

Labour Taxation and Greenfield FDI Decisions

- The Case of OECD Countries -

Petronella Berke (22905) and Julia Wangenheim (22910)

Abstract

This thesis investigates the impact of labour taxation on greenfield FDI decisions in OECD countries between the years 2003 and 2013, using panel data and both fixed effects and first differences models. The findings suggest that labour taxation has a statistically significant negative impact on the discrete decision whether to invest or not. However, no statistically significant impact on the continuous decision of how much to invest was found. This means that the main findings are partly in line with findings from previous studies on the subject, since those have found that labour taxation has a negative impact on both types of decisions. Further areas of research could include investigating the impact of changes in tax rates on FDI within one country. Also, controlling for additional types of taxes would be interesting, or to look at the role of labour tax rates in industry specific data to see whether the impacts are different in different industries.

Keywords: foreign direct investment, labour taxation, corporate taxation
JEL: F21, F23, F53, F5

Supervisor: Anders Olofsgård
Date submitted: 2015-05-18
Date examined: 2015-06-05
Discussant: Anna-Mi Fredriksson and Christoffer Persson
Examiner: Örjan Sjöberg

TABLE OF CONTENTS

1. INTRODUCTION	2
1.1 THE PURPOSE OF THE STUDY.....	2
1.2 THE RELEVANCE OF THE STUDY.....	2
1.3 WHY OECD COUNTRIES?.....	3
2. CURRENT STATE OF KNOWLEDGE	4
2.1 PREVIOUS RESEARCH	4
3. THEORETICAL FRAMEWORK	7
3.1 TERMS.....	7
3.2 FOREIGN DIRECT INVESTMENT	8
3.2.1 FDI trends in OECD countries.....	8
3.3 FDI THEORIES.....	9
3.4 DIFFERENT TYPES OF FDI: VERTICAL AND HORIZONTAL	10
3.5 THEORIES ON TAXES	11
3.5.1 Corporate and labour taxes: their effect on FDI attractiveness.....	11
3.5.2 Labour cost vs labour tax.....	11
3.5.3 Average vs marginal tax rates.....	12
4. METHOD.....	12
4.1 DATA COLLECTION	12
4.2 THE REGRESSION MODEL.....	13
4.3 SELECTION REGRESSION.....	14
4.3.1 The dependent variable.....	14
4.3.2 The independent variables.....	14
4.4 FLOW REGRESSION.....	15
4.4.1 The dependent variable.....	15
4.4.2 The Independent Variables	15
4.5 THE CONTROL VARIABLES.....	15
5. DATA	18
6. RESULTS.....	19
6.1 SELECTION REGRESSION.....	19
6.2 FLOW REGRESSION	20
7. DISCUSSION	21
8. CONCLUSION	21
8. AREAS FOR FURTHER RESEARCH.....	23
9. REFERENCES	24
10. APPENDIX.....	28

1. INTRODUCTION

The idea for this study emerged because we were interested in the effects of the decrease in the Swedish corporate tax rate from 26.3 % to 22 % in 2013. One purpose of the lowered corporate tax rate in Sweden was to attract Foreign Direct Investment (FDI).¹ This made us ponder over what impact the corporate tax rate has on FDI relative to other determinants. Instead of investigating the consequences of the Swedish policy change when lowering the corporate tax rate, we decided to study the impact of tax rates on FDI internationally.

1.1 The Purpose of the Study

There has been much previous research around the corporate tax rate as a determinant for FDI. However, the labour taxation has been neglected when looking at determinants for FDI. We are also narrowing our study to include only greenfield FDI data. To be considered a greenfield FDI project, the criteria is that the investment project must create new direct jobs and capital investment in the host country. The advantage of limiting the study to greenfield FDI is that in general FDI data, projects not qualified as FDI projects may be included as well. Greenfield FDI data is thereby a more precise measure of FDI.²

1.2 The relevance of the study

Looking at labour and corporate taxation simultaneously shows their relative importance for FDI decisions, which could be useful in determining policies that favour FDI. Governments must weigh the advantage of keeping tax rates low in order to attract FDI, against having higher rates and thereby raise tax revenue.³ If our study shows that both corporate and labour taxation have a significant impact on FDI, this could create an interest for further research around labour taxation's effect on FDI. Such research could be useful for host country governments when deciding tax packages that best attract FDI. It could also be useful for source countries, since it can give indications on what kind of taxes are important to consider when choosing to invest abroad.

¹Konjunkturinstitutet, Samhällsekonomska effekter av sänkt bolagsskatt, *Specialstudier*, number 38, 2013.

²UNCTAD, *World Investment Report 2014*.

³OECD, Tax effects on Foreign Direct Investment, *Recent Evidence and Policy Analysis*, vol. 17, 2007.

1.3 Why OECD countries?

A previous study, which has touched upon the research question of this study, is from 2014 by Hansson and Olofsdotter.⁴ Their study investigates the labour taxation and FDI decisions in the European Union (EU). What our study will bring in addition to theirs, is that it will reveal if the labour taxation plays a large role also for FDI into member countries of the Organisation for Economic Co-operation and Development (OECD). There are some important conditions that separate the OECD from the EU. The European Union has developed into a single market through a standardised system of laws that apply to all member states. This means, for example, that there are no passport controls within the union.⁵ This makes labour more mobile in the EU, which may impact what effect the labour taxes have on FDI. On one hand, we believe that the labour taxation should have a larger impact on FDI decisions within the European Union because the favourable regulations (e.g. the free movement of goods, people, services and capital) lower the barriers for FDI, and so the labour taxation should be more crucial. When other determinants get less important, it is reasonable to believe that labour taxation should get a relatively higher role. On the other hand, it could also be the case that the opposite is true, since the EU already has so many favourable regulations in common across its member countries; labour taxation has less of an impact, as it becomes a more surmountable cost when other barriers are lowered.

Nevertheless, we believe it reasonable to assume that the conditions for OECD countries compared to EU countries differ to an extent that could make FDI determinants different. Within a union, the whole regional market that can easily be reached from the host country must also be considered, in contrast to only considering the host market.⁶ Consequently, there is still a surge in the economic research for investigations on labour taxation and FDI decisions in the case of OECD countries. This leads us to our research question: *Does labour taxation have an effect on (1) the number of greenfield FDI projects and (2) the total greenfield FDI inflows into OECD countries?*

⁴ Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.

⁵ The European Commission, 2015. *The EU Single market*, available at: http://ec.europa.eu/internal_market/index_en.htm, accessed 2015-05-16, 13.17.

⁶ Motta, Massimo and Norman, George, Does Economic Integration Cause Foreign Direct Investment?, *International Economic Review*, 1996, vol. 37, no. 4.

The rest of this paper is organised as follows: section 2 presents the current state of knowledge within this field of research, section 3 consists of the theoretical framework – including past and current FDI trends, different types of FDI, theories around determinants for FDI inflows and theories regarding taxes and how they may affect FDI. Section 4 and 5 describes the method and data used, respectively. Section 6 outlines the results and conclusions from the results are drawn in section 7. Finally section 8 gives indications for further research.

