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Tax Wedges and FDI Decisions in the EU15

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Abstract

Free movement of labour and open borders are one of the main principles of the European Union. Workers can relatively easy relocate in the search for new job opportunities and firms compete internationally for productive labour. Corporate taxes affect firms' profits, and also their investment decisions. The costs associated with employment on the other hand have not been studied to the same extent. They do however affect the returns to the investment by impacting production costs and the ability to attract and retain productive labour. In theory therefore, expensive labour (i.e. high tax wedges) should lead more restrictive FDI inflows.

This paper uses bilateral panel data on FDI flows in the EU-15 to analyse the impact of tax wedges on labour on foreign direct investment decisions. The tax wedge is the ratio between the labour cost and the net salary of that labourer. By using this indicator I try to capture the effects of total expensiveness of labour on firms' decisions of investing abroad. I use data for the EU-15 countries in order to control for unobserved heterogeneity and due to the relative mobility of labour in those countries. I employ a gravity equation in my efforts to derive the determinants of FDI-flows and I find that tax wedges in general and employee social security contributions in particular do affect the investment decision of intra-EU15 FDI in a negative way. Due to many zero bilateral observations I use a Heckman two-step estimation model, which controls for sample selection bias and effectively controls for non-existing and negative flows from the regression. For robustment checks I also employ a tobit estimation and a fixed effect estimation. The purpose of this paper is to analyze whether cross-country differences in the tax wedge affects investment decisions.

Keywords: FDI, tax wedges, labour cost, social security contributions

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1. Introduction

I will empirically analyse the impact of tax wedges on incoming foreign direct investments. Generally, most types of taxes are thought to have a dampening effect on FDI, mainly because the profits that companies seek to make can be kept larger in economies with similar economic structures but with lower taxes. The determinants of inflows of FDI differ widely depending on what types of economies are analysed. For instance flows to the EU15[1] are not determined by the same factors as inflows to sub-Saharan countries. In order to be able to draw relevant conclusions for Sweden I will examine bilateral intra EU15 FDI flows. The EU15 countries are characterized by relatively stabile exogenous variables and this allows me to focus on the determinants of FDI that I wish to study. The labor market is also relatively mobile, in 2008 over 1,1% of the total workforce moved internally, indicating an elastic labor supply that answers to cross-country differences (EU, 2008). Moreover the data on the EU15 countries is homogenous and extensive, which simplifies cross-country comparisons. Foreign direct investments are generally assumed to impact the host economy in a positive way, primarily by contributing to increased capital accumulation and technological development (Fregert K. and Jonung L., 2010). By using tax wedges as a dependent variable I wish to analyse whether FDI-inflows are affected and consequently if the positive spillovers associated with FDI are deterred by high wedges.

The amount of papers looking at the effects of corporate taxes on FDI are overwhelming, but surprisingly other types of taxes have not been studied to the same extent. Researchers tend to argue that corporate taxes affect FDI decisions in a relatively large negative way, with estimates of semi-elasticities ranging from -5 to 0 with a median of -2.9 (De Mooij & Ederveen, 2006). Reasonably, taxes that should be of interest to study are the ones that in any way affect the profits and thus also the investment decisions of companies. By assuming that capital is more mobile than labour and therefore also more affected by differences between countries, taxes on capital have been studied to a greater extent. I however argue that taxes on labour, and labour costs in general also influence firms' investment decisions, particularly those levied on knowledge intensive and high-skilled labour. The tax wedge, which is

[1] Countries that count as old EU members or EU15 are: Austria, Belgium, Denmark, Germany, Greece,

measured by the income tax plus employee and employer social security contributions as a % of total labour costs, captures the total expensiveness of labour in relation to what workers actually earn. Total labour costs are defined as gross pay together with employee and employer social security contributions. A high tax wedge therefore implies that the workers' take-home pay makes up a relatively small part of total labour costs, leading to big costs associated with wage increases. Therefore a country, whose work force is expensively employed and accompanied with higher costs in comparison to its trading partners, should deter inflows of FDI. Also high tax wedges within the EU have been found to correlate negatively with employment, indicating that employer and employee social security contributions, together with income taxes, have a positive impact on unemployment (Dolenc & Laporsek, 2010). Consequently this ought to deter FDI.

Intra EU15 FDI is to a greater extent characterized by horizontal FDI rather than vertical FDI. Since the common market enables firms to actively and cost-effectively distribute products throughout the union, there is reason to assume that expanding operations primarily imply the duplication of activities in order to penetrate markets. The gains from selling locally are thus larger than the costs of entering foreign markets through trade or licencsing. Since trade barriers, and trading costs in the union are relatively low, the incentives to purchase or set up a new business facility must offset the costs associated by that investment. Consequently, high tax wedges on labour imply higher costs, eventually affecting firms' profits and reshaping the advantageousness of the mode of entry. Labour taxes ought therefore to be important in that investment decision and by using panel data on bilateral FDI flows and stocks I will analyse the impact of tax wedges on labour on FDI decisions.

A tax wedge is by the OECD defined as the ratio between the amount of taxes paid for an average single worker without children and the corresponding total labour cost for the employer. It gives valuable information about income taxes paid by workers and the social security contributions levied on employees and employers and therefore also on the marginal rate of transformation between labor and consumption (Black, et al., 2009). A higher tax wedge implies that a lesser proportion of total labor costs can be used for consumption. Also countries with a higher tax wedge on labor tend to display a higher total tax burden (OECD 2006b). How this affects the labor market and unemployment levels depend to a great deal on how the tax burden is distributed and also how the extra revenues are used. While being significantly

correlated with unemployment, redistribution of income or increased infrastructural investments may reduce unemployment, whereas actuarial components that are used to benefit workers during different phases in life may be counter-productive (OECDb, 2006). The effects on FDI inflows are however relatively unknown. Income taxes in general are sought to dampen the inflows of FDI, and combined with larger statutory social security contributions the impact on FDI should be even greater. From a company perspective it makes sense that higher tax wedges on labor should discourage investments since it renders a more burdensome workforce and consequently lowers profits

The paper will follow a two-stage Heckman estimation model where FDI decisions are seen as a process of two steps. Fist a company decides whether to invest or not, and second the amount to invest. The analysis will be based on bilateral FDI flows and stocks to and from the EU15 and data on the tax wedge on labor in the EU15. Following the usage of cross-country differences I will also examine actual values on the tax wedge on labor and also if the effects are different when solely looking at employer and employee social security contributions and thus discarding the effects of the income tax. I will also use a tobit estimation and a panel data fixed effects model for robustness checks.

The paper will be structured as follows. Part 2 will go through related literature and theory and discuss incentives for FDI, different forms of FDI and how tax wedges might impact FDI. Also part 2 will present theory regarding horizontal FDI and discern employee and employer social security contributions from the tax wedge. Part 3 gives an overview of the tax wedge on labor and FDI during the studied time period. Part 4 presents the data set, the methodology and the econometrics. Part 5 will put forward the results while part 6 provides an analysis and a discussion and finally part 7 will conclude the paper.

2. Background

2.1 FDI Motivations

A company's survival depend on the profits it makes. If its home market is not sufficient to ensure its survival or if the costs along different value chains are too high, the firm can choose to explore international options. Depending on what advantages the firm has over existing foreign competition; it can choose to enter the market in different ways. The investment decision process of MNEs (multinational enterprises) is complex and affected by a range of different factors. In order to simplify the analysis I will make use of the Eclectic Paradigm laid forward by Dunning in 1977. Basically it explains when MNEs choose the foreign direct investment option as a way to enter a foreign market. As shown in table 1 FDI will take place when the MNE has three simultaneous advantages, namely ownership, location and internalization.

Figure 1: MNE advantages

Source: Dunning J. H. (1977)

The first advantage refers to a firm's tangible or intangible assets. These could for instance be proprietary rights or transaction cost minimizing advantages. Location advantages are external advantages and include natural resources and other institutional, governmental and legal aspects that make it easier to do business. Lastly, internalization advantages refer to the benefits of controlling foreign production.

