Disentangling the Source of Inward FDI Flows and Its Effects on Inequality: A Panel of OECD Countries

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Abstract

This paper is the first that disentangles the source of FDI flows based on economic development and its effects on income inequality in 23 OECD countries for the period 1985-2007. The main findings are that FDI originating from other OECD countries show a significant non-linear relationship with inequality. That is deteriorating the income distribution in the short run while this effect diminishes over time. No such statistical evidence has been found to conclude that FDI from emerging markets has an effect on inequality. In addition, trade liberalization and skill biased technological change seem to be profound predictors of an increasing wage gap.

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Preface

People always told me that writing a master's thesis is the way to apply the academic knowledge which I learnt at the university. I want to underline this since at the very start of this project the finish line seemed endlessly far away. Now, ten months later, the master's thesis is finished which did not go without the necessary obstacles. Although sometimes it was hard to stay motivated, people in my surroundings helped me when I needed it. I want to use this preface to give those people a word of thanks. First of all, I want to thank my parents, Martin and Marijke van Heteren, who continuously have supported me in all decisions I have made during my years at university. Second, I want to thank my girlfriend Amanda Weijts, who has been very patient awaiting my graduation and gave me the space to enjoy my student life. Third, I want to thank a fellow student and friend Jesper Riske with whom I studied a lot and who found a way to create a working environment that certainly accelerated the writing process. Last but not least, I want to give special thanks to my supervisor Prof. Dr. Julian Emami Namini, who continuously gave me good advise whenever I asked for it and helped me to boost the quality of this master's thesis.

Content

Section I Introduction

Emerging market multinational enterprises (EM MNEs) are increasingly active at the international stage. In 2003, FDI outflows of developing countries accounted for a mere 6 percent of the world's total, with a total value of 36 billion US dollar (UNCTAD, 2004). When UNCTAD (2006) gave for the first time much attention to this new wave of FDI outflows, outflows from emerging economies accounted for 133 billion US dollars in 2005, which was 17 percent of the world's total. In 2013, outward direct foreign investment by developing countries reached 426 billion US dollars, which accounts for a record high 31 percent of the world total (UNCTAD, 2013)[1]. Much importance has been given to the increasing cross-border mergers and acquisitions (M&As) especially led by developing Asia. Cross border M&As by EM MNEs had a value of 90 billion US dollars in 2005, which accounts for 13 percent of the world's total. In comparison, this number was only 4 percent in 1987 (UNCTAD, 2006). Also, the number of Greenfield projects rose from 800 in 2002 to more than 1600 in 2003. In 2005 the number of Greenfield projects accounted for 15 percent of the total projects (UNCTAD, 2006)[2].

Even more impressive is that EM MNEs increasingly invest in developed countries, so called south-north FDI flows. Ramamurti and Singh (2009) note that between 1984 and 2004 the share of outward FDI from developing countries to developed host countries was on average 20 percent, with the highest share reported for the year 2000 in which this number has been 35 percent. An example of noteworthy acquisitions were Chinese computer technology company Lenovo's acquisition of IBM's personal computer business in 2005, India's Tata Motors acquiring Jaguar Landrover in 2008, Russian Lukoil's acquisition of Getty Oil in 2000, and the takeover of Anglo-Dutch Corus Steel by India's Tata Steel (Ramamurti & Singh, 2009). According to The Economist (2011), China is by far leading the ranking with respect to cross-border M&A deals between 2000 and 2010 with the USA being the most popular host country (Appendix 1). This new wave of FDI is creating concerns especially among European and American policy makers. These concerns are typically in the context of geopolitics. A very recent profound example is the Dutch Minister of Economic Affairs, Henk Kamp, who is aiming to have a bill accepted that the Ministry of Economic Affairs can reject a hostile takeover of KPN, a Dutch public listed telecom company, in order to avoid that the

[1] These numbers are on the basis of the UNCTAD classification of developing countries.
[2] Information on the value in US dollars is not provided by UNCTAD

essential communication infrastructure falls into the wrong hands (RTL Z, 2014). Since 27 out of 30 Chinese largest foreign investors are state owned enterprises (SOEs) (Morck, et al., 2008), it is not surprising that the motivations of in particular FDI coming from this direction is questioned. It is not unthinkable that these SOEs are means for the Chinese government to increase its international political power.

Another raised doubt, on which this thesis mainly builds, are the employment implications of emerging market FDI adequately captured by the following quote:

…"History also instructs us that Chinese promises to keep jobs in America after acquiring a key piece of our industrial base are empty. A case in point is the acquisition of Texas helicopter maker Brantly International by Weifang Tianxiang Aviation Technology in 2009. All helicopter manufacturing was promptly moved from Coppell, Texas to Qingdao, China." (Navarro & Autry, 2012)[3].

This quote essentially contains the message that EM MNEs, in this example from China, are able to relocate labor intensive activities at home where real wages are lower after acquiring developed country target firms. Through this channel low skilled labor in developed countries can be substituted for low skilled labor in developing countries. In such a way the demand for low skilled labor in developed countries diminishes which will have a negative effect on the relative wages of this group and consequently rising income inequality. Inequality is an important issue since people's well being is mainly affected by relative wages instead of absolute wages (Clark & Oswald, 1996). Inequality also has negative effects on society as a whole. It is found for example that inequality is a strong determinant of firearm homicides (Kennedy, et al., 1998). In fact it is true that for by far the majority of OECD countries within country income inequality increased over the period 1985-2007 (Appendix 2)[4].

It is known that FDI contributes to the growth of economic prosperity (Borensztein, et al., 1998), but the gains are not necessarily equally divided (Figini & Gorg, 2011). The relationship between inequality and FDI is mainly based on a sample of developing countries. Basu and Guariglia (2007) find for example that FDI increases income inequality particularly if the poor are unable to access the benefits of the new technologies MNEs bring. In studying

[3] Peter Navarro is Professor of Economics and Public Policy at the Paul Merage School of Business, University of California. Greg Autry is Adjunct Professor of Entrepreneurship with the Lloyd Greif Center for Entrepreneurial Studies at the Marshall School of Business at the University of Southern California.