2. CURRENT STATE OF KNOWLEDGE

2.1 Previous research

Since the mid 1980's, studies have been made regarding how lowered corporate tax rates affect FDI decisions. The literature in this field commences with Hartman, who provides evidence that domestic corporate tax policy impacts FDI in the United States.⁷ Further, Slemrod also takes into account the investing countries' corporate tax levels and finds that a higher marginal tax rate in the host country leads to lower FDI inflows.⁸ Devereux and Freeman confirm these results using OECD panel data.⁹

Labour taxation has long been neglected in FDI research, since labour traditionally has – unlike capital – been regarded as more or less immobile across country borders. In recent decades this has changed, due to the formation of unions such as the EU, as well as policies favouring labour mobility gaining popularity across the world.¹⁰ Hansson and Olofsdotter investigate the relation between labour taxation and FDI decisions in the European Union. Their study investigates both the selection, i.e. whether to invest or not, and the flow, i.e. how much to invest. They look at bilateral FDI data and they use the labour tax rates as their main independent variable. The Heckman selection model is used, which assumes an underlying selection equation determining whether the dependent variable is observed or not (i.e. whether FDI takes place or not).

⁷ Hartman, David G., Tax Policy and Foreign Direct Investment in the United States, *National Tax Journal*, 1984, vol. 37, no. 4, p. 475-487.

⁸ Slemrod, Joel, *Tax Effects on Foreign Direct Investment in the U.S: Evidence from a Cross-Country Comparison*, National Bureau of Economic Research, Working Paper, no. 3042, Cambridge, Massachusetts, 1989.

⁹ Devereux, Michael P. and Freeman, Harold, The impact of tax on foreign direct investment: Empirical evidence and the implications for tax integration schemes, *International Tax and Public Finance*, 1995, vol. 2, no. 1, p. 85-106.

¹⁰ Drechsler, Denis, International Labour Mobility - Opportunity or Risk for Developing Countries?, *Policy Insights*, OECD Development Centre, 2008, vol. 69.

Consequently, the model enable the independent variables to have different effects on the decision to invest and the amount invested, respectively.¹¹

Hansson and Olofsdotter's findings suggest that both the average and marginal labour taxes have a statistically significant negative impact on the decision to invest in FDI and how much to invest, respectively, but the corporate tax rate differentials have a larger economic impact on FDI than the labour ones. Moreover, Hansson and Olofsdotter conclude that the traditional gravity factors (i.e. social, geographic and economic distance) have a statistically significant impact on FDI decisions. Also, the GDP of both the source and the host country have a positive and statistically significant impact. Distance have the expected negative impact on the amount invested, but no – or even a slightly positive – statistically significant effect of distance on the FDI selection. Whether previous FDI has taken place or not (i.e. agglomeration) is found to positively affect both FDI selection and flow, whereas government investment has a negative impact. Labour productivity influences flow positively but selection negatively. Market potential, on the other hand, affects selection positively, but has no effect on flow. Labour costs affect selection negatively, but has no effect on flow. Furthermore, Hansson and Olofsdotter find that labour tax rates have become more important as a determinant for FDI in recent decades.¹²

Braunerhjelm and Lindqvist found, based on surveys of the 50 largest corporations in Sweden, that individual income taxation is one of the major driving factors for Swedish firm's localisation of headquarters.¹³ Favourable labour taxation thereby seems to play a significant role for where to place headquarters. In their study, they have also, as Hansson and Olofsdotter, followed a two-step procedure for FDI decisions: first, a location decision of whether to invest or not in a particular country, and second, a flow decision of how much to invest. Razin et al¹⁴ and Razin & Sadka¹⁵ use the same reasoning.

¹¹ Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.

¹² Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.

¹³ Braunerhjelm, Pontus and Lindqvist, Tobias, Utvandarna - effekter och drivkrafter bakom kontorsflytten, *Ekonomisk Debatt*, 1999, vol. 27, no. 8, p. 483-497.

¹⁴ Razin, Assaf, Rubinstein, Yona and Sadka, Efraim, *Fixed costs and FDI: the conflicting effects of productivity shocks*, National Bureau of Economic Research, Working Paper no. 10864, Cambridge, Massachusetts, 2004.

¹⁵ Razin, Assaf and Sadka, Efraim, *Vying for foreign direct investment: A EU-type model of tax-competition*, National Bureau of Economic Research, Working Paper, no. 11991, Cambridge, Massachusetts, 2006.

Egger and Radulescu have investigated the effect of labour taxation on FDI outflows by looking at data over the personal income taxes in 49 economies in 2002.¹⁶ They separate the labour tax levied on the employer and on the employee, and find that personal income taxes are less important than corporate income taxes for bilateral FDI outflows. Their paper analyses the implications of effective taxation of labour for profits and, hence, the location decision of a multinational enterprise. They set up a stylised partial equilibrium model and, presuming that worker effort is a function of net wages, assume that a higher employee-borne tax burden reduces effort. In turn, this raises a firm's production costs and reduces efficiency. Accordingly, they show that a higher employee-borne income tax negatively influences a MNE's profit by reducing manager effort.

There are papers discussing the impact that labour or wage costs have on FDI. Labour cost is mainly influencing vertical FDI, since it is an important factor cost (see section 3.4 for description of vertical FDI). There is much evidence that labour costs influence FDI, for example the findings by Braconier et al show a strong negative effect on FDI from the US and Sweden. The results also imply that countries with cheap, low-skilled labour attract FDI more than countries where the low-skilled labour is expensive.¹⁷

This is also in line with studies of FDI flows in Sweden and with studies of FDI in 29 Chinese regions between 1985-1995,^{18 19} both showing that labour cost has a negative effect on FDI. Studies with contrasting results have found that labour cost is not important for localisation of FDI in China, but that agglomeration was an important determinant.^{20 21}

¹⁶ Egger, Peter and Radulescu, Doina M., Labour taxation and foreign direct investment, *The Scandinavian Journal of Economics*, 2011, vol. 113, no. 3, p. 603-636.

¹⁷ Braconier, Henrik, Norbäck, Pehr-Johan and Urban, Dieter, Multinational enterprises and wage costs: Vertical FDI revisited, *Journal of International Economics*, 2005, vol. 67, no. 2, p. 446-470.

¹⁸ Braunerhjelm, Pontus and Thulin, Per, Agglomeration relative wage costs and foreign direct investment – Evidence from Swedish NMCs 1974-1998, *Journal of Industry, Competition and Trade*, 2009, vol. 9, no. 3, p. 197-217.

¹⁹ Cheng, Leonard K. and Kwan, Yum K., What are the determinants of the location of foreign direct investment? The Chinese experience, *Journal of International Economics*, 2000, vol. 51, no. 2, p. 379-400.

²⁰ Chen, Chien-Hsun, Regional determinants of foreign direct investment in Mainland China, *Journal of Economic Studies*, 1996, vol. 23, no. 2, p. 18-30.

²¹ Head, Keith and Ries, John, Inter-city competition for foreign investment: Static and dynamic effects of China's incentive areas, *Journal of Urban Economics*, 1996, vol. 40, no. 1, p. 38-60.

In summary, the negative impact that a high corporate tax rate has on FDI inflows in OECD countries has been confirmed by empirical evidence in previous research. Corporate tax rates have been proved to have a relatively high impact compared to other determinants, a common estimate of the semi-elasticity fall between -5 and 0. The median is 2.9 %, meaning that a one percentage-point increase in the corporate tax rate lowers the FDI inflows with 2.9 %.²² Labour taxation, however, has not been extensively studied to date.

3. THEORETICAL FRAMEWORK

3.1 Terms

Agglomeration economies are the benefits for companies when locating close to other companies. When firms, especially when they are in the same business field, cluster together they can exploit benefits related to economies of scale, network and spill over effects.²³

Foreign direct investment (FDI) is an international investment made by an investor residing in one economy in order to have a lasting interest in an enterprise situated in another economy than that of the investor.²⁴ Hereinafter we will call the investor/parent the source country, while the country where the affiliate/investment is located will be called the host country.