In this breakdown of benefits, one could argue that the tax wedge would go under localization advantages. A lower tax wedge would imply a smaller difference between net pay and total labor costs and thus an advantage of that particular economy. On the other hand, depending on how big the different tax wedge components are their effects on FDI might also be different. For instance, as shown in

figure 3, the average tax wedge in Netherlands is 37,7%, while it is 38,4% in Denmark the components are totally different. In the Netherlands 39% of the tax wedge is made up of income tax, while in Denmark the income tax makes up 93% of the tax wedge. Even though their total effect on firm's profits are almost the same, their components differ widely, and this might be important to the analysis.

2.2 Different forms of FDI

UNCTAD (2009) defines FDI as a long-term investment made to acquire interest in firms or enterprises outside of the economy of the investor. The purpose is to obtain and to be able to control and steer the management of the acquired investment. A threshold of 10% is needed in order for the investment to be qualified as a foreign direct investment. Moreover a direct investment encompasses partly the initial investment and all succeeding transactions both between the parent entity and the direct investment and among affiliated firms (OECD, 1996, 2006).

FDI can either be seen as a stock or as a flow. While flows refer to capital transactions between the parent company and the affiliate, stocks refer to the share of the foreign company's capital and indebtness. Capital transactions can be decomposed into equity capital, reinvested earnings and intra-company loans. In order to be able to analyze the effects of tax wedges on FDI it is important to clarify the assumptions used in this paper. A foreign direct investment can be conducted in different ways; this paper however will not make any distinction between the different entry modes, the main reason being trouble obtaining reliable and sufficient data for the different investment types across the time period.

Greenfield investment occurs when a foreign company sets up a completely new branch, research facility or other business establishment in a host country. Brownfield investments are related to greenfield investments in the sense that both aim to launch a new production activity. Brownfields however do this buy purchasing or leasing existing production facilities whereas greenfield investments imply the starting up of completely new facilities. Mergers & acquisitions (M&A) could basically be explained as the transfer of management. UNCTAD (2009) differentiates between three types of M&As; when a domestic company is sold to a foreign company, when a foreign affiliate is sold to a domestic company and when a foreign company purchases another foreign company in the same host country.

2.3 Tax wedges and FDI

Wedges in general can be said to have a distorting effect on prices. Black et al. (2009) transmits this thinking to the labor market and points out that the relative prices of two commodities can deviate from their efficient value when subject to wedges. Tax wedges on labor can create price distortions between the price of consumption relative to the wage while affecting the marginal rate of transformation between consumption and labor. Specifically a larger tax wedge on labor, i.e. a bigger difference between total labor costs and the net pay, implies that more labor is needed for the same consumption levels. In turn this means that production is also associated with tax wedges on labor since it affects the firms total costs. Consequently a more expensive workforce caused by higher tax wedges should deter investments by increasing costs and also distort consumption prices relative to wage rates by making consumption more expensive. An Italian study conducted by Andrea Festa (2014) arrives at the conclusion that specifically northern Italy (which is far more industrialized than its southern counterpart) shows a negative relationship between tax wedges on labor and employment levels. Moreover Anamarija Separovic (2009) lengthens the analysis by including all OECD countries in her study on tax wedges on labor. She finds that tax wedges, by increasing firms' labor costs, indirectly affect unemployment levels. Generally, authors tend to agree with the conclusion that tax wedges correlate negatively with unemployment levels and positively with employment levels. Turning to basic labor theory, illustrations on the taxation of labor point to the same direction (Borjas, 2013). By levying a tax on employment, regardless if it is assessed on firms or employers, the average wage and employment levels will decline.

Turning to labor productivity, which can be used as a measure of an economy's competences and industrial effectiveness, Hong Ding (2008) uses a two-stage least square fixed effect model on panel data on OECD countries. He finds that a one-percentage increase in the tax wedge on labor can lead to a 0,09 percentage decrease in labor productivity growth rate. Moreover Dolenc and Laporsek (2010) find that a one-percentage increase of the tax wedge on labor decreases employment growth in the EU-27 by 0,10 percentage points. In total, all studies I have found point to the same direction that tax wedges on labor impact both employment and productivity levels negatively.

2.3.1 Employer and employee social security contributions

Part of the tax wedge consists of employee and employer social security contributions. In contrast to the tax wedge, they are measured as a percentage on gross pay. So when table 2 states that Sweden has an income tax of 13,2%, it means that 13,2% of the total labor cost are paid as income taxes. Nevertheless, table 2 shows the employee and employer social security contribution levels across the time period and one can clearly see how Ireland has relatively low SSC contributions compared to its European counterparts. The effects of social security contributions on the economy have been studied, but the effects are somewhat ambiguous. Kerry Papps (2012) uses worker-level panel data for Turkey for 2002-2005 and points to the fact that an increase in social security taxes paid by employers and employees tend to decrease the probability of a worker remaining employed in the next quarter. One could argue that higher SSCs increase the cost of labor and consequently lowers the incentives to hire and retain labor. On the other hand social security contributions might also increase labor mobility, enabling dissatisfied workers with the financial possibility to quit their jobs while actively looking for new employment possibilities. Increased labor mobility have in turn shown to increase innovative activity (Kaiser et al. 2015). In conclusion I expect tax wedges in general and employer and employee social security contributions to have a negative effect on FDI-inflows.

2.3.2 Horizontal FDI

A multinational firm that engages in horizontal FDI duplicates its production processes in new markets. A plant-specific fixed cost is thus incurred, but that cost has to be lower than the cost of entering the market trough trade or licensing. To show the decision processes of the multinational and determine the condition that needs to hold in the first question of investment I follow the way of thought presented in Feenstra (2004). Without deriving the function (specified in pp. 387-389) he arrives at the following condition:

$$\frac{1}{\sigma}\left(\frac{p^i}{P^i}\right)^{1-\sigma} * Y^i - w^i a^i \geq \frac{1}{\sigma}\left(\frac{p^j T^{ij}}{P^i}\right)^{1-\sigma}$$

The left term refers to profits made by investing and operating new production facilities in host country *i* and the right term refers to profits made by exporting from

country *j* to country *i*. One can clearly see how the wage level in the host country, w^i, affects total profits of the investment negatively. a^i refers to the plant fixed costs in the host country, and the larger these two parameters are the larger the profits must be in order for the investment to be profitable. In other words, investments in countries were the cost of labor is driven up by tax wedges need to be less risky and more certain of being successful. This ought to deter some investments and instead lead to higher exports to that particular country.

2.4 Previous studies

There are to my knowledge no previous studies that examine the effect of tax wedges on foreign direct investment. However tax wedges could be seen as a cost that makes employment more expensive and thus could be compared to an income tax. There has not been written a great deal about that either but there is still enough material available for me to be able to expect certain results. The main reason to conduct foreign direct investments is to increase profits (Bellak and Leibrecht, 2009). These profits will in turn dampen when subject to energy prices, cost of labor, taxation policies and other costs. Most commonly, FDI-flows are estimated to correlate negatively with costs that affect the return on investment. In the introductory section I mentioned that previous studies have in general found that corporate taxation affect FDI decisions in a relatively large negative way, with estimates of semi-elasticities ranging from -5 to 0 with a median of -2.9 (De Mooij & Ederveen, 2006). Studies on labour taxation tend to point to the same direction. Hansson and Olofsdotter (2013) employ a gravity equation and use data on marginal and average labour tax rates for 27 EU states during 1997-2007 to find that such taxes have a negative impact on FDI. They argue that labour taxation do matter, primarily because its burden, in a high-skilled worker environment, falls on the employer. Labour has traditionally been viewed as less mobile than capital, sometimes even inelastic. Daveri and Tabellinni (2000) and Bingley and Lanot (2002) however contrast that by specifying that high-skilled labour tend to be relatively responsive to cross-country differences. As in the intra EU-15 case, where an increasing amount of highly skilled workers relocate abroad to purse opportunities and job-offerings. This implies a more competitive environment where every job offering is accompanied by an increasing amount of suitable candidates. In turn, firms have a greater range of potential employees and investment options to choose from. This arguably affects the workers' bargaining

power, leading to a more elastic labour demand and also implying that a prospective tax cut would not solely lead to higher wages, but also higher profits. Labour taxes should therefore realistically affect firms' costs and also their investment decisions. Accordingly tax wedges, which more efficiently capture workers net pay as a % of total labour costs should also affect where foreign direct investments are allocated.