[4] Appendix 2 shows the absolute change in the Gini and Theil coefficients for all countries in the sample. In *Section III: Data and Methodology* the sample and measures of income inequality are discussed in detail.

the link between FDI and income inequality there are only two studies known that use a panel of developed countries which are Figini and Gorg (2011) and Herzer and Nunnenkamp (2013). Both papers find a long-term negative effect of FDI on income inequality. However, these papers study the effect of aggregate FDI flows, while different sources of FDI might have different impacts on incomes. Filling this gap will be the main contribution of this thesis. Therefore, I will try to disentangle the possible different effects of FDI coming from other developed countries and FDI coming from developing countries empirically.

In section II I discuss all possible channels through which globalization and FDI in more detail might affect income inequality and try to link these channels to FDI coming from developing countries as no literature has investigated this issue. Section III discusses the methodology and gives an overview of the data used. In section IV the results are presented and section V summarizes the conclusions.

Section II Literature Review

IIa: Vertical FDI and relative abundant factors of production

IIa.1 International Trade and the Stolper-Samuelson Theorem

The Heckscher-Ohlin (H-O) theorem of international trade states that - within a framework of two countries, two goods, and two factors of production (capital and labor) - *each country will export goods that uses its abundant factor intensively, and will import the goods which uses its scarce factor intensively* (van Marrewijk, 2007). The underlying assumption is that countries are similar except for their relative factor endowments. The main reasoning is that in a scenario of autarky the price of the capital intensive good in the capital scarce country is relatively higher with respect to the price of the same capital intensive good in the capital abundant country. The same reasoning applies to the labor intensive good. Hence, when impediments to trade are removed (such as tariffs), producers of the capital intensive good will start exporting to benefit from the higher price level in the capital scarce country. Consequently producers of the labor intensive good in the labor abundant country will start exporting to the labor scarce country to benefit from higher prices for labor intensive goods in the labor scarce country. Because of this profit maximizing behavior by firms, the supply of capital (labor) intensive goods in the capital (labor) abundant country diminishes, since it is partially exported to the capital (labor) scarce country. The smaller supply of capital (labor)

intensive goods in the capital (labor) abundant country has an upward pressure on capital (labor) intensive goods prices in that country and a downward pressure in the capital (labor) scarce country. Hence, trade liberalization leads to an increase in the price of the export good and conversely, in a fall in the price of the import good.

The well known Stolper-Samuelson theorem extended the H-O model by investigating the effect of trade on the real returns to the factors of production via the changes in relative good prices. It is noted that *"an increase in the relative price of a good will lead to a rise in the return to the factor which is used most intensively in the production of that good, and conversely, to a fall in the return to the other factor"* (Stolper & Samuelson, 1941). The straightforward explanation is that the price of a good is determined by its factor costs. If the price of a good increases that uses relatively more labor than capital in its production process, it can be assumed that the demand for labor increases, and therefore wages rise. Since the other good's price should stay the same or decline (in the case when it is an imported good) the rise in wages should be compensated by a fall in rents.

Leontief (1953) is the first author who investigated the H-O theorem for American industries empirically. He found for the year 1947 that the US exported more labor intensive goods than it imported, and conversely imported more capital intensive goods than it exported. This finding is in contrast with the H-O theorem and is known as the Leontief Paradox. Leontief himself added that his finding can be seen as evidence that US labor is more productive than in the rest of the world and hence that the US has a superior labor comparative advantage. Others have investigated the Leontief paradox and have had overlapping conclusions that instead of looking at capital and labor as factor inputs, one could divide the factors of production in skilled and unskilled labor. It has been found that when doing so, trade patterns are roughly still consistent with H-O predictions (Kreinin, 1965; Keesing, 1965; Baldwin, 1971). This means that the US exports more skilled labor intensive goods than it imports, while it imports more unskilled labor intensive goods than it exports.

When skilled labor and unskilled labor are the two production factors, the Stolper-Samuelson theorem predicts that increased trade with more developed countries decreases income inequality within a developing country (which is in general more unskilled labor abundant), because wages of unskilled labor rise. Contrary, trade liberalization harms unskilled labor in developed countries and therefore increases income inequality within these countries. Indeed, for the US, which is the most studied country in this context, it has been found that increased

import competition has contributed to relative more unemployed unskilled workers and a fall in their relative wages during the 1980s (Murphy & Welch, 1991; Revenga, 1992; Borjas, et al., 1992).

More recent literature put the magnitude of the effect of trade competition on falling relative wages for unskilled labor to question and gave more attention to skill biased technological change (SBTC). I will elaborate on this topic in subsection *IIb*. Others put more emphasis on factor mobility as the cause of diverging wages in favor of skilled workers, because the Heckscher-Ohlin-Samuelson (H-O-S) model does not only predict a tendency towards factor price equalization (FPE) through trade, but also through inter-country mobility of factors (Samuelson, 1948). Next, I will describe how north-south FDI fits in the framework of the H-O-S model as does south-north FDI with the emphasis on relative abundant factors of production. In subsection *IIb* I will shift the attention from production factors to models that relax the assumptions of constant returns to scale and perfectly competitive markets.