Greenfield FDI is a type of FDI where a new venture is started in a foreign country by a source country, with new operational facilities being built from the ground up and new jobs being created in the host country.²⁵

²² Mooij, Ruud A. de and Ederveen, Sjef, *What a difference does it make? Understanding the empirical literature on taxation and international capital flows*, European Commission, Directorate-General for Economic and Financial Affairs, vol. 261, 2006.

²³ Glaeser, Edward L. (ed.), *Agglomeration Economics*, National Bureau of Economic Research, Cambridge, Massachusetts, 2010.

²⁴ Bertrand, Ayse and Christiansen, Hans, Trends and Recent Developments in Foreign Direct Investment, *International Investment Perspectives: Freedom of Investment in a Changing World*, OECD, Directorate for Financial, Fiscal and Enterprise Affairs, 2002.

²⁵ Investopedia, 2015, available at: <http://www.investopedia.com/terms/g/greenfield.asp>, accessed 2015-05-16, 12.33.

Global multinational enterprises (MNE's) are companies generating sales and profits from multiple locations around the world. There are various definitions of a MNE but one way to interpret it is as a company that has their sales in at least three different continental markets, with a minimum of 20 % of their sales in each of them.²⁶ Another form company operating internationally are *Transnational Corporations (TNC's)*. They are enterprises that include the parent enterprises and their foreign affiliates. The parent controls the assets of the affiliates and the affiliates are located in countries other than the parent's home country.²⁷ MNE's and TNC's are potentially overlapping since one corporation can fulfil the criteria for both definitions simultaneously.

The Organisation of Economic Co-operation and Development (OECD) has the aim of promoting policies that improve the economic and social well being for people around the world. The OECD secretariat collects and analyses data, after which committees discuss policy regarding this information, the Council makes decisions, and then governments in the member countries implement recommendations. Today, there are 34 member countries and the OECD includes many of the most advanced economies but also the emerging economies Chile, Mexico and Turkey.²⁸

3.2 Foreign Direct Investment

3.2.1 FDI trends in OECD countries

The trend during the 2000s has been that FDI inflows to OECD countries has decreased, while FDI outflows have increased, strengthening the OECD countries role as a net FDI provider. However, just at the start of the 2000s, between 2000 and 2001, FDI flows both in and out of the OECD sharply declined from a historically high level (five times as high flows as five years

²⁶ Financial Times, 2015. *Financial Times Lexicon*, available at: <http://www.oecd.org/about/membersandpartners/>, accessed 2015-05-16, 13.02.

²⁷ UNCTAD, 2013. *Transnational corporations (TNC)*, available at: [http://unctad.org/en/Pages/DIAE/Transnational-corporations-\(TNC\).aspx](http://unctad.org/en/Pages/DIAE/Transnational-corporations-(TNC).aspx), accessed 2015-05-16, 13.08.

²⁸ OECD, 2015. *Members and partners*, available at: <http://www.oecd.org/about/membersandpartners/>, accessed 2015-05-16, 12.57.

before that). This indicates a bursting FDI bubble at the turn of the millennium.²⁹ Preceding that, FDI flows grew strongly during the 1990s, largely due to the integration of international capital markets.³⁰ In 1990-1997, the average increase in FDI flows was 13 %, while 1998-2000 the average was approaching 50 % – well above the rates of world trade and economic growth.³¹

3.3 FDI theories

There are some theories on what determines FDI decisions that will be presented in this section, and then compared with the results from the regressions (section 6). These theories will also be used in order to select relevant control variables.

The standard models for horizontal FDI (more on horizontal vs vertical FDI in section 3.4) means that there is a trade off between plant-level fixed costs and trade costs. When the host country is large enough for the fixed costs of the plant to be offset by the trade costs saved, FDI is chosen over exports.³² According to the *capital market theory*, FDI is determined by the interest rates and is a part of portfolio investment, i.e FDI can be combined to create a profitable portfolio.³³ The *gravity approach* to FDI is a theory suggesting that the closer two countries are – economically, geographically and socially – the higher will the FDI be.³⁴ Another suggestion is that the institutional framework in countries has a great importance on FDI. The better, more secure and well functioning institutions and the less the domestic political risk is, the higher the FDI will be.³⁵

²⁹ Bertrand, Ayse and Christiansen, Hans, Trends and Recent Developments in Foreign Direct Investment, *International Investment Perspectives: Freedom of Investment in a Changing World*, OECD, Directorate for Financial, Fiscal and Enterprise Affairs, 2002.

³⁰ Carson, Carol S., *Foreign Direct Investment Trends and Statistics*, Statistics Department, International Monetary Fund, Washington, DC, 28 October 2003.

³¹ Cardillo, Colleen, Montanjes, Marie, Motala, John and Patterson, Neil K., *Foreign Direct Investment – Trends, Data Availability, Concepts, and Recording Practices*, International Monetary Fund, Washington, DC, 2004.

³² Markusen, James R., Multinationals, multi-plant economies, and the gains from trade, *Journal of International Economics*, 1984, vol. 16, no. 3-4, p. 205-226.

³³ Choudhury, Rahul N. and Nayak, Dinkar, *A selective review of foreign direct investment theories*, Asia-Pacific Research and Training Network on Trade, Working Paper 143, ESCAP, Bangkok, 2014.

³⁴ Pagano, Marco and Volpin, Paolo F., The political Economy of Corporate Governance, *American Economic Review*, 2005, vol. 95, no. 4, p. 1005-1030.

³⁵ Wilhelms, Saskia, *Foreign Direct Investments and its determinants in Emerging markets*, United States Agency for International Development, 1998.

In a *neoclassical investment model*, the capital stock in different locations will adjust such that the corporate tax rates in countries become equalised. To illustrate: an increase in the tax rate in country A will cause capital to relocate from country A to country B. The pre-tax rate of return in country B will decrease, and increase in country A, until after-tax rates of return are again equalised. According to the *Core Periphery model* (CP), the capital relocation of capital due to an increase in tax rates is limited, due to the fact that it is offset by advantages in market access that a TNC possess in its existing location. There are incentives for firms to invest in large markets due to *agglomeration*, i.e. a location where there is a high business concentration that offers spill over effects and economies of scale. Agglomeration economies thereby make the effect of tax rate changes non-linear.³⁶ We will consider this reasoning by including an agglomeration variable in our regression (described closer in section 5).

3.4 Different types of FDI: vertical and horizontal

Horizontal FDI is when firms duplicate their operational activities in multiple countries, while vertical FDI, also called outsourcing or offshoring, is when firms locate different stages of their production in different countries. The bulk of FDI is horizontal. As developed countries are both the source and the host to most FDI, this suggests that market access is more important than low production cost as a motive for FDI. In horizontal FDI, the question is typically how to best serve the host country, whereas in vertical FDI it is how to best serve the domestic market.³⁷ The effect that taxes have on vertical and horizontal FDI may differ. For example, since labour costs mainly affect vertical FDI decisions, labour taxation likely plays a more important role for vertical than for horizontal FDI. However, this study will not distinguish between the two types of FDI because of data limitations, why we will not go deeper into the different implications for the two types.³⁸

³⁶ OECD, Tax effects on Foreign Direct Investment, *Recent Evidence and Policy Analysis*, number 17, 2007.

³⁷ Markusen, James R., Multinationals, multi-plant economies, and the gains from trade, *Journal of International Economics*, 1984, vol. 16, no. 3-4, p. 205-226.

³⁸ Braconier, Henrik, Norbäck, Pehr-Johan and Urban, Dieter, Multinational enterprises and wage costs: Vertical FDI revisited, *Journal of International Economics*, 2005, vol. 67, no. 2, p. 446-470.

