The Impact of Multinational Corporations on Income Inequality in Europe

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ABSTRACT

In this thesis, we investigate the impact of multinational corporations through foreign direct investments on income inequality in 39 European countries for the period 1980-2008. The main findings are that, on average, inward and outward FDI have a positive short-run effect on inequality which diminishes over time as FDI stocks accumulate. Furthermore, there are clear heterogeneous effects between different groups of European countries: low-skilled labour abundant countries see their inequality levels rise in the short run due to a low supply of high-skilled workers, whereas low-skilled workers in high-skilled labour abundant countries are adversely affected due to outsourcing as it takes time to adjust. Observing horizontal and vertical FDI, we find that horizontal FDI initiates large spill-over effects for all income groups in OECD countries as the majority of inward FDI originate from other high-income countries with advanced technologies. The results are partly robust to using alternative measures of multinational activity and inequality.

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ABBREVIATIONS

ADF	Augmented Dickey Fuller
D&S	Deininger & Squire
EHII	Estimated Household Income Inequality
EU	European Union
FDI	Foreign Direct Investment
FE	Fixed Effects
GDP	Gross Domestic Product
H-O-S	Heckscher-Ohlin-Samuelson
HFDI	Horizontal Foreign Direct Investment
IV	Instrumental Variable
MNC	Multinational Corporation
MRT	Marginal Rate of Transformation
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Cooperation and Development
R&D	Research & Development
SWIID	Standardized World Income Inequality Database
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
UTIP	University of Texas Inequality Project
VFDI	Vertical Foreign Direct Investment
WIID	World Income Inequality Database

1. INTRODUCTION

Multinational corporations (MNCs)[1] have notably moved up the ranks in the global economy to now being one of the most influential actors in the world. Foreign direct investments (FDI)[2] by MNCs have globally been increasing at an extraordinarily fast pace in the past few decades. In more recent history, FDI trends have been fluctuating. Although global FDI flows have risen significantly in 2015 due to a recovering world economy, FDI inflows have declined by 2% to $1.75 trillion in 2016 as MNCs observed global economic growth slowing down and increased policy uncertainties. This was mainly due to a drop of FDI inflows to developing countries by 14%. However, despite the growing geopolitical risks and continued uncertainty, forecasts for 2018 and the years to come are reasonably optimistic. Economic growth and corporate profits are expected to pick up momentum, causing FDI flows to increase gradually to approximately $1.85 trillion by 2018. Meanwhile in Europe, FDI inflows have doubled since 2014 whilst outflows by European MNCs have slowed down again after a short upsurge. Currently, ten of the top 20 host countries of FDI are based in Europe, whereas 12 of the top 20 source countries of FDI are European (UNCTAD, 2017a).

These numbers clearly indicate that MNCs are dominating the world economy and strengthening their position in Europe. However, with great power comes great responsibility. As a result, there are many conflicting opinions on the real societal impact of MNCs. On the one hand, multinationals are regarded as one of the most important sources that create and transfer technological knowledge whilst contributing to economic growth and welfare. On the other hand, these enterprises primarily focus on the growth of their own corporation and maximizing their profits, whilst neglecting the potential effects on both their home country and the host countries of their subsidiaries. For instance, developed countries generally witness an outflow of jobs, whilst developing countries are struggling to gain economic independence with the ever-increasing power of MNCs. Nick Dearden, the director of non-profit anti-poverty organisation Global Justice Now, has claimed that ‘’the vast wealth and power of corporations is at the heart of so many of the world’s problems – like inequality and climate change’’ (Inman, 2016). The environmental and social issues caused by MNCs have already been widely analysed and documented. In the meantime, rising income inequality has

[1] Although there exist small differences between the classifications, this paper considers MNCs synonymous with multinational enterprises and transnational enterprises/corporations.

[2] FDI is defined by UNCTAD (2017) as an investment in a foreign company where the foreign investor owns at least 10% of the outstanding stocks in order to have a lasting interest in the foreign firm and influence on the management. FDI includes equity capital, reinvested earnings and intra-company loans.

become one of the hottest economic topics in the 21st century in both developed and developing countries. With increasing labour and capital mobility and a very integrated world economy, what impact do these multinationals have on societies? And, do MNCs in fact play a role in the inequalities of a country? More specifically, we will investigate the following question:

To what extent, if at all, do multinational corporations impact income inequality in Europe?

This research paper investigates the impact of MNCs through FDI on income inequality in 39 European countries between the years of 1980 and 2008. Overall, the results of my empirical analyses show that, on average, inward and outward FDI have a positive short-run effect on inequality that diminishes over time as FDI stocks accumulate. Furthermore, there are clear heterogeneous effects present between different groups of European countries. Observing horizontal and vertical FDI, we find that horizontal FDI initiates large spill-over effects in OECD countries as the majority of inward FDI originate from other high-income countries with advanced technologies. The results are partly robust to using alternative measures of multinational activity and inequality. The contribution of this thesis is as follows. First, empirical evidence for Europe remains scarce and therefore this research has much added value. Second, the implications of outward FDI and heterogeneous countries have often been ignored in papers, which is why we include different models to investigate. Third, and most important, what most papers fail to address is differentiating between the host and source countries of FDI to analyse the potential impacts of vertical and horizontal FDI on inequality. We make an attempt to address this gap by creating proxy variables.

The thesis is structured as follows. In Chapters 2 and 3, we first introduce the concepts of inequality and multinationals in order to entirely understand how they are measured and to observe how these have developed over the recent years. Then, in Chapter 4 we review prior studies on this subject and simultaneously discuss the theoretical framework that will be followed in the paper. Chapters 5-8 reflect upon the data and discuss the methodology used in the empirical analysis. Chapter 9 presents the empirical results of the estimations and robustness checks are performed. Finally, Chapter 10 concludes and discusses possible policy implications.

2. INEQUALITY

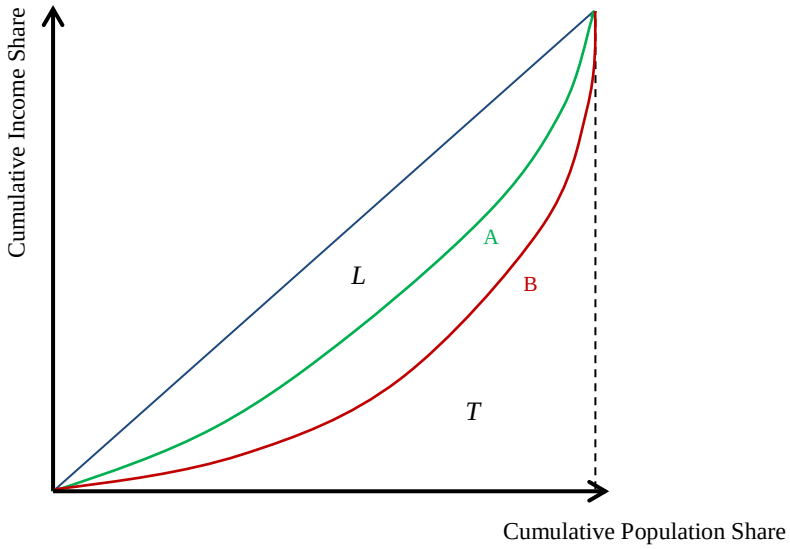
The concept of inequality is at first glance very straightforward but, at the same time, incredibly complex. Inequality has been a major concern in societies for centuries but it is only since recently that the interest in the topic has sparked up again, partly due to the emergence of big data. There are a number of reasons why we should be concerned about inequality, ranging from scientific interest to the desire for justice. Particularly for economists, it is our job to think of ways to distribute income and other economic resources as efficiently as possible. However, there exists a trade-off between equity and efficiency, and hence social welfare is not necessarily maximised when resources are redistributed (Salverda *et al.*, 2009). Furthermore, Wilkinson (2011) points out in his TED Talk several negative social and health issues that go together with high economic inequality. For instance, it is shown that countries with high income inequality tend to have higher crime rates, less social mobility, and more health problems. Therefore, it is of great importance to first grasp the concept of inequality before analysing it thoroughly. This section describes the inequality measures that are used in our empirical analyses – the Gini coefficient and the Theil index. In addition, we will show how income inequality has developed in Europe in the recent past.

2.1 Measuring Inequality

2.1.1 The Lorenz Curve and the Gini Coefficient

Due to its simple properties, the Gini coefficient is one of the most popular measures for the degree of income inequality in a country, or another collective group. Though, to be able to obtain the Gini, one must first study the income distribution of the country. In particular, the Gini coefficient is derived from the Lorenz curve, which is a graphical depiction of the income distribution in a country. As designed by Max Lorenz in 1906, the graph plots the cumulative income share on the Y-axis and the cumulative population share on the X-axis. A hypothetical, yet realistic, example is shown below in Figure 2.1. If *x*% of the population earns *x*% of the income, there is a perfectly equal income distribution, shown by the diagonal line. As this extreme scenario is virtually impossible to achieve, the coloured lines show more realistic income distributions of two fictional countries, A and B. The rule is simple: the bigger the belly, the greater is the income inequality in the country. Thus, country B has a more unequal income distribution than country A, since the Lorenz curve of country B is further away from the line of perfect equality.

Figure 2.1: Lorenz Curve



Also named after its founder Corrado Gini in 1912, the Gini coefficient can now be found using the ratio of the area between the Lorenz curve and the 45-degree line (L) and the complete triangle below the 45-degree line, which is equal to ½. The straightforward calculation then becomes

$$G = \frac{L}{0.5} = 2L \tag{2.1}$$

Similarly,

$$\begin{aligned} L + T &= 0.5 \\ 2L + 2T &= 1 \\ G = 2L &= 1 - 2T \end{aligned} \tag{2.2}$$

Therefore, letting p_i be the known population share and y_i be the known income share, the Gini coefficient can be formally approximated by

$$\begin{aligned} T &= \sum \left(p_i y_{i-1} + \frac{1}{2} p_i (y_i - y_{i-1}) \right) \\ T &= \sum (\frac{1}{2} p_i y_{i-1} + \frac{1}{2} p_i y_i) \\ 2T &= \sum (p_i (y_i + y_{i-1})) \\ G = 1 - 2T &= 1 - \sum (p_i (y_i + y_{i-1})) \end{aligned} \tag{2.3}$$

where $y_i > y_{i-1}$.

Thus, the Gini always has a value between 0 and 1, where 0 means perfect equality and 1 means perfect inequality. In reality, countries usually have Gini coefficients between 0.2 and 0.7. Despite its simplicity, there are a few shortcomings of using the Gini as a measure for income inequality. The biggest disadvantage is that two countries could have the same Gini coefficient but not the exact same inequality. The Lorenz curves of the countries would then have the same area but not the same shape. In addition, a country's Gini does not provide the full story if you want to analyse inequality in certain dimensions, such as ethnicity or gender (Salverda *et al*., 2009). Indeed, it is not realistic to assume that a single index is able to explain all developments of a country's income distribution. However, the Gini is still the most helpful tool when comparing inequality between countries empirically and is also extensively used throughout history. We therefore believe that the index adequately summarizes inequality in a country and will be consulted as the main inequality measure in the empirical part of the paper.

2.1.2 The Theil Index

The second inequality measure that is utilised in the analyses is the Theil index (or Theil's T statistic), named after the Dutch econometrician Henri Theil. Whereas the Gini coefficient only allows to look at overall inequality, the Theil index enables researchers to decompose inequality into different groups and find the main drivers of inequality in a country. For example, a distinction can be made across regions, gender, or race (Conceição and Galbraith, 2000). Although this paper does not use the decomposition property to focus on specific groups within a country, it is still important to understand how this measure works as it is widely applied in many inequality studies.

Suppose there are *k* amounts of subgroups *g* in a country, each containing *n* individuals. Given this, the Theil index can be determined as follows:

$$T = \sum_{k=1}^{n} p_k \left(\frac{y_k}{\bar{y}}\right) \ln\left(\frac{y_k}{\bar{y}}\right) + \sum_{k=1}^{n} p_k \left(\frac{y_k}{\bar{y}}\right) T_k \qquad (2.4)$$

where

$$T_k = \frac{1}{n_k} \sum_{i \in g_k} \left(\frac{y_i}{y_k}\right) \ln\left(\frac{y_i}{y_k}\right),$$

T is the overall Theil index, T_k is the group-specific Theil index, p_k is the population share of group k, $\bar{y}$ is the mean income of the country, y_k is the mean income of group k, and y_i is the income of individual i. The summation sign in the group-specific component ensures that each person contributes to the Theil index. However, individual data is seldom available for each country. If a population can be divided in mutually exclusive and completely exhaustive groups, Theil's T statistic is flexible enough to deal with this issue. Namely, the overall Theil index T consists of two parts: inequality between groups and inequality within groups. These are represented by the first and second terms of equation (2.4), respectively. When aggregated data is available, the between-group component of T is able to capture the input of each group to overall inequality. That is, the sum of the between-group components can act as a lower bound for the Theil index of a population.[3]

2.2 Development of Income Inequality in Europe

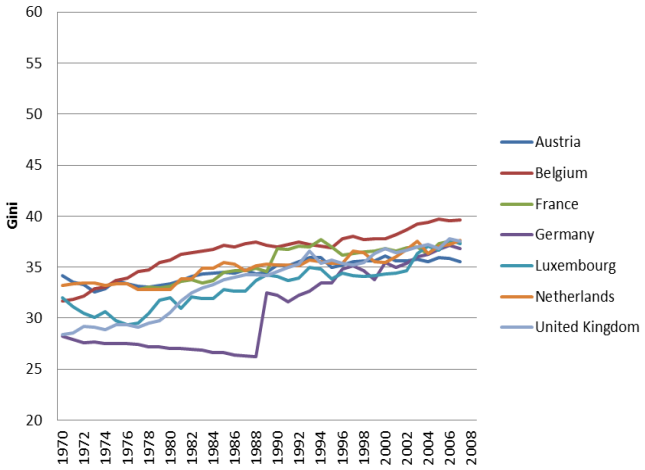
Europe has been home to some of the world's most egalitarian nations, such as the Scandinavian welfare countries between the 1970s and 1990s. Back then in the Scandinavian countries, the top 10% would own 25% of the total income whilst the bottom 50% possessed a share of 30%. Over the past few decades, the majority of the European countries have seen their income distribution become more unequal. Now it is more common to see the top 10% capture 35% of the total income whereas the bottom 50% receive 25%. Though having more equal societies than the United States[4], the income inequality in Europe shows a general increasing trend in the 21st century (Piketty, 2014).

However, there is much variation when examining the development of the income inequality of each individual European country in detail. Figure 2.2 presents the Gini indexes of European countries for the period of 1970-2008. The countries are divided into six groups that share the same characteristics: EU Core (North), EU Periphery (South), EU High Skills & Taxes, EU New Members (since 2004), Transition Countries and Other.[5] The core countries of the European Union (EU) have intermediate levels of income inequality but they all show an increasing trend over the past decades. The peripheries of the EU, characterised with their large debts, demonstrate systematically higher inequality, even though their levels have

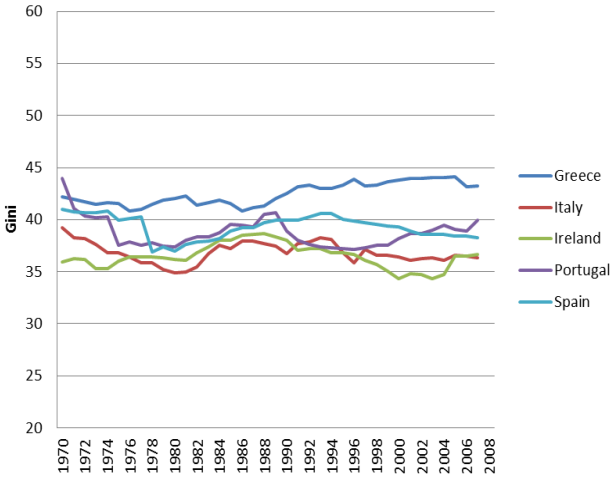
[3] The Data section and Appendix A expand further on the specific Theil index used in the analyses.
[4] In the USA, the top 10% currently receive nearly 55% of the total income whereas the bottom 50% own 20%.
[5] These subgroups are also applied in the empirical section of the paper. The motivation for selecting the subgroups is provided when discussing the hypotheses.

remained relatively constant. Further, there is much variation between the recently accessioned EU members in panel (c). Nevertheless, the income inequality within these countries appear to converge to a relatively high level. It is also worth mentioning that the Gini indices of these countries have remained relatively constant after entering the EU. As mentioned earlier, the Scandinavian countries are well-known for having very low inequality levels, which can be observed in panel (d). It is noteworthy that they share the characteristics of having a high-skilled workforce and high tax rates, which in turn help to redistribute resources and keep inequality low. In panel (e), we see a number of countries that have undergone a transition from planned economies to more liberalised market economies in the 1990s, also known as transition countries. As expected, most of the transition countries had relatively low inequality levels during the times of socialism. Then, as these economies took on a capitalistic system around the 1990s, inequality levels rose sharply in a short time span. Though still suffering from relatively high inequality, the transition countries have improved their income distribution since the start of the 21st century. Finally, looking at other European countries, we find that Turkey has an exceptionally high inequality level. Norway and Iceland follow a similar trajectory as the other Scandinavian countries. Switzerland has not many data points available but also appears to enjoy relatively low income inequality.

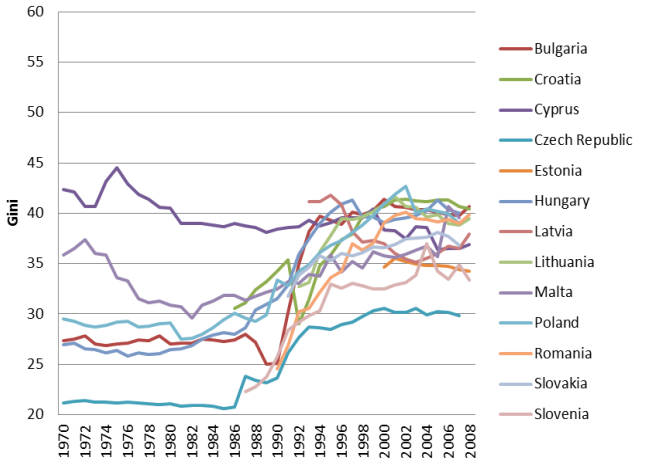
Figure 2.2: Gini Index, 1970-2008



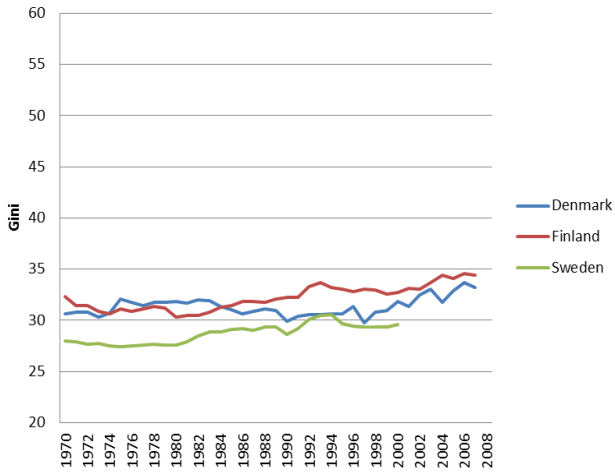
(a) EU Core (North)



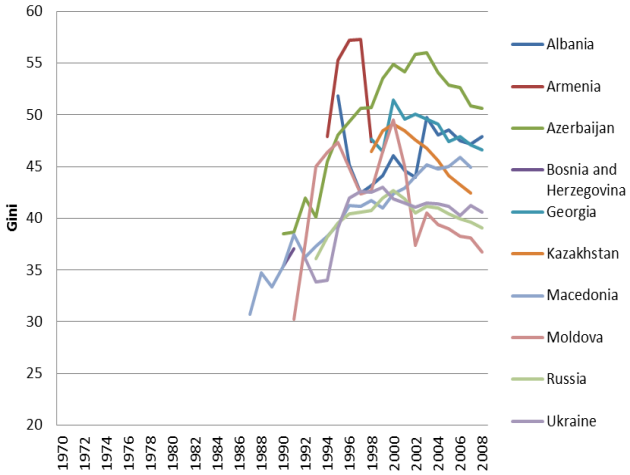
(b) EU Periphery (South)



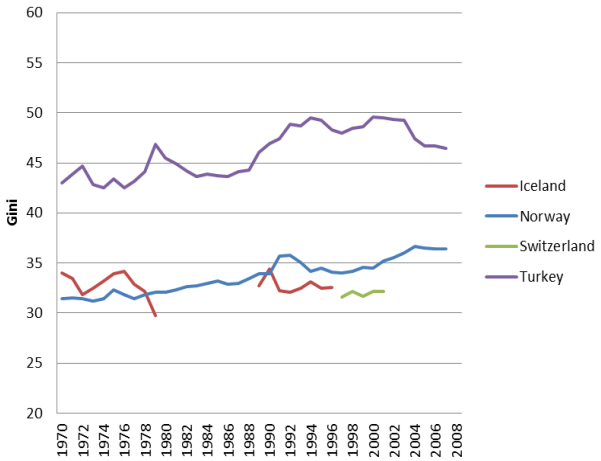
(c) EU New Members (since 2004)



(d) EU High Skills & Taxes



(e) Transition Countries



(f) Other

Source: UTIP (2014)

3. MULTINATIONAL CORPORATIONS

As the world has become more globalised than ever before, MNCs have taken a pivotal role in the global economy. Over the past few years, the top MNCs have increased their wealth relative to most countries. Moreover, the top 10 largest multinationals are now worth $285 trillion, which is more than the combined value of $280 trillion of the bottom 180 countries, including Ireland, Indonesia and Greece (Inman, 2016). This fact alone perfectly demonstrates how much power a few MNCs possess to influence the world economy, and economic inequality within countries. However, in order to discover a potential link between multinationals and inequality, we need to study MNCs in more depth and understand how they operate. Thus, this section will first explain what conditions a firm must satisfy to become a MNC. Afterwards, the different types of MNCs are presented by following the knowledge-capital model. Finally, we focus on MNCs in Europe and observe how multinational activity has developed over the past decades.