IIa.2 North-south FDI

FDI is equity capital that moves across boundaries and can thus be seen as a form of factor mobility (Caves, 1971). North-south FDI generally is motivated by aiming at cost reductions. Firms from more developed countries in the north offshore production activities that require relatively unskilled labor to developing countries in the south where real wages are lower (Feenstra & Hanson, 1996; Feenstra & Hanson, 1997; Venables, 1999). This is also known as vertical FDI. Feenstra and Hanson (1996,1997) found that the offshoring of production activities from US firms to Mexican maquiladora's increased the relative wage gap between production and non-production workers in both countries. The authors emphasized that production activities that are relatively unskilled to US firms, are relatively skilled to Mexican standards. Thus, there is a within industry shift towards the demand for relative skilled labor in both the US and Mexico. Venables (1999) derived theoretically that when trade costs are low enough, it would become beneficiary for firms to offshore the production of the intermediate good to low wage countries[5]. Consequently importing the intermediate good from the low wage country to the home country where final assembly takes place (intra-firm trade). In line with Feenstra and Hanson (1996,1997), Venables (1999) argues that this process

[5] Assuming that the intermediate good Y is less capital (skilled labor) intensive than the downstream product Z produced at final assembly in the home country. It is also assumed that there is another good X which is produced both at the foreign (labor abundant) country and the home (capital abundant/ skilled labor abundant) country. This good is freely tradable, but more labor intensive than the intermediate good Y in the foreign country and more capital intensive than the intermediate good Y in the home country.

might shift demand within industries towards more capital (skilled labor) and increases its factor price in both countries.

Does this mean that outward FDI by developed countries always hurts the relative unskilled and less paid workers within the developed country as predicted by above authors? Indeed, theory about outward FDI from developed countries and its distributional effects are rather ambiguous (Herzer & Nunnenkamp, 2013). Herzer and Nunnenkamp (2013) point out in their own literature review that some scholars argue that outward FDI does not necessarily need to hurt the unskilled. They distinguish the country, industry, and firm level. I will summarize their literature review by referring to the same authors and, if necessary, add some references for the reader's understanding.

Actually, there is convergence between the core and periphery of the world in terms of average GDP per capita. Even when all countries in the world experience rising within country income inequality, there can still be income convergence between more and less developed countries (Sala-i-Martin, 2002). FDI can be seen as a "vehicle of technology" and plays an important role in the catching-up process (Borensztein, et al., 1998). At the industry level it is noted that if firms tend to offshore labor intensive production activities, it may well be that the relative amount of employment of unskilled workers in the capital intensive part of the industry surpasses its previous level (Jones & Kierzkowski, 2001). With these circumstances, unskilled worker's real wages might rise. Also for the US there has no evidence been found that MNE transfers (excluding arm's-length transactions) between 1977 and 1994 raised the skilled-unskilled wage gap within US industries (Slaughter, 2000)[6]. At the firm level the fragmentation of labor intensive production activities might lead to increased competitiveness if the offshoring firm can increase its productivity. Then, it would be likewise that the firm can expand its domestic activities, generating more jobs in the process (Arndt, 1997; Marin, 2004). In a similar fashion a firm might raise its market share through vertical FDI, because it is a cost reduction strategy and therefore is expected to give the firm a cost competitive advantage. The parent firm might keep activities at home that are complementary to foreign operations (Becker, et al., 2005). Herzer and Nunnenkamp (2013) however did not report that Becker et al. (2005) also found that: *"a one percent larger wage gap between Germany and locations in Central and Eastern Europe (CEE) is associated with 760 fewer*

[6] The main difference between Feenstra and Hanson (1996,1997) and Slaughter (2000) is that Slaughter considers only within-firm activity, while Feenstra and Hanson include both within firm activity and arm's-length transactions.

jobs at German parents and 4,620 more jobs at affiliates in CEE. A one percent larger wage gap between Sweden and CEE is associated with 140 fewer jobs at Swedish parents and 260 more jobs at affiliates in CEE". This is in line with standard cost reduction vertical FDI theory. Nonetheless, it must be said that German parents have most affiliates in relative skilled labor abundant countries (Becker, et al., 2005). Thus, it could be the case that relative more skilled labor in Germany is substituted for foreign labor that consists of similar skills, but having lower real wages. In that case outward FDI might harm the skilled in domestic industries in terms of relative employment and real wages.

The above-mentioned literature is mainly concentrated on the offshoring of production activities and demand shifts within manufacturing industries. Although the offshoring of services is much more evident nowadays. *"The share of job loss accounted for by workers displaced from information, financial services, and professional and business services nearly tripled, from 15 percent during the 1979-82 recession to 43 percent over the 2001-2003 period"* (Jensen, et al., 2005). Using micro-level data of individual firms and households it is found for Germany and the United Kingdom that offshoring of service related jobs has a small albeit significant effect in diverging wages between skilled and unskilled workers within the same industry (Geishecker & Gorg, 2008; Geishecker & Gorg, 2013). More remarkable is that when allowed for cross-industry labor mobility the wage effect towards the more skilled is much more pronounced in Germany (Baumgarten, et al., 2013). As an example the authors use the offshoring of an electrical engineer's tasks in the automobile sector which might also affect engineers in the machinery industry, because engineers may move between automobiles and machinery.

Empirical testing on the consequences of outward FDI[7] in a panel setting of eight European countries shows a positive effect on income inequality in the short run whereas in the long run a negative effect is found (Herzer & Nunnenkamp, 2013). The authors however comment that European countries tend to invest largely in similar advanced host countries. So far I can summarize that offshoring by western MNEs is found by most scholars to diverge wages in favor of skilled workers in the home country if the home and host country are different enough with respect to their relative factor endowments.

[7] The advantage of outward FDI is that it includes both the manufacturing and the services sector, so conclusions on the effect of offshoring on the relative skilled-unskilled wage ratio can be more generalized.