3.5 Theories on taxes

3.5.1 Corporate and labour taxes: their effect on FDI attractiveness

Corporate tax rates as a determinant of FDI decisions is built on the fact that profit is taxed at different rates in different countries. MNEs can thereby escape a high tax burden by placing their operations in countries with low corporate tax rates. Compared to the vast research on corporate tax rates' impact on FDI, the labour tax has been neglected and overseen in much research around FDI, although it also has an important influence on FDI decisions. Labour taxation affects the net return in a firm directly by increasing its costs. In addition, it may also imply less favourable incentives to the workers, since corporations want to offset the higher tax cost on labour with decreasing labour costs in other ways. According to the *efficiency wage theory* and literature, there is a positive relationship between wage and work effort.³⁹ This means that lowered wages to compensate for higher labour taxes likely leads to reduced effort from the workers, which in turn influences the net return of the firm negatively by lowering the productivity. Another indirect effect that labour taxes have, based on the efficiency wage theory, is that high tax rates makes other opportunities more attractive to workers, and therefore the tax rates may affect a firm's ability to hire and retain productive workers.⁴⁰

There has been a downward trend in corporate tax rates during the last decades, a so-called tax competition.⁴¹ We argue that this results in lower corporate tax rate diversity between countries, which could imply that corporate tax rates will play a less important role for FDI attractiveness. Countries must presumably instead compete based on other criteria, where they can distinguish themselves and offer a competitive advantage. Labour taxes – among other factors – can become more important instead, which means that our study might be of greater importance.

3.5.2 Labour cost vs labour tax

Many studies (see section 2.1) have considered labour costs when looking at the determinants for FDI. According to us, there are two reasons for why labour taxes should be included as an

³⁹ Prendergast, Candice, *What Happens Within Firms? A survey of empirical evidence on compensation policies*, National Bureau of Economic Research, 1996.

⁴⁰ Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.

⁴¹ OECD, Tax effects on Foreign Direct Investment, *Recent Evidence and Policy Analysis*, number 17, 2007.

additional independent variable. First of all, if the labour tax is not controlled for, there might be an omitted variable bias. Secondly, according to Egger and Radulescu, it is the net wage that determines the employee's effort.⁴² Not considering the level of labour taxation would thereby not account for that a high average wage level in a country might be offset, to some extent, by high labour taxes.

3.5.3 Average vs marginal tax rates

When MNEs make decisions regarding FDI, it typically takes the form of a two-step procedure:

1. The firm decides if it should directly invest or not in a particular country.
2. The firm decides the scale of the operation: how much to invest.

The role of taxes differs in these two stages. In a study by Devereux and Griffith, it is claimed that average tax rates influence discrete decisions (whether to invest or not) and marginal tax rates influence continuous decisions (how much to invest).⁴³

4. METHOD

4.1 Data collection

We use Hansson and Olofsdotter's study as a framework for identifying and choosing the variables for our regressions. We tried to replicate their variables, but not fully so. Some variables that Hansson and Olofsdotter use are not available for OECD-countries, but we then tried to replace it with something similar. We also had to collect different kind of data variables for another reason: we do not look at bilateral data and hence we are setting up another model compared to Hansson and Olofsdotter. Our dependent variables are the ones that differ the most.

⁴² Egger, Peter and Radulescu, Doina M., Labour taxation and foreign direct investment, *The Scandinavian Journal of Economics*, 2011, vol. 113, no. 3, p. 603-636.

⁴³ Devereux, Michael P. and Griffith, Rachel, The Taxation of Discrete Investment Decisions, *International Tax and Public Finance*, 1998, vol. 10, p. 107-126.

4.2 The Regression Model

We will not look at bilateral FDI flows, as Hansson and Olofsdotter does, but rather the total FDI inflows to each of the 34 OECD countries. Therefore we do not need to use the Heckman selection model, since we will not have a lot of zero observations in FDI flows, which would be the case if looking at bilateral FDI.

To be able to use an ordinary least square (OLS) method, the time-independent error term (a_i) must be uncorrelated with the independent variables. It is likely that some countries will be more attractive than others, which should increase FDI and to some extent offset the disadvantages of a higher tax rate. We control for the fixed effects (FE) between our 34 OECD countries by running a fixed effect estimation. Controlling for fixed effects reduces the variation in the data, since only within variation for each country is used, rather than both within and between variations. This, in turn, reduces efficiency as well as the degrees of freedom.

If the idiosyncratic error terms (u_{it}) are serially uncorrelated, FE is more efficient (smaller variances in the estimated coefficients). If on the other hand changes in the idiosyncratic error terms (Δu_{it}) are serially uncorrelated, FD is more efficient. We will use the FE estimator, but with the awareness of its impact on the variation. Also, we will run a first differences (FD) estimation to compare with our fixed effects estimation. To use the fixed effects estimator strict exogeneity must be assumed, which implies that the idiosyncratic error term (u_{it}) must be uncorrelated with the independent variables in each period of time. This is quite a strong assumption to make.

We run two regressions for two different purposes: first, the selection regression, which estimates what determines the discrete decision, i.e. whether to invest or not. Second, the flow regression, which estimates what determines the scale of the FDI: how much to invest. Below, the dependent and independent variables for each regression are described. After that, the control variables, which are included in both regressions, are presented. The specification of the variables can be found in appendix A1.

4.3 Selection regression

$$fdi_{projgreen} = \beta_0 + \beta_1 corp_{tax_{it}} + \beta_2 avg_{inc_{tax_{it}}} + \beta_3 avg_{soc_{sec_{it}}} + \beta_4 fc_{corp_{tax_{it}}} + \beta_5 fc_{avg_{inc_{tax_{it}}}} \\ + \beta_6 fc_{soc_{sec_{it}}} + \chi_{it} + a_i + u_{it}$$

4.3.1 The dependent variable

The dependent variable is the number of greenfield FDI projects. Our idea was first to collect data over general FDI but when we discovered the data over greenfield FDI, we preferred this measure since it captures true FDI investments better than a more general FDI measure.

4.3.2 The independent variables

The three independent variables that are used for the selection regression are average measures (see reasoning behind this in section 3.5.3): the statutory corporate tax rate, the average individual income tax rate (for individuals with an income that is 167 % of average earnings) and the average social security contributions (for individuals with an income that is 167 % of average earnings). The distinction between income tax levied on employee (individual income tax) and employer (social security contributions) is made in order to distinguish their respective impact on FDI decisions, as they are not necessarily the same. We have chosen to look at employees in the top bracket of income levels, as we follow Hansson and Olofsdotters' reasoning that labour taxation should matter more for higher income employees, who are more attractive on the labour market and thereby more difficult to retain. Therefore, the net – post-tax – income is of higher importance for this group compared to lower income groups, who have fewer opportunities to change jobs.⁴⁴

⁴⁴ Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.

4.4 Flow regression

fdi_inflows_green

$$= \beta_0 + \beta_1 METR_{it} + \beta_2 top_marg_inc_tax_{it} + \beta_3 marg_soc_sec_{it} + \beta_4 fc_METR_{it} \\ + \beta_5 fc_top_marg_inc_tax_{it} + \beta_6 fc_marg_soc_sec_{it} + \chi_{it} + a_i + u_{it}$$

4.4.1 The dependent variable

The dependent variable in the flow selection is the total value of FDI inflows, to reflect the scale of FDI.