3.1 The OLI Framework

The decision of a domestic firm to become multinational is based on the ‘’OLI’’ framework. This acronym stands for the 3 conditions that must be fulfilled in order to become a MNC: ownership, location, and internalisation. In particular, a firm must firstly own assets that can thrive in foreign territories. Knowledge-based assets, such as having a popular brand name or a well-organized company structure, usually enable a multinational to produce more efficiently than local firms and therefore capture a significant share of the market. Secondly, there must be locational benefits available in such a manner that the knowledge-based assets are more efficiently exploited by also producing in a foreign plant, rather than only in the home country. For instance, when both the home and foreign market are sufficiently large, multi-plant production would be profit maximizing due to economies of scale. Also, producing abroad is more attractive when transport costs are high. If this condition were not to be satisfied, then the firm would be more profitable by concentrating its production in one country and exporting to other markets. Thirdly, the establishment must be sufficiently incentivised to keep production internal, meaning that it has to be more profitable producing in their own subsidiary than outsourcing to a local firm. Knowledge-based assets are valuable and thus it makes intuitive sense that large firms do not want to reveal their technology to any competitors (Bowen *et al.*, 1998).

3.2 The Knowledge-Capital Model: Horizontal and Vertical FDI

As mentioned earlier, multinational activity of a country is typically determined by observing the incoming and outgoing FDI. Specifically, there are two types of FDI that can be distinguished by following the knowledge-capital model, as described in Markusen *et al.* (1996). The most important feature of the model is that it allows for trade costs and different factor prices, which enables to combine both horizontal and vertical FDI in a single model. When a MNC wants to supply similar products to a foreign market and replicates a plant abroad to save on transport costs, it is said to engage in horizontal FDI. Horizontal MNCs therefore sell all products locally to serve the respective markets. However, when the firm makes use of comparative advantages between countries and relocates different stages of the production process to subsidiaries abroad, it is called vertical FDI. Vertical MNCs typically locate headquarter activities in the high-skilled labour-abundant home country and move relatively low-skilled labour-intensive production to the low-skilled labour-abundant country. Afterwards, part of the production is exported to the home country.

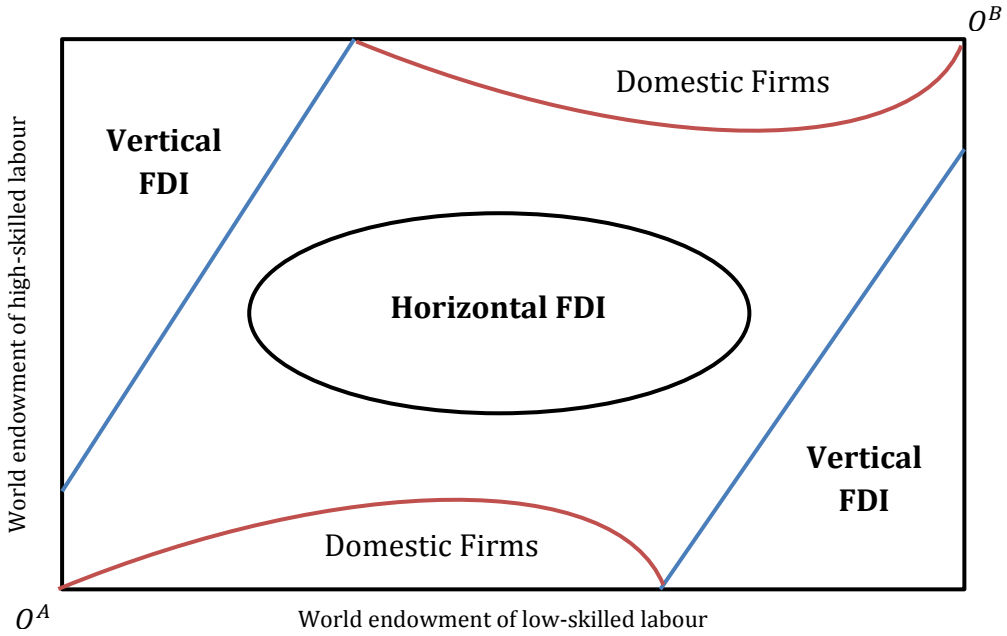
Due to its length and complexity, we will only present a brief outline of the theory behind the knowledge-capital model. The model includes two countries (A and B), two production factors (high-skilled (H) and low-skilled (L) labour), and two goods (X and Y). It is assumed that the factors are mobile between sectors, but immobile between countries. Moreover, good X is high-skilled labour-intensive with increasing returns to scale, whereas good Y is low-skilled labour-intensive with constant returns to scale. Y is treated as the numeraire, and FDI can only occur in the sector of X. The production of X has three activities: locating the headquarter services, locating the plant facilities, and final production.[6] As a result, three firm types emerge in both countries: horizontal MNCs, vertical MNCs, and domestic firms[7]. Figure 3.1 illustrates the knowledge-capital model as a simple graphical representation in the form of an Edgeworth box, based on Markusen (2002). Country endowments of high-skilled and low-skilled labour are measured on the Y- and X-axis, respectively. The origin of country A is on the lower-left corner, whereas the origin of country B is on the upper-right corner. Trade costs are assumed to be constant and significantly positive. Also, the size of a country grows as you move away from its origin. Horizontal MNCs dominate when the countries are similar in both size and relative factor endowments

[6] These stages are ranked from high- to low-skilled respectively, which are also more high-skilled labour-intensive than the production of Y.
[7] Domestic firms have their headquarters and production in the same country.

together with high trade costs and high demand, whereas vertical MNCs are more prevalent when the countries have different relative factor endowments with low trade costs.[8]

In addition, the theory is in line with reality. For instance, the bulk of FDI occur between developed countries that are similar, which are horizontal of type. When vertical FDI is documented it is usually the case that the headquarters are situated in a technologically-advanced developed country, whilst the final production is located in a developing country. It poses a challenge to test this model empirically, as multinationals frequently engage in vertical and horizontal FDI simultaneously. However, the knowledge-capital model has often been successfully estimated with supportive results (Carr *et al.*, 2001; Braconier *et al.*, 2005).

Figure 3.1: Knowledge-Capital Model, Simplified Graphical Depiction (Markusen, 2002)



3.3 Multinationals in Europe

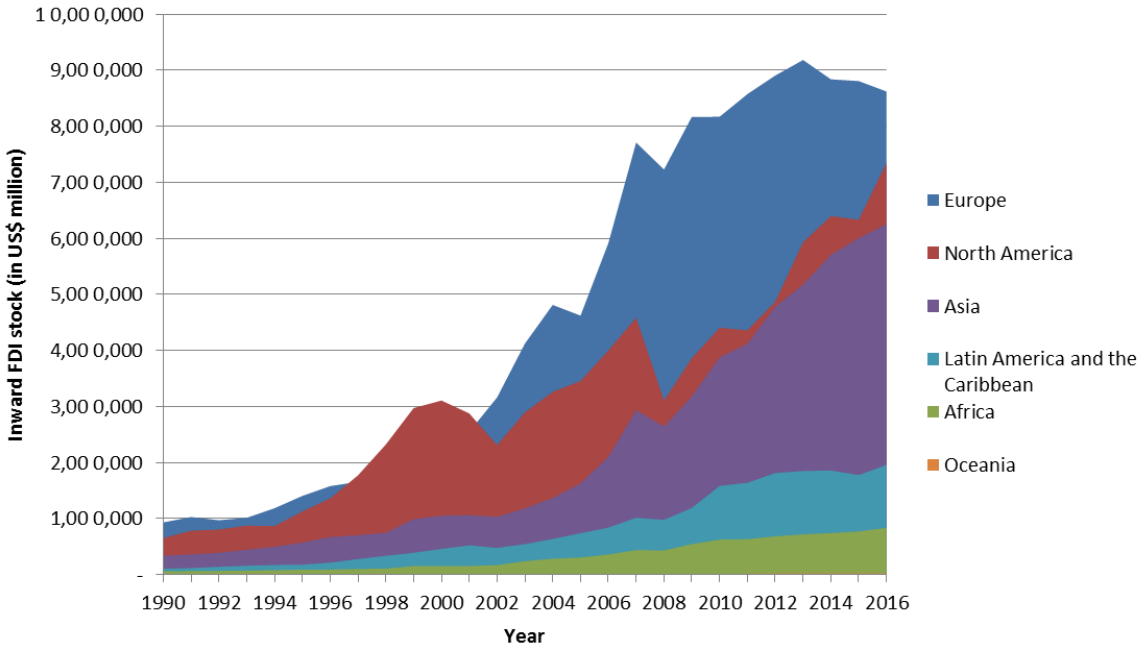
Together with the United States, European multinationals have topped the list of the world's largest MNCs[9] for decades. The top 100 largest non-financial multinationals includes 56 European MNCs, four of which are found in the top 5. Most of these European MNCs are headquartered in the United Kingdom (15), France and Germany (11) (UNCTAD, 2017b). Another indicator which shows the dominance of European MNCs is the expenditures on

[8] Vertical MNCs are especially the most dominant when the home country is small and high-skilled labour-abundant.
[9] Based on foreign assets.

research and development (R&D). In 2015, three German multinationals – Volkswagen, Daimler and Siemens – collectively spent $27.4bn on R&D, which amounts to 27% of the total R&D expenditures in Germany. In Sweden, Ericsson was solely responsible for almost 30% of the R&D spending in the whole country. Furthermore, R&D expenditures of MNCs can in some cases exceed the total R&D spending of their home country.[10] For example, the R&D spending of Roche and Novartis – two Swiss multinationals in the healthcare sector – amounted to 130% of that in Switzerland in 2015 (Ericsson, 2015; OECD, 2017; PWC, 2017; Siemens, 2017).

Comparing Europe with other regions, it is evident that Europe has generally been the leading host and source of multinational activity in the world. The area charts in Figure 3.2 and 3.3 show the inward and outward FDI stocks, respectively, of different regions in the world over the past few decades. In 2016, Europe accounted for 32% of all inward stocks and nearly 40% of all outward stocks in the world. Over time, the share of FDI flows by European MNCs has risen significantly, which can be accredited to the increasing integration of the European Union (EU) since the 90s.

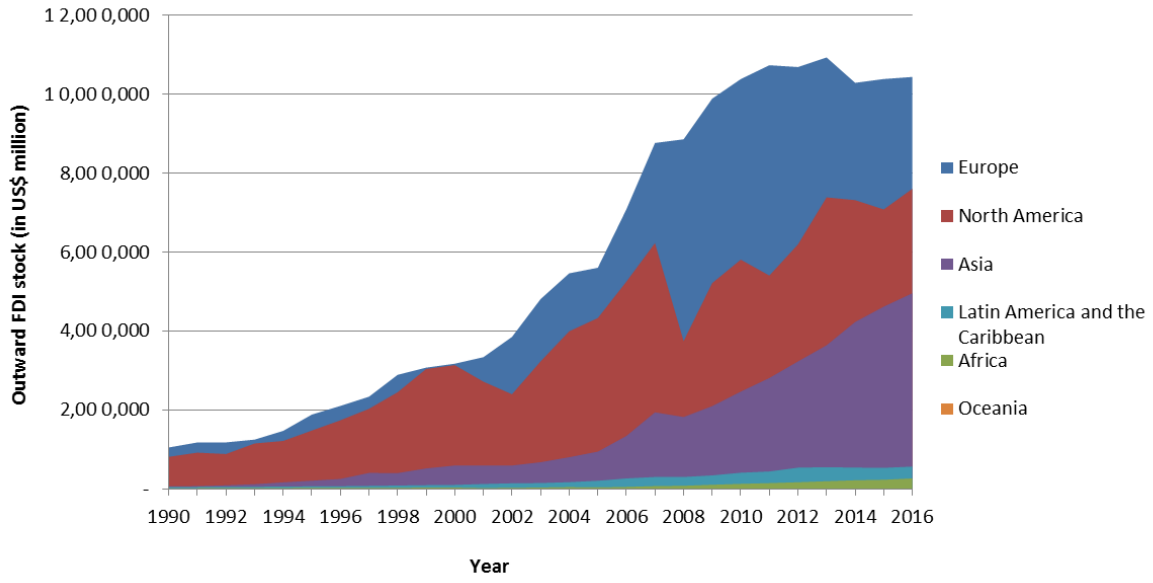
Figure 3.2: Inward FDI Stock, by Region, 1990-2016



Source: World Investment Report (2017)

[10] This is more likely to occur in small countries.

Figure 3.3: Outward FDI Stock, by Region, 1990-2016



Source: World Investment Report (2017)

Focusing on recent years, FDI flows in Europe seem to have stagnated to some extent. After a significant increase of investments in 2015, European multinationals reduced their investments by 23% in 2016. This was mainly due to declines in outflows in Ireland (-73%), Switzerland (-71%) and Germany (-63%). However, in 2017, it is predicted that inflows and outflows in Europe will recover back to the levels observed in 2015. The main cause of the slight recovery is a number of mergers and acquisitions (M&As)[11], which were essential for European MNCs after a decline of corporate profits in order to save costs and access new markets. Although FDI flows are back on the rise again, recent political events might have adverse impacts on the recovery in Europe. Most importantly, Brexit and several elections in Europe resulted in surprising outcomes which increased the policy uncertainties for multinationals. Indeed, in times of uncertainty, MNCs generally avoid investments in a country and consider different regions instead (UNCTAD, 2017a).

[11] Mainly the merger deals between Anheuser-Busch InBev and SABMiller ($103bn), and Shell and BG ($69bn).

4. LITERATURE REVIEW

4.1 Multinationals and their Effects on Inequality

Since the emergence of multinational corporations in the 20th century, their impact have been extensively studied by researchers. Income inequality is one of the effects that has been analysed, and it has picked up steam in recent years with more data becoming available. Most studies focus on the effects of inward FDI on the income inequality of specific countries, regions, a group of countries with similar levels of development, or the whole world. The connection between MNCs and their effect on inequality is at this point in time unclear. The vast majority of researchers find empirical evidence of increasing FDI flows resulting in more income inequality (see, for example: Asteriou *et al*., 2014; Herzer *et al*., 2014; Tausch and Heshmati, 2012). Nevertheless, there are many scholars who argue that multinationals have contributed to reducing income inequality (see, for example: Chintrakarn *et al*., 2012; Figini and Görg, 2011; Jensen and Rosas, 2007) – or had no significant effects on inequality of any kind (Milanovic, 2005; Sylwester, 2005). Hence, there seems to be no consensus reached on the general effects of MNCs on income inequality worldwide.

However, most researchers have reached a near consensus of a positive relationship between FDI and income inequality in developing countries specifically (Anner and Hossain, 2014; Herzer *et al*., 2014; Wu and Hsu, 2012). For instance, analysing the 1970s until the 1990s, Gopinath and Chen (2003) find evidence that inward FDI flows widens the skilled-unskilled wage gap for a group of developing countries. For the same time period, Basu and Guariglia (2007) analyse 119 developing countries receiving FDI, and they find that economic growth caused by FDI stimulates economic inequality. They attribute this to the poor having difficulties accessing education, which prevents them from handling new and advanced technology.

As compelling as the evidence for developing countries may be, the effects of multinationals on the income distribution in developed economies are uncertain, and empirical evidence is scarce and unconvincing (Chintrakarn *et al*., 2012). Figini and Görg (2011) investigate in their study 103 developed and developing countries from 1980 to 2002. They present robust results that FDI inward stock leads to rising wage inequality for developing countries, and diminishing with further increases (a non-linear effect). However, wage inequality is discovered to fall with inward FDI for developed countries, without robust

evidence of a non-linear effect. Also, it is noteworthy and unfortunate that the authors could not control for technology in the empirical analysis due to data unavailability.

In contrast to Figini and Görg (2011), focusing on Europe and its nation states, most studies generally show that multinational activity has led to more income inequality. For instance, Lee (2006) investigates the effects of globalization on income inequality in 14 European countries. Even though the result is based on roughly 80 observations only, the author concludes that multinational activity has a robust positive impact on inequality. Noteworthy of the author's analysis is the inclusion of demographic variables as controls, many of which are significant in explaining income inequality in Europe. Similarly, Asteriou *et al*. (2014) have recently found evidence of rising income inequality due to FDI, analysing the EU-27 countries. However, this paper distinguishes itself in a pivotal way: to control for heterogeneity across European nations, subgroups within the EU-27 are investigated, namely the Core, Periphery, High Technology, and New EU Member countries. Also, they control for financial globalization and other financial variables in the empirical analysis, which have usually been omitted in earlier studies but are found to have a significant effect on income inequality in Europe. At the same time, the authors do not control for (or even mention) the level of development, which still differs substantially among European countries, and is often seen as an essential control variable when examining income inequality. Other studies have focused on specific regions or countries in Europe. Mahutga and Bandelj (2008) notice an interesting natural experiment in the case of Central and Eastern Europe, where 10 socialist countries joined the EU and opened up their economies after their communist regimes fell in the 1990s. They discover a short-term positive relationship between FDI and income inequality, robust for different measures of multinational activity. Country-specific studies on this topic in the European context have mainly been undertaken for the United Kingdom. Taylor and Driffield (2005) investigated the link between wage inequality and MNCs, studying British manufacturing industries on the 3-digit level. After controlling for trade and technology, their results indicate that multinationals had in fact a small yet positive effect on wage inequality in the UK. In a similar fashion, Driffield *et al*. (2010) perform the same analysis for the UK, but they also take into account forward and backward linkage effects between industries.[12] They find that FDI generally increases income inequality nationally, whilst at the regional level there is much heterogeneity due to assisted policies that increase

[12] Forward linkages involve foreign firms selling to the domestic sector, whereas backward linkages encompass foreign firms purchasing inputs from domestic firms.

demand for low-skilled workers. However, backwardly linked inward investments work to decrease income inequality nationally, whereas locally it causes more inequality due to technology transfers and spill-overs.

4.2 Comparative Advantage and its Implications on the Skill Premium

4.2.1 Heckscher-Ohlin-Samuelson Model and Stolper-Samuelson Theorem

The main explanation for the increase of income inequality due to FDI stems from one of the most important models of international trade, the Heckscher-Ohlin-Samuelson (H-O-S) model. The model, in its most basic form, features 2 countries, 2 goods and 2 production factors (2x2x2 model). It shows how the different relative factor endowments of countries explain why countries trade. For this reason, the H-O-S model is also known as the ‘’factor abundance’’ theory. The pattern of trade is explained by the Heckscher-Ohlin theorem: a country will use its comparative advantage and specialize in producing and exporting the good that intensively uses the production factor which the country is abundantly endowed with, and therefore importing the other good that intensively uses the production factor that the country is less endowed with (Bowen *et al*., 1998, ch. 4). Caselli and Feyrer (2007) point out that the marginal product of capital does not vary across countries, and therefore is not a determinant of FDI flows. Hence, this paper does not involve capital as a relevant production factor to consider for multinationals. Consequently, using high-skilled labour and low-skilled labour as the two production factors, (developing) countries that are abundant in low-skilled labour specialize in low-skilled labour-intensive production, whereas (developed) countries that are abundant in high-skilled labour specialize in high-skilled labour-intensive production. Though being simplistic and using very restrictive assumptions, the attractiveness of the H-O-S model stems precisely from its simplicity and intuitiveness.

Income inequality comes into play when we analyse a theorem that is derived from the H-O-S model: the Stolper-Samuelson theorem. Again in the basic 2x2x2 version, it states that an increase in the price of a good leads to a more than proportionate increase in the nominal, relative and real return of the factor that is used most intensively in its production, and to a decline of the nominal, relative and real return of the other factor (Bowen *et al.*, 1998, ch. 4.1). The price increase can occur through the world price, taxes, or tariffs, for example. Therefore, in the case of high-skilled and low-skilled labour, the increase in the demand for low-skilled labour in developing countries raises their wages and lowers the wages of high-

skilled labour whereas the opposite happens in developed countries. This means that the income distribution in developing countries should become more equal, whereas income inequality in developed countries should rise (Milanovic, 2005).

To understand the Stolper-Samuelson theorem more in detail, we can focus on a simple model with two industries: R&D and manufacturing. Intuitively, we assume that R&D uses high-skilled labour (H) intensively, whereas manufacturing is carried out intensively by low-skilled workers (L). Letting the price of a manufacturing good be the numeraire, the zero profit conditions are:

$$P_{R\&D} = a_{H_{R\&D}} w_H + a_{L_{R\&D}} w_L \tag{4.1}$$

$$P_{manu} = a_{H_{manu}} w_H + a_{L_{manu}} w_L = 1 \tag{4.2}$$

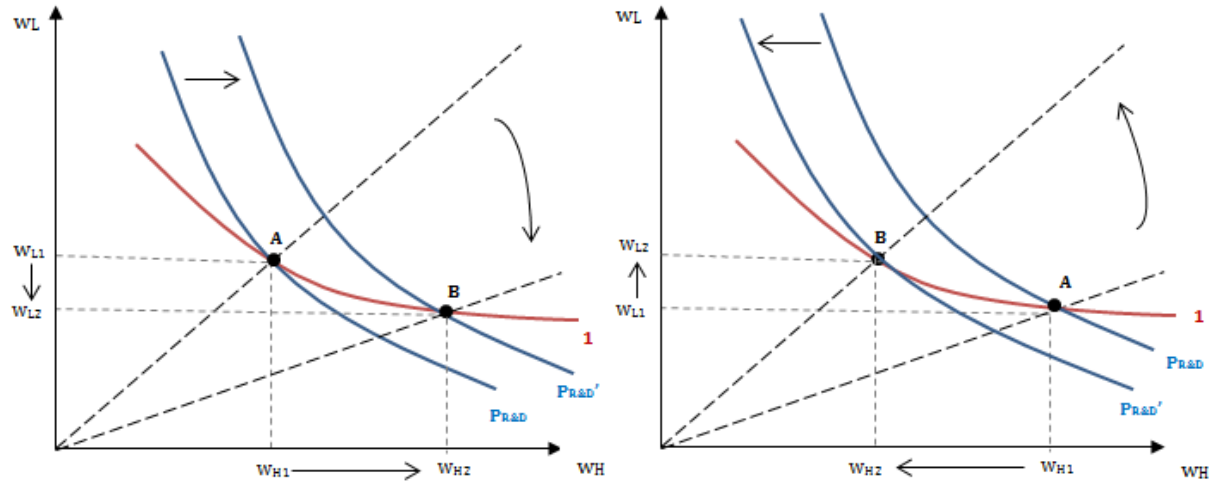
where a_{jm} is the equilibrium unit labour requirement of factor j in industry m, and w_j is the wage of factor j. Solving both (4.1) and (4.2) for w_L:

$$w_L = \frac{P_{R\&D}}{a_{L_{R\&D}}} - \frac{a_{H_{R\&D}}}{a_{L_{R\&D}}} w_H \tag{4.3}$$

$$w_L = \frac{1}{a_{L_{manu}}} - \frac{a_{H_{manu}}}{a_{L_{manu}}} w_H \tag{4.4}$$

Figure 4.1 gives a simple graphical representation of (4.3) and (4.4) as the iso-price curves $P_{R\&D}$ and 1, respectively, for both a developed country and a developing country. An increase (decrease) in the demand for skilled labour leads to a shift from $P_{R\&D}$ to $P_{R\&D}'$, which signifies a rise (fall) in the relative price of R&D services. This occurs, for instance, when a multinational locates the low-skilled manufacturing jobs in a developing country and specializes in R&D in a developed country. As a result, the relative price of R&D increases in the developed country and falls in the developing country as the price of manufacturing is fixed. The new zero profit equilibrium shifts from point A to B for both countries. Hence, low-skilled wages go down (up) from w_{L1} to w_{L2}, whereas high-skilled wages rise (fall) from w_{H1} to w_{H2}. Thus, assuming that developed countries are generally high-skilled labour-abundant and developing countries low-skilled labour-abundant, the Stolper-Samuelson theorem helps to explain a rise of income inequality in developed countries and a fall of income inequality in developing countries. Although the theorem is a useful starting point and seems to correspond with recent trends, it still remains an oversimplified explanation and does not capture the full story (Abrego and Edwards, 2002; Ruffin, 2009).