A very tempting question remains: "Why giving so much attention to north-south FDI flows if we are interested in the reverse south-north (or developing to developed country) FDI flows?" The H-O-S model can also explain this direction of FDI flows, since lower real wages in developing countries, which are relatively more unskilled labor abundant, give rise to a cost competitive advantage for EM MNEs that can be exploited internationally (Andreff & Balcet, 2013). Most studies on EM MNEs have focused on the asset seeking behavior of EM MNEs (Luo & Tung, 2007; Rui & Yip, 2008; Ramamurti & Singh, 2009). Many EM MNEs engage in cross-border mergers and acquisitions to acquire more advanced technologies and managerial know-how. Notwithstanding that EM MNE FDI is mostly of the asset seeking type rather than exploiting firm specific advantages[8], Andreff and Balcet (2013) justly addressed that EM MNEs have a home country cost advantage for labor which they can exploit to become global competitive players. Since multinationals may fragment business activities in different countries according to their strategic needs (Dunning, 1988), it is not unthinkable that EM MNEs, after having acquired a target firm in a developed country, relocate certain labor intensive activities to their home country where real wages are lower (Chari, et al., 2012). In theory, relative factor prices can explain south-north FDI. In *subsection IId* I will describe the subject in more detail.

IIb: Horizontal FDI and skill biased technological change

IIb.1 Skill biased technological change

Another stream of literature focuses on the bias of increasing real wages towards skilled workers because of technological innovations. For example in the US it has been found that R&D and computer technology investments increased the relative demand for non-production (skilled) workers and their relative wages within manufacturing industries during the 1980s (Berman, et al., 1994; Acemoglu, 1998). This effect is generated because most innovations require workers that are skilled enough to use these innovations. Some innovations, such as computers, serve a general purpose for the whole economy rather than a specific sector. These innovations are called 'general purpose technologies' (Aghion & Howitt, 2002). The authors argue that just after the introduction of a new technology, that can be used in more sectors of the economy, at first only some well educated workers are able to implement this technology in daily business. In the short run therefore the wage premium for skilled workers increases.

[8] See Dunning (1979) and Rugman (1980) for a detailed description of the OLI paradigm and how western MNEs are known for their ownership advantages. Also see Blonigen (1997) who showed that Japanese investments were mainly driven by acquiring firm specific assets.

Since the technology serves a general purpose the transferability of skills is large. The extent to which the skill premium is reduced in the long run depends on the evolution of the supply of skills. More specifically, it depends on individual worker's cost-benefit analyses of adapting to the new technologies; whether the benefits of future higher real wages outweigh the extra costs (such as educational costs) of adapting. In subsection IIb.2 I describe how globalization and FDI in particular could lead to skill biased technological change.

IIb.2 Horizontal FDI and technology spillovers

Intra-industry trade could not be explained by H-O theory of comparative advantage, but is rather the consequence of market imperfections and product differentiation (Helpman & Krugman, 1985). It is known that the majority of trade takes place among industrialized countries. This type of trade is not the consequence of a difference in relative abundant factors but the result of market seeking behavior. Firms invest in their brand awareness and product quality (through R&D) to penetrate foreign markets and increase their global market share. Another way of penetrating foreign markets is the establishment of subsidiaries by firms in the form of horizontal FDI. This kind of FDI is mainly undertaken by firms that possess certain ownership advantages such as brand awareness, R&D capacity, monopoly power, managerial and organizational skills, and human capital abundance that make it attractive to exploit these advantageous internationally (Dunning, 1979). Multi-plant operations become increasingly interesting when firms have a technical efficiency advantage over individual national firms (Markusen, 1984). MNEs invest in R&D to upgrade their product quality and are able to duplicate the knowledge in the production of the same product geographically separated from the home country without additional input costs, called multi-plant economies of scale.

Having discussed that horizontal FDI is to large extent attributable to MNEs having a technological advantage over domestic firms, it is straightforward that FDI and SBTC are linked. MNEs are known to be able to entail new technologies in host countries and disperse these technologies to domestic firms (Caves, 1974; Findlay, 1978; Das, 1987; Blomstrom & Wang, 1992; Smarzynska Javorcik, 2004; Haskel, et al., 2007). In fact, for Ireland it is found that within manufacturing industries the presence of multinational enterprises increased the wage gap between white collar (industrial workers) and blue collar (administrative and technical staff) workers due to the introduction of new technologies that increased the demand for the blue collar (skilled) workers (Figini & Gorg, 1999). The MNE in this framework is a

"role model" for the incumbent firms and uses a more advanced technology in the production process that increases the demand for skilled labor on impact. When domestic firms replace old technologies by the more advanced technologies of the MNE (e.g. by imitating), eventually all firms in the sector demand skilled labor, and hence the demand for unskilled labor reduces towards zero[9]. Thus, in the short run income inequality increases, while this deteriorating effect diminishes over time. In a panel of developed and developing countries the same theory by the same authors is applied when testing for the causation of inward FDI on wage inequality and they find for developed countries wage convergence as a result of inward FDI and for developing countries a non-linear effect as in the case with Ireland (Figini & Gorg, 2011). The authors point out that the negative effect for developed countries is plausibly obtained because developed countries' firms already produce at the technological frontier and more inward FDI and associated *'technologies become more widespread and easier to use so that more workers are able to reap the benefits in terms of increased wage premium'*.

The findings of Figini and Gorg (2011) are in line with Markusen and Venables (1997) who state that branch plant operations are less skilled intensive than headquarter (HQ) services and supplied empirical evidence by Carr et al. (1998) who confirmed this. Idem, Blonigen and Slaughter (2001) found that in particular Japanese Greenfield investments in the US tend to reduce the skilled-unskilled wage ratio, while no such significant effect has been found for other modes of FDI such as acquisitions. Also, Chintrakarn et al. (2012) found for 48 US states a significant long term negative relationship between inward FDI and wage inequality which they blame to foreign plants operating in less skilled intensive activities. Nevertheless, much heterogeneity among states is detected. Finally, in a similar fashion Herzer and Nunnenkamp (2013) show that there is a non-linear effect of inward FDI on income inequality and wage inequality in Europe. That is, inward FDI has a positive effect on income inequality in the short run, but the long run effect appears to be negative. However, for Spain a different pattern is found, here income/wage inequality is increased both in the short and in the long run. The authors substantiate this indicating that Spain is the poorest country in the sample in terms of GDP per capita, so even among developed countries the level of development might be a reason for finding different impacts.