4.4.2 The Independent Variables

In the flow regression, the independent variables included are, as discussed in section 3.5.3 marginal measures: the marginal effective corporate tax rate on corporate investment, the marginal personal income tax (for individuals with an income that is 167 % of average earnings) and the employer's marginal social security contributions (for individuals with an income that is 167 % of average earnings). The marginal effective corporate tax rate measures the impact of corporate tax rates on the rate of return of the investment, and is thus the most relevant measure of the incentive to invest for a firm.⁴⁵

4.5 The Control Variables

The control variables will constitute valid proxies for time-dependent factors that could also play an important role for the attractiveness of FDI. We use previous studies (mainly Hansson and Olofsdotter's) and theories on FDI as guidelines for choosing which factors to include as control variables. In our regressions, χ represents a vector of our control variables that we will include to reduce possible omitted variable biases.

When the size of the host market is big, it likely attracts FDI, since there is room for expansion on the domestic market, with a large customer base to saturate. To estimate the market size we used the countries' total GDP in US dollars as a control variable. GDP per capita gives an

⁴⁵ Tax Policy Center, 2015. *Business Taxation: What are the statutory and effective corporate tax rates?*, available at: <http://www.taxpolicycenter.org/briefing-book/key-elements/business/statutory.cfm>, accessed 2015-05-16, 16.20.

indication on how rich the country is relative to its population size, i.e. the level of wealth and the purchase power of the population. We expect that the greater the country wealth is, the more attractive the country is for TNCs' investments. We are using inflation rates in order to reflect the economic stability in each country.

Fragility in some markets, e.g. risks related to policy uncertainty and regional instability, may negatively affect the expected upturn in FDI.⁴⁶ As a proxy for the political risk and the strength of the institutions we are using Transparency International's Corruption Perception Index, which is a composite index that measures the perceived level of public sector corruption. To that, we are adding a measure of strength of legal rights. We also wanted to include a measure over property rights, but were restricted by the data availability.

We are controlling for each economy's infrastructure standards. To indicate how good the infrastructure is we searched for some indicator of the quality of the countries' overall infrastructure. The only measure that was available was unfortunately "the quality of port infrastructure" and this did not seem reasonable to use. This measure would be very insufficient and somewhat irrelevant; many of the OECD countries do not even have any coasts. Instead we use the total expenditures on inland infrastructure investments as a proxy. We assume that the more a country invest in the infrastructure, the better it is likely to work. This may not be true, however. Assume for example that country A has invested heavily in the infrastructure system before 2003, and then in the following years it only had to maintain the high infrastructure standards and did not invest that much. At the same time country B has invested poorly before but a lot during the years 2003-2013. Country A may still have the most well functioning infrastructure but the scale of investments indicates the opposite. Nevertheless, we mean that better infrastructure should attract FDI investment and that our measure manages to capture this to a large extent.

We expect that the business environment in the host country affects the FDI attractiveness, and therefore we include the following control variables measuring the business climate: the cost of business start-up procedures, the time to enforce a contract, the time to resolve insolvency and

⁴⁶ Navaretti, Giorgio Barba and Venables, Anthony J., *Multinational Firms in the World Economy*, Princeton, Princeton University Press, 2006.

the time to register property. The higher those measures are, the less favourable for FDI we deem the country to be. In the OECD statistics database, we found a measure that is a weighted average of the business environment factors mentioned above. However, for quite a few OECD countries there was a lack of data on this measure. Therefore, we instead chose to pick the most relevant indicators for which there was also a lot of data available.

As stated previously, we expect that agglomeration – the extent of business concentration – will have a positive impact on FDI. We followed Hansson and Olofsdotter's reasoning that a good proxy to capture the agglomeration effect would be to use the previous year's FDI capital stock. Countries with a larger pre-existing stock of FDI will likely, *ceteris paribus*, have an advantage in attracting new investment compared to countries with a smaller stock. This is due to the fact that a large FDI capital stock implies a larger business concentration, which firms benefit from due to spill over effects, network effects and economies of scale. A large existing FDI stock also serves as an assurance, indicating to potential investors that the country is suitable to invest in. In summary, the agglomeration effect might mitigate the effect of high tax rates, as it can – at least to some, not insignificant, extent – outweigh the disadvantages. That is, we expect it to have a positive impact on FDI attractiveness.

The level of government investments is likely to have an impact on the FDI, since less government investments may leave room for more private rather than public investments, making the country more attractive to foreign investors. It could also be the case that large government investments mean higher overall standards for e.g. infrastructure and institutions, which could attract FDI. In summary, the expected impact of government investments is likely to have an impact on FDI attractiveness, but it is ambiguous if the net effect is positive or negative.

We have ranked the countries based on their English skills, as higher English proficiency should have a positive impact on FDI, since it facilitates the communication between the foreign investors and the native people of the host country.

We use the value of total imports and exports as explanatory variables showing the volume of trade, as we believe that if a country extensively engages in international trade, it could be an

advantage to invest in an affiliate in that country rather than trading with it. As mentioned in section 3.3, when the host country is sufficiently large, the fixed costs of the plant can be offset by the trade costs saved. FDI is then chosen over exports.

We expect trade barriers to affect FDI, but it is ambiguous how. If the tariffs in a host country are high, it may be costly for a source country to trade with it, and it may be relatively profitable to instead directly invest in order to avoid these barriers. On the other hand, low barriers can attract FDI if investing firm intends to export to a large extent from the facilities in the host country. Average wage levels are controlled for, and it is likely that lower wage levels attract FDI. But wage levels should not be considered in isolation, the productivity also matters, so we control for that too.

We are controlling for the financial crises by using a dummy variable (fc_{it}) for the years 2007-2009. It is not obvious how to define the time period for the financial crisis since it consists of different stages, depending on the seriousness of its impacts. We decided to use the period 2007-2009, which was defined as the financial crisis in the IMF working paper “Financial Crises: Explanations, Types, and Implications” by Stijn Claessens and M. Ayhan Kose.⁴⁷ This will take the financial crisis into consideration in our study, even if it is arguable that it could have been done differently, e.g. with different weights depending on how strong the effects of the crisis was for each year. However, this would have been difficult to estimate accurately and we therefore chose to only use one dummy.

5. DATA

We look at data over a time period of eleven years (from 2003 to 2013), which gives us 374 observations. A good general rule of thumb says that 300 observations are good for factors analysis.⁴⁸ We first had a broader time period, from 1990 to 2013, but that resulted in a lot of systematically missing values for almost all of our variables so we decided to narrow the time period and make the data more concise, and that still gives us nearly almost 400 observations.

⁴⁷ Claessens, Stijn and Kose, M. Ayhan, *Financial Crises: Explanations, Types, and Implications*, International Monetary Fund, Working Paper, vol. 13, no. 28, Washington, DC, 2013.

⁴⁸ Tabachnick, Barbara G. and Fidell, Linda S., *Using Multivariate Statistics*, 3rd ed., New York: HarperCollins, 1996.

We also think that this time period is accurate since it keeps the figures up to date and relevant for today's economic climate. The data is in the form of a panel dataset. All variables and data sources are presented in appendix A1. Most of our data is collected from the OECD, which we deem to be a reliable source for our purposes, and is also used by many other studies of good quality. Data from the OECD is supplemented by other sources – which we have evaluated and found to be reliable – when needed.

6. RESULTS

In this section, the results for each of the two regressions are presented. The impacts of changes in any one variable are all presented *ceteris paribus*. The effect of all independent variables, and the control variables with statistically significant impacts on conventional levels (1 %, 5 % or 10 %), are presented. For a full list of the regression output, see appendix A3. Stata omitted the variable for linguistic tie in the regression. This is because of collinearity, i.e. the observations for each country remain constant over time, and thus the variable cannot be part of a fixed effect estimation, since there needs to be variation over time when using fixed effects.