Higher costs associated with hiring might also affect firms' abilities to attract good labour. If a big portion of the salary goes to paying taxes and/or if the cost of hiring high-skilled labour is associated with high social security contributions, it might be hard for foreign firms to find and retain desirable labour. The relationship between wage level and work effort has previously been found to correlate. Intuitively, the wage level and the yearly wage increase should affect the effectiveness of labour. Prendergast (1996) examines the relationship between wage and work effort and find that compensation policies and other work incentives have a positive impact on labour effectiveness. A higher worker morale induced by higher wages would theoretically lead to a productivity increase. One possible explanation can be drawn from efficiency wage theory, which suggests that a wage level higher than the firm's marginal revenue product would induce workers to increase productivity and thus the firm's revenue and profits. Consequently a higher pay would also deter workers from seeking opportunities elsewhere, leading to a higher sense of loyalty and greater work effort. A higher pay level cannot solely be seen as a motivator; on the contrary, equity theory suggests that the comparison to other employees' wages can lessen worker morale and lead to unproductive behaviour. Jones, Gareth and George (2008) who discuss a range of employee motivational theories conclude that a disproportionate pay-rise of a colleague can induce less productive work efforts. Consequently labour taxes should have an effect on firm's profits. Either by increasing the factual costs associated to labour, or by decreasing the opportunity cost, making leisure less costly and reducing productivity. An FDI decision ought therefore to take labour taxes in general and tax wedges in particular into account. The World Competitiveness Report (2009) highlights the importance of incentives, and stresses its significance in increasing competitiveness. Cross-country differences in labour tax wedges could arguably affect these incentives and also have a negative impact on firms' willingness to invest abroad.

2.4.1 Common estimation methods

Most commonly the gravity equation has been used to estimate the determinants of trade flows. The gravity equation has been used in several different ways with different econometric techniques, each having its advantages and disadvantages. Following below is a short walkthrough of some of the most common estimation methods.

Figure 2: Common estimation methods

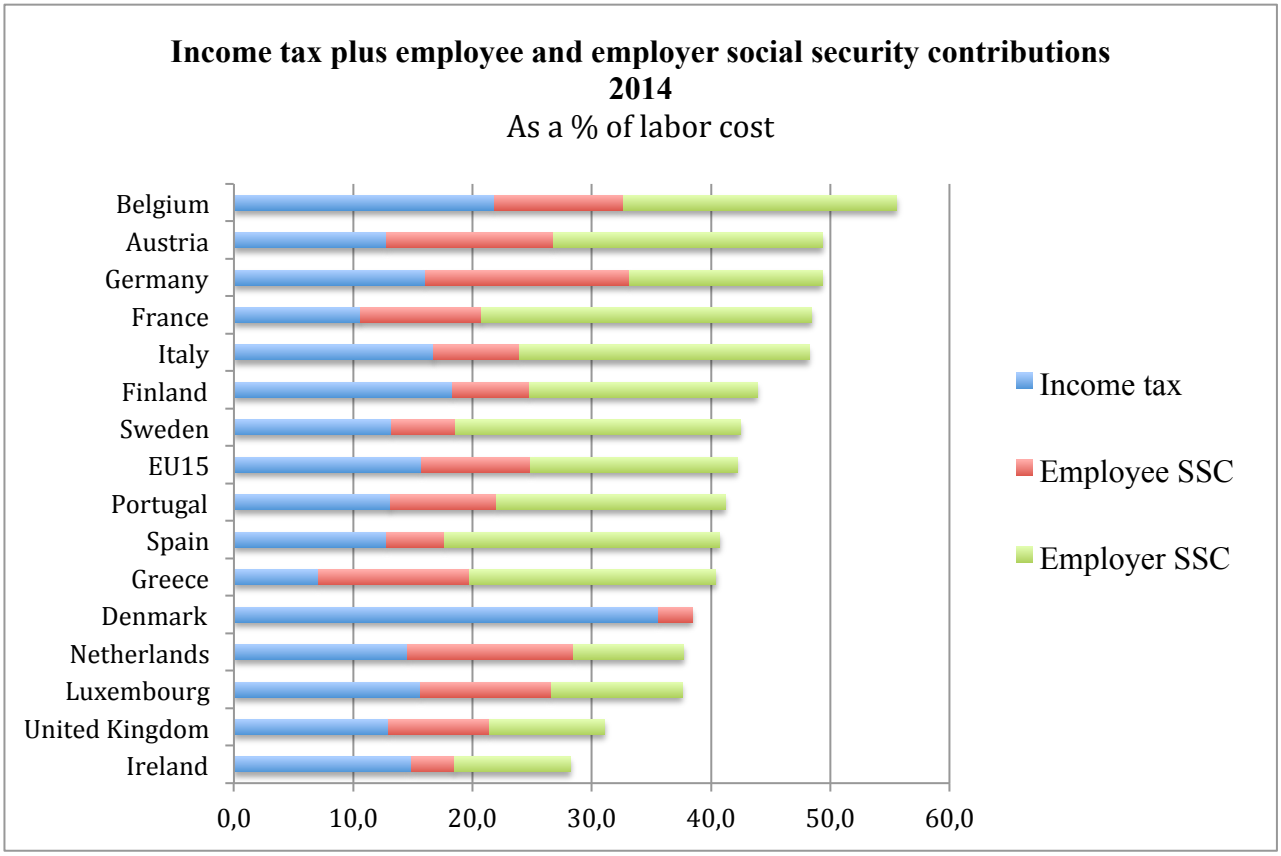
Estimation method	Advantages	Disadvantages	References
Truncated OLS	- Simple	- Coefficients are biased - Zero flows are eliminated	Martin and Pham (2008) Westerlund and Wilhelmsson (2009
Tobit	- Simple - Zero trade flows problem dealt with	- Lack of theoretical foundation - Probability that an observation will be censored and value of dependent variable are determined by same variables	Martin and Pham (2008); Marcoulier (2002)
Panel Fixed effects	-Simple	- Time-invariant terms dropped - Zero flows eliminated	Hendersson and Millimet (2008); Andrews et al. (2006)
Heckman two-step	- Different set of variables determine value of dependent variable and probability of censoring. - No multicollinearity problems - Rationale for zero trade flows	-Exclusion variables are required - Difficult to find identification restriction.	Davis and Kristjánsdóttir (2010); Hansson and Olofsdotter (2013); Razin et al. (2004)

Source: Herrera E. (2013)

3. The tax wedge and FDI in the EU15

The tax wedge measures the income tax plus employee and employer social security contributions as a % of total labor costs. Total labor costs are defined as net pay plus income tax and employee and employer social security contributions. By differentiating the cost of a worker from the net pay of that worker I hope to be able to distinguish whether the cost per se would affect the inflow of FDI in any way. The tax wedge constellation is different in different countries, and despite the total cost being equal in many countries; the separate parts may be designed in totally different ways. As mentioned before, the average tax wedge in Denmark and in the Netherlands is roughly the same, but their components differ widely. While Denmark's cost of labor does not involve any employer social security contributions (SSC) and a tiny 2,8% employee SSC, the Netherlands' cost of labor has an employer SSC of 9,2% and an employee SSC of 13,9%. As seen in table 2, Belgium employs the most expensive average work force in the EU15, while Ireland employs the cheapest. The average income tax as a % of total labor costs in the EU15 is 15,8%, the average employee SSC is 9,1% and the average employer SSC is 17,3%. During the last decade the tax wedge on labor has not seen any relative change. The average EU15 tax wedge on labor has decreased slightly from 42,7 % in 2000 to 41,9 % in 2014, which is a decrease of about 2%. The question is now if this decrease would facilitate any FDI-inflows, or will economies with stable and relatively low tax wedges attract more FDI than countries whose tax wedges are higher. Another question that arises is if the tax wedge components matter in any way. The cross-country differences are high. As shown in table 2, Ireland's tax wedge on labor accounts to 28,2 % of the total labor cost, in Belgium on the other hand it is 55,6 %. The percentage of labor costs paid in income tax varies considerably, from 35,6 % in Denmark to 7,1 % in Greece and 10,6 % in France. The percentage of labor costs paid in employee social security contributions varies from 17,1 % in Germany to 3,6 % in Ireland. Lastly the percentage of labor costs paid in employer social security contributions is highest in France (27,7 %) and lowest in Ireland (9,7 %).