On the contrary to above findings, Taylor and Driffield (2005) report a significant positive relationship between inward FDI and rising income inequality for the period 1983-1992

[9] See Aghion and Howitt (1998) for a comprehensive model of social learning and wage inequality.

within the UK manufacturing sector using data of 101 industries. They blame this effect to technology spillovers generated by multinationals and consequently a bias towards an increased demand for skilled labor. However, these authors have not tested for non-linearity to test the adaptability hypothesis as described above. In a comparable manner, Lee (2006) found that inward FDI in 14 European countries resulted in deteriorating income distributions over the period 1951-1992. A comment however needs to be made, namely that this finding is based on only 80 observations and as with Taylor and Driffield (2005), no efforts were made to investigate non-linear or long term effects.

The distributional consequences as a result of increasing inward FDI in developed countries seem to be in favor of unskilled/ less paid workers. A demand shift towards skilled labor is at best obtained in the short run. However, heterogeneity exists and even in a sample of developed countries one needs to take into account the different levels of development.

IIc: Heterogeneous workers, learning, and firms

Malchow-Moller et al. (2013) distinguish three channels through which foreign firms might increase real wages in favor of skilled labor (known as the wage premium). The first is that of heterogeneous workers (HW). This theory implies that workers in the host country are demanded for their ex ante skills[10]. MNEs tend to choose to invest in more advanced technologies and workers are needed that are able to cope with these technologies. This is the SBTC theory already explained. The second theory popping up is that of heterogeneous learning (HL). In the HL theory workers exogenously learn on the job (being employed by the multinational means the worker automatically learns from the more advanced technology used by this firm) which implies that these workers obtain ex post skills. The authors assume that in the first period workers are paid lower real wages (at the competitive labor market level), while in the second period the firm pays its workers higher real wages in order to prevent workers from switching jobs and transferring their knowledge to competitors[11]. If workers do move from a foreign to a domestic firm this might trigger the catching-up process

[10] With ex ante skills it is meant that workers possess some qualifications/skills before they enter the firm. On the contrary, with ex post skills it is meant that workers learn new skills during their stay at the firm and thus obtain the skills after working for a certain period at the firm.

[11] The effect of preventing workers from switching jobs by paying them higher real wages is from the oligopoly model with multinational firms introduced by Glass and Saggi (2002), but whereas these authors assume that the multinational pays a wage premium directly, Malchow-Moller et al. (2013) assume that it takes a period before the workers learn the superior technology of the firm and hence it takes a period before the firm needs to pay the wage premium. They note that this is in line with the models of Ethier and Markusen (1996) and Markusen (2001) who also assume that it takes a period before a worker catches up with the technology.

and the non-linear effect of inward FDI on the skilled-unskilled wage ratio as reviewed extensively in previous subsection *IIb*. The third and final theory highlighted is that of heterogeneous firms (HF). The wage premium can be the result of firm specific characteristics. MNEs tend to have higher labor demand elasticities than do purely domestic firms, because of the threat that multinational firms can shut down their plant operations (Fabbri, et al., 2003). A wage premium can be paid to workers at the multinational firm to compensate for the higher volatility in labor demand (Malchow-Moller, et al., 2013)[12]. Another reason is that workers can have preferences for domestic firms and foreign firms need to lure workers by offering higher real wages (Lipsey, 2004). Finally, in an imperfect labor market setting, Budd et al. (2005) found that international rent sharing in multinational European firms could explain approximately 20 percent higher real wages in foreign affiliates and increasing if the parent company owns a higher percentage of the stocks in the affiliate. *"If supervision is more expensive in foreign firms because of cultural differences or size, these firms could rely more extensively on efficiency wages to avoid shirking or to induce optimal effort"* (Malchow-Moller, et al., 2013). This paper concludes that all three channels have the implication that foreign firms pay higher real wages.

The work of Conyon et al. (2002) shows evidence that wages in UK firms have risen in the period 1989-1994 with about 3,4 percent due to foreign ownership. The authors argue that differences in labor productivity (about 13 percent) can be seen as the main cause of wage differentials between foreign owned and domestic firms. This finding is additional evidence that foreign firms are either able to hire more skilled labor (HW theory) or to prevent them from leaving after they improved their skills by learning on the job (HL theory).

IId: Emerging market FDI

IId.1 Employment implications and expected wage changes

Milelli et al. (2010) investigate outward FDI by Chinese and Indian firms towards European host countries and note that most of these investments are targeted towards large European countries (UK, Germany and France) and the bulk of investments is market oriented. The authors point out that there are no recorded negative effects on employment because of this type of FDI. Most firms from Chinese or Indian origin even add jobs, Chinese telecom company Huawei Technologies have employed 2,000 workers in their European subsidiaries

[12] See also Bernard and Sjoholm (2003) who found for the period 1975-1989 that foreign owned plants in the Indonesian manufacturing sector are 20 percent more likely to shut down than purely domestic firms and note that this might be the reason why foreign owned plants pay higher real wages.

and maritime company COSCO having 800. Additional, these companies invest increasingly in R&D centres in Europe contributing to the creation of skilled jobs. In Germany, Chinese and Indian firms are known to buy especially SMEs that otherwise would go bankrupt mainly in mechanics and metal products industries thereby preserving jobs. They finalize by making a small note that possible future M&A deals could harm European workers, since then the chance of shutting down operations increases when pivotal assets are acquired. Hanemann and Rosen (2012) report that 428 Greenfield projects by Chinese firms in Europe between 2000 and 2011 can account for approximately the creation of 15,000 jobs. M&A deals, where a Chinese company bought the majority stake, are estimated to have created an additional 30,000 jobs. A profound example is Geely's 2010 acquisition of Volvo. This not only saved 16,000 jobs but also led to a 11 billion US dollar investment program in Sweden and the rest of Europe to create jobs. As Milelli et al. (2010), these authors add that many jobs have been saved by buying struggling small companies.