6.1 Selection regression

The corporate tax rates have a statistically significant negative effect on the number of FDI projects at the 1 % level. Increasing the corporate tax rate with one percentage point would reduce the number of FDI projects by 6.816. A one-percentage increase in the average personal income tax rate would reduce the number by 6.478, significant at a 10 % level. The social security contributions have a negative impact on the number of greenfield FDI project: a one percentage point increase would decrease the number of projects by 1.764. However, this result is not significant on any conventional significance level.

An increase in the GDP per capita by 100 US dollars would reduce the number of FDI projects by one (significant at the 5 % level). An increase in agglomeration by one million dollars would have zero impact on the number of projects (significant at the 1 % level).

The interaction effect between the financial crisis and corporate tax rates shows that the crisis somewhat mitigates the negative impact of an increase in corporate tax rate, while the opposite is true for the average personal income tax: the effect is even more negative. Both these results are significant on a 5 % level.

FD estimation shows a similar effect of corporate tax rates. The impact of average personal income tax rates differs, however, showing a slight positive but not significant impact. The social security contributions have a slightly stronger negative effect, but are still not significant. GDP per capita is not significant using FD, but the agglomeration impact is the same as when using FE, and is significant (5 % level).

6.2 Flow regression

In the flow regression, when using the FE estimator, a one-percentage increase in the marginal corporate tax rate would increase FDI inflows by 165.6 million US dollars, but this is not statistically significant on any conventional significance level. A one-percentage increase in the top marginal labour tax rate would increase FDI inflows by 39.2 million USD, but this was not statistically significant either. Neither were the marginal social security contributions, but the effect on flow was negative by 385.8 US dollars.

The impact of inflation (10 % level) and import (5 % level) is positive, while the impact of GDP (10 % level), corruption and exports (10 % significance level) is negative. The financial crisis makes the impact the marginal effective corporate tax rates even more positive, and this interaction effect is significant on a 10 % level.

When using the FD estimator in the flow regression there were no statistically significant effects for any of our independent variables. In contrast to when using an FE estimator, the effects are negative for all of them. The only variable showing a significant impact is import, with a positive effect (10 % level).

7. DISCUSSION

We decided not to use a log-linear model for our study, since we neither saw, nor expected tendencies for skewness in our data (which would probably have been an issue if we had used bilateral data). However, in hindsight, looking at our results, it could have been good for comparability reasons. For example, our results show that a one-percentage point increase in the personal income tax would decrease the number of greenfield FDI projects by 6.5. This could be large for a small country, while it only constitutes a small change for a large country.

We have very few significant values and many of the figures for our estimates surprises us. Starting with the selection regressions, both using the FE and the FD estimations show that the corporate tax rate has a negative effect on the FDI investments, which is in line with our predictions. For the personal income taxes, the FE regression shows a negative effect while it in the FD regression has a positive effect on the FDI investments. The FD is not in accordance with our hypothesis and it is also surprisingly that these two regressions are indicating different effects, which they do for other variables as well. One explanation for this could be that the assumption of strict exogeneity does not hold. There is a large discrepancy between the corruption estimate in the FD and FE regressions.

Our results are, as stated earlier, surprising to us since they are contradicting to the existing theories. This could be a reason to question existing theories, but we rather believe that it is something that has more to do with shortcomings in our data somehow. Perhaps we have too few observations to show the true relationship. According to us, this is something that makes us suspicious about the precision and reliability for all our estimates. We feel less comfortable to draw any general conclusions from our results in respect to this.

8. CONCLUSION

The following section contains conclusions regarding the results of the regressions. Conclusions are only drawn for variables with statistically significant impacts, on conventional levels. In line with previous research – and as expected – corporate tax rates have a negative impact on the greenfield FDI decision whether to invest or not. The average personal income tax rates also

have a negative impact, which is in line with Hansson and Olofsdotter's findings. The effect of GDP per capita and agglomeration are however not as expected: we believed they would both have a positive impact on the investment decision. It is also somewhat surprising that the impact of the financial crisis differs between corporate and personal income tax rates.

For the greenfield FDI inflows, no statistically significant impact of the independent variables was found. Regarding the control variables, there are several surprising results. Inflation rate was used as a proxy for economic stability, and the result that higher inflation rate would increase FDI inflows is thereby remarkable. It could be that fluctuations in inflation, or deviation from inflation goals, would have been a better proxy to use for this purpose. At the same time, higher inflation traditionally entails a more uncertain economic climate and restraints on investments. Analogous to the first regression, it is not in line with our expectations that GDP has a negative impact on the investments. As discussed in section 4.4, a larger domestic market should attract higher levels of FDI.

Some other results are more in line with our expectations: a higher level of corruption is not likely to make a country attractive for FDI. A reasonable explanation for the negative impact of higher export levels is that if there is much export from a country, they already produce a lot and there is less room for additional investment. In the same way, high import levels likely mean that there are opportunities for further investment, which could explain the positive impact.

Our findings regarding the selection decision are in line with Hansson and Olofsdotter's. However, they also found a statistically significant negative effect of labour taxation on the decision of how much to invest. This difference could be due to our studies are not completely comparable method wise. They use the Heckman selection model and we use a fixed effect estimator. This is because they look at bilateral FDI, while we look at total FDI projects and inflows. Another difference is that they have more observations, which entails higher statistical significance. Also, they use another time period (1997-2007) and the EU instead of the OECD.

Since we use a fixed effects estimation, a lot of variation in the data is lost, reducing the significance. More observations (in the form of a longer time period or more countries) could

have given stronger and more valid results. However, as mentioned earlier, it was hard to find data further back in time; we chose to only include data for 2003 to 2013 in order to not have values missing systematically, which would also have created biased results.

In summary, this report has shown that higher labour taxation has a negative impact on the discrete greenfield FDI decision whether to invest or not, in OECD countries between 2003 and 2013. However, the impact of labour taxation is not clear on the size of the investments. Also, there are many estimates indicating effects that surprise us and which we do not really believe are reasonable. We are therefore careful to draw any general conclusions from this. We believe that more investigations concerning labour taxation and FDI in OECD countries are needed, preferably in a larger scale with data from further back in time. More observations could increase the chance of finding significant relationships.

8. AREAS FOR FURTHER RESEARCH

Going back to what originally spurred our interest, it would be interesting to investigate the impact of changes in corporate and labour tax rates on FDI within one country. Our study and results should be treated with caution since there might be other taxes and factors affecting the actual tax burden; controlling for additional taxes could be areas for further research. It would also be interesting to look at industry specific data regarding FDI inflows and projects to see if there are different effects of the labour taxation in different industries.