Figure 3: Tax wedge components 2014

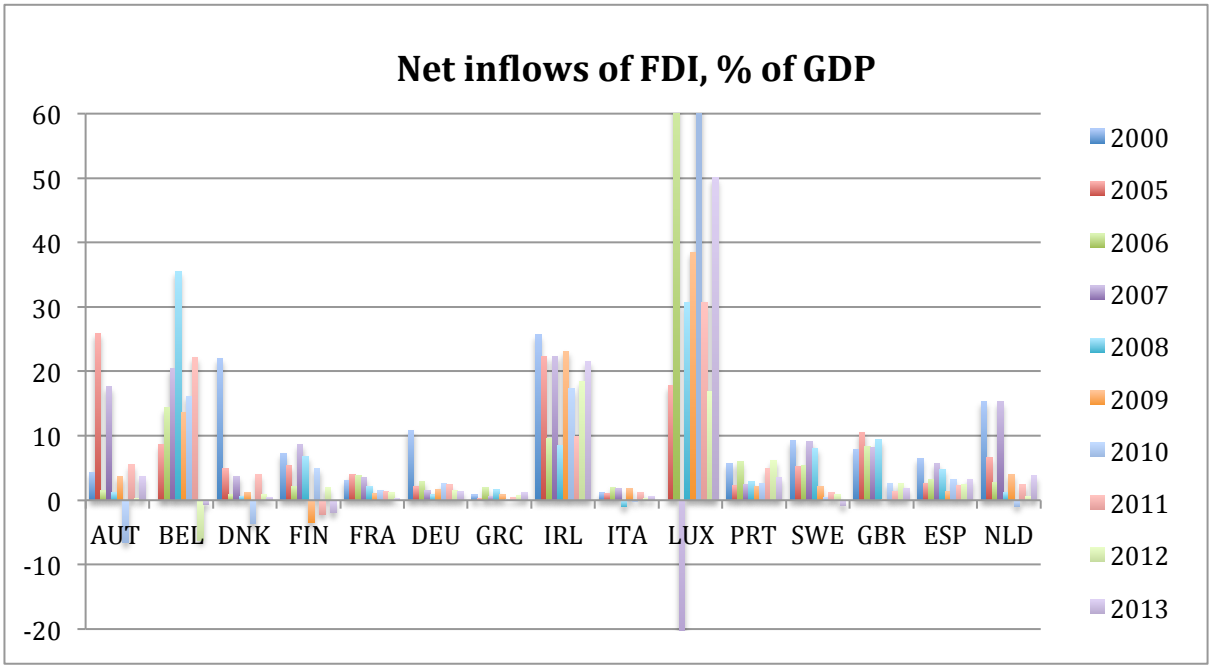


Source: OECD Economic Outlook Volume 2014 (No. 96).

Previous papers have to a great extent studied income taxes and their effects on FDI flows; I want to argue that the tax wedge might be of equal importance. Lets assume for instance that a European firm has decided to invest in a EU-15 country. As mentioned above the firm will go through a decision process where different aspects of the investment are taken into account. Profit enhancing or diminishing effects ought to be important in the localization decision and consequently the cost of labor in general and tax wedges on labor in particular should affect decisions. The EU-15 countries are relatively equal in economic structure, infrastructure, political stability and other exogenous variables that might influence an investment decision. A firm must then consider what costs are associated with the investment. Depending on the firm, the total labor cost, as a % of total costs will differ. As can be seen in table 2 the tax wedge on labor differ widely across the union. Table 3 shows net inflows of foreign direct investments as a % of GDP and one can clearly see how Luxembourg stands out as the biggest net receiver, closely followed by Ireland, Belgium and Austria. Interestingly, Ireland has shown a stabile net inflow over the past decade

while the other three top countries fluctuate far more. Comparing to the tax wedge on labor, Ireland, which employs the cheapest labor, also receives the second most FDI as a % to GDP, averaging an annual 17,9% over the time period. Belgium, which actually employs the most expensive labor, has an average inflow of 13,8% over the time period.

Figure 4: Net inflows of FDI as a % of GDP



Source: International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates, 2014.

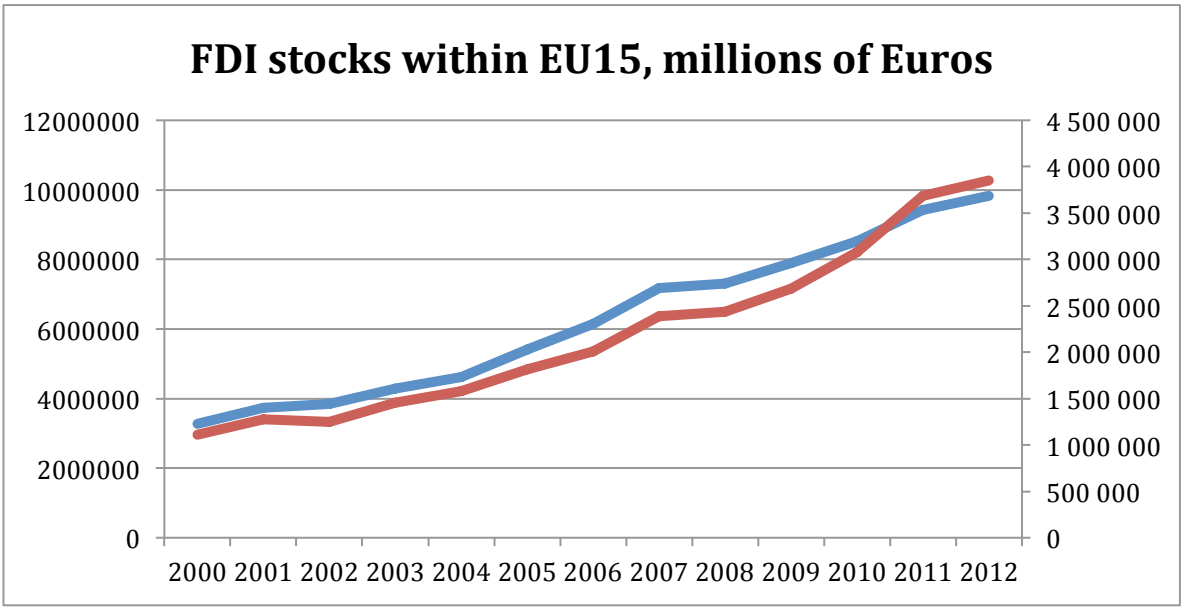
Except for Luxembourg, the rest of the EU15 score somewhere between 5% (UK and Netherlands) and 1% (Italy and Greece).

The incentive to hire additional workers would depend on what contributions the extra worker has on profits, i.e. the difference between marginal revenue (the income of hiring an extra worker) and marginal cost (the cost of hiring an extra worker). In order to compensate for higher labor costs the worker in that particular country must produce more value. One could stretch this further and argue that in order to stay profitable, a particular foreign direct investment must yield higher revenue the higher the tax wedge. In turn, this would imply that risky investments would to a greater extent be drawn to countries were the cost of labor is lower and where a bigger part of the revenue could be used to cover other costs associated with

the investment. Consequently countries with lower tax wedges should attract more foreign direct investment in general and high-skilled workers in particular.

