24	0.68	-0.12	0.16	0.10	0.63	0.30	1
	(0.18)	(0.65)	(0.13)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)	(0.00)	

P-values in parentheses. Bold coefficients are significant for $p < 0.05$

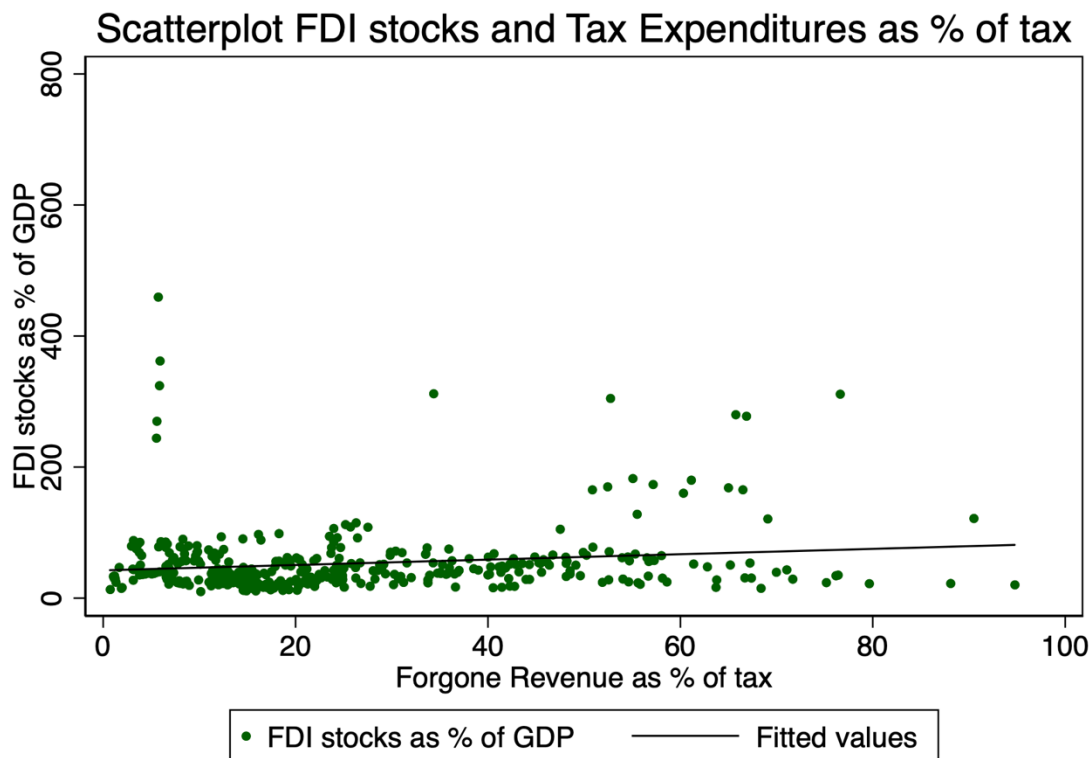
Appendix 3: Summary statistics

Variable	N	Mean	SD	Min	Max
Forgone revenue as % of tax revenue	486	24.79	18.61	0.709	94.75
Forgone revenue as % of GDP	519	4.545	3.216	0.155	21.50
FDI stocks as % of GDP	520	54.90	60.29	10.43	766.9
GDP in mln USD	623	1.244e+06	2.750e+06	11,075	2.137e+07
GDP/c PPP in USD	622	35,513	17,514	8,432	117,721
GDP growth %	624	2.080	3.677	-14.84	25.36
Inflation %	563	2.693	3.826	-4.478	53.55
Government debt as % of GDP	527	68.92	35.09	7.195	183.9
Government deficit	552	-2.028	4.371	-32.12	18.64
Corporate tax rate	640	25.10	6.881	9	39.30
Percent unemployed	552	7.595	3.577	2.017	26.12
ULC as % change in previous period	533	2.695	3.774	-15.56	27.12
Control of corruption	640	77.26	19.07	18.27	100
Education spending as % of GDP	474	4.351	0.852	2.487	6.591
Tertiary education attainment %	561	31.19	10.69	9.624	59.96

Appendix 4: Scatter plot TE as % of GDP and FDI stocks with trendline



Appendix 5: Scatter plot TE as % of tax and FDI stocks with trendline



Appendix 6: Fixed effects panel regression of FDI stocks on FE as % of GDP with controls