Figure 4.1: Stolper-Samuelson Theorem and Factor Price Frontiers



(a) Developed Country (b) Developing Country

4.2.2 North-South Model

Another model, stemming from the Heckscher-Ohlin model and Stolper-Samuelson theorem, that has been used extensively to explain the effects of FDI on inequality is the North-South model. MNCs originating from developed countries often decide to fragment and move their production to low-cost developing countries to utilize their comparative advantage. Therefore, (vertical) FDI usually flows from the developed North to the developing South. Since the production that is moved is usually relatively low-skilled for the developed country, and relatively high-skilled for the developing country, there is likely to be more demand for high-skilled labour in both the North and the South. Consequently, the skill premium will rise in both countries, whilst the wages and employment of low-skilled workers fall. Therefore, the income distribution of both the developed and developing country is expected to be adversely affected (Asteriou *et al*., 2014).

For developing countries, the model has been used substantially in the case of Mexico to examine the consequences of the FDI liberalization since the 1980s and the North American Free Trade Agreement (NAFTA) since 1994. Empirical evidence suggest that the relative wage for high-skilled labour increased and thus the North-South model holds for Mexico and other developing Latin American countries (Feenstra and Hanson, 1997; Herzer *et al*., 2014). Jensen and Rosas (2007) report that Mexican states that received more FDI experienced less income inequality in the 90s. In spite of this finding, there was much heterogeneity present among states, contingent on whether the state is close to the US border. Moreover, Alderson and Nielsen (2002) provide support by investigating 16 (developed)

OECD countries and finding a positive link between income inequality and FDI. They include a separate independent variable in the empirical analysis to control for North-South trade, which is also positive and significant. The authors attribute these results to three main implications of FDI. Firstly, capital leaving to low-wage countries accelerates deindustrialization as people switch to the service sector. The service sector generally has more inequality and less union power to keep wages high. Secondly, the fragmentation of production weakens workers' bargaining power because it is difficult for workers to organize. Thirdly, FDI outflows result in workers having less capital to work with, which increases the marginal production of capital (or rents) and lowers the marginal product of labour (or wages). In addition, the demand for high-skilled workers, and hence their wages, rise as lower skilled jobs move out the country. This leads to a change in the distribution of income between labour to capital and the demand for skilled labour.

For most developed countries in Europe, it is generally accepted that outward FDI has adverse effects on the low-skilled workers of the source country. In particular, offshoring mainly occurs in labour-intensive and low-wage industries, which leads to more inequality within these industries, but at the same time convergence with other skill- and capital-intensive industries (Herzer and Nunnenkamp, 2013). Using the same empirical methodology as Herzer *et al*. (2014), Herzer and Nunnenkamp (2013) measure the impact of both incoming and outgoing FDI on income inequality in European nations. Although their main analysis only covers 8 countries to obtain a balanced panel, they also extend the sample to 29 countries to control for sample-selection bias. They find that both inward and outward FDI have a negative effect on inequality in the long run. Nevertheless, the authors also come to the conclusion that the short-run effect is positive and that there is heterogeneity across countries. The North-South model could possibly be interesting in examining FDI flows into the newest (developing) member states of the EU. However, the authors note that the bulk of outward FDI from big European countries only go to similar developed host countries. Furthermore, Lorentowicz *et al*. (2005) find that outsourcing activities of MNCs in Poland are significantly correlated with a large increase in the demand for and wages of skilled Polish workers. This is because the multinational activities originate from countries that are high-skilled labour-abundant, such as the US, the Netherlands and France, and therefore demanding high-skilled workers. However, in Austria they find a decline of the skill premium because Austrian MNCs have moved skill-intensive production to Eastern Europe and specialized in low-skilled labour-intensive production.

4.3 Multinationals and Technology Transfers

4.3.1 Skill-biased Technological Change

The most common explanation for the decline of wages for low-skilled labour and growing demand for skilled labour – alongside increased international trade – is skill-biased technological change (Goldberg and Pavcnik, 2007). In particular, multinationals usually introduce new and advanced technologies in a host country which require certain skill levels from workers. If there are not enough high-skilled workers available to meet the higher demand for skills, the inequality between high- and low-skilled workers is expected to increase in the short run.

Following Violante (2008), let labour input L be a constant elasticity of substitution (CES) function of high- (L_h) and low-skilled (L_l) labour:

$$L = [(A_h L_h)^{\sigma} + (A_l L_l)^{\sigma}]^{\frac{1}{\sigma}} \tag{4.5}$$

where A_h and A_l are the factor-specific productivities and $0 \leq \sigma \leq 1$. After deriving the marginal rate of transformation (MRT) and taking the log, we get:

$$\ln(MRT_{h,l}) = \sigma \ln\left(\frac{A_h}{A_l}\right) + (1-\sigma) \ln\left(\frac{L_l}{L_h}\right) \tag{4.6}$$

The MRT changes when A_h/A_l rises, which means there is skill-biased technological change. As a result, this leads to an increase in the relative productivity of high-skilled labour which increases the demand for skilled workers, and therefore the skill premium. In line with theory, Bandick and Hansson (2009) examine the growing presence of MNCs in Sweden after their EU admission, and their potential part in the rising income inequality in the Swedish manufacturing industry. They find that technology transfers play a considerable part in explaining the increase in demand for high-skilled labour when foreign MNCs take over local firms. Acemoglu (2002) provides evidence of skill-biased technical change, and additionally points out that this occurrence is less prominent in Europe (as opposed to the US, for instance). He argues that it is due to European labour market institutions encouraging investments which improve the productivity of low-skilled workers. This would explain the relatively smaller rise of the skill demand in Europe compared to the US.

4.3.2 Long-run Spill-overs and Skill Attainment

It becomes more complex in the long run, however, as domestic firms enjoy positive spill-overs from technology transfers and imitate the advanced production technologies. The spill-overs due to FDI can occur in two ways: horizontally and vertically. Horizontal spill-overs can benefit all competitors in the industry, whereas vertical spill-overs are transferred to affiliates through licensing or trainings (Cheung and Lin, 2004). In addition, domestic workers improve their skill levels which increases the supply of high-skilled workers who can utilize the new technology. As the domestic firms learn and upgrade the skills of their labour force, the skill premium ultimately falls and the gap between high- and low-skilled workers diminishes again (Taylor and Driffield, 2005; Figini and Görg, 2011). Sylwester (2005) also points out that the ones who gain the most from FDI inflows might be the economic elites, since they are often the most capable of capturing the returns to the technological spill-overs. However, at the same time, the spill-overs can create more opportunities for the poor who would otherwise probably not receive them.

To which extent a host country is able to absorb and adopt new foreign technology depends on its absorptive capacities. Empirical evidence show that FDI can only contribute to domestic productivity growth when enough absorptive capacity is present in domestic firms. For instance, Wu and Hsu (2012) investigate whether absorptive capacities play a part in the link between FDI and income inequality and find that FDI is expected to lead to more inequality in (developing) countries with low absorptive capacities, whilst there is no significant effect for (developed) countries with high absorptive capacities. Moreover, Damijan *et al*. (2013) study the effects of FDI through technology transfers and spill-overs in 10 European transition countries, and find that the presence of foreign multinationals' subsidiaries have benefited firms in most countries when accounting for their absorptive capacities. The positive spill-overs are experienced mainly by high productivity firms with high absorptive capacities, whereas negative spill-overs tend to occur in low productivity firms. Nicolini and Resmini (2010) find evidence for Bulgaria, Poland and Romania that only the high productivity firms have enjoyed technological spill-overs from FDI, and that spill-overs happen more often when the technology gap between domestic and foreign firms is not too wide and there is sufficient absorptive capacity. However, in the case of Italy, France and Spain, the positive externalities for domestic firms are correlated with large technology gaps whilst absorptive capacity does not have a significant effect, suggesting heterogeneity in Europe (Castellani and Zanfei, 2003).

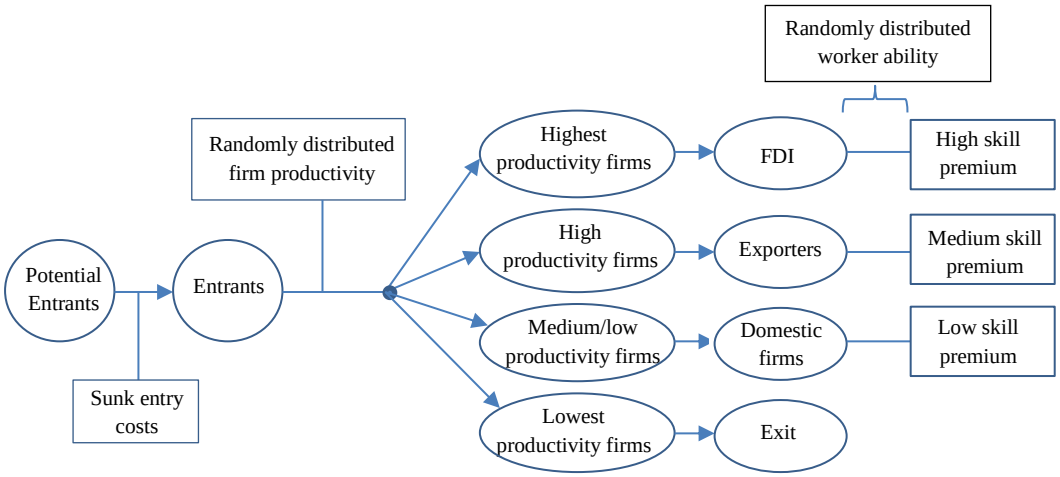
4.4 Heterogeneous Firms

As stated earlier, the H-O model explains that countries with different relative endowments trade to make use of their comparative advantage. However, after it became evident that similar countries also trade within the same industry, Krugman introduced the ‘’new trade theory’’ in the 1980s which clarifies the intra-industry trade. The main contributions of Krugman were to include increasing returns to scale and imperfect competition which helped explain vertical and horizontal multinationals, as mentioned in the previous chapter. The Krugman trade model was intensively used and, as a result, economists often relied on its restrictive assumption that all firms in a specific segment are symmetrical. After more firm-level data became available in the 21st century, it was the PhD thesis of Melitz (2003) that started a new era in the field of international economics. Melitz (2003) introduces firm heterogeneity in Krugman’s model by giving each firm different marginal costs and a fixed exporting cost. Helpman *et al*. (2003) further extend it by allowing firms the decision to engage in FDI to set up a subsidiary plant. These extensions help to explain why only a few firms that are the most productive engage in FDI (and exporting), and that these firms have different characteristics to those that do not. Finally, Helpman *et al*. (2010) also introduce ‘’ex post match-specific heterogeneity in a worker’s ability’’ in the model. Since the ability of an employee cannot be observed directly, employers have to screen the workers to make sure they are sufficiently skilled. The more productive (multinational) firms screen more effectively and therefore possess more high-skilled labour than the less productive (domestic) ones. As the more productive firms are also more profitable, they pay higher wages to hold onto the high-skilled employees, therefore widening the income gap.

The main distinctive feature of MNCs relative to domestic firms is their ownership advantage, which include firm-specific and knowledge-based assets, such as technological knowhow and management skills (Bowen *et al*., 1998). These can be successfully introduced in a dissimilar host country through FDI. Moreover, with heterogeneous firms there are different productivities, whereby the least productive firms do not find it profitable anymore and leave the market. Other low productive firms only serve the domestic market, whereas only the most productive firms choose to engage in FDI and invest in foreign markets (Helpman *et al*., 2003). Hence, this enables multinationals to pay high wages in an industry due to their greater productivity and profitability compared to domestic firms. MNCs are ultimately able to employ higher skilled workers and pay higher wages, further deteriorating the income distribution. There is ample empirical evidence supporting this ‘’new new trade

theory'' (Girma *et al*., 2005; Helpman *et al*., 2003; Mayer and Ottaviano, 2008). Inspired by Greenaway and Kneller (2007), Figure 4.2 depicts a schematic overview of the heterogeneous firms theory.

Figure 4.2: Heterogeneous Firms Theory, Schematic Overview



4.5 Addressing the Gap

Although various papers have examined the relationship between FDI and income inequality, empirical evidence for Europe remains scarce. Moreover, the implications of outward FDI have often been ignored in analyses. Whilst Herzer and Nunnenkamp (2013) investigate the effects of both inward and outward FDI in Europe, they do not look into the observable heterogeneity across different types of countries in their empirical analysis. Asteriou *et al*. (2014) do a sufficient job of accounting for the heterogeneity problems, but they ignore the distributional implications of outward FDI in their analysis. Furthermore, what both papers fail to include in their study is differentiating the host (and source) countries of FDI. Therefore, my research addresses this gap by examining the effects of both inward and outward FDI on income inequality in Europe, whilst also performing the analysis on subgroups of countries. Moreover, the host and source countries of FDI are taken into account in order to analyse the potential impacts of vertical and horizontal FDI on inequality. The problem of endogeneity is discussed and tackled in the analyses by using several statistical techniques, which has been widely ignored by researchers in the literature. Finally, in the empirical analysis, different empirical methods are used together with new variables and updated data.

5. HYPOTHESES

The main objective of the paper is to find any effects of multinational activity on the within-country inequality in European countries. In order to perform the analysis, five hypotheses are put forward that extensively deal with various aspects of multinational activity. The hypotheses are mainly inspired from the models of Asteriou *et al.* (2014), Herzer and Nunnenkamp (2013), and Figini and Görg (2011). In line with the skill-biased technological change and spill-over theories, we propose first of all that inward FDI tends to increase the demand for high-skilled labour since the workers need to be able to operate high technology equipment. This increases the skill premium, and therefore the gap between the high-skilled and the low-skilled widens, increasing income inequality in the short run. However, as more and more FDI accumulates in the long run, low-skilled workers will have improved their skill set due to spill-overs and technical/educational skill attainment. Hence, the skill premium ultimately falls again and the income distribution improves. Herzer and Nunnenkamp (2013) have provided evidence of a short-run positive effect and a long-run negative effect for European countries. Moreover, Figini and Görg (2011) find a nonlinear effect for developing countries, though not for developed countries. Secondly, outward FDI is similarly expected to cause higher inequality levels at the short term. Outsourcing and offshoring tend to adversely affect the wages of low-skilled workers in low-skilled labour-abundant industries, therefore increasing inequality. However, the effect can eventually become ambiguous as labour-intensive industries could close the wage gap with the more skill- and capital-intensive industries (Herzer and Nunnenkamp, 2013). In addition, MNCs usually improve their productivity levels from saving costs which could eventually lead to more production and jobs in the home country. Consequently, we investigate the following hypotheses:

Hypothesis 1: *Inward FDI has a positive effect on income inequality in the short run, but a negative effect in the long run.*

Hypothesis 2: *Outward FDI has a positive effect on income inequality in the short run, but a negative effect in the long run.*

Moreover, it makes sense to assume that the impact of FDI on a country depends on the characteristics of a country. One country might be further away from the technological frontier than the other and might therefore respond differently to incoming or outgoing FDI. Figini and Görg (2011) argue that it is incorrect to pool countries of different levels of development in this analysis. More specifically, they split their sample into OECD and non-

OECD countries, which represent developed and developing countries respectively, and find evidence of different effects for the two groups. Herzer and Nunnenkamp (2013) find large cross-country differences in the impact of inward and outward FDI on inequality in Europe. Similarly, Asteriou *et al.* (2014) divide their dataset into multiple sub-samples and illustrate diverse results between them. In line with these findings, we additionally propose the following hypothesis:

Hypothesis 3: *The magnitude of the impact of multinationals on inequality depends on the characteristics of the country.*

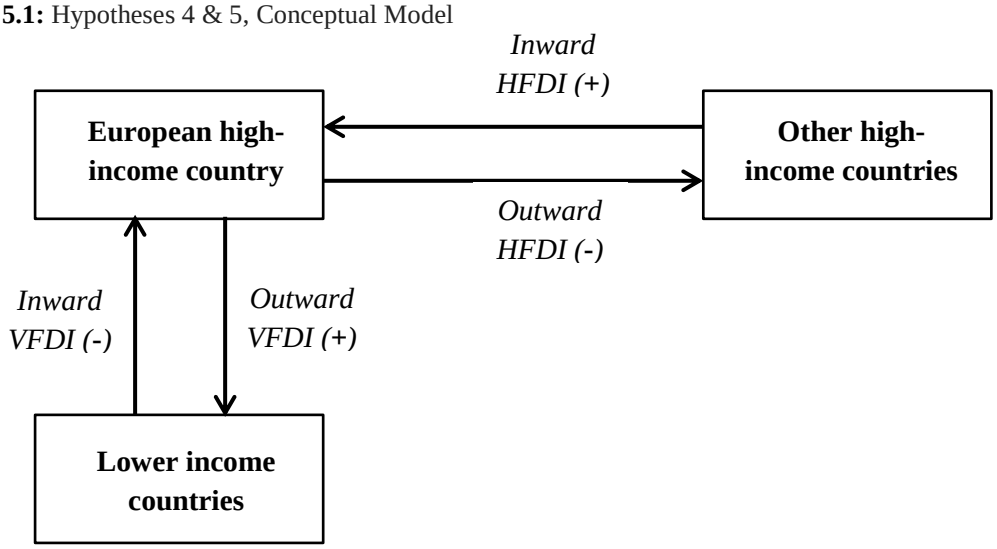
Finally, we consider that the gap between skilled and unskilled wages is contingent on the type of FDI present in a country. It is a challenging task to empirically distinguish between horizontal and vertical FDI, since multinationals often partake in both activities at the same time. However, we introduce proxies that capture both horizontal and vertical FDI, which are presented in detail in the Methodology section. As mentioned earlier, the type of FDI that flows between countries is generally contingent on the levels of development of the respective countries. Horizontal FDI mostly takes place between similar countries, whereas vertical FDI usually flows between high- and low-income countries. At this point, we make two important assumptions. Firstly, we argue that inward FDI originating from high-income countries leads to a higher demand for high-skilled workers than inward FDI from lower income countries (FDI from high-income countries is usually more technologically advanced). Secondly, we suggest that outward FDI from high-income countries to lower income countries affects low-skilled workers in the developed country more adversely than its high-skilled workers (low-skill-intensive jobs usually relocate to lower income countries). Therefore, we propose the following hypotheses:

Hypothesis 4: *Inward (horizontal) FDI from other high-income countries increase inequality in European high-income countries to a greater extent than inward (vertical) FDI from lower income countries.*

Hypothesis 5: *Outward (vertical) FDI to lower income countries increase inequality in European high-income countries to a greater extent than outward (horizontal) FDI to other high-income countries.*

Due to data availability reasons, this analysis only takes into account inward and outward FDI of European countries that are OECD members.[13] In line with the assumption used by Figini and Görg (2011), OECD countries resemble high-income countries and the rest of the world is treated as lower income countries. Figure 5.1 gives a clearer visualisation of Hypotheses 4 and 5, where the magnitudes of the negative impact on income inequality are given in parentheses.

Figure 5.1: Hypotheses 4 & 5, Conceptual Model



[13] See: Methodology and Data.

6. METHODOLOGY

6.1 Empirical Specifications

Using Hypotheses 1-3, we test to what extent MNCs affect income inequality within a country by observing its inward and outward multinational activity. To measure multinational activity, the main analyses utilise real FDI stocks. As mentioned before, real FDI flows are consulted for robustness checks. Moreover, in order to take the size of a country into account, the real FDI variables are taken as a percentage of the country's gross domestic product (GDP). Hence, the following regression models are estimated:

$$Inequality_{i,t} = \beta_0 + \beta_1 IFDI_{i,t-1} + \beta_2 IFDI_{i,t-1}^2 + \beta_3 X_{i,t} + \delta_t + \gamma_i + \varepsilon_{i,t} \quad (6.1)$$

$$Inequality_{i,t} = \beta_0 + \beta_1 OFDI_{i,t-1} + \beta_2 OFDI_{i,t-1}^2 + \beta_3 X_{i,t} + \delta_t + \gamma_i + \varepsilon_{i,t} \quad (6.2)$$

where $Inequality_{i,t}$ is the applied inequality measure for country $i = 1,2,\ldots,N$ in year $t = 1,2,\ldots,T$, $IFDI_{i,t}$ and $OFDI_{i,t}$ denote real inward and outward FDI stock (or flow) as a percentage of country i's GDP respectively in year $t - 1$, $X_{i,t}$ is a vector of control variables, δ_t is a set of time dummies, γ_i represents country fixed effects, and $\varepsilon_{i,t}$ is the error term.[14] The quadratic terms of the FDI variables are included to capture possible non-linear effects.