I believe intra EU-15 investment decisions differ from that of investments from companies outside that group. Figure 5 separates total FDI stocks in the EU-15 from stocks acquired from EU-15 partners, and one can clearly see that intra EU-15 FDI accounts for roughly 25 percent of total FDI. The red line and the right axis show FDI stocks for intra EU-trade whereas the left axis and the blue line shows total FDI stocks in the EU-15. The growth rate has been relatively steady across the time period, with intra EU-15 FDI stocks averaging a roughly 11% annual increase, peaking between 2010 and 201 when it grew by 19,6 %. Total FDI stocks in the EU-15 grew during the same period by 9,7%, peaking between 2004 and 2005 when it grew by 17,1 %. This suggests that intra EU-15 investments are growing relatively fast, and companies within the EU, are finding economies close by advantageous to invest in.

Figure 5: FDI stocks within EU15



Source: OECD

Increasing FDI stocks and flows have thus not been accompanied by an overall decrease of the tax wedge on labor. Higher tax wedges however imply that a lesser portion of the total labor costs actually goes to the employee, and thus makes employment more expensive.

4. Methodology and data

I wish to test whether the theoretical predictions align with the dataset and determine if tax wedges on labor in general and cross-country differences and employee and employer social security contributions in particular matter in the foreign direct investment decision. I follow Blonigen and Davies (2004) and use a log-linear specification. This allows me to deal with the skewness common in FDI data. To correct for many zero observations and also avoid problems related to sample selection bias as much as possible I first use the two-step Heckman estimation technique (Davies and Kristjánsdóttir, 2010). This allows me to account for the different effects that different independent variables may have on the decision to invest or not followed by the amount to invest. In addition I will compare those results to a tobit regression, and a panel data fixed effects estimation. New investments are associated with sunk costs that have to be paid at the beginning of the investment. As Razin et al. (2004) puts it, they do not affect the amount to invest but play a key role in determining the investment location. The investment decision is characterized by two questions, first whether to invest or not and second how much to invest. By closely following the thought process presented in Davis and Kristjánsdóttir (2010) I first employ a two-step Heckman-estimation estimation model where negative or zero investments are controlled for by adding an extra variable calculated by probit regression.

As mentioned, a firm can choose to either produce at the home market or abroad. Costs include both total production costs and trade costs and are convex functions of quantity. In addition firms face firm-level and plant-level fixed costs on its home and foreign plants respectively. These costs are unavoidable and must be incurred in order to proceed with the investment. The firm is left with a decision problem of investing abroad or not, and if it chooses to invest, how much to invest Davis and Kristjánsdóttir (2010). This two-stage Heckman estimation process will be accompanied by simple tobit and fixed effects regressions to see how the estimates are affected if the two-step decision process is ignored. The dataset for bilateral EU15 FDI flows from 2000 to 2013 is collected from OECD.

As mentioned earlier, fixed costs determine the initial entry of FDI and the investments in the dataset might have been initiated long before the start of the

sample. By using the technique proposed by Razin et al. (2004), positive FDI flows are considered as new MNEs entering the host market. As Davis and Kristjánsdóttir (2010) states, the downside of this technique might be that the expansions of existing projects are overlooked and instead are interpreted as the inflow of new firms.

Following the two-step Heckman procedure I employ a tobit regression which is a maximum likelihood estimation where probit and regression analysis are combined (Dougherty, 2011). By setting the lower limit to zero, I effectively discard any negative and non-existant FDI-flows and therefore avoid underestimating the effects of the independent variables. Negative flows can be problematic when analysing investment flows since they capture the repayment of loans to the investing country. This means that during a specific year, new investments and the expansion of existing investments might be overlooked and overshadowed by the repayment of loans. Finally I employ a Hausman test to determine whether to use fixed or random effects in the final regression. The test is designed to show s whether the unobserved effects are distributed independently of the dependent variables (Dougherty, 2011). The estimation model comprises an unobserved factor u_i and a model using random effects assumes that the covariance between the unobserved factor and the dependent variables is zero. If we fail to reject the null hypothesis (ie. if the covariance between u_i the dependent variables is zero) we conclude that only fixed effect models are consistent estimates. If the null hypothesis is rejected both models are ok but with random effect being superior due to lower standard deviation. My test statistic is 0,0003, and I therefore fail to reject the null hypothesis and employ a fixed effect regression, and hence I test for autocorrelation, normality of residuals and heteroscedasticity.

4.1 Tobit estimation

A tobit analysis censors the regression by applying either an upper bound or a lower bound to the dependent variable such that observations outside the bound are constrained and interpreted as being directly on the limit (Dougherty, 2011). Hypothesize the relationship below to be subject to a lower bound $Y_{L.}$

$$Y^* = \beta_1 + \beta_2 X + u$$
$$Y = Y^* for\ Y^* > Y_L$$
$$Y = Y_L\ for\ Y^* \leq Y_L$$

Thus negative and zero observations are interpreted as being directly on the limit. However since the same variables determine the value of the dependent variable together with the probability of censorship and since I expect heteroscedasticity, the tobit regression might produce biased estimates (Amemiya, 1984). By excluding estimates systematically I may give rise to non-zero expected values of the error term and thus also sample selection bias.

4.2 Two-step Heckman estimation and probit

A way to deal with the possibility of sample selection bias is to employ a two-step Heckman estimation model. A probit regression is first used to regress a dummy variable that takes the value 1 if there is a positive FDI-inflow from country *j* to country *i* at time period *t*, and value 0 if the flow is non-existent or negative. During this method maximum likelihood analysis is used to compute the marginal effects of the dependent variables presented in figure 9 in the appendix. For instance, the calculations suggest that an increase in distance has a negative effect on FDI-inflows. The marginal effects are later put together with the cumulative standardized normal distribution, which gives the probability of the event occurring for any composition of determinants. After this I construct the inverse mills ratio, which is calculated by dividing the sum of each variable evaluated at its mean value multiplied by its probit value, and is later included as an explanatory variable in the regression. The inverse mills ratio is negative, implying that the error terms in the original model are correlated negatively. The thought process behind this method is presented in Dougherty (2011, pp. 365-378).

During the probit regression a variable Z is defined as a linear function of the independent variables that together regulate the probability of the event (positive FDI-inflows) occurring.

$$Z = \beta_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

From this follows the cumulative standardized normal distribution that tells us the probability of the FDI-flows for any value of Z, in other words the probability of the FDI-flows being positive in the data set.

$$p_i = F(Z_i)$$

As mentioned before, maximum likelihood analysis is used to compute the marginal effects. These are best defined as derivatives of each dependent variable.

$$\frac{\vartheta p}{\vartheta X_i} = f(Z)\beta_i$$

where

$$f(Z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}Z^2}$$

which is the standardized normal distribution. Consequently the inverse mills ratio (lambda) is computed as follows:

$$\lambda_i = \frac{f(v_i)}{F(v_i)}$$

where the numerator is interpreted as the density function for the error term normalized by the standard deviation and the denominator is the probability of being positive. Lambda is then used as an explanatory variable in the estimation model to correct for omitted variables (i.e. negative and non-existent FDI-flows). In accordance to theory the output of the two-step estimation method would be of primary interest.