In line with above literature it is found for the 1995-2007 period that the 50 largest EM MNEs increased their foreign employment by 247 percent (Gammeltoft, et al., 2010). However, where EM MNEs are able to attract talented graduates from universities, they suffer from their *"liability of foreignness"* and are far less popular as potential employers for high skilled professionals in Europe and the US (Alkire, 2014). The author distinguishes various issues. A very important one here is that EM MNEs tend to pursue a very centralized decision making process in their subsidiaries which implies that there is little room for highly talented managers to run these subsidiaries. Many find it important that their work represents their identity, EM MNEs in this respect lack brand recognition and are also distrusted when it comes to corporate responsibility. The result could be that EM MNEs are forced to pay a wage premium to attract high skilled professionals just because of their *"liability of foreignness"*.

Bertrand (2009) found at the firm level for France that cross-border acquisitions have the effect of significantly increasing R&D investments and parent firms do not relocate these activities to their home country. He adds that this effect is very likely to occur if the buyer seeks intangible assets such as managerial and technological know-how and to exploit these the parent firm can use the knowledge of the local workforce. Since EM MNEs are known for their asset seeking behavior, it is likely that many of these firms behave in this way. For example, Duysters et al. (2009) give an overview of the internationalization process of

China's Haier Group. Haier, a company producing various household appliances[13], is a company that increased its operations in developed countries (especially in the US) by entering into joint ventures during the 1980s and 1990s to capture more advanced technologies[14] both establishing production facilities as R&D centres abroad. Haier felt it to be more important to produce near its selling market than taking advantage of its home cost competitive advantage. Also, the difficulty of importing large sized products from China and accompanying high transport costs played a major role in this decision making by Haier's management.

Above findings suggest that it is clear that EM MNEs create jobs in developed host countries. On the contrary, Chen (2011) and Chari et al. (2012) report that public traded US target firms experience a significant decrease in employment and sales after a foreign takeover by a developing country firm. They also find that profits are boosted. Chen (2011) states that this finding is inconsistent with foreign takeovers by industrialized country MNEs which boosts not only profits, but also employment and sales. The authors hypothesize that their findings are evidence that EM MNEs downsize less profitable divisions of the target and restructure it in such a way that they can exploit home country lower wages and in-source manufacturing jobs. The consequence would be that mainly production workers lose their jobs following the acquisition. Production workers are traditionally the worse paid, suggesting that FDI from emerging markets hurts those already at the bottom of the income distribution.

IId.2 Is there any conclusive evidence?

Emerging market FDI is subject to very specific examples of countries (mainly China and to lesser extent India) and firms (Amighini, et al., 2010). Additionally, the modest literature on employment implications (*subsection IId.1*) is not even conclusive whether EM MNEs in developed countries create jobs or not. Nevertheless, where jobs are created they tend to favor the more skilled/ better paid workers. From above literature one can distinguish various channels through which inward FDI from EM MNEs in developed countries favor skilled labor more than unskilled labor, or may even hurt the unskilled:

1. When EM MNEs create jobs, it is mainly because of an increase in R&D activity for which skilled labor is demanded rather than creating low skilled jobs.

[13] Refrigerators, washing machines, freezers, air conditioners e.g. (see Duysters et al. (2009, table 1 page 331) for the historical diversification process of Haier's products)
[14] In 1984 Haier formed an alliance with Germany's Liebherr company and captured its -18 degrees Celcius four star refrigerator technology.

2. EM MNEs are able to relocate less skilled production activities to their home countries where they experience a home country competitive advantage of lower real wages.
3. EM MNEs are multinational firms and might need to pay a wage premium to attract workers in line with HF theory. In general, multinational firms want to attract skilled labor which means it is this group benefiting from the premium.

How is this different from multinationals originating from developed home countries? The crucial difference is that developed country MNEs are known to be able to entail new technologies which is found to bring spillovers. Especially in developed countries that produce at the technological frontier this implies that technologies become more widespread (Figini & Gorg, 2011). Emerging market FDI is mostly motivated by acquiring intangible assets such as technical expertise and can in this sense not bring the same spillover effects as developed country MNEs (Mathews, 2002; Luo & Tung, 2007; Deng, 2007; Rui & Yip, 2008; Deng, 2009; Ramamurti & Singh, 2009). In addition, EM MNEs tend to rigorously reorganize target firms by efficiency seeking motives leading to less employment following the acquisition (Chen, 2011; Chari, et al., 2012).

From Figure 1 can be read that it is noteworthy when the source of FDI coming to the OECD countries (Appendix 2 lists the countries included with their respective Gini and Theil coefficients) will be separated in FDI originating from OECD and non-OECD countries, they show opposite correlations with income inequality. This is true for both measures of income inequality, the Gini and the Theil coefficient[15]. The vertical axes represent the natural logarithms of the inequality measures, the Gini and Theil coefficients (LNGINI and LNTHEIL). The horizontal axes show the natural logarithms of the inward FDI stock coming from OECD countries (LNIFDIOECD) and non-OECD countries (LNIFDIWORLD) respectively. It can be seen as indicative evidence that aggregate FDI data cannot account for the opposite effects that EM MNEs and developed country MNEs might have on incomes. It seems that in line with my hypothesis, although developed country MNEs have a negative effect on income/wage inequality, EM MNEs tend to widen the income/wage gap[16]. Of course, it is necessary to test the relationships more formally using econometric methods.

[15] See *Section III Data and Methodology* for more information on the data and variables used.
[16] Iceland seems to be a negative outlier considering inward FDI coming from non-OECD countries. In the econometric specification robustness of the results will be checked by excluding Iceland from the sample.