Tables 11.1.1-11.1.4 list the countries included in each hypothesis and the subgroups they are divided into for Hypothesis 3[15]. As mentioned before, we divide all European countries of the dataset in five subgroups: EU Core (North), EU Periphery (South), New EU Members, High Skills & Taxes, and Transition. The Core countries of the EU resemble the established order, who are widely known for having a high-skilled population and highly advanced technology. The majority of the largest MNCs originate from these countries. The Periphery countries are relatively poorer than the Core countries and are known for having high debts. The labour forces in these countries are relatively low-skilled labour-intensive. The New EU Members also have a relatively low-skilled labour force, but have steadily improved economically in the recent years and educational attainment is also rising. The High Skills & Taxes countries from Scandinavia have always been well known for their low inequality levels due to their Nordic policies which combine capitalism with socialism to create a welfare state. This comes at the expense of high tax rates, but in return the population

[14] The decision to include time and fixed effects is further elaborated in section 8.
[15] Iceland, Luxembourg and Switzerland are excluded in Hypothesis 3 due to a lack of data.

is provided free health care and free education. Finally, the Transition countries are the most low-skilled labour-intensive countries in Europe as they switched from a planned to a market economy not long ago. The majority of these countries repeatedly deal with economic recessions and have much to improve in terms of technological and educational attainment.

Further, in Hypotheses 4 and 5, we attempt to analyse the impact of inward and outward FDI on the income inequality in a developed country by separating the source and host countries of the FDI stock, respectively. In particular, we distinguish between developed and developing countries in order to simulate horizontal (developed-developed) and vertical (developed-developing) FDI. As stated before, we assume that OECD members are high-income countries, whereas the rest of the world is considered as lower income countries. In addition, a number of modifications were made to ensure a clear distinction between high-income and lower income countries, in line with the World Bank Country Classifications.[16] Thus, we propose the following proxies that epitomise horizontal and vertical FDI, which are calculated as follows:

$$Inward\ HFDI_{i,t} = \frac{Inward\ FDI\ from\ high\ income\ countries_{i,t}}{GDP_{i,t}}$$

$$Inward\ VFDI_{i,t} = \frac{(Inward\ FDI\ from\ all\ countries_{i,t} - Inward\ FDI\ from\ high\ income\ countries_{i,t})}{GDP_{i,t}}$$

$$Outward\ HFDI_{i,t} = \frac{Outward\ FDI\ to\ high\ income\ countries_{i,t}}{GDP_{i,t}}$$

$$Outward\ VFDI_{i,t} = \frac{(Outward\ FDI\ to\ all\ countries_{i,t} - Outward\ FDI\ to\ high\ income\ countries_{i,t})}{GDP_{i,t}}$$

As a result, the following regression models are estimated:

$$InequalityOECD_{i,t} = \beta_0 + \beta_1 yHFDI_{i,t-1} + \beta_2 yHFDI^2_{i,t-1} + \beta_3 X_{i,t} + \delta_t + \varepsilon_{i,t} \quad (6.3)$$

$$InequalityOECD_{i,t} = \beta_0 + \beta_1 yVFDI_{i,t-1} + \beta_2 yVFDI^2_{i,t-1} + \beta_3 X_{i,t} + \delta_t + \varepsilon_{i,t} \quad (6.4)$$

where $InequalityOECD_{i,t}$ is the applied inequality measure for the European OECD country *i* in year *t*, $HFDI_{i,t}$ and $VFDI_{i,t}$ denote real horizontal and vertical FDI stock (or flow) as a

[16] I exclude Turkey from the OECD group, and I include The Bahamas, Bermuda, British Virgin Islands, Brunei Darussalam, Cayman Islands, Channel Islands, Cyprus, Faeroe Islands, French Polynesia, Greenland, Hong Kong, Kuwait, Liechtenstein, Qatar, San Marino, Singapore, Taiwan, Turks and Caicos Islands, United Arab Emirates and Virgin Islands (U.S.) as high-income countries.

percentage of GDP in year $t - 1$ respectively, y indicates either inward or outward streams, $X_{i,t}$ is a vector of control variables, δ_t is a set of time dummies, and $\varepsilon_{i,t}$ is the error term.

6.2 Endogeneity Issues

The main problem concerning equations (6.1)-(6.4) is that several independent variables might be correlated with the error term, or, in other words, there is likely to be endogeneity issues. This would result in biased coefficients in our regressions if untreated. Endogeneity bias in our model is possible due to a number of reasons. First of all, reverse causality might be present between inequality and FDI. In particular, FDI might not only explain inequality, but inequality could also be a determinant for a multinational's decision whether to invest in a country. For instance, a MNC could be less willing to invest in a country that has high inequality levels due to higher risks of social conflicts and instability. Conversely, vertical MNCs can exploit the high inequality level and locate low-wage low-skilled activities in the country (Herzer and Nunnenkamp, 2013). The majority of the literature on the effects of FDI on inequality address issues such as endogeneity but they generally deal with them in different manners. For example, Figini and Görg (2011) and Milanovic (2005) use the generalised methods of moments systems estimator, whereas Sylwester (2005) builds a simultaneous three-equation model including the Gini, FDI and the economic growth rate.

To deal with this issue and acquire unbiased estimates, we make use of the two-stage least-squares estimator (2SLS). This enables us to use instrumental variables (IVs) to deal with the endogenous FDI variables. Consequently, at least one IV is required that is correlated with the FDI variables and uncorrelated with the error term in the respective model. A common approach is to use lagged values of the endogenous variable as the IV. Since several papers from the literature also employ this method[17], we find sufficient reason to instrument the potentially endogenous FDI variables by their one-period lagged values. Including lagged FDI also ensures that any effects on wages are completed since it normally takes time to notice any substantial spill-over effects on inequality.

[17] See, for example: Figini and Görg (2011), Milanovic (2005).

7. DATA

The empirical analysis primarily makes use of an unbalanced panel dataset, consisting of 39 European countries in total over the period of 1980 to 2008 and reaching up to 746 observations.[18] In addition, a balanced dataset is used in the analysis of Hypotheses 1 and 2. This dataset only includes 15 countries over the period 1981-2007, resulting in a total number of 405 observations. Then, for Hypothesis 3, the unbalanced dataset is divided into 5 different groups. The Core (North) panel consists of 6 countries over the period of 1980-2007. The Periphery (South) panel includes 5 countries between 1980 and 2007. The dataset for New EU Members is made up of 11 countries over the period of 1991-2007. The High Skills & Taxes panel consists of 4 countries over the period of 1980-2007. Finally, the Transition dataset includes 10 countries between the years of 1980 and 2008. For Hypotheses 4 and 5, the unbalanced dataset is consulted which contains data of 22 (developed) OECD countries for the period 1985-2008. In order to compare the results, we made certain that the same observations of the main analysis are taken in the robustness checks. Accordingly, we interpolate and extrapolate missing data when needed. Tables 11.2.1-11.2.8 in appendix report the descriptive statistics of all panel datasets.[19]

7.1 Dependent Variable: Inequality

There are several databases available to collect inequality measures from. However, the most complete and internationally comparable variables for inequality can be found in the University of Texas Inequality Project (UTIP) database, based on the Industrial Statistics database from the United Nations Industrial Development Organization (UNIDO): the UTIP-UNIDO Theil index and the Estimated Household Income Inequality (EHII) Gini index (UTIP, 2014).

The UTIP-UNIDO variable takes the form of a Theil's T statistic, measured across industrial sectors within each country. It is created using measures of income and population from the UNIDO database: manufacturing wages and number of employees. The two variables are arranged in matrices by industries and regions, after which the between-group

[18] Andorra, Belarus, Bosnia and Herzegovina, Cyprus, Liechtenstein, Malta, Monaco, Montenegro, San Marino and Serbia are excluded in the dataset due to a lack of data.
[19] Outliers in the data are removed to prevent measurement error.

components are calculated.[20] As mentioned before, the between-group component is proven to be a consistent measure for inequality. Hence, the unobserved within-group component causes no issues in obtaining a measure for manufacturing wage inequality (Conceição and Galbraith, 2000; Galbraith and Kum, 2003).

Noticing a comparability issue in the widely-used Deininger & Squire (D&S) dataset from the World Bank, Galbraith and Kum (2005) combined their UTIP-UNIDO Theil manufacturing pay inequality measures with the D&S household income inequality data (and other control variables) to estimate more effective Gini coefficient measures of household income inequality, the EHII. Specifically, the EHII index is created by firstly regressing the D&S income inequality data on the UTIP-UNIDO manufacturing pay inequality measures, three dummy variables that control for the different Gini data sources in the D&S dataset (gross/net of tax, household/personal income, and measure of income/expenditure), and three other relevant variables that are determinants of income inequality (share of manufacturing employment, share of urban population, and population growth rate). Indeed, they find that manufacturing pay inequality is strongly correlated with income inequality. The residuals of the regression can be used to identify for which countries in the D&S dataset the Gini coefficients are measured either too high or too low. In addition to the UTIP-UNIDO pay inequality measure, the three dummy variables and the manufacturing employment share are the only variables found to be robust and therefore the other two control variables are excluded. Finally, the EHII can be calculated in the format of a Gini index as follows:

$$EHII = \alpha + \beta * U + \gamma * X \tag{7.1}$$

where U represents UTIP-UNIDO manufacturing pay inequality, and X is a matrix of the robust exogenous variables. α, β and γ are retrieved from the OLS regression with robust standard errors, only including the robust variables. This results in an unbalanced panel dataset with more than 3,800 observations for 150 countries over the period of 1963-2008.

The EHII dataset has several advantages over other inequality datasets. Firstly, the D&S dataset does not only have poor coverage but also suffers from measurement errors, which makes it difficult to compare countries in a correct manner (Galbraith and Kum, 2005). Secondly, even though the coverage of the UTIP-UNIDO database is as extensive as that of the EHII, the Theil measures are only based on the manufacturing sector and on wage

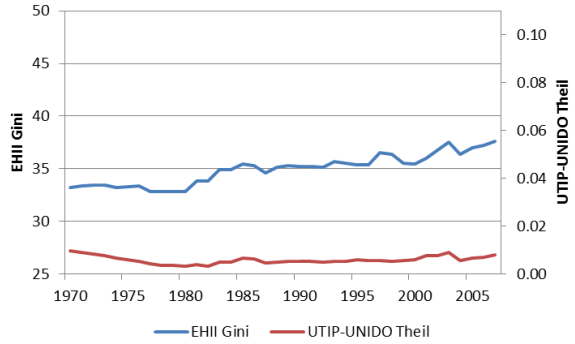
[20] See section 2.1.2 for the definition and Appendix A for a detailed calculation of the Theil index.

inequality. The service sector accounts for the majority of Europe's production and labour market, and the UTIP-UNIDO Theil does not take into account other sources of income (e.g. profits). Therefore, the UTIP-UNIDO dataset is not included in the main analysis. Thirdly, the World Income Inequality Database (WIID) and the Standardized World Income Inequality Database (SWIID) are admittedly practical, widely covered and the most recently updated datasets. However, WIID does not make it possible to compare their collection of data across countries, whereas SWIID replaces missing observations with substituted values and thus contains biased Gini coefficients (Jenkins, 2014). Finally, compared to most other inequality datasets such as those of the World Bank, OECD, and Eurostat, the EHII dataset covers significantly more countries and years. For these reasons, the EHII Gini index is used as the main dependent variable in the empirical analysis. In addition, the UTIP-UNIDO Theil index[21] is consulted for a robustness check as MNCs theoretically impact manufacturing wage inequality through the skill premium.

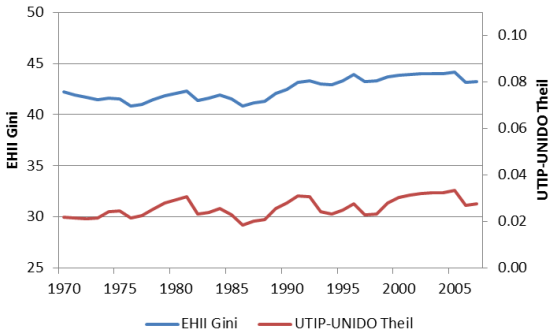
We have seen earlier how overall income inequality has progressed in Europe over the past years. However, it is also interesting to compare this with the development of manufacturing wage inequality. Figure 7.1 shows the development of the EHII Gini and UTIP-UNIDO Theil indices for five European countries. Each country is selected from one of the five subgroups that are examined in Hypothesis 3 of the empirical analysis: Netherlands from the Core (North) countries, Greece from the Periphery (South) countries, Poland from the New EU Members, Denmark from the High Skills & Taxes countries, and Turkey from the Transition countries. In accord with expectations based on equation (7.1), the Gini and Theil indices demonstrate a relatively high correlation in each country.[22] It is striking that the Theil indices show more variation between the countries than the Gini indices. This is likely due to the fact that the UTIP-UNIDO Theil only takes manufacturing wages into account, whereas the EHII Gini overall income inequality. From both measures we are able to establish that inequality in these countries has developed in the same manner as their respective subgroup.[23]

[21] Multiplied by 1,000 in the empirical analyses for convenience.
[22] In fact, taking all countries into account, the Gini and Theil have a correlation of 0.78 (N = 1,041). This makes intuitive sense as the UTIP-UNIDO Theil is used to calculate the EHII Gini.
[23] See section 2.2.

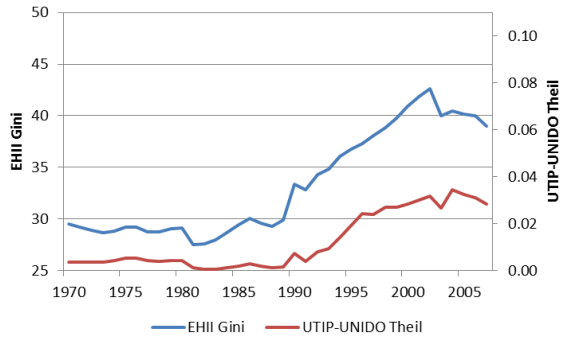
Figure 7.1: EHII Gini and UTIP-UNIDO Theil indices for 5 European Countries



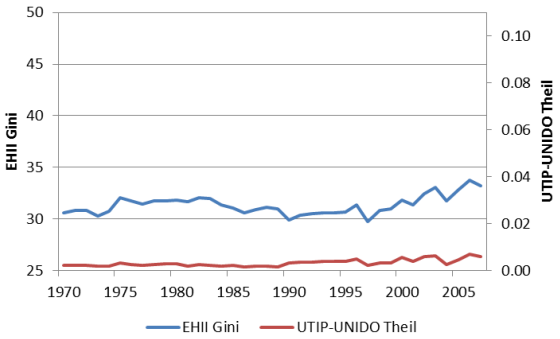
(a) Netherlands



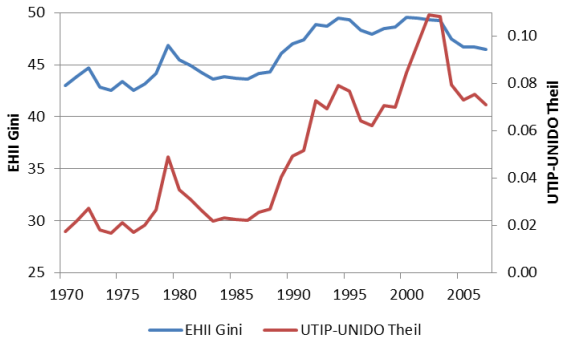
(b) Greece



(c) Poland



(d) Denmark



(e) Turkey

7.2 Variable of Interest: Foreign Direct Investment

To measure the amount of FDI, we consult two data sources. For Hypotheses 1-3, data for inward and outward FDI are retrieved from the UNCTADstat (2017) database. To create the horizontal and vertical FDI variables for Hypotheses 4-5, there are two databases available that distinguish FDI stock by reporting and partner country: OECD and UNCTAD.

OECD.Stat (2017) is consulted as the OECD datasets cover more years and partner countries. Both the UNCTAD and OECD databases only provide FDI data in current prices, which do not enable us to compare countries with each other. Therefore the FDI data are converted from current to constant 2010 US$ prices, using US inflation data. The primary variables used in the empirical analyses are real FDI stocks because stocks generally capture long-run effects much better than yearly flows (Chintrakarn *et al.*, 2012; Figini and Görg, 2011; Herzer and Nunnenkamp, 2013). However, as a robustness check, real FDI stocks are replaced by real FDI inflows and outflows. Finally, all real FDI variables are taken as a share of (constant 2010 US$) GDP, retrieved from World Bank (2017a).

7.3 Control Variables

The regressions include control variables that are commonly used in studies on inequality. Table 7.1 summarizes all variables used in the empirical analyses. The majority of empirical papers on inequality at least control for the following three variables: trade openness, level of development, and education.[24] As mentioned earlier, trade openness could affect inequality through the Stolper-Samuelson theorem: as trade intensifies, inequality in countries relatively abundant with unskilled labour typically falls as they specialise in low-skilled intensive production, whilst it typically rises in countries relatively abundant with skilled labour as they specialise in high-skilled intensive production. However, developing countries that open up to trade might also experience higher demand for high-skilled intensive goods, and therefore a higher skill premium on wages. Literature provides mixed results of the effects of trade on inequality (Milanovic, 2005). $Trade_{i,t}$ is expressed as the sum of exports and imports of goods and services as a share of GDP. Data for this variable are retrieved from the World Development Indicators of the World Bank (2017b).

The level of development $lnY_{i,t}$ is included in the analyses as GDP per capita in constant 2010 US$, taken from the World Bank (2017c). This enables us to test the ‘’Kuznets curve’’: this hypothesis states that, as a country develops over time, its income inequality first increases and then decreases in a concave fashion. Hence, squared GDP per capita, $lnY_{i,t}^2$, is also included to capture a potential non-linear effect. Both variables are transformed into logarithms in order to compress large values. As a result, we expect GDP per capita to have a positive sign and the squared term to be negative.

[24] See, for example: Herzer and Nunnenkamp, 2013; Wu and Hsu, 2012; Figini and Görg, 2011.

The level of education affects income inequality through the labour market: the higher the school enrolment ratio, the higher the supply of skilled labour, which should reduce wage inequality by increasing the relative supply of skilled labour. Tertiary education, $Educ_{i,t-3}$, is represented as the gross enrolment ratio of the enrolled students in tertiary education to the population of the age group that officially links with tertiary education in the respective country. Since it takes around 3 years for an enrolled student to finish tertiary education and enter the labour market, the variable is lagged 3 years. Data for tertiary education are taken from the World Bank (2017d).

In addition to these key control variables, we include a number of other variables from the World Bank database that have been previously used in similar analyses. We control for the degree of government influence by including the government expenditure share of real GDP per capita in 2005 constant prices, $Gov_{i,t}$. The more a government participates in the economy of a country, the more it is capable of redistributing resources and diminishing inequality in that country. Indeed, the majority of researches find evidence that governments in countries with high inequality levels tend to spend less on redistribution. We therefore expect the coefficient of $Gov_{i,t}$ to be negative. This variable can be found in the Penn World Tables 6.3 (Heston *et al.*, 2010). Income inequality tends to be low in countries where citizens enjoy the most political rights. Thus we expect the coefficient for $Rights_{i,t}$ to have a positive sign in all regressions. $Rights_{i,t}$ are measured as discrete values from a one-to-seven scale, with 1 being the highest degree of freedom and 7 being the lowest. Data for political rights are retrieved from Freedom of the World (2017). Finally, labour institutions need to be accounted for, such as Acemoglu (2002) pointed out. Theory shows that unions have an ambiguous effect on income inequality. Specifically, more union density increases the labour share, which raises the unemployment rate and therefore enlarges income inequality. But unions also provide more bargaining power, which decreases wage differentials and therefore has a negative impact on inequality.[25] However, multiple studies find a negative correlation between union presence and income inequality.[26] Several studies covering the subject of this paper, such as Figini and Görg (2011), have acknowledged that these institutions need to be controlled for but were not able to do it due to data unavailability. Consequently, we try to control for labour institutions by including the variable $Union_{i,t}$, which measures the union density rate in a country. The variable is calculated by taking a country's net union

[25] Checchi and García-Peñalosa (2010) provide empirical evidence of an ambiguous effect.
[26] See, for example: Visser and Checchi, 2009; Dafermos and Papatheodorou, 2013.

membership rate as a percentage of the total employed wage earners, retrieved from Visser (2016).

Table 7.1: Summary of Variables – Definitions

Category	Variable	Description	Source
Inequality	$Gini_{i,t}$	Estimated household income inequality, expressed as the Gini index.	UTIP (2014)
	$Theil_{i,t}$	Manufacturing wage inequality, expressed as the Theil index.	UTIP (2014)
Globalization	$IFDI_{i,t-1}$	Inward FDI stock (or flow) in country *i* in constant 2010 US$, measured as % of GDP, lagged one year.	UNCTADstat (2017)
	$OFDI_{i,t-1}$	Outward FDI stock (or flow) from country *i* in constant 2010 US$, measured as % of GDP, lagged one year.	UNCTADstat (2017)
	$HFDI_{i,t-1}$	Inward or Outward FDI stock (or flow) in country *i* from or to high-income countries in constant 2010 US$, measured as % of GDP, lagged one year.	OECD.Stat (2017)
	$VFDI_{i,t-1}$	Inward or Outward FDI stock (or flow) in country *i* from or to lower income countries in constant 2010 US$, measured as % of GDP, lagged one year.	OECD.Stat (2017)
	$Trade_{i,t}$	Total trade (exports + imports) of goods and services, measured as % of GDP.	World Bank (2017b)
Macro economic	$lnY_{i,t}$	Real GDP per capita, in constant 2010 US$.	World Bank (2017c)
Demo graphic	$\Delta Educ_{i,t-3}$	Total enrolment in tertiary education, measured as % of the total population in the tertiary education age group, lagged 3 years, first-differenced when non-stationary.	World Bank (2017d)
Political	$Gov_{i,t}$	Government Expenditure share of real GDP per capita, in % 2005 constant prices.	Heston *et al.* (2010)
	$Rights_{i,t}$	Political rights, measured as a discrete value from 1-7, with one representing the highest degree of rights and seven the lowest.	Freedom in the World (2017)
Institutional	$Union_{i,t}$	Union density rate, measured as net union membership as % of employed persons.	Visser (2016)

8. REGRESSION DIAGNOSTICS

Prior to estimating the regressions, several diagnostic tests are performed to assess the validity of our model. Firstly, using the Augmented Dickey Fuller (ADF) test, all variables are tested for the presence of unit-root (or non-stationarity). If a variable is non-stationary, the estimation results are spurious and hence makes the regression unreliable. When there is unit-root present in a variable, it is therefore replaced by its first difference to ensure stationarity. Tables 11.3.1-11.3.14 in appendix show the results of the ADF tests on all datasets. Noticeably we find that $Educ_{i,t-3}$ is non-stationary in most of the datasets. This makes intuitive sense as tertiary education levels have been trending upwards over the past decades in all European countries. Next, the correlations between the independent variables are examined to detect any highly-correlated variables in the regression and check for multicollinearity. The correlation matrices are available in Tables 11.4.1-11.4.8 in appendix. We find no evidence of any multicollinearity issues.