4.3 Panel data fixed effects model

The estimation method assumes that each individual has some specific fixed effect that is unobserved and thus creates a somewhat biased estimate. The fixed effect estimation equation is as follows:

$$Y_{it} = \beta_1 + \beta_{it}X_{it} + \delta_t + a_i + \epsilon_{it}$$

where (a)

$$a_i = \sum_{p=1}^{s} \gamma_p Z_{pi}$$

α_i represents unknown intercepts for each country pair and is referred to as an unobserved effect. It is comprised of specific unobserved heterogeneity that is unique to each country pair. There might be other characteristics to each country pair that affects FDI-flows that those in the model. These effects will be controlled for by the unobserved effect. To deal with this issue I employ a within-group regression that is used to eliminate the unobserved effect by using mean values of the observations of a given country pair and then subtracted from the original data set.

$$(a) - [\bar{Y}_i = \beta_1 + \beta_{it}\bar{X}_{it} + \delta\bar{t} + a_i + \bar{\varepsilon}_{it}]$$

$$=$$

$$Y_{it} - \overline{Y_\iota} = \beta_{it}\left(X_{ijt} - \overline{X_{\iota j}}\right) + \delta(t - \bar{t}) + \varepsilon_{it} - \overline{\epsilon_\iota}$$

Consequently the unobserved effect is removed and FDI-flows are instead explained by their means following the variation of the independent variables about their means (Doughterty, 2011). However this method implies that any time-invariant variable (such as distance, sharing a border, etc.) together with zero observations will be dropped.

4.3.1 Heteroscedasticity

When the error term variance is unequally distributed the dataset is characterized by heteroscedasticity. This biases the estimate and defies basic OLS assumptions, implying that estimates of standard errors of regression coefficients will be wrong. In turn t tests and f tests will be invalid. Since I use different sized country-specific data over time, the error term is likely to be affected by the GDP levels of the specific countries. In order to correct for this I apply a modified Wald test for group wise heteroscedasticity with the null hypothesis being constant variance in the error term. By getting a prob >chi2 of 0.000 I reject the null hypothesis and use robust standard errors in the regression.

4.3.2 Autocorrelation

Autocorrelation implies that the disturbance term depends on its own value in the previous time period and thus defying the assumption of independently distributed disturbance terms.. Most commonly autocorrelation happens when excluded variables affect the dependent variable and this can lead to large variances and wrongly estimated standard errors (Dougherty, 2011). By using a Woolridge test for autocorrelation in panel data I employ the null hypothesis that there is no serial correlation. My prob > F = 0,6603 and I thus fail to reject the null hypothesis and conclude that there is no serial correlation in my panel data.

4.4 The gravity equation

Trade theorists generally employ gravity equations to analyse and predict trade patterns. Gravity models are based on the prediction that trade between nations will relate positively to the size of their economies and inversely to their trading costs (Feenstra, 2004). A number of variables can be used to capture these costs, commonly used are distance, dummies for sharing a common border, being an island or being landlocked, sharing a common language or some other cultural feature which may help to influence trade. In general gravity models tend to be popular among empirical trade economists, mainly due to high explanatory values and the fact that it is relatively easy to add additional variables (WTO, 2005). However as Andersson and van Wincoop points out (2003) it is important that the interpretation of the regression coefficients is done with a structural consistent approach. If the model should lack theoretical foundation and therefore risk being subject to subjectivity in the interpretation, its credibility might be significantly weakened. Moreover econometric problems such as multicollinearity and autocorrelation may arise when variables are added in an arbitrary fashion. (WTO, 2005) Gravity models stem from a range of different trade theories, from traditional factor proportions to Ricardian types and monopolistic models. A common denominator however is that a well specified gravity model will control for relative trading costs (Andersson & Van Winoop, 2003). In short this means that **"**the propensity of country *i* to import from country j is determined by country i's trade cost toward j relative to its overall resistance to import and to the average resistance facing exporters to country "(WTO, 2005). An issue that has relating to gravity models is the problem with zero trade. This can be a result from actual zero trade or from missing data and how this is handled differs between researchers. Some simply drop zero trade observation from the sample while some argue that disregarding zero trade observations can generate biased estimates (Helpman, et al. 2008).

4.4.1 Model specification

By following previous studies on FDI I employ a gravity model where the determinants include standards gravity variables, tax wedge differences,

agglomeration economies and other control variables.[2] The flow equation is estimated as follows:

$$lnFDIflow_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ij} + \beta_3 TAXWEDGEDIFF_{ijt} + AGGLOM_{ij-t} + D1CONTIG + D2COMLANG + D3COLONY + D4SMCTRY + X_{1ijt}\beta + \lambda_t + u_{ij} + \varepsilon_{ijt} \quad \text{if} \quad lnFDIflow_{ijt} > 0 \tag{1}$$

where $lnFDIflow_{ijt}$ is the natural logarithm of the flow of FDI to host country *i* from investing country *j* in year t. $lnGDP_{it}$ is the natural logarithm of GDP in the host country at time *t* and $lnGDP_{jt}$is the natural logarithm of GDP in the investing country at time *t*, both these effects are expected to be positive. $lnDIST_{ij}$, representing multilateral trade resistance, is the logarithm of the bilateral distance between the two countries and is collected from the CEPII database. $TAXWEDGEDIFF_{ijt}$ is the difference in tax wedge between the host and investing country at time t, and is expected to affect incoming FDI negatively. $AGGLOM_{ij-t}$ is an agglomeration variable based on the stock of FDI in the previous year, CONTIG, COMLANG, COLONY and SMCTRY are dummy variables that capture common borders, common languages colonial history and being part of the same country in the past respectively, X_{1ijt} is a vector which accounts for country-specific characteristics in the host country such as trade volume and GDP per capita, λ_t is a time dummy and ε_{ijt} is the error term with mean zero and variance σ^2. I also replace tax wedge differentials with actual tax wedge levels in the host country at time *t* to test whether the level matters more than the cross-country differences (eq. 3). Moreover I separate employee and employer social security contributions from the tax wedge to see if they matter in the investment decision (eq. 4). One must note though that the tax wedge is measured as a % of labour cost, whereas employee and employer social security contributions are measured as a % of gross pay.

[2] See for instance Blonigen and Davies (2004), Kahouli and Maktouf (2004) and Wolff (2007)

$$lnFDIflow_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ij} + \beta_3 TAXWEDGE_{it} + AGGLOM_{ij-t} + D1CONTIG + D2COMLANG + D3COLONY + D4SMCTRY + X_{1ijt}\beta + \lambda_t + u_{ij} + \varepsilon_{ijt} \quad \text{if} \quad lnFDIflow_{ijt} > 0 \tag{2}$$

$$lnFDIflow_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ij} + \beta_4 SSCemployer_{it} + \beta_5 SSCemployee_{it} + AGGLOM_{ij-t} + D1CONTIG + D2COMLANG + D3COLONY + D4SMCTRY\ X_{1ijt}\beta + \lambda_t + u_{ij} + \varepsilon_{ijt} \quad \text{if} \quad lnFDIflow_{ijt} > 0 \tag{3}$$

$$lnFDIflow_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ij} + \beta_4 SSCemployee_{it} + \beta_5 SSCemployee_{it} + AGGLOM_{ij-t} + D1CONTIG + D2COMLANG + D3COLONY + D4SMCTRY\ X_{1ijt}\beta + \lambda_t + u_{ij} + \varepsilon_{ijt} \quad \text{if} \quad lnFDIflow_{ijt} > 0 \tag{4}$$

I use bilateral net FDI inflows provided by Eurostat as my dependent variable. The foreign direct investment flows are measured in millions of current US$ and shows the value of the investment flows from investing country *i* to host country *j* at time *t*. The most interesting independent variable for my research is *wedge, wedgediff*, *employeessc* and *employerssc*. OECD provides data on the tax wedge back to 2000. They define the tax wedge as "the ratio between the amount of taxes paid by an average single worker with no children and the corresponding total labour cost for the employer". I have compiled this data and calculated the bilateral differences across the time period in order to see if these differences have any effect on FDI flows. I will also test whether social security contributions by themselves matter in the investment decision. This regression will enable me to find out whether component differences play a different role than differences of the tax wedge altogether. The sizes of the economies are represented by their GDP levels, and are expected to have a positive impact on investment flows. Geographical distance can be

a somewhat ambiguous variable, since it might affect horizontal and vertical FDI in different ways. Neary (2009) points to theory that suggests horizontal FDI to be a substitute to trade and thus discouraged by falling trading costs (i.e. shorter geographical distance). He does however conclude that experience from the 1990s suggest otherwise while stating that the traditional bipolarisation of horizontal and vertical FDI no longer can serve as a valid breakdown of foreign direct investment types. Yeaple (2003) and UNCTAD (1998) both suggest that most multinational enterprises engage in "complex integration strategies", which cannot be defined as neither horizontal nor vertical FDI.