9. REFERENCES

- Bertrand, Ayse and Christiansen, Hans, Trends and Recent Developments in Foreign Direct Investment, *International Investment Perspectives: Freedom of Investment in a Changing World*, OECD, Directorate for Financial, Fiscal and Enterprise Affairs, 2002.
- Braconier, Henrik, Norbäck, Pehr-Johan and Urban, Dieter, Multinational enterprises and wage costs: Vertical FDI revisited, *Journal of International Economics*, 2005, vol. 67, no. 2, p. 446-470.
- Braunerhjelm, Pontus and Lindqvist, Tobias, Utvandarna - effekter och drivkrafter bakom kontorsflytten, *Ekonomisk Debatt*, 1999, vol. 27, no. 8, p. 483-497.
- Braunerhjelm, Pontus and Thulin, Per, Agglomeration relative wage costs and foreign direct investment – Evidence from Swedish NMCs 1974-1998, *Journal of Industry, Competition and Trade*, 2009, vol. 9, no. 3, p. 197-217.
- Cardillo, Colleen, Montanjees, Marie, Motala, John and Patterson, Neil K., *Foreign Direct Investment – Trends, Data Availability, Concepts, and Recording Practices*, International Monetary Fund, Washington, DC, 2004.
- Carson, Carol S., *Foreign Direct Investment Trends and Statistics*, Statistics Department, International Monetary Fund, Washington, DC, 28 October 2003.
- Chen, Chien-Hsun, Regional determinants of foreign direct investment in Mainland China, *Journal of Economic Studies*, 1996, vol. 23, no. 2, p. 18-30.
- Cheng, Leonard K. and Kwan, Yum K., What are the determinants of the location of foreign direct investment? The Chinese experience, *Journal of International Economics*, 2000, vol. 51, no. 2, p. 379-400.

- Choudhury, Rahul N. and Nayak, Dinkar, *A selective review of foreign direct investment theories*, Asia-Pacific Research and Training Network on Trade, Working Paper no. 143, ESCAP, Bangkok, 2014.
- Claessens, Stijn and Kose, M. Ayhan, *Financial Crises: Explanations, Types, and Implications*, International Monetary Fund, Working Paper, vol. 13, no. 28, Washington, DC, 2013.
- Devereux, Michael P. and Freeman, Harold, The impact of tax on foreign direct investment: Empirical evidence and the implications for tax integration schemes, *International Tax and Public Finance*, 1995, vol. 2, no. 1, p. 85-106.
- Devereux, Michael P. and Griffith, Rachel, The Taxation of Discrete Investment Decisions, *International Tax and Public Finance*, 1998, vol. 10, p. 107-126.
- Drechsler, Denis, International Labour Mobility - Opportunity or Risk for Developing Countries?, *Policy Insights*, OECD Development Centre, 2008, vol. 69.
- Egger, Peter and Radulescu, Doina M., Labour taxation and foreign direct investment, *The Scandinavian Journal of Economics*, 2011, vol. 113, no. 3, p. 603-636.
- The European Commission, 2015. *The EU Single market*, available at: http://ec.europa.eu/internal_market/index_en.htm, accessed 2015-05-16, 13.17.
- Financial Times, 2015. *Financial Times Lexicon*, available at: <http://www.oecd.org/about/membersandpartners/>, accessed 2015-05-16, 13.02.
- Glaeser, Edward L. (ed.), *Agglomeration Economics*, National Bureau of Economic Research, Cambridge, Massachusetts, 2010.

- Hansson, Åsa and Olofsdotter, Karin, Labor Taxation and FDI decisions in the European Union, *Open Economies Review*, 2014, vol. 25, no. 2, p. 263-287.
- Hartman, David G., Tax Policy and Foreign Direct Investment in the United States, *National Tax Journal*, 1984, vol. 37, no. 4, p. 475-487.
- Head, Keith and Ries, John, Inter-city competition for foreign investment: Static and dynamic effects of China's incentive areas, *Journal of Urban Economics*, 1996, vol. 40, no. 1, p. 38-60.
- Investopedia, 2015, available at: <http://www.investopedia.com/terms/g/greenfield.asp>, accessed 2015-05-16, 12.33.
- Markusen, James R., Multinationals, multi-plant economies, and the gains from trade, *Journal of International Economics*, 1984, vol. 16, no. 3-4, p. 205-226.
- Mooij, Ruud A. de and Ederveen, Sjef, *What a difference does it make? Understanding the empirical literature on taxation and international capital flows*, European Commission, Directorate-General for Economic and Financial Affairs, vol. 261, 2006.
- Motta, Massimo and Norman, George, Does Economic Integration Cause Foreign Direct Investment?, *International Economic Review*, 1996, vol. 37, no. 4.
- Navaretti, Giorgio Barba and Venables, Anthony J., *Multinational Firms in the World Economy*, Princeton, Princeton University Press, 2006.
- OECD, 2015. *Members and partners*, available at: <http://www.oecd.org/about/membersandpartners/>, accessed 2015-05-16, 12.57.
- OECD, Tax effects on Foreign Direct Investment, *Recent Evidence and Policy Analysis*, vol. 17, 2007.

- Pagano, Marco and Volpin, Paolo F., The political Economy of Corporate Governance, *American Economic Review*, 2005, vol. 95, no. 4, p. 1005-1030.
- Razin, Assaf, Rubinstein, Yona and Sadka, Efraim, *Fixed costs and FDI: the conflicting effects of productivity shocks*, National Bureau of Economic Research, Working Paper no. 10864, Cambridge, Massachusetts, 2004.
- Razin, Assaf and Sadka, Efraim, *Vying for foreign direct investment: A EU-type model of tax-competition*, National Bureau of Economic Research, Working Paper, no. 11991, Cambridge, Massachusetts, 2006.
- Slemrod, Joel, *Tax Effects on Foreign Direct Investment in the U.S: Evidence from a Cross-Country Comparison*, National Bureau of Economic Research, Working Paper, no. 3042, Cambridge, Massachusetts, 1989.
- Tabachnick, Barbara G. and Fidell, Linda S., *Using Multivariate Statistics*, 3rd ed., New York: HarperCollins, 1996.
- Tax Policy Center, 2015. *Business Taxation: What are the statutory and effective corporate tax rates?*, available at: <http://www.taxpolicycenter.org/briefing-book/key-elements/business/statutory.cfm>, accessed 2015-05-16, 16.20.
- UNCTAD, 2013. *Transnational corporations (TNC)*, available at: [http://unctad.org/en/Pages/DIAE/Transnational-corporations-\(TNC\).aspx](http://unctad.org/en/Pages/DIAE/Transnational-corporations-(TNC).aspx), accessed 2015-05-16, 13.08.
- UNCTAD, *World Investment Report 2014*.
- Wilhelms, Saskia, *Foreign Direct Investments and its determinants in Emerging markets*, United States Agency for International Development, 1998.

10. APPENDIX

A1. Description of variables

<u>Selection regression</u>	Variable	Definition	Source	Mean	Min	Max	Std. dev.
Dependent variable:	fdi_proj	Number of greenfield FDI projects	UNCTAD's World Investment Report 2014, annex table 22	191.67	0	1706	254.80
Independent variables:	avg_inc_tax	Average income tax rate (%), 167% of average earnings	OECD statistics	30.87	7	50	9.18
	soc_sec	Average rate of employer's social security contributions (%)	OECD statistics	17.55	0	43,84	11.66
	corp_tax	Combined corporate income tax rate (%), since the complete tax impact on corporations impact on FDI decisions	OECD statistics	26.87	12.5	40.87	6.53
<u>Flow regression</u>							
Dependent variable:	fdi_inflows_green_n	Total value of greenfield FDI inflows in millions of US dollars	UNCTAD's World Investment Report 2014, annex table 19	8886.41	1.8	72745.99	11312.78
Independent variables:	top_marg_inc_tax_n	Top marginal personal income tax rate (%)	Tax foundation	40.45	4.05	59	9.69
	marg_soc_sec	Marginal rate of employer's social security contributions (%)	OECD statistics	14.76	0	43.36	12.57
	METR_n	Marginal Effective Corporate Tax Rate on corporate investment (%)	Tax foundation	20.56	5.7	38.8	7.69
Control variables (both regressions)	gdp	Gross Domestic Product in current millions of US dollars	World Development Indicators	1228558	9822.14	1,68e+07	2544384
	gdp_capita	GDP per head of population, current prices, USD, current PP's	OECD statistics	33463.08	8806.4	91754.2	13369.4
	aggl	Previous year's FDI stock (total acumulation of FDI), in millions of US dollars	UNCTADstat and UNCTAD's World Investment Report 2014, annex table 03	328769.9	797.87	3923969	550433.2