Working with panel data usually provides a convenient way to control for unobserved effects. These are unpleasant when untreated, as they cause the estimated coefficients to be correlated with the error term and thus potentially make the estimates susceptible to (omitted variable) bias. This generally happens in pooled OLS models so it is more practical to use a special type of model (Torres-Reyna, 2007). In fixed effects (FE) models, country-specific unobserved effects are captured and thus allows for an arbitrary correlation between these effects and the independent variables. This is in contrast to the random effects method, where the error term and the independent variables are assumed to be uncorrelated with each other (Wooldridge, 2010). In our context, the assumption of RE would imply that the European sample countries are randomly drawn from the world population set. However, many EU member countries are considered to be homogenous (Lee, 2006), and therefore it already seems likely that using the RE estimation method is inappropriate here. Also, the majority of papers that have analysed the effects of FDI on inequality have estimated FE models. Nevertheless, we check which model to consult by using the Hausman test. Based on the results, it is confirmed that a FE model is preferred over both a pooled OLS and RE model. Thus, we believe that a fixed-effects specification is the most appropriate method to use between these models. Further, we check whether time dummies should be included to account for time-fixed effects. Again, based on the results, time dummies are included in all regressions.

In line with theory, we suspect that FDI is endogenous and therefore we are using an IV approach to draw conclusions from instead of the FE model. We can check whether the FDI variables are indeed endogenous by using the Durbin-Wu-Hausman test of endogeneity. We find that both the Durbin score statistic and the Wu-Hausman statistic have very small p-values for both inward and outward FDI variables. Thus we can reject the null hypothesis of exogeneity, confirming that we should use an IV to correct for the endogeneity. Finally, the assumptions on the error term must be tested. After running a modified Wald test, as explained by Torres-Reyna (2007), it is found that the residuals are not homoscedastic. Moreover, serial correlation could result in biased coefficients and thus a Lagrange multiplier test is carried out, which gives significant evidence of serial correlation. Therefore, in order to correct for heteroscedasticity and serial correlation, all estimations make use of robust and clustered standard errors (Hoechle, 2007).

9. EMPIRICAL ANALYSIS

9.1 Hypothesis 1 – Impact of Inward FDI on Inequality

Hypothesis 1: *Inward FDI has a positive effect on income inequality in the short run, but a negative effect in the long run.*

The estimation results of Hypothesis 1 for the unbalanced and balanced panel are reported in Tables 9.1 and 9.2, respectively. To see how the results vary, we look at two different estimation techniques: fixed effects (columns I-III) and two-stage least-squares (columns IV-VI).[27] Control variables are added in each column which allows us to inspect how the additions affect the estimations.

In Table 9.1, we find evidence that inward FDI has a significantly positive correlation with income inequality. This finding is in line with those of Asteriou *et al*. (2014) and Lee (2006), who find that inward FDI has been deteriorating the income distribution in European countries. From the FE regression, we observe significance at the 10% level, which disappears after including all control variables. However, as mentioned earlier, the FE approach does not correct for endogeneity bias and hence the 2SLS method should give more reliable results. As opposed to the FE results, the 2SLS estimation gives highly significant positive coefficients for inward FDI at the 1% level in all three columns. We find that, on average, a 1%-point rise in inward FDI stock as a share of GDP in year $t-1$ is predicted to increase the Gini index by 3.92 points in year t, *ceteris paribus*.[28] This suggests that multinationals increase the skill premium in the short term and cause a rise in inequality, thus supporting the first part of the hypothesis. There is, however, insufficient proof of a non-linear effect of inward FDI on inequality across all estimations, although the sign of the quadratic term is in line with the hypothesis. Herzer and Nunnenkamp (2013) provide evidence of a significantly positive short-run effect, but they additionally find significantly negative long-run effects. Looking at the control variables, the goodness-of-fit measured by the R^2 improves greatly after adding the chosen variables. This comes at the expense of a fall in the total number of observations, but nonetheless supports the selection of control variables. From the

[27] In addition, other IV estimation techniques were examined using Generalized Method of Moments and Limited Information Maximum Likelihood. However, these results need not be presented since they are practically identical to the reported 2SLS results.

[28] We summarise the effect of IFDI on Gini by using an approximation of equation (6.1), following Wooldridge (2009). Namely, we take the derivative w.r.t. IFDI to find the estimated slope: $\frac{\Delta Gini}{\Delta IFDI} = \beta_1 + 2\beta_2 IFDI$. If we plug in $IFDI = 0$, β_1 represents the approximate slope from $IFDI = 0$ onwards, etc.

2SLS estimations, we find that countries that are more open to trade are associated with lower Gini indices. Further, the estimates of log real GDP per capita suggest a highly significant convex relationship with income inequality, as opposed to the concave Kuznets curve. A possible explanation for this notable result could be that in the recent decades the vast majority of European countries were in the most advanced stages of development. As time progresses, developed countries see their inequality levels rise again, according to the ‘’augmented’’ Kuznets’ hypothesis (Milanovic, 1994). We also find that a higher degree of government involvement and labour union influence tend to have an equalizing effect in Europe.

Table 9.1: Hypothesis 1 – Gini, Inward FDI Stock, Unbalanced Panel

	Dependent variable: $Gini_{i,t}$					
	FE			2SLS		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
$IFDI_{i,t-1}$	4.372*	3.042*	1.810	4.277**	11.01***	3.920***
	(2.446)	*(1.612)*	*(1.841)*	*(2.065)*	*(2.380)*	*(1.356)*
$IFDI^2_{i,t-1}$	-1.625	-1.565	-0.608	-2.371*	-2.697	-0.928
	(1.263)	*(0.980)*	*(0.967)*	*(1.435)*	*(2.004)*	*(1.009)*
$Trade_{i,t}$		-0.015	-0.006		-0.060***	-0.026***
		(0.009)	*(0.017)*		*(0.007)*	*(0.005)*
$lnY_{i,t}$		15.08*	8.984		-11.40***	-27.89***
		(8.641)	*(13.39)*		*(2.836)*	*(6.660)*
$lnY^2_{i,t}$		-1.211**	-0.747		0.427***	1.211***
		(0.493)	*(0.655)*		*(0.149)*	*(0.328)*
$\Delta Educ_{i,t-3}$		-0.049	-0.009		-0.069	0.048
		(0.051)	*(0.038)*		*(0.076)*	*(0.076)*
$Gov_{i,t}$			0.005			-0.425***
			(0.095)			*(0.037)*
$Rights_{i,t}$			-1.089*			0.050
			(0.605)			*(0.412)*
$Union_{i,t}$			-0.049			-0.034***
			(0.032)			*(0.007)*
$Constant$	34.88***	-0.290	22.40		110.5***	202.0***
	(0.434)	*(38.69)*	*(70.18)*		*(13.37)*	*(34.23)*
Country FE	YES	YES	YES	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES
R^2	0.255	0.361	0.498	0.119	0.529	0.548
Observations	746	732	559	715	704	539
No. of countries	39	39	31	39	39	31
Sample	1980-2008	1980-2008	1980-2008	1981-2008	1981-2008	1981-2008

Notes: Table 9.1 shows the results of six regressions that examine the impact of inward FDI on income inequality in an unbalanced panel. Columns (I)-(III) are estimated using FE, whereas columns (IV)-(VI) are estimated using 2SLS. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

In order to ensure that the results are not primarily driven by countries with better data coverage, we also use a balanced dataset from which the results are shown in Table 9.2. From column (VI), we can conclude that there is still substantial evidence of a positive short-term effect. Additionally, the quadratic term has now become significant at the 5% level. We can plug the estimates into equation (6.1), take the derivative with respect to IFDI, and deduce that the maximum point of the concave curve lies at a value of 0.67%. This means that countries that have a higher inward FDI share can expect to reap more benefits from spill-over

Table 9.2: Hypothesis 1 – Gini, Inward FDI Stock, Balanced Panel

	Dependent variable: $Gini_{i,t}$					
	FE			2SLS		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
$IFDI_{i,t-1}$	1.700	0.314	0.413	8.599***	1.666	5.006**
	(3.556)	*(2.610)*	*(2.916)*	*(2.858)*	*(1.930)*	*(2.167)*
$IFDI^2_{i,t-1}$	-0.253	-0.378	-0.197	-7.022***	-1.610	-3.762**
	(1.739)	*(1.245)*	*(1.345)*	*(2.270)*	*(1.472)*	*(1.784)*
$Trade_{i,t}$		0.005	0.008		0.007	0.018***
		(0.022)	*(0.024)*		*(0.006)*	*(0.006)*
$lnY_{i,t}$		-12.51	-16.49		-27.71***	-52.87***
		(19.02)	*(18.12)*		*(6.481)*	*(9.545)*
$lnY^2_{i,t}$		0.209	0.372		1.043***	2.284***
		(0.886)	*(0.855)*		*(0.326)*	*(0.458)*
$\Delta Educ_{i,t-3}$		-0.059	-0.063		0.048	0.087
		(0.050)	*(0.053)*		*(0.089)*	*(0.082)*
$Gov_{i,t}$			0.043			-0.039
			(0.114)			*(0.042)*
$Rights_{i,t}$			-0.728			-1.140**
			(1.211)			*(0.539)*
$Union_{i,t}$			-0.049			-0.048***
			(0.051)			*(0.005)*
$Constant$	34.40***	139.8	165.5	39.38***	213.7***	343.9***
	(0.488)	*(102.8)*	*(99.45)*	*(1.129)*	*(31.99)*	*(50.04)*
Country FE	YES	YES	YES	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES
R^2	0.372	0.403	0.443	0.169	0.705	0.753
Observations	420	420	420	405	405	405
No. of countries	15	15	15	15	15	15
Sample	1980-2007	1980-2007	1980-2007	1981-2007	1981-2007	1981-2007

Notes: Table 9.2 shows the results of six regressions that examine the impact of inward FDI on income inequality in a balanced panel. Columns (I)-(III) are estimated using FE, whereas columns (IV)-(VI) are estimated using 2SLS. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

effects and see their inequality level decline. The balanced panel therefore provides support for Hypothesis 1. It should be noted that the sample only consists of 15 countries which are mainly the most developed countries in Europe. Hence, there might be a problem of sample selection as these countries could drive the results and also not perfectly resemble the whole of Europe.

9.2 Hypothesis 2 – Impact of Outward FDI on Inequality

Hypothesis 2: *Outward FDI has a positive effect on income inequality in the short run, but a negative effect in the long run.*

We examine the relationship between outward FDI and income inequality in Tables 9.3 and 9.4. It is evident that the coefficients of the outward FDI variables in the unbalanced sample are highly inconsistent. Following the same steps as for Hypothesis 1, we see in column (IV) that both the level and quadratic terms are significant at the 1% level and displaying a U-shaped function. However, after adding the control variables in columns (V) and (VI), both OFDI coefficients switch signs and show an inverted-U relationship. In addition, the level term loses its statistical significance whereas the quadratic term remains significant at the 5% level.

The estimates from the unbalanced panel provide support for the popular belief that outsourcing initially hurts low-income groups as income inequality is predicted to rise at the start, but decline again in the long term as these groups adapt their skills. This is in line with Herzer and Nunnenkamp (2013) who find a long-term negative impact on inequality. However, taking the inconsistent estimates and insignificance of the level term into account, the results could be misleading and therefore no clear conclusion can be drawn of an impact of outward FDI on inequality from the unbalanced sample.

In contrast, when analysing the balanced panel, we find more consistent results. From the 2SLS estimations, it is predicted that outward FDI has an inverted-U-shaped relationship with inequality at the 1% significance level. After including all control variables in column (VI), the maximum point is observed to be situated at OFDI = 0.604. These results are in line with the findings of Egger and Egger (2006) who show that, in the EU, outsourcing decreases the productivity of low-skilled workers in the short run due to the imperfect European goods and labour markets, but increases again in the long run after employment adjustments. The countries that the researchers analysed were the original EU-15 countries, which are almost identical to the sample used in our balanced panel. Hence, it is not surprising to see similar results. Thus, in the same way as Hypothesis 1, the balanced panel provides ample support for Hypothesis 2.

Table 9.3: Hypothesis 2 – Gini, Outward FDI Stock, Unbalanced Panel

	Dependent variable: $Gini_{i,t}$					
	FE			2SLS		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
$OFDI_{i,t-1}$	-4.306	-4.953	2.266	-16.48***	0.556	0.497
	(4.872)	*(4.020)*	*(2.799)*	*(1.523)*	*(1.671)*	*(1.426)*
$OFDI^2_{i,t-1}$	3.019	2.843	-0.057	10.89***	-3.478***	-2.413**
	(2.611)	*(2.086)*	*(1.353)*	*(1.296)*	*(1.350)*	*(0.989)*
$Trade_{i,t}$		0.013	-0.003		-0.033***	-0.019***
		(0.011)	*(0.018)*		*(0.005)*	*(0.004)*
$lnY_{i,t}$		12.09	18.52		-3.526	-24.00***
		(11.08)	*(18.67)*		*(2.981)*	*(7.060)*
$lnY^2_{i,t}$		-1.131*	-1.239		0.024	0.999***
		(0.625)	*(0.912)*		*(0.155)*	*(0.343)*
$\Delta Educ_{i,t-3}$		-0.029	0.004		-0.095	0.074
		(0.053)	*(0.035)*		*(0.080)*	*(0.077)*
$Gov_{i,t}$			0.022			-0.445***
			(0.102)			*(0.037)*
$Rights_{i,t}$			-1.176**			-0.026
			(0.567)			*(0.430)*
$Union_{i,t}$			-0.057*			-0.032***
			(0.033)			*(0.007)*
$Constant$	34.46***	20.65	-24.08	41.75***	73.70***	185.3***
	(0.486)	*(50.70)*	*(97.04)*	*(1.281)*	*(14.38)*	*(36.68)*
Country FE	YES	YES	YES	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES
R^2	0.255	0.388	0.511	0.266	0.457	0.546
Observations	711	697	543	677	666	523
No. of countries	38	38	31	38	38	31
Sample	1980-2008	1980-2008	1980-2008	1981-2008	1981-2008	1981-2008

Notes: Table 9.3 shows the results of six regressions that examine the impact of outward FDI on income inequality in an unbalanced panel. Columns (I)-(III) are estimated using FE, whereas columns (IV)-(VI) are estimated using 2SLS. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 9.4: Hypothesis 2 – Gini, Outward FDI Stock, Balanced Panel

	Dependent variable: $Gini_{i,t}$					
	FE			2SLS		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
$OFDI_{i,t-1}$	4.565	2.327	3.302	19.18***	6.613***	8.080***
	(3.517)	*(3.437)*	*(3.263)*	*(2.453)*	*(1.386)*	*(1.522)*
$OFDI^2_{i,t-1}$	-1.815	-0.664	-0.826	14.32***	-5.772***	-6.691***
	(2.109)	*(1.899)*	*(1.670)*	*(2.214)*	*(1.086)*	*(1.016)*
$Trade_{i,t}$		0.008	0.014		0.012***	0.019***
		(0.025)	*(0.026)*		*(0.004)*	*(0.005)*
$lnY_{i,t}$		-9.242	-14.84		-29.00***	-59.06***
		(21.84)	*(21.55)*		*(5.796)*	*(9.394)*
$lnY^2_{i,t}$		0.060	0.271		1.120***	2.602***
		(1.024)	*(1.030)*		*(0.290)*	*(0.449)*
$\Delta Educ_{i,t-3}$		-0.048	-0.046		0.034	0.070
		(0.049)	*(0.051)*		*(0.084)*	*(0.077)*
$Gov_{i,t}$			0.035			0.003
			(0.102)			*(0.046)*
$Rights_{i,t}$			-0.780			-1.335***
			(1.205)			*(0.498)*
$Union_{i,t}$			-0.071			-0.052***
			(0.049)			*(0.004)*
$Constant$	33.91***	121.7	160.0	42.05***	219.3***	373.9***
	(0.490)	*(117.0)*	*(115.8)*	*(0.870)*	*(28.77)*	*(49.39)*
Country FE	YES	YES	YES	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES
R^2	0.390	0.410	0.466	0.268	0.729	0.787
Observations	420	420	420	405	405	405
No. of countries	15	15	15	15	15	15
Sample	1980-2007	1980-2007	1980-2007	1981-2007	1981-2007	1981-2007

Notes: Table 9.4 shows the results of six regressions that examine the impact of outward FDI on income inequality in a balanced panel. Columns (I)-(III) are estimated using FE, whereas columns (IV)-(VI) are estimated using 2SLS. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level..

9.3 Hypothesis 3 – Heterogeneous Effects of Multinationals on Inequality

Hypothesis 3: *The magnitude of the impact of multinationals on inequality depends on the characteristics of the country.*

We grouped all European countries together in the first two hypotheses to analyse whether FDI uniformly affected income inequality in a country. However, according to existing literature and the theoretical framework, it would not be surprising to find diverse effects for different types of countries. In order to check for heterogeneous effects among different types of European countries, we therefore estimate equations (6.1) and (6.2) for five separate subgroups, as displayed in Tables 9.5 and 9.6, respectively.

In Table 9.5, we find significant evidence of an initial negative effect of inward FDI on inequality in the Core countries. The declining effect on inequality is also found to slow down as inward FDI increases, since the quadratic term is positive and significant at the 10% level. The minimum point of the convex function is situated at IFDI = 0.209. This result can be explained by the fact that MNCs in highly developed Core countries already work with the most advanced technology available. Other less advanced technology transfers that arrive with inward FDI can therefore be utilised by lower skilled workers, who also benefit from the increased wage premium (Figini and Görg, 2011). In the long term, however, high-skilled workers are rewarded to a higher extent and more high-income groups could be created. Hence, income inequality is predicted to rise again after the stationary point of 0.209.

Interestingly, we also observe a negative impact of inward FDI in the Periphery countries. This is in line with the findings of Asteriou *et al*. (2014), who also find a significantly negative correlation. However, there is no evidence of any non-linear effects. The magnitude of the initial impact of IFDI on inequality is larger for the Periphery than for the Core. This is not surprising because the Periphery countries are relatively more low-skilled labour-abundant than the Core countries. Namely, MNCs typically locate more high-skilled labour-intensive activities in the Core countries whereas the low-skilled labour-intensive activities are relatively more common in the Periphery countries. The increase in demand for low-skilled labour in the Periphery raises the wages of that group, and therefore income inequality falls more sharply in the Periphery countries. When we look at the turning point for the Periphery and compare it to that of the Core, we indeed find that the minimum is further away at a value of IFDI = 0.373.

Further, there is no evidence of any statistically significant effects of inward FDI on inequality in the New EU Member countries and the High Skills & Taxes countries. The signs of the IFDI coefficients for both subgroups are as expected: a concave function for the New EU Members as the majority of the countries in the sample are relatively low-skilled labour-abundant, and a convex function for the High Skills & Taxes countries as they are relatively high-skilled labour-abundant. Nevertheless, we find that the turning point for New EU Members is achieved at IFDI = 1.622, which no country has ever accumulated in the sample. Similarly, the minimum point of IFDI = 0.599 for the High Skills & Taxes countries is far away from the mean of its sample.

Table 9.5: Hypothesis 3 – Gini, Inward FDI Stock

	Dependent variable: $Gini_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$IFDI_{i,t-1}$	-0.583*	-3.179*	1.249	-8.985	6.408***
	(0.292)	*(1.770)*	*(9.454)*	*(14.22)*	*(1.941)*
$IFDI^2_{i,t-1}$	1.393*	4.257	-0.385	7.495	-4.577***
	(0.841)	*(3.058)*	*(3.453)*	*(9.754)*	*(1.247)*
$Trade_{i,t}$	0.013**	0.021	0.015	0.043**	-0.081***
	(0.006)	*(0.013)*	*(0.014)*	*(0.022)*	*(0.019)*
$lnY_{i,t}$	420.2***	91.88***	85.61***	-85.35**	-22.29**
	(37.18)	*(35.22)*	*(20.58)*	*(36.83)*	*(11.17)*
$lnY^2_{i,t}$	-20.17***	-4.740***	-5.036***	3.864**	1.281*
	(1.733)	*(1.765)*	*(1.143)*	*(1.690)*	*(0.694)*
$Educ_{i,t-3}$	0.023	0.143	0.005	-0.065	-0.156***
	(0.034)	*(0.129)*	*(0.106)*	*(0.077)*	*(0.025)*
$Gov_{i,t}$	0.271***	0.550***	-0.087	-0.255***	-0.015
	(0.082)	*(0.170)*	*(0.077)*	*(0.070)*	*(0.063)*
$Rights_{i,t}$		0.938	-0.102	-2.238***	0.861***
		(0.709)	*(0.369)*	*(0.490)*	*(0.322)*
$Union_{i,t}$	0.025**			-0.107***	
	(0.012)			*(0.040)*	
$Constant$	-1658.5***	-410.9**	-320.0***	518.4***	146.1***
	(200.7)	*(174.8)*	*(91.84)*	*(199.5)*	*(44.50)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.800	0.548	0.596	0.862	0.615
Observations	141	135	152	101	128
No. of countries	6	5	11	4	10
Sample	1981-2007	1981-2007	1990-2007	1981-2007	1981- 2008

Notes: Table 9.5 shows the results of five regressions that examine the impact of inward FDI on income inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Finally, we find that in the Transition countries inward FDI affects income inequality in an inverted U-shape at the 1% significance level. This finding is also in accordance with Figini and Görg (2011), who find a similar concave-shaped effect for non-OECD countries. A possible explanation is the 'North-South' model: examining the source countries of the incoming FDI in the Transition countries, the majority of IFDI come from highly developed Western European countries (OECD.Stat, 2017). Since multinationals bring relatively high-skilled activities into the Transition countries, the skill premium initially rises and inequality therefore increases. However, as the inward FDI stock accumulates, low-skilled workers in Transition countries benefit from the advanced technology transfers and attain more skills, leading to a decline of income inequality. The decline is predicted to occur after a value of IFDI = 0.700, *ceteris paribus*. This is also in line with the findings of Mahutga and Bandelj (2008), who report a positive short-run effect in Central and Eastern European countries.