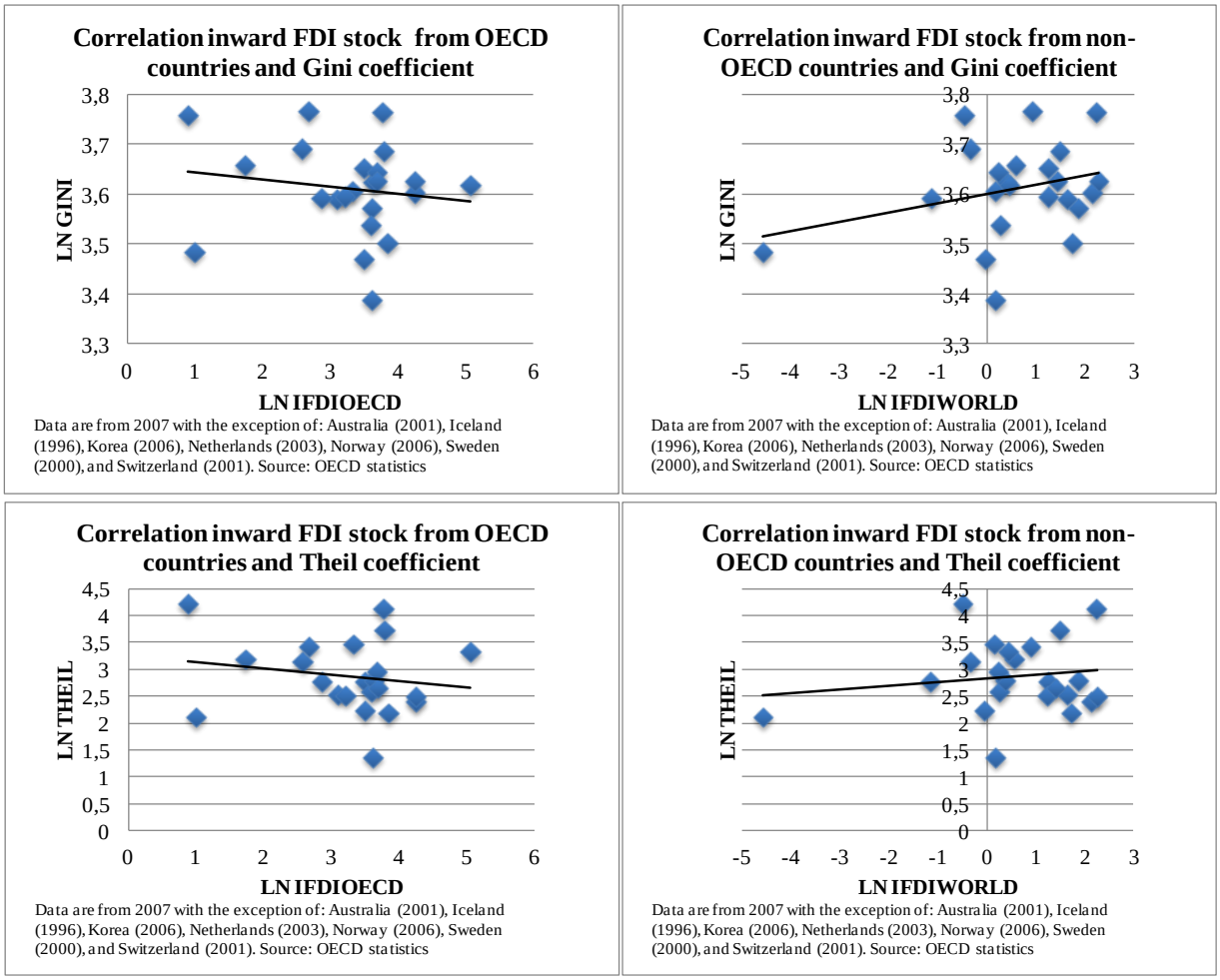

Figure 1: Correlations between the source of FDI and income inequality measures

Section III Data and Methodology

IIIa: Data

1. The sample

The focus of this thesis is investigating the link between the origin of FDI and income inequality in developed countries. Thus there needs to be a definition of developed countries. I define developed countries as those who are member of the OECD for the entire period in the sample, 1985-2007, with the exception of South Korea and Turkey. Table 1 shows that the GDP per capita in purchasing power parity of South Korea is much closer to the OECD average for all years in comparison with Turkey[17]. However, if this would be the only argument one might think that is a little bit arbitrary. An additional reason is that South-Korea,

[17] The year 2000 is included since *Section IV Results* will focus mainly on the 2000-2007 period for reason mentioned in that section.

member of the OECD since 1996, is included because it can be considered as a fully grown developed country itself not only with respect to its GDP per capita, but also its firms. The economy is home to global players like Daewoo, Hyundai, and especially Samsung, who are known for their technical expertise and fit better in the developed country MNE framework than in the EM MNE framework. On the other hand, Turkey, one of the founders of the OECD in 1961, is excluded from the sample because, besides that it is by far poorer in terms of GDP per capita than any other country in the sample, its institutional quality does not represent that of a developed country (Dumludag, 2009), and most importantly its firms are typical EM MNEs from the past years (Cuervo-Cazurra & Genc, 2008). Finally, Belgium needed to be excluded because of data unavailability. This leaves the sample with 23 OECD countries (Appendix 2).