	leg	Strength of legal rights (0=weak to 12=strong). No data for 2003, but estimated to be the same as 2004-2010, which were all the same.	World development Indicators	6.53	2	12	2.02
	infra_n	Total inland transport infrastructure investment, (% of GDP). No data for 2012 & 2013, but assumed to be the same as 2011.	World development Indicators	0.98	0	2.5	0.47
	contr	Time to enforce contract (days)	World development Indicators	514.08	216	1440	260.82
	prop	Time to register property (days). No data for 2003, but estimated to be the same as 2004, since the values for 2004-2013 were very consistent	World development Indicators	44.38	1	391	65.03
	insolv	Time to resolve insolvency (days)	World development Indicators	1.93	0.4	9.2	1.30
	tariff_n	Tariff rate, applied, weighted mean, (%)	The World Bank	1.90	0	15.44	1.36
	cost_start_n	Cost of business start-up procedures (% of GNI per capita)	World development Indicators	7.36	0	40.4	7.60
	gov_cons	General government final consumption expenditure, (% of GDP)	The World Bank	19.20	9.95	28.06	3.93
	avg_wage_n	Average annual wages, in 2013 constant prices, at 2013 USD's PPP's	OECD statistics	36247.35	0	56340	12274.01
	produc	GDP per hour worked	OECD statistics	41.38	13.4	93.6	15.53
	corruption	Corruption Perceptions Index	Transparency International	6.99	2.97	9.7	1.82
	imp	Imports of goods, US billion dollars	OECD statistics	268.07	2.83	2276.3	367.79
	exp	Imports of goods, US billion dollars	OECD statistics	249.08	2.39	1579.59	302.93
	eng	English proficiency ranking (1 to 5, where 1 is very high)	Education First, ranking for Greece, Iceland, Israel and Luxembourg estimated from ETS	Omitted by Stata			
	infl	Annual percentage	World	2.69			2.36

		change in consumer prices	development Indicators, Chile: UNCTADStat		-4.48	25.30	
	fc	Dummy variable for the financial crisis 2007-2009, taking the value 1 for that period	"Financial Crises: Explanations, Types, and Implications" by Stijn Claessens and M. Ayhan Kose, IMF	0.13	0	1	0.33

A2. OECD member countries

Australia	Iceland	Slovak Republic
Austria	Ireland	Slovenia
Belgium	Israel	Spain
Canada	Italy	Sweden
Chile	Japan	Switzerland
Czech Republic	Korea	Turkey
Denmark	Luxembourg	UK
Estonia	Mexico	US
Finland	Netherlands	
France	New Zealand	
Germany	Norway	
Greece	Poland	
Hungary	Portugal	

A3. Regression output

FE selection regression	fdi_proj_green	FD selection regression	D.fdi_proj_green
corp_tax	-6.816 (3.21)**	D.corp_tax	-6.338 (2.83)**
avg_inc_tax	-6.478 (1.88)	D.avg_inc_tax	0.706 (0.18)
soc_sec	-1.764 (0.47)	D.soc_sec	-2.912 (0.74)
infl	2.563 (0.76)	D.infl	2.528 (1.05)
gdp_capita	-0.010 (2.40)*	D.gdp_capita	-0.001 (0.18)
gdp	0.000 (0.01)	D.gdp	-0.000 (1.05)
aggl	0.000 (4.74)**	D.aggl	0.000 (2.24)*
corruption	-20.012 (1.48)	D.corruption	0.828 (0.06)
leg	-6.383 (0.82)	D.leg	-2.835 (0.41)
contr	0.017 (0.19)	D.contr	0.001 (0.01)
insolve	8.773 (1.12)	D.insolve	1.938 (0.17)
prop	0.208 (1.47)	D.prop	0.092 (0.54)
exp	0.244 (1.11)	D.exp	-0.004 (0.02)
imp	0.206 (0.80)	D.imp	0.360 (1.59)
tariff_n	4.207 (0.83)	D.tariff_n	0.960 (0.25)
cost_start_n	2.464 (1.46)	D.cost_start_n	1.778 (1.05)
gov_cons	-3.114 (0.58)	D.gov_cons	6.813 (1.16)
produc	3.075 (0.93)	D.produc	2.040 (0.53)
avg_wage_n	0.004 (0.83)	D.avg_wage_n	-0.004 (0.71)
infra_n	18.669 (1.08)	D.infra_n	-18.791 (1.14)
fc_corp_tax	2.679 (2.48)*	D.fc_corp_tax	1.075 (1.16)
fc_avg_inc_tax	-2.155 (2.15)*	D.fc_avg_inc_tax	-0.569 (0.66)
fc_soc_sec	1.090 (1.33)	D.fc_soc_sec	-0.167 (0.24)
_cons	661.005 (2.87)**	R ²	0.22
R ²	0.50	N	245
N	281	* p<0.05; ** p<0.01	

* p<0.05; ** p<0.01

FE flow regression	fdi_inflows_green_n
METR_n	165.572 (0.94)
top_marg_inc_tax_n	39.203 (0.47)
marg_soc_sec	-385.802 (1.64)
infl	430.204 (1.66)
gdp_capita	-0.075 (0.23)
gdp	-0.005 (1.77)
aggl	0.004 (0.81)
corruption	-2,031.061 (1.82)
leg	-351.198 (0.56)
contr	-4.622 (0.63)
insolve	14.480 (0.02)
prop	13.850 (1.19)
exp	-29.118 (1.75)
imp	45.284 (2.35)*
tariff_n	-1,056.841 (1.30)
cost_start_n	32.425 (0.19)
gov_cons	48.149 (0.11)
produc	-176.116 (0.67)
avg_wage_n	0.196 (0.52)
infra_n	216.930 (0.15)
fc_METR_n	179.452 (1.86)
fc_top_marg_inc_tax_n	-13.832 (0.25)
fc_marg_soc_sec	-12.486 (0.27)
_cons	30,266.688 (1.78)
R ²	0.21
N	246

* $p < 0.05$; ** $p < 0.01$

FD flow regression	D.fdi_inflows_green_n
D.METR_n	-273.564 (0.84)
D.top_marg_inc_tax_n	-34.494 (0.27)
D.marg_soc_sec	-363.267 (1.00)
D.infl	467.529 (1.54)
D.gdp_capita	-0.091 (0.17)
D.gdp	-0.008 (1.48)
D.aggl	0.002 (0.26)
D.corruption	-2,412.046 (1.54)
D.leg	-31.578 (0.04)
D.contr	-3.237 (0.24)
D.insolve	109.589 (0.08)
D.prop	8.826 (0.46)
D.exp	-15.065 (0.63)
D.imp	48.297 (1.86)
D.tariff_n	-1,441.835 (1.59)
D.cost_start_n	88.328 (0.33)
D.gov_cons	443.310 (0.57)
D.produc	-61.156 (0.14)
D.avg_wage_n	0.150 (0.22)
D.infra_n	-2,744.772 (1.26)
D.fc_METR_n	18.434 (0.16)
D.fc_top_marg_inc_tax_n	-5.263 (0.08)
D.fc_marg_soc_sec	35.777 (0.59)
R ²	0.12
N	211

* $p < 0.05$; ** $p < 0.01$