In Table 9.6, we find that outward FDI significantly increases income inequality in the Core countries at first, but declines in the long term. This finding supports the popular belief of the adverse effects from outsourcing (low-skilled) jobs on the wages and employment of low-skilled workers in the Core countries. However, in the long term, it is expected that these workers adapt through educational attainment and therefore inequality slows down. In particular, inequality is expected to fall again, on average, after an outward FDI stock share of 0.743, *ceteris paribus*.

Similar to the Core countries, the same conclusion appears to hold for the Periphery and the New EU Members. The OFDI estimates have the same signs and they are statistically significant at the 1% level. Moreover, the initial shock of outward FDI on inequality is stronger in both subgroups as the magnitudes of the first FDI coefficient are larger. A possible explanation is the fact that these countries have a much larger low-skilled work force (the New EU Members relatively more than the Periphery), thus outsourcing jobs adversely affects a larger group of people, leading to an immediate rise in inequality. However, when we take the turning points into account, we find that the maximums are situated at a value of OFDI = 0.321 for the New EU Members and OFDI = 0.429 for the Periphery. Although these values are much smaller than that of the Core, no country (except Ireland in 2007) has reached such an outward FDI stock share. This makes intuitive sense because the vast majority of outward FDI originates from a small number of advanced Western European countries, as mentioned before. Thus, we can ignore the right side of the quadratic functions for the Periphery and the New EU Members as these results might be

misleading. Further, we find no significant evidence of any effects of outward FDI on inequality in the High Skills & Taxes countries and Transition countries.

Table 9.6: Hypothesis 3 – Gini, Outward FDI Stock

	Dependent variable: $Gini_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$OFDI_{i,t-1}$	5.853***	6.364***	10.92***	-7.307	13.74
	(0.955)	*(1.529)*	*(2.255)*	*(5.658)*	*(15.91)*
$OFDI^2_{i,t-1}$	-3.938***	-7.416***	-17.02***	8.419	-15.87
	(0.675)	*(1.678)*	*(4.752)*	*(12.26)*	*(15.53)*
$Trade_{i,t}$	0.016***	0.005	-0.011	0.019	-0.118***
	(0.006)	*(0.006)*	*(0.011)*	*(0.021)*	*(0.016)*
$lnY_{i,t}$	487.5***	165.3***	105.4***	-100.9***	-5.189
	(36.65)	*(27.19)*	*(15.81)*	*(35.74)*	*(12.40)*
$lnY^2_{i,t}$	-23.39***	-8.386***	-6.242***	4.583***	0.106
	(1.699)	*(1.346)*	*(0.886)*	*(1.668)*	*(0.755)*
$Educ_{i,t-3}$	0.030	0.119	-0.072	-0.036	-0.230***
	(0.031)	*(0.116)*	*(0.090)*	*(0.077)*	*(0.021)*
$Gov_{i,t}$	0.484***	0.079	-0.120*	-0.227***	0.039
	(0.087)	*(0.122)*	*(0.071)*	*(0.077)*	*(0.040)*
$Rights_{i,t}$		1.580***	-0.624**	-2.531***	1.003***
		(0.535)	*(0.310)*	*(0.492)*	*(0.316)*
$Union_{i,t}$	0.040***			-0.103**	
	(0.013)			*(0.049)*	
$Constant$	-1896.8***	-773.8***	-398.9***	602.7***	92.65*
	(198.7)	*(136.9)*	*(70.51)*	*(189.3)*	*(50.05)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.837	0.628	0.676	0.863	0.760
Observations	141	124	153	101	106
No. of countries	6	5	11	4	10
Sample	1981-2007	1981-2007	1988-2007	1981-2007	1986- 2008

Notes: Table 9.6 shows the results of five regressions that examine the impact of outward FDI on income inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

9.4 Hypotheses 4 & 5 – Impacts of Horizontal and Vertical FDI on Inequality

Hypothesis 4: *Inward (horizontal) FDI from other high-income countries increase inequality in European high-income countries to a greater extent than inward (vertical) FDI from lower income countries.*

Hypothesis 5: *Outward (vertical) FDI to lower income countries increase inequality in European high-income countries to a greater extent than outward (horizontal) FDI to other high-income countries.*

Finally, we examine the impacts of horizontal and vertical FDI on income inequality, of which the results are reported in Table 9.7. Columns (I) and (II) report inward FDI originating from high-income and lower income countries, respectively, where the former reflects horizontal FDI and the latter vertical FDI. The results provide sufficient evidence that support Hypothesis 4. In particular, we see that inward HFDI has an U-shaped relationship with inequality in OECD countries, which is statistically significant at the 5% level. The same conclusion was drawn earlier for the Core countries in Hypothesis 3, as the majority of FDI received by those developed countries are also of the horizontal type. The estimates show that the minimum of the function is situated at 0.577%, which is well within the range of the observed real inward FDI stock shares. We can furthermore establish that inward VFDI has an inverse-U relationship with inequality, but the squared value is not statistically significant at the 10% level. This result could be attributed to the fact that the amount of FDI originating from non-OECD countries is virtually negligible in the OECD countries. Also, technology transfers are likely to play an insignificant role, seeing that the level of technology used in OECD countries is typically far advanced already.

Columns (III) and (IV) present the impact of outward FDI to high-income and lower income countries, respectively, in the OECD countries. We find mixed results from the outward FDI estimates that adequately support Hypothesis 5. The coefficients for both outward HFDI variables show a U-shaped impact (similar to Hypothesis 2), but they are both statistically insignificant. Therefore, we are not able to determine any correlation between outgoing multinational activity from developed countries to other developed countries and inequality in the source country. However, from column (IV), we observe a highly significant correlation between outward VFDI and inequality at the 1% significance level. That is, income inequality is found to increase at first, as the low-skilled workers see their jobs flowing out of the country. After the predicted turning point of 0.391%, inequality levels are

expected to come down again due to educational attainment and increased production after efficiency gains from outsourcing.

Table 9.7: Hypotheses 4 and 5 – Gini, Horizontal and Vertical FDI Stock

	Dependent variable: $Gini_{i,t}$			
	Inward		Outward	
Variables	(I)	(II)	(III)	(IV)
$HFDI_{i,t-1}$	-9.151**		-1.458	
	(3.877)		*(2.367)*	
$HFDI^2_{i,t-1}$	7.926**		4.787	
	(3.292)		*(4.993)*	
$VFDI_{i,t-1}$		3.501**		6.563***
		(1.372)		*(1.422)*
$VFDI^2_{i,t-1}$		-4.165		-8.397***
		(3.695)		*(2.296)*
$Trade_{i,t}$	-0.024***	-0.039***	-0.034***	-0.033***
	(0.007)	*(0.006)*	*(0.006)*	*(0.005)*
$lnY_{i,t}$	-43.03***	-26.83***	-43.12***	-35.95***
	(10.37)	*(9.267)*	*(11.04)*	*(9.979)*
$lnY^2_{i,t}$	2.007***	1.215***	1.991	1.639***
	(0.498)	*(0.049)*	*(0.522)*	*(0.479)*
$\Delta Educ_{i,t-3}$	0.124	0.225**	0.190**	0.218**
	(0.087)	*(0.092)*	*(0.089)*	*(0.091)*
$Gov_{i,t}$	-0.181***	-0.288***	-0.283***	-0.305***
	(0.060)	*(0.048)*	*(0.061)*	*(0.051)*
$Rights_{i,t}$	-0.322	-0.193	-0.657	-0.645
	(0.791)	*(0.875)*	*(0.778)*	*(0.248)*
$Union_{i,t}$	-0.058***	-0.044***	-0.045***	-0.047***
	(0.006)	*(0.007)*	*(0.006)*	*(0.006)*
$Constant$	271.9***	198.3***	274.7***	239.6***
	(54.62)	*(48.55)*	*(59.01)*	*(52.44)*
Country FE	NO	NO	NO	NO
Time FE	YES	YES	YES	YES
R^2	0.613	0.589	0.581	0.606
Observations	279	302	281	299
No. of countries	22	22	22	22
Sample	1986-2008	1986-2008	1986-2008	1986-2008

Notes: Table 9.7 shows the results of four regressions that examine the impact of horizontal and vertical FDI on income inequality in OECD countries, using 2SLS. Columns (I)-(II) report inward FDI, whereas columns (III)-(IV) report outward FDI. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Overall, the estimation results largely support our hypotheses up to this point, except for Hypothesis 5. The effects of FDI on inequality appear to depend on the type of country,

particularly on its economic and technological level. The empirical results are therefore for the most part in line with the empirical studies that have inspired the hypotheses. In the next section, we employ robustness tests to check for the validity of our results.

9.5 Robustness Checks

9.5.1 Theil Index

To check for the robustness of the estimation results, we first use an alternative measure for inequality: the Theil index. As mentioned earlier, the Theil index measures wage inequality in the manufacturing sector. Although the measure is not directly comparable to the Gini index, it enables us to investigate whether FDI causes any changes in the skill premium in the manufacturing sector. Tables 11.5.1-11.5.4 in appendix present the results for all hypotheses with the Theil index as dependent variable. For Hypotheses 1 and 2, we find that all FDI coefficients have the same sign as observed in the main analysis. Additionally, the estimates have become more statistically significant. The larger magnitudes suggest that the impact of FDI on wage inequality in the manufacturing sector is more significant than for overall inequality. This makes intuitive sense because the manufacturing sector is affected directly from multinational activity, as opposed to overall inequality which takes into account more sources of income.

Next, observing the impact of inward FDI for the different subgroups in Table 11.5.2, a similar conclusion can be drawn as before. The signs of the estimates have remained the same, whereas the magnitudes have risen. However, the IFDI variables of the Transition countries do not pass the robustness check as they have lost their significance. Looking more closely at the data, it is interesting to note that the Theil index has a much higher variance in the Transition countries in comparison to the other subgroups, which might explain the sudden loss in significance. Moreover, examining outward FDI for the subgroups in Table 11.5.3, we find that the results are robust as all OFDI coefficients for all subgroups display the same signs and statistical significance as the main analysis.

Finally, in Table 11.5.4, we see that the horizontal and vertical FDI estimates are robust. The magnitudes of the VFDI coefficients are remarkably high, which are mainly driven by the Transition countries. All in all, the results of the robustness check with the Theil index are largely in line with the findings for overall income inequality, which should not be

surprising since we observe a high correlation between the two inequality measures (Galbraith and Kum, 2005).

9.5.2 FDI Flows

As a second robustness check, we replace FDI stocks with FDI flows. Tables 11.5.5-11.5.8 in appendix present the results for all five hypotheses. First of all, we find that both Hypothesis 1 and 2 do not pass the robustness test as the FDI flow variables have lost their significance and acquired the wrong signs, except for outward FDI flow in the balanced panel.

For Hypothesis 3 in Table 11.5.6, we interestingly find robust results for the inward FDI flow variables. The variables that were significant at the 10% level have now become significant at the 1% level. However, similar to the Theil index, the IFDI flow coefficients of the Transition countries have lost their significance. The coefficients of outward FDI flows in Table 11.5.7 are highly inconsistent. For instance, the FDI estimates of the Core countries have lost their significance and switched signs. The New EU Members, High Skills & Taxes countries, and Transition countries show similar results as the main analysis, but their magnitudes have increased dramatically.

Finally, in Table 11.5.8, we surprisingly see that all horizontal and vertical FDI flow coefficients have become statistically insignificant. Moreover, except for inward HFDI flow, the rest of the estimates have switched signs. Therefore, this is in stark contrast with not only the main analysis but also Hypotheses 4 and 5. All in all, we can conclude that using FDI flows do not provide robust results, except when analysing inward FDI flows for the subgroups in Hypothesis 3. In order to get a clear overview of all empirical analyses, Table 9.8 presents a summary of the FDI estimates for all hypotheses.

Table 9.8: Summary – Estimation Results

		IFDI	$IFDI^2$	Turning Point	OFDI	$OFDI^2$	Turning Point
Main Analysis	Europe (Unbalanced)	3.920***	-0.928	2.112 (max)	0.497	-2.413**	0.103 (max)
	Europe (Balanced)	5.006**	-3.762**	0.665 (max)	8.080***	-6.691***	0.604 (max)
	Core	-0.583*	1.393*	0.209 (min)	5.853***	-3.938***	0.743 (max)
	Periphery	-3.179*	4.257	0.373 (min)	6.364***	-7.416***	0.429 (max)
	New EU Members	1.249	-0.385	1.622 (max)	10.92***	-17.02***	0.321 (max)
	High Skills + Taxes	-8.985	7.495	0.599 (min)	-7.307	8.419	0.434 (min)
	Transition	6.408***	-4.577***	0.700 (max)	13.74	-15.87	0.433 (max)
	Horizontal	-9.151**	7.926**	0.577 (min)	-1.458	4.787	0.152 (min)
	Vertical	3.501**	-4.165	0.420 (max)	6.563***	-8.397***	0.391 (max)
Robust?	Theil	Yes			Yes		
	FDI Flows	Only subgroups			No		

Hypothesis 1: ✓
Hypothesis 2: ✓
Hypothesis 3: ✓
Hypothesis 4: ✓
Hypothesis 5: ✖

10. CONCLUSION

The impact of multinationals on income inequality through foreign direct investments is an essential topic in today's world. However, as of now, existing literature analysing Europe have been inadequate in their research, as certain aspects have been disregarded (e.g. vertical and horizontal FDI) and/or important issues have been ignored (e.g. endogeneity issues). In this paper we use a panel of 39 European countries for the period of 1980-2008 to investigate the relationship between inward and outward FDI and income inequality in Europe. FDI is measured as real FDI stock as a share of GDP, whereas inequality is evaluated as the estimated household income inequality Gini index. Specifically, we analyse whether a non-linear effect is present, in line with Figini and Görg (2011), and if there are heterogeneous effects between the different types of European countries, as inspired by Asteriou *et al.* (2014) and Herzer and Nunnenkamp (2013). In addition, we create a theoretical model using proxy variables that represent vertical and horizontal FDI by examining the source and host countries of incoming and outgoing FDI, respectively. We particularly distinguish between high-income OECD countries and lower income non-OECD countries, and propose that OECD countries engage in horizontal FDI with each other whilst OECD and non-OECD countries engage in vertical FDI.

We find significantly positive correlations between both inward and outward FDI and income inequality in Europe, which diminish over time as the FDI stocks accumulate. Examining different subgroups, there is evidently much heterogeneity present in Europe. For Core countries, inward FDI appears to have an equalizing impact which slows down in the long term. This is likely due to the fact that the bulk of their inward FDI originate from similarly high-skilled labour-abundant countries with advanced technology and thus the low-skilled workers are also more likely to enjoy the spill-over effects. The opposite appears to be true for Transition countries: as these countries are more low-skilled labour-abundant, there is an insufficient supply of high-skilled labour available that can work with the incoming advanced technology, and thus inequality rises initially but falls after adjusting in the long term. Observing the different impacts of outward FDI in Europe, the Core, the Periphery and the New EU Members show a statistically significant inverted-U relationship with inequality. This finding provides support for the popular opinion that outsourcing and offshoring adversely affect the low-skilled labour force in the short run, partly due to imperfections of the European goods and labour markets which prevent quick adjustments. However, in the

long run, the gap stops widening due to increased domestic production which is made possible by the productivity gains from outsourcing and/or offshoring. Further, incoming horizontal FDI decreases income inequality in the European (high-income) OECD countries in the short run but rapidly increases it again in the long run. The effect is much larger than incoming vertical FDI from non-OECD countries, which is not found to have a significantly nonlinear effect. This suggests that the much larger spill-over effects are indeed due to the fact that the majority of inward FDI originate from other high-income countries that possess the most advanced technologies. Looking at outgoing HFDI and VFDI, we observe no significant impact from outward HFDI but we do find a highly significant inverted-U relationship between outward VFDI and inequality. Finally, we find that these results are robust to an alternative measure of inequality (i.e. wage inequality in the manufacturing sector), but not completely to another measure of multinational activity (i.e. real FDI flows).

Based on our findings, there are several recommendations and policy implications that can be put forward. Firstly, the results imply that policymakers of European countries are advised to attract MNCs. This could initially cause backlash socially and economically, but in the long run, inequality levels are expected to fall, the labour force becomes more educated, and the country is a step closer to the technological frontier. Secondly, governments should take responsibility and financially assist those who have been affected by outsourcing and offshoring, whether it be on a national or European level. This could happen through simple transfers or subsidies that actively encourage people to re-educate. Future research should put more focus in examining horizontal and vertical FDI and collecting more reliable data. As both multinational activity and income inequality levels keep rising in the world, it is of great importance to thoroughly investigate all possible welfare effects that these developments bring along. Thus, more focus should be put on efficient and reliable data collection, and multinational activity should be regularly and carefully inspected as many MNCs have already started to become more powerful than countries.

APPENDIX

A. Example Calculation of the UTIP-UNIDO Theil Index

Section 2.1.2 presented the composition of the Theil index and showed how the measure for inequality can be decomposed in a between- and within-groups component. This appendix gives a detailed step-by-step calculation of how to derive the between-groups component, which serves as the estimate of the UTIP-UNIDO Theil index for manufacturing wage inequality.

UTIP finds that the Theil index also has a fractal (or, self-similar) property, meaning that the structure of the Theil index remains similar at each level of aggregation (Conceição *et al.*, 2000). Since there are no individual data available, UTIP uses two hierarchal levels: geographical units and industrial sectors within each unit. Wages are taken as a proxy for income, whereas the employed people are taken as a measure of the population. To make calculations easier, we can rewrite the between-groups component of equation (2.4) as follows:

$$T_B = \sum_{k=1}^{m} \left(\frac{Y_k}{\sum_{k=1}^{n} Y_k} \right) * \ln \left(\frac{\frac{Y_k}{\sum_{k=1}^{n} Y_Y}}{\frac{n_k}{\sum_{k=1}^{n} n_k}} \right) \qquad \text{(A.1)}$$

where T_B is the between-groups component of the Theil index, and Y_k is the total income of group *k*. We focus on the Netherlands in the following example. To simplify matters even more, suppose the Netherlands only has three provinces (or, geographical units) – Noord-Holland, Zuid-Holland and Gelderland – and three industrial sectors – Apparel, Chemical and Rubber. In addition, we have the following statistics available for year *t*:

EMPLOYMENT	Apparel	Chemical	Rubber	**TOTAL**
Noord-Holland	12	9	12	**33**
Zuid-Holland	8	6	11	**25**
Gelderland	10	8	8	**26**
TOTAL	**30**	**23**	**31**	**84**

WAGES	Apparel	Chemical	Rubber	**TOTAL**
Noord-Holland	78	55	86	**219**
Zuid-Holland	72	62	82	**216**
Gelderland	61	43	74	**178**
TOTAL	**211**	**160**	**242**	**613**

First, we calculate the between-region (T_{Br}) and between-sector (T_{Bs}) Theil components:

$$T_{Br} = \frac{219}{613} * \ln\left(\frac{\left(\frac{219}{613}\right)}{\left(\frac{33}{84}\right)}\right) + \frac{216}{613} * \ln\left(\frac{\left(\frac{216}{613}\right)}{\left(\frac{25}{84}\right)}\right) + \frac{178}{613} * \ln\left(\frac{\left(\frac{178}{613}\right)}{\left(\frac{26}{84}\right)}\right) = 0.0070$$

$$T_{Bs} = \frac{211}{613} * \ln\left(\frac{\left(\frac{211}{613}\right)}{\left(\frac{30}{84}\right)}\right) + \frac{160}{613} * \ln\left(\frac{\left(\frac{160}{613}\right)}{\left(\frac{23}{84}\right)}\right) + \frac{242}{613} * \ln\left(\frac{\left(\frac{242}{613}\right)}{\left(\frac{31}{84}\right)}\right) = 0.0014$$

Then, we sum both components to find the UTIP-UNIDO Theil index for the Netherlands in year *t*:

$$T_B = T_{Br} + T_{Bs} = 0.0070 + 0.0014 = 0.0084$$

B. Data Information

Table 11.1.1: List of 39 Countries in Unbalanced Dataset, Hypotheses 1 and 2

List of Countries in Unbalanced Dataset		
Albania	Germany	Norway
Armenia*	Greece	Poland
Austria	Hungary	Portugal
Azerbaijan	Iceland	Romania
Belgium	Ireland	Russian Federation
Bulgaria	Italy	Slovak Republic
Croatia	Kazakhstan	Slovenia
Czech Republic	Latvia	Spain
Denmark	Lithuania	Sweden
Estonia	Luxembourg	Switzerland
Finland	Macedonia, FYR	Turkey
France	Moldova	Ukraine
Georgia	Netherlands	United Kingdom

*: Not included in Hypothesis 2

Table 11.1.2: List of 15 Countries in Balanced Dataset, Hypotheses 1 and 2

List of Countries in Balanced Dataset		
Austria	Germany	Norway
Belgium	Greece	Portugal
Denmark	Ireland	Spain
Finland	Italy	Turkey
France	Netherlands	United Kingdom

Table 11.1.3: List of Countries Divided into Subgroups, Hypothesis 3

Country	EU	Accession	Subgroup	Country	EU	Accession	Subgroup
Albania			Transition	Latvia	✓	2004	New EU Members
Armenia			Transition	Lithuania	✓	2004	New EU Members
Austria	✓	1995	Core (North)	Luxembourg	✓	1958	-
Azerbaijan			Transition	Macedonia, FYR			Transition
Belgium	✓	1958	Core (North)	Moldova			Transition
Bulgaria	✓	2007	New EU Members	Netherlands	✓	1958	Core (North)
Croatia	✓	2013	New EU Members	Norway			High Skills & Taxes
Czech Republic	✓	2004	New EU Members	Poland	✓	2004	New EU Members
Denmark	✓	1973	High Skills & Taxes	Portugal	✓	1986	Periphery (South)
Estonia	✓	2004	New EU Members	Romania	✓	2007	New EU Members
Finland	✓	1995	High Skills & Taxes	Russian Federation			Transition
France	✓	1958	Core (North)	Slovak Republic	✓	2004	New EU Members
Georgia			Transition	Slovenia	✓	2004	New EU Members
Germany	✓	1958	Core (North)	Spain	✓	1986	Periphery (South)
Greece	✓	1981	Periphery (South)	Sweden	✓	1995	High Skills & Taxes
Hungary	✓	2004	New EU Members	Switzerland			-
Iceland			-	Turkey			Transition
Ireland	✓	1973	Periphery (South)	Ukraine			Transition
Italy	✓	1958	Periphery (South)	United Kingdom	✓	1973	Core (North)
Kazakhstan			Transition				