Gravity models tend to display a relatively high goodness of fit, but one must note that their usage in FDI papers are theoretically unfounded (Hansson and Olofsdotter, 2013). The impact of markets and geography are too complex to capture in a simple and appealing gravity model. Despite working well for horizontal FDI, vertical FDI decisions rest on a much more complicated platform where alternate investment locations have to be considered, however since intra EU15 FDI is mostly horizontal, such a model can be used in an adequate matter.

The difference in tax wedges between economies is the main variable in consideration. By capturing cross-country differences I try to examine the relationship between FDI inflows and differences in labour tax wedges between investing and host economies. A larger tax wedge, i.e. a positive difference, would imply that the average employer in the host economy spends a bigger proportion of total labour costs on taxes. Every salary would thus be accompanied with higher costs and consequently every worker would be more expensive. Theoretically, high cross-country tax wedge differences should affect incoming FDI in a positive way by offering businesses a smaller difference between pre-tax and post-tax returns.

In conclusion I include variables that are theoretically supposed to affect FDI decisions, such as GDP per capita and host country exports.

5. Results

Models 1 through 4 are estimated using heckman, tobit and fixed effects estimation techniques. The results are presented in order, starting from model 1 and ending at model 4.

5.1 Tax wedge

The Heckman and Tobit estimation techniques both show a negative significant impact of the tax wedge on labour on inflows of FDI. Specifically a 1% increase of the tax wedge would lead to a 0,02 % decline in FDI inflows. The fixed effects estimation shows a positive but insignificant effect of the tax wedge on FDI-inflows. GDP of the investing country behave as expected by impacting inflows positively. On the other hand GDP in the host country show mixed results, impacting inflows negatively in the Heckman-estimation and showing positive impact in the tobit and fixed effects estimation. Estimates of the exports in the host country show significant positive effects on FDI-inflows in the Heckman estimation but negative and insignificant coefficients in the two other techniques. The stock of FDI in the previous year surprisingly impacts inflows negatively in the Heckman and fixed effects estimation but positive in the tobit estimation. Moreover dummies for being part of the same country in the past and sharing a colonial history show positive effects on FDI-inflows, and surprisingly sharing a common language and border impacts FDI negatively. As mentioned earlier, time-invariant variables are omitted in the fixed effects estimation.

Figure 6: Tax wedge regressions

	Heckman1 b/se	Tobit1 b/se	Fixed1 b/se
main			
ln_gdpj	0.371**	0.444***	0.696
	(0.05)	(0.05)	(0.75)
ln_gdpi	-6.217**	0.301	2.656*
	(2.12)	(0.17)	(1.03)
wedge	-0.020*	-0.020*	0.052
	(0.01)	(0.01)	(0.05)
ln_exports_i	10.978**	-0.397	-1.028
	(3.69)	(0.26)	(0.75)
ln_gdpcap_i	-6.046**	0.386	-0.913
	(2.11)	(0.26)	(1.25)
ln_fdistock1	-2.054*	0.426**	-0.131
	(0.81)	(0.13)	(0.29)
ln_dist	0.949	-1.687***	0.000
	(0.86)	(0.12)	(.)
smctry	1.767***	0.728*	0.000
	(0.50)	(0.37)	(.)
colony	0.635	0.121	0.000
	(0.38)	(0.34)	(.)
comlang_ethno	-0.825**	-0.362	0.000
	(0.30)	(0.26)	(.)
contig	-0.749**	-0.118	0.000
	(0.29)	(0.20)	(.)
lambda	-23.086**		
	(7.47)		
Constant	47.389**	4.623	-15.957*
	(14.36)	(3.29)	(6.87)
sigma			
Constant		1.723***	
		(0.04)	
R-sqr	1008.000	1010.000	207.000
dfres	4100	4091	3016

5.2 Tax wedge differences

The main purpose of introducing cross-country differences in the regression was to see if the effects on inflows were estimated to be different when considering the difference in the tax wedge on labour between the host and investing country, instead of solely looking at the tax wedge levels in the host country. Figure 7 shows that the estimates on the tax wedge differences are positive but insignificant for all estimation methods. Despite of being insignificant, a positive estimation indicates that increasing tax wedge differences ie. increasing the tax wedge in the host economy relative to the investing economy impacts positively on investments. The other control variables show similar estimates.

Figure 7: Regression on tax wedge differences

	Heckman2 b/se	Tobit2 b/se	Fixed2 b/se
main			
ln_gdpj	0.402***	0.474***	0.629
	(0.06)	(0.05)	(0.74)
ln_gdpi	-6.132**	0.343*	2.606*
	(2.12)	(0.17)	(1.05)
wedgediff	0.009	0.009	-0.017
	(0.01)	(0.01)	(0.03)
ln_exports_i	10.694**	-0.605*	-0.682
	(3.70)	(0.25)	(0.68)
ln_gdpcap_i	-5.856**	0.533*	-1.310
	(2.11)	(0.26)	(1.19)
ln_fdistock1	-1.942*	0.521***	-0.136
	(0.81)	(0.13)	(0.29)
ln_dist	0.931	-1.688***	0.000
	(0.86)	(0.12)	(.)
smctry	1.749***	0.716	0.000
	(0.50)	(0.37)	(.)
colony	0.754*	0.244	0.000
	(0.38)	(0.34)	(.)
comlang_ethno	-0.905**	-0.445	0.000
	(0.30)	(0.26)	(.)
contig	-0.791**	-0.164	0.000
	(0.29)	(0.20)	(.)
lambda	-22.935**		
	(7.48)		
Constant	45.159**	2.676	-12.254*
	(14.37)	(3.27)	(5.44)
sigma			
Constant		1.726***	
		(0.04)	
R-sqr	1008.000	1010.000	207.000
dfres	4104	4094	3018

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

5.3 Employer social security contributions

Employer social security contributions show an overall positive impact on inflows of FDI. The Heckman-two step estimation technique and the tobit regression show positive and significant estimates, where as the fixed effects estimation is also positive but insignificant. Consequently a 1% increase of the employer SSC would lead to increased FDI-inflows of roughly 0,021%

Figure 7: Employer SSC regression

	Heckman3 b/se	Tobit3 b/se	Fixed3 b/se
main			
ln_gdpj	0.391***	0.455***	0.586
	(0.05)	(0.05)	(0.74)
ln_gdpi	-5.580**	0.198	2.845**
	(2.12)	(0.17)	(1.03)
employerssc	0.021***	0.022***	0.127
	(0.01)	(0.01)	(0.10)
ln_exports_i	9.723**	-0.364	-0.913
	(3.69)	(0.25)	(0.65)
ln_gdpcap_i	-5.114*	0.599*	-1.229
	(2.11)	(0.25)	(1.17)
ln_fdistock1	-1.766*	0.433***	-0.024
	(0.81)	(0.13)	(0.31)
ln_dist	0.608	-1.735***	0.000
	(0.86)	(0.12)	(.)
smctry	1.598**	0.674	0.000
	(0.50)	(0.37)	(.)
colony	0.836*	0.387	0.000
	(0.38)	(0.34)	(.)
comlang_ethno	-0.909**	-0.501*	0.000
	(0.30)	(0.25)	(.)
contig	-0.838**	-0.284	0.000
	(0.29)	(0.20)	(.)
lambda	-20.493**		
	(7.47)		
Constant	40.080**	2.095	-17.057*
	(14.38)	(3.24)	(7.20)
sigma			
Constant		1.715***	
		(0.04)	
R-sqr	1008.000	1010.000	207.000
dfres	4093	4082	3016

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

5.4 Employee social security contributions

Employee social security contributions are estimated to impact inflows of FDI in a negative way when using Heckman and Tobit estimation techniques. Their impact are estimated to -0,069 (Heckman) and -0,074 (tobit).The fixed effect model however shows a positive impact on FDI flows.