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forgone revenue as % of GDP	4.840* (2.340)	4.665 (2.314)	3.782 (2.364)	4.148 (2.553)	4.783 (2.359)	3.901 (2.203)	4.139* (1.853)
Corporate income tax rate		-1.389* (0.617)					
Inflation %			1.999 (1.128)				
Percent unemployed			2.016 (1.389)				
Ln GDP/c PPP in USD			116.149 (59.138)				
ULC as % change in previous period			-1.401 (2.088)				
Government debt as % of GDP				0.611* (0.264)			
Government deficit				2.596* (1.026)			
Control of corruption					-0.250 (0.258)		
Ln GDP in mln USD =						54.213* (26.690)	
GDP growth %						1.146 (1.003)	
Tertiary education attainment %							2.422 (1.389)
Education spending as % of GDP							-23.372 (12.198)
Constant	33.77** (10.78)	70.883** (20.941)	-1,200.091 (625.151)	0.424 (17.016)	53.786* (25.539)	-682.770 (354.573)	60.759* (26.013)
Observations	414	414	325	365	414	414	347
Number of ID	37	37	32	35	37	37	37
Adjusted R-squared	0.065	0.072	0.188	0.140	0.063	0.160	0.371
Robust standard errors in parentheses							
*** p<0.001, ** p<0.01, * p<0.05							

Appendix 7: Fixed effects panel regression of FDI stocks on FE as % of tax with controls

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forgone revenue as % of tax	1.019* (0.436)	0.980* (0.438)	0.912* (0.381)	0.956* (0.440)	1.011* (0.432)	0.826* (0.368)	0.868* (0.361)
Corporate income tax rate		-1.283 (0.653)					
Inflation %			2.200* (1.063)				
Percent unemployed			1.615 (1.221)				
Ln GDP/c PPP in USD			111.256* (52.768)				
ULC as % change in previous period			-1.442 (2.118)				
Government debt as % of GDP				0.607* (0.228)			
Government deficit				2.719** (0.961)			
Control of corruption					-0.383 (0.454)		
Ln GDP in mln USD =						53.378* (23.937)	
GDP growth %						1.120 (0.957)	
Tertiary education attainment %							2.367 (1.283)
Education spending as % of GDP							-22.692* (10.922)
Constant	30.42** (11.06)	64.930** (22.214)	-1,150.744* (559.782)	-3.947 (20.049)	60.946 (38.109)	-674.313* (321.909)	56.352* (26.344)
Observations	412	412	325	365	412	412	347
Number of ID	37	37	32	35	37	37	37
Adjusted R-squared	0.078	0.083	0.200	0.156	0.077	0.169	0.389
Robust standard errors in parentheses							
*** p<0.001, ** p<0.01, * p<0.05							

Appendix 8: Full statistical model

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forgone revenue as % of tax	0.858* (0.363)	0.859* (0.365)	0.915* (0.383)	1.005* (0.420)	1.092* (0.426)	1.094* (0.429)	0.905* (0.361)
Corporate income tax rate		0.174 (1.011)	0.281 (0.963)	0.0530 (0.888)	0.294 (0.714)	0.315 (0.712)	-0.225 (0.634)
Ln GDP in mln USD			52.84 (67.93)	103.2 (144.5)	269.3 (154.3)	266.4 (153.6)	69.50 (119.2)
GDP growth %			2.482 (1.290)	2.874 (1.535)	2.585* (1.230)	2.643* (1.256)	1.382 (0.853)
Inflation %				3.182* (1.472)	1.914 (1.649)	1.991 (1.683)	0.682 (1.203)
Percent unemployed				3.031 (2.028)	2.038 (1.483)	2.225 (1.430)	2.570 (1.360)
Ln GDP/c PPP in USD				60.39 (199.4)	-86.07 (171.1)	-89.33 (173.6)	122.2 (127.3)
ULC as % change in previous period				-2.507 (2.328)	-3.194 (1.604)	-3.182 (1.595)	-2.726 (1.514)
Government debt as % of GDP					0.647 (0.361)	0.657 (0.358)	0.504 (0.305)
Government deficit					2.889*** (0.670)	3.056*** (0.767)	2.014** (0.564)
Control of corruption						0.768 (0.796)	0.243 (0.493)
Tertiary education attainment %							2.991 (1.545)
Education spending as % of GDP							-9.669 (7.963)
Constant	19.78 (13.43)	14.74 (39.25)	-678.7 (900.1)	-1,961 (1,262)	-2,632* (1,262)	-2,630 (1,293)	-2,237** (796.4)
Observations	412	412	412	325	319	319	277
Number of ID	37	37	37	32	32	32	32
Adjusted R-squared	0.169	0.167	0.208	0.268	0.341	0.340	0.615
Control for years is not displayed							
Robust standard errors in parentheses							
*** p<0.001, ** p<0.01, * p<0.05							