Table 11.1.4: List of 22 Countries in OECD Dataset, Hypotheses 4 and 5

List of Countries in OECD Dataset		
Austria	Hungary	Slovak Republic
Czech Republic	Iceland	Slovenia
Denmark	Ireland	Spain
Estonia	Italy	Sweden
Finland	Netherlands	Switzerland
France	Norway	United Kingdom
Germany	Poland	
Greece	Portugal	

C. Descriptive Statistics

Table 11.2.1: Descriptive Statistics – Unbalanced Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	35.97	6.01	57.27	20.58	1063
$Theil_{i,t}$	24.91	27.16	254.60	2.77	1066
$IFDI_{i,t}$	0.31	0.39	4.05	0.01	1194
$OFDI_{i,t}$	0.22	0.42	4.79	-0.01	1121
$IFDIflow_{i,t}$	0.03	0.09	2.52	-0.16	1366
$OFDIflow_{i,t}$	0.02	0.07	1.58	-0.29	1252
$Trade_{i,t}$	85.01	44.66	438.16	9.10	1459
$lnY_{i,t}$	9.60	1.10	11.59	6.54	1482
$\Delta Educ_{i,t-3}$	1.34	2.27	14.74	-10.27	1453
$Gov_{i,t}$	18.30	7.21	59.65	6.02	1216
$Rights_{i,t}$	2.32	1.91	7.00	1.00	1579
$Union_{i,t}$	41.05	21.62	100.00	6.31	940

Table 11.2.2: Descriptive Statistics – Balanced Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	36.22	4.43	49.57	26.23	563
$Theil_{i,t}$	19.38	14.81	111.90	4.60	558
$IFDI_{i,t}$	0.28	0.34	2.63	0.01	540
$OFDI_{i,t}$	0.27	0.35	2.69	0.05	524
$IFDIflow_{i,t}$	0.02	0.04	0.39	-0.16	420
$OFDIflow_{i,t}$	0.02	0.04	0.40	-0.04	402
$Trade_{i,t}$	68.53	33.55	216.24	9.10	690
$lnY_{i,t}$	10.23	0.56	11.43	8.31	690
$\Delta Educ_{i,t-3}$	1.48	1.96	12.49	-10.27	621
$Gov_{i,t}$	14.97	2.80	23.29	7.77	570
$Rights_{i,t}$	1.32	0.88	7.00	1.00	667
$Union_{i,t}$	40.43	18.62	80.65	6.31	622

Table 11.2.3: Descriptive Statistics – Core (North) Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	34.30	3.05	39.67	26.23	221
$Theil_{i,t}$	14.89	5.89	32.94	5.49	221
$IFDI_{i,t}$	0.31	0.34	2.09	0.03	216
$OFDI_{i,t}$	0.38	0.37	2.03	0.01	216
$IFDIflow_{i,t}$	0.02	0.04	0.39	-0.03	276
$OFDIflow_{i,t}$	0.03	0.04	0.40	-0.05	276
$Trade_{i,t}$	76.95	34.32	165.49	30.83	276
$lnY_{i,t}$	10.40	0.26	10.86	9.79	276
$\Delta Educ_{i,t-3}$	1.32	1.85	12.49	-10.27	213
$Gov_{i,t}$	15.73	2.45	22.38	11.25	228
$Rights_{i,t}$	1.00	0.00	1.00	1.00	252
$Union_{i,t}$	33.81	14.77	62.75	7.55	264

Table 11.2.4: Descriptive Statistics – Periphery (South) Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	38.77	2.44	44.13	34.30	190
$Theil_{i,t}$	24.58	10.52	49.12	6.87	185
$IFDI_{i,t}$	0.34	0.43	2.63	0.01	180
$\Delta OFDI_{i,t}$	0.02	0.08	0.63	-0.09	164
$IFDIflow_{i,t}$	0.02	0.05	0.57	-0.16	230
$OFDIflow_{i,t}$	0.02	0.04	0.50	-0.04	194
$Trade_{i,t}$	64.15	38.88	216.24	23.11	230
$lnY_{i,t}$	10.03	0.38	11.09	9.08	230
$\Delta Educ_{i,t-3}$	1.64	1.93	11.40	-3.42	210
$Gov_{i,t}$	12.70	1.79	16.41	7.77	190
$Rights_{i,t}$	1.33	0.96	7.00	1.00	225
$Union_{i,t}$	33.93	13.74	60.76	11.26	175

Table 11.2.5: Descriptive Statistics – New EU Members Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	33.11	6.05	42.65	20.58	276
$Theil_{i,t}$	23.47	17.52	73.67	2.77	259
$IFDI_{i,t}$	0.30	0.24	0.99	0.00	258
$OFDI_{i,t}$	0.04	0.07	0.33	-0.01	260
$IFDIflow_{i,t}$	0.03	0.03	0.26	-0.10	257
$OFDIflow_{i,t}$	0.01	0.01	0.09	-0.10	257
$Trade_{i,t}$	103.09	33.93	184.55	39.14	270
$lnY_{i,t}$	9.21	0.50	10.14	8.08	268
$\Delta Educ_{i,t-3}$	1.47	2.51	14.74	-8.27	366
$Gov_{i,t}$	21.99	5.86	38.59	9.09	275
$Rights_{i,t}$	2.49	2.10	7.00	1.00	361
$Union_{i,t}$	31.28	20.79	97.78	6.53	169

Table 11.2.6: Descriptive Statistics – High Skills & Taxes Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	31.62	2.13	36.63	27.42	145
$Theil_{i,t}$	7.56	2.91	13.73	3.02	145
$IFDI_{i,t}$	0.20	0.18	0.74	0.01	144
$OFDI_{i,t}$	0.26	0.22	0.82	0.01	144
$IFDIflow_{i,t}$	0.02	0.03	0.21	-0.04	184
$OFDIflow_{i,t}$	0.02	0.03	0.15	-0.06	183
$Trade_{i,t}$	69.32	13.20	104.83	43.39	184
$lnY_{i,t}$	10.68	0.36	11.43	9.82	184
$\Delta Educ_{i,t-3}$	1.44	2.48	11.59	-6.22	168
$\Delta Gov_{i,t}$	-0.05	0.66	1.96	-1.64	148
$Rights_{i,t}$	1.09	0.29	2.00	1.00	180
$Union_{i,t}$	68.96	9.69	87.43	51.29	175

Table 11.2.7: Descriptive Statistics – Transition Countries Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	37.99	9.50	57.27	20.58	275
$Theil_{i,t}$	40.60	44.57	254.58	2.77	283
$IFDI_{i,t}$	0.29	0.25	1.12	0.00	401
$OFDI_{i,t}$	0.05	0.06	0.33	-0.01	344
$IFDIflow_{i,t}$	0.04	0.04	0.38	-0.12	413
$OFDIflow_{i,t}$	0.01	0.01	0.09	-0.10	354
$Trade_{i,t}$	89.18	36.80	184.55	9.10	470
$lnY_{i,t}$	8.41	0.76	10.08	6.54	493
$Educ_{i,t-3}$	35.44	20.77	91.03	4.70	562
$Gov_{i,t}$	22.63	8.32	59.65	9.09	354
$Rights_{i,t}$	4.08	1.93	7.00	1.00	606
$Union_{i,t}$	35.35	24.72	100.00	6.31	113

Table 11.2.8: Descriptive Statistics – OECD Dataset

Variables	Mean	Std. Dev.	Max. Value	Min. Value	Obs.
$Gini_{i,t}$	35.97	6.01	57.27	20.58	1063
$Theil_{i,t}$	24.91	27.16	254.60	2.77	1066
$IHFDI_{i,t}$	0.31	0.31	2.06	0.02	477
$IVFDI_{i,t}$	0.03	0.05	0.40	-0.01	500
$OHFDI_{i,t}$	0.27	0.34	2.13	-0.01	476
$OVFDI_{i,t}$	0.06	0.09	0.57	0.00	495
$IHFDIflow_{i,t}$	0.08	0.48	6.86	-0.11	538
$IVFDIflow_{i,t}$	0.02	0.14	2.21	-0.13	580
$OHFDIflow_{i,t}$	0.08	0.45	6.26	-0.28	523
$OVFDIflow_{i,t}$	0.02	0.15	2.68	-0.08	546
$Trade_{i,t}$	85.01	44.66	438.16	9.10	1459
$lnY_{i,t}$	9.60	1.10	11.59	6.54	1482
$\Delta Educ_{i,t-3}$	1.34	2.27	14.74	-10.27	1453
$Gov_{i,t}$	18.30	7.21	59.65	6.02	1216
$Rights_{i,t}$	2.32	1.91	7.00	1.00	1579
$Union_{i,t}$	41.05	21.62	100.00	6.31	940

D. Unit Root Tests

Table 11.3.1: Unbalanced Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	159.507	0.0000	43	1194
$OFDI_{i,t}$	120.576	0.0083	43	1121
$IFDIflow_{i,t}$	513.289	0.0000	43	1366
$OFDIflow_{i,t}$	487.346	0.0000	43	1252
$Trade_{i,t}$	246.775	0.0000	43	1459
$lnY_{i,t}$	275.378	0.0000	43	1482
$Educ_{i,t-3}$	58.883	0.9830	43	1525
$Gov_{i,t}$	192.882	0.0000	43	1216
$Rights_{i,t}$	326.468	0.0000	43	1579
$Union_{i,t}$	243.459	0.0000	31	940

Table 11.3.2: Unbalanced Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$Educ_{i,t-3}$	572.493	0.0000	43	1453

Table 11.3.3: Balanced Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	57.220	0.0020	15	540
$OFDI_{i,t}$	78.528	0.0000	15	524
$IFDIflow_{i,t}$	131.971	0.0000	15	420
$OFDIflow_{i,t}$	87.646	0.0000	15	402
$Trade_{i,t}$	60.799	0.0007	15	690
$lnY_{i,t}$	160.332	0.0000	15	690
$Educ_{i,t-3}$	17.569	0.9651	15	637
$Gov_{i,t}$	73.350	0.0000	15	570
$Rights_{i,t}$	84.263	0.0000	15	667
$Union_{i,t}$	104.496	0.0000	15	622

Table 11.3.4: Balanced Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$Educ_{i,t-3}$	248.082	0.0000	15	621

Table 11.3.5: Core (North) Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	23.171	0.0263	6	216
$OFDI_{i,t}$	18.630	0.0979	6	216
$IFDIflow_{i,t}$	110.234	0.0000	6	276
$OFDIflow_{i,t}$	68.736	0.0000	6	276
$Trade_{i,t}$	22.288	0.0344	6	276
$lnY_{i,t}$	67.737	0.0000	6	276
$Educ_{i,t-3}$	10.659	0.5584	6	221
$Gov_{i,t}$	22.285	0.0344	6	228
$Rights_{i,t}$	-	-	-	-
$Union_{i,t}$	31.006	0.0020	6	264

Table 11.3.6: Core (North) Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$Educ_{i,t-3}$	89.563	0.0000	6	213

Table 11.3.7: Periphery (South) Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	17.697	0.0603	5	180
$OFDI_{i,t}$	8.897	0.5419	5	169
$IFDIflow_{i,t}$	84.348	0.0000	5	230
$OFDIflow_{i,t}$	64.212	0.0000	5	194
$Trade_{i,t}$	17.127	0.0716	5	230
$lnY_{i,t}$	49.788	0.0000	5	230
$Educ_{i,t-3}$	2.381	0.9925	5	215
$Gov_{i,t}$	32.144	0.0004	5	190
$Rights_{i,t}$	63.403	0.0000	5	225
$Union_{i,t}$	-	-	-	-

Table 11.3.8: Periphery (South) Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$OFDI_{i,t}$	86.276	0.0000	5	164
$Educ_{i,t-3}$	99.918	0.0000	5	210

Table 11.3.9: New EU Members Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	45.700	0.0022	11	258
$OFDI_{i,t}$	33.382	0.0567	11	260
$IFDIflow_{i,t}$	116.213	0.0000	11	257
$OFDIflow_{i,t}$	132.763	0.0000	11	257
$Trade_{i,t}$	47.127	0.0014	11	270
$lnY_{i,t}$	46.881	0.0015	11	268
$Educ_{i,t-3}$	14.431	0.8855	11	383
$Gov_{i,t}$	34.615	0.0425	11	275
$Rights_{i,t}$	95.829	0.0000	11	361
$Union_{i,t}$	-	-	-	-

Table 11.3.10: New EU Members Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$Educ_{i,t-3}$	111.338	0.0000	11	366

Table 11.3.11: High Skills & Taxes Countries Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	39.525	0.0000	4	144
$OFDI_{i,t}$	35.516	0.0000	4	144
$IFDIflow_{i,t}$	66.650	0.0000	4	184
$OFDIflow_{i,t}$	51.431	0.0000	4	183
$Trade_{i,t}$	21.811	0.0053	4	184
$lnY_{i,t}$	43.146	0.0000	4	184
$Educ_{i,t-3}$	11.127	0.1946	4	172
$Gov_{i,t}$	8.756	0.3633	4	152
$Rights_{i,t}$	40.025	0.0000	4	180
$Union_{i,t}$	38.541	0.0000	4	175

Table 11.3.12: High Skills & Taxes Countries Dataset: Unit Root Test – 1st Difference

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$Educ_{i,t-3}$	61.030	0.0000	4	168
$Gov_{i,t}$	69.485	0.0000	4	148

Table 11.3.13: Transition Countries Dataset: Unit Root Test – Level

	ADF – Level			
Variables	Stat.	P-value	Countries	Observations
$IFDI_{i,t}$	91.169	0.0003	25	401
$OFDI_{i,t}$	87.670	0.0008	25	344
$IFDIflow_{i,t}$	185.564	0.0000	25	413
$OFDIflow_{i,t}$	206.395	0.0000	25	354
$Trade_{i,t}$	211.881	0.0000	25	470
$lnY_{i,t}$	85.555	0.0013	25	493
$Educ_{i,t-3}$	106.421	0.0000	25	562
$Gov_{i,t}$	104.158	0.0000	23	354
$Rights_{i,t}$	140.883	0.0000	25	606
$Union_{i,t}$	-	-	-	-

Table 11.3.14: OECD Dataset: Unit Root Test – Level

	ADF – 1st Difference			
Variables	Stat.	P-value	Countries	Observations
$IHFDI_{i,t}$	102.750	0.0000	25	477
$IVFDI_{i,t}$	119.924	0.0000	25	500
$OHFDI_{i,t}$	103.266	0.0000	25	476
$OVFDI_{i,t}$	67.881	0.0469	25	495
$IHFDIflow_{i,t}$	306.210	0.0000	25	538
$IVFDIflow_{i,t}$	388.272	0.0000	25	580
$OHFDIflow_{i,t}$	274.518	0.0000	25	523
$OVFDIflow_{i,t}$	257.577	0.0000	25	546

E. Correlation Tests

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.80	1.00										
$IFDI_{i,t}$	0.10	0.02	1.00									
$OFDI_{i,t}$	-0.06	-0.20	0.74	1.00								
$IFDIflow_{i,t}$	0.04	0.06	0.61	0.47	1.00							
$OFDIflow_{i,t}$	-0.07	-0.16	0.54	0.73	0.62	1.00						
$Trade_{i,t}$	-0.10	-0.04	0.77	0.53	0.56	0.43	1.00					
$lnY_{i,t}$	-0.47	-0.63	0.22	0.51	0.09	0.40	0.19	1.00				
$\Delta Educ_{i,t-3}$	0.09	0.11	0.07	-0.03	0.05	0.02	0.11	-0.01	1.00			
$Gov_{i,t}$	-0.21	0.01	-0.26	-0.29	-0.04	-0.20	-0.07	-0.44	-0.06	1.00		
$Rights_{i,t}$	0.28	0.43	-0.17	-0.20	-0.09	-0.16	-0.22	-0.48	-0.11	0.13	1.00	
$Union_{i,t}$	-0.50	-0.40	-0.12	0.00	-0.05	0.03	0.00	0.31	-0.13	0.24	-0.03	1.00

Table 11.4.1: Correlation Matrix: Unbalanced Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.82	1.00										
$IFDI_{i,t}$	0.06	-0.08	1.00									
$OFDI_{i,t}$	-0.06	-0.21	0.78	1.00								
$IFDIflow_{i,t}$	-0.03	-0.07	0.54	0.50	1.00							
$OFDIflow_{i,}$	-0.11	-0.18	0.51	0.65	0.75	1.00						
$Trade_{i,t}$	-0.16	-0.22	0.73	0.58	0.49	0.46	1.00					
$lnY_{i,t}$	-0.66	-0.72	0.23	0.40	0.19	0.31	0.40	1.00				
$\Delta Educ_{i,t-3}$	0.07	0.02	0.05	0.05	0.01	0.04	0.01	0.14	1.00			
$Gov_{i,t}$	-0.27	-0.17	-0.29	-0.03	-0.09	-0.01	-0.09	0.05	-0.10	1.00		
$Rights_{i,t}$	0.26	0.48	-0.19	-0.24	-0.13	-0.18	-0.26	-0.55	-0.11	0.06	1.00	
$Union_{i,t}$	-0.46	-0.35	-0.01	-0.05	0.07	0.03	0.22	0.31	0.03	0.35	-0.10	1.00

Table 11.4.2: Correlation Matrix: Balanced Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.53	1.00										
$IFDI_{i,t}$	0.67	0.31	1.00									
$OFDI_{i,t}$	0.60	0.07	0.91	1.00								
$IFDIflow_{i,t}$	0.48	0.29	0.67	0.57	1.00							
$OFDIflow_{i,t}$	0.44	0.11	0.62	0.62	0.90	1.00						
$Trade_{i,t}$	0.50	0.25	0.62	0.48	0.48	0.40	1.00					
$lnY_{i,t}$	0.64	0.03	0.59	0.63	0.41	0.47	0.43	1.00				
$\Delta Educ_{i,t-3}$	0.12	0.00	0.02	0.02	-0.01	0.01	-0.06	0.05	1.00			
$Gov_{i,t}$	-0.22	-0.37	-0.15	-0.05	-0.19	-0.14	-0.08	-0.49	-0.08	1.00		
$Rights_{i,t}$	.	.	.	.	.	.	.	.	.	.	.	
$Union_{i,t}$	0.00	0.52	0.18	-0.04	0.23	0.07	0.42	-0.28	-0.02	-0.28	.	1.00

Table 11.4.3: Correlation Matrix: Core (North) Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$\Delta OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.49	1.00										
$IFDI_{i,t}$	-0.38	-0.35	1.00									
$\Delta OFDI_{i,t}$	-0.18	-0.07	0.29	1.00								
$IFDIflow_{i,t}$	-0.25	-0.13	0.40	0.37	1.00							
$OFDIflow_{i,t}$	-0.33	-0.20	0.58	0.70	0.26	1.00						
$Trade_{i,t}$	-0.47	-0.34	0.78	0.19	0.43	0.53	1.00					
$lnY_{i,t}$	-0.50	-0.64	0.39	0.36	0.24	0.58	0.43	1.00				
$\Delta Educ_{i,t-3}$	0.07	0.25	0.06	0.16	0.08	0.16	0.07	0.23	1.00			
$Gov_{i,t}$	0.47	0.49	-0.60	-0.09	-0.31	-0.39	-0.73	-0.56	-0.19	1.00		
$Rights_{i,t}$	-0.03	-0.05	-0.08	-0.04	-0.05	-0.12	-0.08	-0.12	0.03	-0.09	1.00	
$Union_{i,t}$	.	.	.	.	.	.	.	.	.	.	.	.

Table 11.4.4: Correlation Matrix: Periphery (South) Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.78	1.00										
$IFDI_{i,t}$	0.09	0.13	1.00									
$OFDI_{i,t}$	-0.10	-0.05	0.57	1.00								
$IFDIflow_{i,t}$	0.24	0.22	0.70	0.24	1.00							
$OFDIflow_{i,t}$	0.01	0.02	0.61	0.93	0.30	1.00						
$Trade_{i,t}$	-0.04	0.12	0.71	0.54	0.41	0.54	1.00					
$lnY_{i,t}$	-0.35	-0.33	0.49	0.55	0.17	0.46	0.57	1.00				
$\Delta Educ_{i,t-3}$	0.03	0.06	0.25	0.22	-0.01	0.25	0.28	0.33	1.00			
$Gov_{i,t}$	0.24	0.15	-0.36	-0.46	-0.12	-0.36	-0.33	-0.73	-0.33	1.00		
$Rights_{i,t}$	-0.07	-0.04	-0.39	-0.16	-0.28	-0.20	-0.46	-0.41	-0.26	0.20	1.00	
$Union_{i,t}$	.	.	.	.	.	.	.	.	.	.	.	.

Table 11.4.5: Correlation Matrix: New EU Members Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t-3}$	$\Delta Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.83	1.00										
$IFDI_{i,t}$	0.36	0.34	1.00									
$OFDI_{i,t}$	0.15	0.15	0.87	1.00								
$IFDIflow_{i,t}$	-0.10	-0.08	0.47	0.53	1.00							
$OFDIflow_{i,t}$	-0.08	-0.08	0.35	0.50	0.72	1.00						
$Trade_{i,t}$	0.31	0.17	0.70	0.46	0.32	0.25	1.00					
$lnY_{i,t}$	0.68	0.37	0.50	0.24	0.08	0.06	0.57	1.00				
$\Delta Educ_{i,t-3}$	0.34	0.27	0.36	0.37	0.27	0.31	0.32	0.27	1.00			
$\Delta Gov_{i,t}$	-0.07	-0.01	-0.18	-0.19	-0.19	-0.28	-0.31	-0.10	-0.15	1.00		
$Rights_{i,t}$	-0.14	0.23	-0.28	-0.28	-0.15	-0.18	-0.29	-0.42	-0.13	0.07	1.00	
$Union_{i,t}$	-0.75	-0.67	-0.14	0.19	0.20	0.22	-0.28	-0.74	-0.14	-0.06	-0.06	1.00

Table 11.4.6: Correlation Matrix: High Skills & Taxes Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IFDI_{i,t}$	$OFDI_{i,t}$	$IFDIflow_{i,t}$	$OFDIflow_{i,t}$	$Trade_{i,t}$	$lnY_{i,t}$	$Educ_{i,t-3}$	$Gov_{i,t}$	$Rights_{i,t}$	$Union_{i,t}$
$Gini_{i,t}$	1.00											
$Theil_{i,t}$	0.79	1.00										
$IFDI_{i,t}$	0.31	0.27	1.00									
$OFDI_{i,t}$	0.07	0.12	0.34	1.00								
$IFDIflow_{i,t}$	0.22	0.26	0.77	0.09	1.00							
$OFDIflow_{i,t}$	0.25	0.42	0.48	0.74	0.46	1.00						
$Trade_{i,t}$	-0.15	-0.06	0.47	-0.02	0.38	0.12	1.00					
$lnY_{i,t}$	-0.05	-0.08	-0.25	0.25	-0.34	0.08	-0.69	1.00				
$Educ_{i,t-3}$	-0.61	-0.40	-0.04	0.32	-0.01	0.08	0.15	0.05	1.00			
$Gov_{i,t}$	0.10	0.19	0.34	-0.03	0.46	0.05	0.24	-0.53	0.15	1.00		
$Rights_{i,t}$	0.31	0.43	0.32	0.46	0.19	0.46	0.04	0.19	0.12	0.00	1.00	
$Union_{i,t}$	.	.	.	.	.	.	.	.	.	.	.	.