Figure 8: Employee SSC regressio

	Heckman4 b/se	Tobit4 b/se	Fixed4 b/se
main			
ln_gdpj	0.382***	0.437***	0.576
	(0.05)	(0.05)	(0.75)
ln_gdpi	-4.910*	0.051	2.852**
	(2.11)	(0.17)	(1.04)
employeessc	-0.069***	-0.074***	0.083*
	(0.01)	(0.01)	(0.03)
ln_exports_i	8.750*	0.100	-0.593
	(3.68)	(0.27)	(0.65)
ln_gdpcap_i	-4.786*	0.098	-1.430
	(2.10)	(0.26)	(1.18)
ln_fdistock1	-1.665*	0.213	-0.195
	(0.81)	(0.14)	(0.29)
ln_dist	0.236	-1.786***	0.000
	(0.87)	(0.12)	(.)
smctry	1.601**	0.814*	0.000
	(0.50)	(0.37)	(.)
colony	0.421	0.012	0.000
	(0.38)	(0.34)	(.)
comlang_ethno	-0.674*	-0.312	0.000
	(0.30)	(0.25)	(.)
contig	-0.674*	-0.194	0.000
	(0.29)	(0.20)	(.)
lambda	-17.643*		
	(7.48)		
Constant	40.557**	8.295*	-14.850**
	(14.26)	(3.34)	(5.52)
sigma			
Constant		1.704***	
		(0.04)	
R-sqr	1008.000	1010.000	207.000
dfres	4082	4068	3012

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

6. Discussion and analysis

I want to start by commenting on the relative insignificance of the fixed effect estimations. Due to the large amount of missing values the estimates look somewhat bewildering in comparison to the other estimation models. As mentioned in section 4 the Heckman and Tobit estimations deal more effectively with missing values and their estimates are therefore more reliable although the two-step estimation is better equipped in controlling for zero variables. The fixed effects estimation considers negative flows and simply drop zero flows and time-invariant variables leading to biased and non-reliable estimates. The purpose of this paper is to analyse whether tax wedges on labour impact the inflows of FDI, therefore estimation methods that deal with zero flows effectively are better equipped in providing more accurate estimations.

The impact of tax wedges on intra EU15 foreign direct investments were not as big as I first anticipated. In hindsight I believe the dataset could have been more specialized in order to capture the sectors which probably are most affected by the tax wedge on labour and by cross-country differences. The data that I use on tax wedges does not differentiate between income groups, and might therefore underestimate the effect that tax wedges, tax wedge differences and social security contributions have on FDI flows, primarily because most intra EU-15 FDI is horizontal and therefore to a greater extent affect knowledge intensive persons. Knowledge-intensive labour, which can be said to have an above average income, is more mobile than the average worker, implying that data set to capture tax wedges on high-skilled workers might be better equipped in capturing the effects that tax wedges on labour might have. Workers in those industries are thus more likely to be affected by cross-country differences than the average worker and a focus on average wedges might not capture those effects to a full extent. Different direct investment types might also react differently to different policies and thus also to tax wedges. My research does not distinguish between greenfield investments and M&A and is therefore unable to capture any effects that are specific to different investment types. It is also unable to separate new investment projects from the expansion of existing projects; therefore the estimations can be subject to biases when individual large negative flows displace the flows of lesser magnitude. For instance new investment projects that are relatively risky and therefore small in size will not show in the data if an existing subsidiary in the host economy repays an intra-company loan to the investing country. An

interesting orientation for future research would be to analyze the different modes of entry by themselves and see if there is any evidence of them reacting differently to tax wedges and also focus on knowledge intensive industries (intra EU15 case) solely and thus using the tax wedge on labor for persons earning above the average salary in each country.

The extent to which a multinational enterprise that invests in a host country can attain the advantages it has relative to host companies are affected by the tax wedge on labour. If the labour cost is high and if workers receive a relatively small amount of that labour cost, alternatives such as exporting or licensing might seem more attractive. In accordance with my results and specifically in terms of horizontal FDI I would argue that countries with high tax wedges are more likely to deter FDI and instead witness foreign firms to enter the economy by other, less costly and less risky modes of entry. The attractiveness of a country in a relatively small and homogenous group as the EU15 ought to be affected by the means of which a company can retain the profits it makes. Since intra EU15 FDI-flows are characterized by horizontal FDI, which in turn can be seen as a substitute to trade, an interesting scope for future research would be to see if tax wedges also affect trade between countries.

In summary my study is a first step in the analysis of tax wedges on foreign direct investment flows. Future research on other time periods and other groups of countries would to a great extent improve the knowledge about the effects of tax wedges.

7. Conclusion

In conclusion I find that tax wedges in general and employee social security contributions in particular, do affect inflows of FDI to some extent. Surprisingly employer social security contributions show a positive effect on FDI and this might be a result of an earlier point regarding the mobility of labour. However further studies need to be conducted in order to be able to draw any absolute conclusions regarding the effects of tax wedges on labor on the inflows of FDI.

Appendix

Figure 9: Probit regression

```
Probit regression, reporting marginal effects          Number of obs =   1890
                                                       LR chi2(10)   =  60.85
                                                       Prob > chi2   = 0.0000
Log likelihood = -1264.3428                            Pseudo R2     = 0.0235
```

trade	dF/dx	Std. Err.	z	P>|z|	x-bar	[95% C.I.]	
ln_gdpj	.0026293	.0104989	0.25	0.802	13.2309	-.017948	.023207
ln_gdpi	.1857841	.0318705	5.83	0.000	13.2322	.123319	.248249
ln_fdi~1	.0709004	.0260752	2.72	0.007	12.4694	.019794	.122007
ln_gd~_i	.1836578	.0500589	3.67	0.000	10.673	.085544	.281771
ln_exp~i	-.3227893	.0476789	-6.77	0.000	12.4716	-.416238	-.22934
ln_dist	-.0758091	.0261024	-2.90	0.004	7.0044	-.126969	-.024649
smctry*	-.0338309	.0818733	-0.41	0.678	.028571	-.1943	.126638
colony*	-.013768	.0771294	-0.18	0.858	.028571	-.164939	.137403
comlan~f*	.0151646	.0536823	0.28	0.778	.104762	-.090051	.12038
contig*	.0166179	.0479602	0.35	0.730	.152381	-.077382	.110618
obs. P	.5634921						
pred. P	.5646733	(at x-bar)					

(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| correspond to the test of the underlying coefficient being 0

Source: Own calculations

Figure 10: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ln_fdiflow	1374	6.309553	2.33092	-4.50986	11.42803
ln_gdpj	2940	13.096	1.19817	9.952192	15.13783
ln_gdpi	2940	13.096	1.19817	9.952192	15.13783
employerssc	3150	22.52116	11.13754	-.16	44.03
employeessc	3150	11.72951	4.8992	2.7	24.04
wedge	3150	41.75689	7.722523	22.23	57.1
wedgediff	3136	-.0790147	11.21995	-33.58	33.58
ln_exports_i	1926	12.47777	.9262168	10.84976	14.34681
ln_gdpcap_i	2140	10.61083	.4038141	9.35031	11.64166
ln_fdistock1	2754	12.24157	1.089608	9.542589	14.2095
dist	3150	1339.666	726.4398	173.0333	3362.978
colony	3150	.0285714	.1666251	0	1
smctry	3150	.0285714	.1666251	0	1
comlang_et~o	3150	.0571429	.2321522	0	1
contig	3150	.152381	.3594468	0	1

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