Table 11.4.7: Correlation Matrix: Transition Countries Dataset

	$Gini_{i,t}$	$Theil_{i,t}$	$IHFDI_{i,t}$	$IVFDI_{i,t}$	$OHFDI_{i,t}$	$OVFDI_{i,t}$	$IHFDIf$	$IVFDIf$	$OHFDIf$	$OVFDIf$	$Trade_{i,t}$	$lnY_{i,t}$	$\Delta Educ_{i,t}$	$Gov_{i,t}$	$Rights$	$Union_{i,t}$
$Gini_{i,t}$	1.00															
$Theil_{i,t}$	0.79	1.00														
$IHFDI_{i,t}$	0.08	0.01	1.00													
$IVFDI_{i,t}$	0.15	0.10	0.82	1.00												
$OHFDI_{i,t}$	-0.13	-0.33	0.52	0.39	1.00											
$OVFDI_{i,t}$	0.02	-0.09	0.59	0.52	0.55	1.00										
$IHFDIflow_i$	-0.08	-0.05	0.50	0.41	0.27	0.34	1.00									
$IVFDIflow_i$	-0.04	0.01	0.02	0.13	-0.02	0.03	0.39	1.00								
$OHFDIflow$	-0.13	-0.25	0.31	0.21	0.62	0.35	0.40	0.07	1.00							
$OVFDIflow$	-0.12	-0.09	0.41	0.39	0.30	0.67	0.35	0.05	0.24	1.00						
$Trade_{i,t}$	-0.11	-0.07	0.74	0.63	0.26	0.40	0.43	0.01	0.17	0.37	1.00					
$lnY_{i,t}$	-0.45	-0.64	0.05	0.03	0.52	0.25	-0.05	-0.04	0.34	0.16	0.02	1.00				
$\Delta Educ_{i,t-3}$	0.10	0.09	0.08	0.09	-0.13	-0.03	0.05	0.03	-0.05	0.01	0.11	-0.09	1.00			
$Gov_{i,t}$	-0.25	-0.11	-0.14	-0.10	-0.17	-0.35	0.11	0.11	-0.13	-0.10	0.06	-0.34	0.03	1.00		
$Rights_{i,t}$	0.13	0.38	-0.16	-0.09	-0.18	-0.16	-0.12	0.01	-0.14	-0.13	-0.19	-0.28	-0.14	-0.06	1.00	
$Union_{i,t}$	-0.56	-0.44	-0.28	-0.21	0.01	-0.22	-0.10	0.03	0.01	-0.02	-0.12	0.41	0.02	0.33	-0.10	1.00

Table 11.4.8: Correlation Matrix: OECD Dataset

F. Robustness Checks

Table 11.5.1: Robustness Check – Hypotheses 1 and 2, Theil Index

	Dependent variable: $Theil_{i,t}$			
	Unbalanced		Balanced	
Variables	(I)	(II)	(III)	(IV)
$IFDI_{i,t-1}$	15.66***		40.91***	
	(5.337)		*(8.708)*	
$IFDI^2_{i,t-1}$	-8.755**		-20.62***	
	(3.871)		*(6.902)*	
$OFDI_{i,t-1}$		-20.04***		49.96***
		(4.216)		*(5.028)*
$OFDI^2_{i,t-1}$		16.76***		-29.62***
		(3.127)		*(3.249)*
$Trade_{i,t}$	0.010	-0.015	0.114***	0.086***
	(0.018)	*(0.017)*	*(0.024)*	*(0.019)*
$lnY_{i,t}$	-29.83	-60.76**	-1.305	-61.81
	(28.12)	*(27.85)*	*(5.477)*	*(47.58)*
$lnY^2_{i,t}$	0.681	2.264*	1.061	1.955
	(1.376)	*(1.343)*	*(2.252)*	*(2.276)*
$\Delta Educ_{i,t-3}$	-0.099	-0.062	-0.342***	-0.158***
	(0.069)	*(0.065)*	*(0.067)*	*(0.055)*
$Gov_{i,t}$	-1.061***	-1.149***	0.098	0.576***
	(0.141)	*(0.134)*	*(0.195)*	*(0.182)*
$Rights_{i,t}$	2.196*	2.948**	1.876	2.018
	(1.266)	*(1.346)*	*(1.280)*	*(1.261)*
$Union_{i,t}$	-0.033	-0.030	0.002	-0.057***
	(0.022)	*(0.023)*	*(0.020)*	*(0.017)*
$Constant$	278.5*	426.1***	176.5***	465.7*
	(143.1)	*(143.9)*	*(34.54)*	*(248.2)*
Country FE	NO	NO	NO	NO
Time FE	YES	YES	YES	YES
R^2	0.587	0.613	0.777	0.439
Observations	539	523	405	405
No. of countries	31	31	15	15
Sample	1981-2008	1981-2008	1981-2007	1981-2007

Notes: Table 11.5.1 shows the results of four regressions that examine the impact of inward and outward FDI on manufacturing wage inequality, using 2SLS. Columns (I)-(II) report the results for the unbalanced panel, whereas columns (III)-(IV) report the results for the balanced panel. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.2: Robustness Check – Hypothesis 3, Theil Index and Inward FDI

	Dependent variable: $Theil_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$IFDI_{i,t-1}$	-16.36**	-18.98*	13.40	-8.446	55.94
	(6.550)	*(10.03)*	*(44.86)*	*(12.75)*	*(107.8)*
$IFDI^2_{i,t-1}$	13.44**	5.973	-21.95	2.011	-239.9
	(5.276)	*(7.320)*	*(57.69)*	*(6.464)*	*(194.6)*
$Trade_{i,t}$	0.149***	0.128***	0.180***	0.043	-0.317
	(0.031)	*(0.033)*	*(0.067)*	*(0.022)*	*(0.206)*
$lnY_{i,t}$	549.5***	93.86	-32.94	-85.35**	102.5
	(206.8)	*(99.27)*	*(92.33)*	*(36.83)*	*(107.9)*
$lnY^2_{i,t}$	-29.13***	-6.318	-2.227	3.864**	-6.250
	(9.756)	*(4.942)*	*(5.095)*	*(1.690)*	*(6.769)*
$Educ_{i,t-3}$	-0.091	0.430	0.049	-0.065	-0.741***
	(0.161)	*(0.438)*	*(0.551)*	*(0.078)*	*(0.285)*
$Gov_{i,t}$	-1.069***	2.350***	-0.618*	-0.255***	-0.182
	(0.369)	*(0.410)*	*(0.375)*	*(0.070)*	*(0.727)*
$Rights_{i,t}$		-3.773*	0.046	-2.238***	9.426**
		(2.258)	*(1.521)*	*(0.490)*	*(4.093)*
$Union_{i,t}$	-0.053			-0.107***	
	(0.061)			*(0.040)*	
$Constant$	-2524.5**	-296.5	314.5	518.4***	-403.9
	(1101.3)	*(496.6)*	*(414.8)*	*(199.5)*	*(430.3)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.595	0.832	0.468	0.862	0.485
Observations	141	135	152	101	128
No. of countries	6	5	11	4	10
Sample	1981-2007	1981-2007	1990-2007	1981-2007	1981- 2008

Notes: Table 11.5.2 shows the results of five regressions that examine the impact of inward FDI on manufacturing wage inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.3: Robustness Check – Hypothesis 3, Theil Index and Outward FDI

	Dependent variable: $Theil_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$OFDI_{i,t-1}$	36.33***	63.55***	250.2**	-7.307	399.6
	(3.951)	*(13.08)*	*(114.0)*	*(5.658)*	*(670.3)*
$OFDI^2_{i,t-1}$	-22.18***	-97.83***	-1049.1***	8.419	-3398.5
	(2.835)	*(22.50)*	*(407.3)*	*(12.26)*	*(4307.7)*
$Trade_{i,t}$	0.150***	0.058***	0.132**	0.019	-0.871***
	(0.023)	*(0.019)*	*(0.054)*	*(0.021)*	*(0.207)*
$lnY_{i,t}$	959.9***	208.3**	3.432	-101.0***	351.1***
	(166.9)	*(83.54)*	*(9.513)*	*(35.74)*	*(129.9)*
$lnY^2_{i,t}$	-48.66***	-12.01***	-2.051	4.583***	-23.31***
	(7.813)	*(4.152)*	*(4.276)*	*(1.668)*	*(8.061)*
$Educ_{i,t-3}$	-0.039	0.296	-0.139	-0.036	-1.653***
	(0.136)	*(0.466)*	*(0.533)*	*(0.077)*	*(0.246)*
$Gov_{i,t}$	0.047	1.178***	-0.730**	-0.227***	0.458
	(0.353)	*(0.336)*	*(0.355)*	*(0.077)*	*(0.463)*
$Rights_{i,t}$		-4.159**	-1.273	-2.531***	11.86***
		(1.810)	*(1.430)*	*(0.492)*	*(3.303)*
$Union_{i,t}$	0.021			-0.103**	
	(0.054)			*(0.049)*	
$Constant$	-4686.8***	-850.4**	178.7	602.7***	-1172.7**
	(895.6)	*(419.3)*	*(345.5)*	*(189.3)*	*(512.3)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.763	0.846	0.511	0.863	0.608
Observations	141	124	153	101	106
No. of countries	6	5	11	4	10
Sample	1981-2007	1981-2007	1988-2007	1981-2007	1986- 2008

Notes: Table 11.5.3 shows the results of five regressions that examine the impact of outward FDI on manufacturing wage inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.4: Robustness Check – Hypotheses 4 and 5, Theil Index

	Dependent variable: $Theil_{i,t}$			
	Inward		Outward	
Variables	(I)	(II)	(III)	(IV)
$HFDI_{i,t-1}$	-5.324**		-8.091	
	(2.531)		*(7.141)*	
$HFDI^2_{i,t-1}$	8.460**		3.098	
	(3.319)		*(6.925)*	
$VFDI_{i,t-1}$		126.8*		112.3***
		(76.38)		*(42.73)*
$VFDI^2_{i,t-1}$		-548.7		-786.4***
		(478.6)		*(236.4)*
$Trade_{i,t}$	-0.013	-0.079***	-0.061***	-0.063***
	(0.025)	*(0.020)*	*(0.021)*	*(0.021)*
$lnY_{i,t}$	-115.8***	-16.36	-102.6**	-67.71
	(42.26)	*(43.36)*	*(48.01)*	*(47.15)*
$lnY^2_{i,t}$	4.779**	-0.049	4.202*	2.398
	(2.022)	*(2.092)*	*(2.262)*	*(2.254)*
$\Delta Educ_{i,t-3}$	0.279	0.548*	0.303	0.405
	(0.328)	*(0.320)*	*(0.307)*	*(0.319)*
$Gov_{i,t}$	-1.179***	-1.257***	-1.102***	-1.301***
	(0.191)	*(0.167)*	*(0.190)*	*(0.161)*
$Rights_{i,t}$	7.397**	7.288**	6.168*	5.618
	(3.373)	*(3.667)*	*(3.571)*	*(3.565)*
$Union_{i,t}$	-0.015	0.019	-0.017	-0.003
	(0.021)	*(0.023)*	*(0.023)*	*(0.023)*
$Constant$	714.3***	201.8	641.9**	488.6**
	(223.3)	*(226.5)*	*(256.4)*	*(248.3)*
Country FE	NO	NO	NO	NO
Time FE	YES	YES	YES	YES
R^2	0.687	0.622	0.659	0.627
Observations	279	302	281	299
No. of countries	22	22	22	22
Sample	1986-2008	1986-2008	1986-2008	1986-2008

Notes: Table 11.5.4 shows the results of four regressions that examine the impact of horizontal and vertical FDI on manufacturing wage inequality in OECD countries, using 2SLS. Columns (I)-(II) report inward FDI, whereas columns (III)-(IV) report outward FDI. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.5: Robustness Check – Hypotheses 1 and 2, FDI Flows

	Dependent variable: $Gini_{i,t}$			
	Unbalanced		Balanced	
Variables	(I)	(II)	(III)	(IV)
$IFDIflow_{i,t-1}$	-12.84		-8.508	
	(33.04)		*(10.53)*	
$IFDIflow^2_{i,t-1}$	128.1		54.00	
	(170.6)		*(36.88)*	
$OFDIflow_{i,t-1}$		-7.645		55.01**
		(16.01)		*(22.59)*
$OFDIflow^2_{i,t-1}$		120.1		-237.7**
		(75.61)		*(94.12)*
$Trade_{i,t}$	-0.032	-0.015***	0.009**	0.019***
	(0.034)	*(0.004)*	*(0.005)*	*(0.005)*
$lnY_{i,t}$	-14.12	-27.32***	-53.45***	-59.24***
	(24.02)	*(6.579)*	*(9.839)*	*(8.907)*
$lnY^2_{i,t}$	0.506	1.186***	2.317***	2.620***
	(1.226)	*(0.319)*	*(0.472)*	*(0.426)*
$\Delta Educ_{i,t-3}$	0.082	0.053	0.098	0.109
	(0.102)	*(0.071)*	*(0.084)*	*(0.080)*
$Gov_{i,t}$	-0.418***	-0.433***	-0.034	0.045
	(0.094)	*(0.037)*	*(0.046)*	*(0.063)*
$Rights_{i,t}$	-0.117	0.017	-1.069**	-1.313***
	(0.461)	*(0.419)*	*(0.539)*	*(0.496)*
$Union_{i,t}$	-0.031***	-0.037***	-0.046***	-0.059***
	(0.010)	*(0.007)*	*(0.004)*	*(0.008)*
$Constant$	137.1	199.6***	346.0	373.9***
	(114.6)	*(34.32)*	*(51.53)*	*(46.80)*
Country FE	NO	NO	NO	NO
Time FE	YES	YES	YES	YES
R^2	0.363	0.565	0.746	0.429
Observations	539	523	405	405
No. of countries	31	31	15	15
Sample	1981-2008	1981-2008	1981-2007	1981-2007

Notes: Table 11.5.5 shows the results of four regressions that examine the impact of inward and outward FDI flows on income inequality, using 2SLS. Columns (I)-(II) report the results for the unbalanced panel, whereas columns (III)-(IV) report the results for the balanced panel. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.6: Robustness Check – Hypothesis 3, Inward FDI Flows

	Dependent variable: $Gini_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$IFDIflow_{i,t-1}$	-21.96***	-21.95***	28.92	-44.65	-56.77
	(8.067)	*(5.951)*	*(37.19)*	*(31.92)*	*(62.66)*
$IFDIflow^2_{i,t-1}$	66.25***	65.25	-182.7	182.4	621.3
	(25.37)	*(59.12)*	*(128.8)*	*(152.9)*	*(465.4)*
$Trade_{i,t}$	0.015**	0.010	0.013	0.008	-0.086***
	(0.007)	*(0.015)*	*(0.012)*	*(0.020)*	*(0.023)*
$lnY_{i,t}$	472.7***	35.92***	79.81***	-84.29***	-27.24**
	(48.06)	*(9.662)*	*(20.90)*	*(32.42)*	*(12.21)*
$lnY^2_{i,t}$	-22.73***	-3.125***	-4.740***	3.900***	1.568**
	(2.248)	*(0.821)*	*(1.171)*	*(1.518)*	*(0.751)*
$Educ_{i,t-3}$	0.037	0.009	0.005	-0.003	-0.142***
	(0.042)	*(0.062)*	*(0.127)*	*(0.062)*	*(0.034)*
$Gov_{i,t}$	0.146*	-0.062	-0.121	-0.405***	-0.017
	(0.088)	*(0.153)*	*(0.078)*	*(0.078)*	*(0.080)*
$Rights_{i,t}$		-0.023	-0.109	-1.887***	0.566
		(0.266)	*(0.360)*	*(0.499)*	*(0.405)*
$Union_{i,t}$	0.014			-0.017	
	(0.014)			*(0.039)*	
$Constant$	-2423.8***	215.62**	-292.0***	498.6***	171.8***
	(258.2)	*(50.12)*	*(92.43)*	*(171.7)*	*(50.91)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.833	0.465	0.576	0.800	0.520
Observations	166	165	151	125	136
No. of countries	6	5	11	4	10
Sample	1975-2007	1975-2007	1991-2007	1975-2007	1974- 2008

Notes: Table 11.5.6 shows the results of five regressions that examine the impact of inward FDI flows on income inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.7: Robustness Check – Hypothesis 3, Outward FDI Flows

	Dependent variable: $Gini_{i,t}$				
	2SLS				
Variables	Core (North)	Periphery (South)	New EU Members	High Skills & Taxes	Transition
$OFDIflow_{i,t-1}$	-11.37	-305.9***	361.8**	-0.333	759.3
	(9.918)	*(114.5)*	*(172.0)*	*(25.69)*	*(705.6)*
$OFDIflow^2_{i,t-1}$	38.40	3691.3**	-4758.8**	33.29	-1595.3
	(36.21)	*(1738.2)*	*(2316.8)*	*(28.13)*	*(1325.4)*
$Trade_{i,t}$	0.019***	-0.001	-0.012	0.013	-0.177***
	(0.006)	*(0.008)*	*(0.015)*	*(0.020)*	*(0.042)*
$lnY_{i,t}$	476.6***	131.2**	79.33***	-101.4***	-18.03
	(45.46)	*(62.12)*	*(14.94)*	*(31.06)*	*(19.65)*
$lnY^2_{i,t}$	-22.89***	-6.754**	-4.748***	4.688***	0.853
	(2.135)	*(3.137)*	*(0.832)*	*(1.449)*	*(1.209)*
$Educ_{i,t-3}$	0.056	0.244**	-0.084	0.087	-0.112
	(0.039)	*(0.121)*	*(0.111)*	*(0.061)*	*(0.085)*
$Gov_{i,t}$	0.240***	-0.063	-0.104	-0.433***	-0.053
	(0.085)	*(0.210)*	*(0.078)*	*(0.082)*	*(0.097)*
$Rights_{i,t}$		0.558**	-0.311	-2.135***	0.895**
		(0.243)	*(0.340)*	*(0.517)*	*(0.354)*
$Union_{i,t}$	0.023*			0.004	
	(0.013)			*(0.045)*	
$Constant$	-2446.4***	-593.6**	-286.1***	589.1***	157.8*
	(243.1)	*(303.8)*	*(67.06)*	*(165.1)*	*(84.46)*
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES
R^2	0.846	0.332	0.610	0.733	0.400
Observations	166	139	151	125	104
No. of countries	6	5	11	4	10
Sample	1975-2007	1975-2007	1988-2007	1975-2007	1985- 2008

Notes: Table 11.5.7 shows the results of five regressions that examine the impact of outward FDI on income inequality in five different European subgroups, using 2SLS. The robust standard errors are given in parentheses. Variables in level-form that contain unit root are included in their first-differenced form. Significance: *** at 1% level, ** at 5% level, * at 10% level.

Table 11.5.8: Robustness Check – Hypotheses 4 and 5, FDI Flows

	Dependent variable: $Gini_{i,t}$			
	Inward		Outward	
Variables	(I)	(II)	(III)	(IV)
$HFDIflow_{i,t-1}$	-0.927		-7.237	
	(6.597)		*(7.382)*	
$HFDIflow^2_{i,t-1}$	0.967		4.340	
	(3.282)		*(3.496)*	
$VFDIflow_{i,t-1}$		-66.63		45.67
		(208.4)		*(34.78)*
$VFDIflow^2_{i,t-1}$		143.2		-60.54
		(413.1)		*(49.63)*
$Trade_{i,t}$	-0.019***	-0.025	-0.022***	-0.021**
	(0.005)	*(0.161)*	*(0.006)*	*(0.008)*
$lnY_{i,t}$	-42.93***	-18.26	-36.07***	-41.44***
	(10.88)	*(38.27)*	*(9.597)*	*(11.25)*
$lnY^2_{i,t}$	1.944***	0.713	1.628***	1.899***
	(0.525)	*(19.42)*	*(0.463)*	*(0.546)*
$\Delta Educ_{i,t-3}$	0.152*	0.189	0.089	0.182**
	(0.091)	*(1.022)*	*(0.092)*	*(0.088)*
$Gov_{i,t}$	-0.462***	-0.442	-0.327***	-0.400***
	(0.048)	*(0.769)*	*(0.048)*	*(0.054)*
$Rights_{i,t}$	0.294	0.844	-0.106	-0.036
	(0.762)	*(0.953)*	*(0.836)*	*(0.871)*
$Union_{i,t}$	-0.031***	-0.025	-0.040***	-0.039***
	(0.007)	*(0.131)*	*(0.006)*	*(0.006)*
$Constant$	277.0***	153.7	239.5***	265.1***
	(57.43)	*(186.6)*	*(50.58)*	*(58.22)*
Country FE	NO	NO	NO	NO
Time FE	YES	YES	YES	YES
R^2	0.609	0.423	0.595	0.550
Observations	342	379	330	347
No. of countries	22	22	22	22
Sample	1986-2008	1986-2008	1986-2008	1986-2008

Notes: Table 11.5.8 shows the results of four regressions that examine the impact of horizontal and vertical FDI flows on income inequality in OECD countries, using 2SLS. Columns (I)-(II) report inward FDI flows, whereas columns (III)-(IV) report outward FDI flows. The robust standard errors are given in parentheses. Significance: *** at 1% level, ** at 5% level, * at 10% level.

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