Table 1 GDP per capita South Korea and Turkey relative to the rest of the OECD

	1985	**2000**	**2007**
Average OECD	13495,31	28075,05	39187,81
South Korea	4364,50	17197,15	26101,37
(% of average OECD)	*32,34*	*61,25*	*66,61*
Turkey	3161,78	9328,49	14038,76
(% of average OECD)	*23,43*	*33,23*	*35,82*

2. Income inequality

Most papers have relied on the assumption that production workers are low skilled and non-production workers are skilled (see *Section II: Literature Review*). The difference in wages between these two groups is the skilled-unskilled wage gap. However, such an assumption cannot be valid nowadays. Computer technology is widespread and can be used by many different skill groups. For example an administrative employee who keeps track of school enrollments does not need to have a secondary education degree, but can still be considered as a non-production worker. It is therefore that I rely on less sensitive measures of income inequality, namely the Estimated Household Income Inequality (EHII) database and the UTIP-UNIDO database. Both measures are derived from the University of Texas Inequality Project (UTIP)[18]. The EHII database base covers Gini coefficients that are estimated by regressing the Deininger and Squire Gini coefficients[19] on the amount of people employed in the manufacturing sector as a percentage of the total population and UTIP-UNIDO industrial

[18] See http://utip.gov.utexas.edu/data.html
[19] See Deininger and Squire (1996)

pay inequality data (Galbraith & Kum, 2005). The UTIP-UNIDO database measures pay inequality in the form of Theil coefficients within the manufacturing sector across industries (Galbraith & Kum, 2005). The EHII Gini coefficients have a 0-100 scale, where a higher number represents a higher level of income inequality. The UTIP-UNIDO Theil coefficients have a zero lower bound, but no upper bound. For presentation purposes only, the variable is multiplied by a thousand, because most values are in the range 0-0,1 and would generate many zero's in the coefficient.

The most important advantage is that the EHII and UTIP-UNIDO databases are much more complete and recently updated in contrast with other widely used inequality data sets such as the Gini coefficient dataset developed by Deininger and Squire (1996), the Luxembourg Income Study (LIS) database or the World Income Inequality Database (WIID). In fact the databases I use are the only income inequality databases with a coverage until and including the year 2007[20]. This is essential since FDI flows from emerging markets towards developed host countries took off after the millennium[21]. It is very simple linking wages to skilled and unskilled labor by assuming that people get paid by firms based on their abilities. Widening income inequality would thus be interpreted as a widening of the relative skilled-unskilled wage ratio. To the best of my knowledge this is the first paper that uses the updated UTIP databases.

The EHII Gini coefficient is the preferred measure of income inequality since it takes into account income inequality in both the manufacturing as well as the services sector, while industrial pay inequality measure, the UTIP-UNIDO Theil coefficient, only takes into account wage inequality between manufacturing industries. It is straightforward that having a sample of developed countries the services sector is of significant quantitative importance when looking at FDI stocks. Chintrakarn et al. (2011) note that in the United States the manufacturing sector accounted only for 35% of total inward FDI stocks in 2008.

3. Foreign direct investment

To capture the presence of multinational firms, FDI is the best indicator as will become clear from the following definition of FDI which stems from the OECD Benchmark Definition of Foreign Direct Investment Fourth Edition (2008):

[20] Updated November 2013, before this date the databases covered only until 2002.
[21] In fact, it is necessary to have income inequality data until present since FDI flows from emerging markets significantly increased the past few years, especially from China (see *Section I: Introduction*). However, the EHII database and the UTIP-UNIDO database have the most recent data available which covers only until 2007.

"Direct investment is a category of cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest in an enterprise (the direct investment enterprise) that is resident in an economy other than that of the direct investor. The motivation of the direct investor is a strategic long-term relationship with the direct investment enterprise to ensure a significant degree of influence by the direct investor in the management of the direct investment enterprise. The "lasting interest" is evidenced when the direct investor owns at least 10% of the voting power of the direct investment enterprise. Direct investment may also allow the direct investor to gain access to the economy of the direct investment enterprise which it might otherwise be unable to do. The objectives of direct investment are different from those of portfolio investment whereby investors do not generally expect to influence the management of the enterprise."

FDI data are downloaded from OECD statistics which is the only entity that has a free accessible FDI database that disaggregates data to bilateral FDI positions between countries[22]. The database allows to separate between two origins of FDI: OECD countries and Total World excluding OECD. The inward FDI stock positions of the developed countries with respect to the two sources (OECD and Total World excluding OECD) are divided by their individual GDP levels, both measured in US dollars. Dividing by GDP is necessary, because otherwise the quantitative importance of FDI can be overstated.

4. Main control variables

Figini and Gorg (2011) opt for three control variables that, according to theory, should be included in the econometric specifications: *"openness to trade, the level of development and the level of education."*

Openness to trade is computed as $\left(\frac{Exports+Imports}{GDP}\right) \times 100\%$, where all components are derived from OECD statistics and measured in US dollars. It needs to be included for the reasons mentioned in *paragraph IIa.1* relating more openness to trade with rising income inequality in skilled labor abundant countries and on the other hand to diminishing inequality within unskilled labor abundant countries based on the Stolper-Samuelson theorem. Making the assumption that the developed countries in our sample are skilled labor abundant I expect a positive sign for this variable.

[22] See http://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_PARTNER

The level of development is included, to control for the Kuznets effect. According to the Kuznets theorem countries follow a path in which income inequality increases when a country starts developing until a certain stage of development at which a threshold is met and income inequality starts decreasing as a result of more progress in development (Kuznets, 1955). The first effect takes place, because the emergence of investment opportunities early in development will be grasped by the people at the top of the income distribution that have the money to make those investments, while an inflow of cheap rural labor to the cities prevent manufacturing wages to go up. The latter effect is obtained, because economic growth allows for more investments in physical capital that should accelerate economic growth even more and at a certain point the benefits of economic prosperity trickle down to the poor, because of more wage and tax legislation that allows the public sector to distribute the gains from growth more equally. The level of development is defined as GDP per capita, measured in purchasing power parity (PPP) US dollars, collected from OECD Statistics. PPP US dollars are used, because it better describes the relative living standards of the various countries in the sample.

The level of education controls for the supply side of the labor market. When the wage premium for skilled labor rises, more people tend to enroll in higher educational programs since the gains become larger. For example, Emami Namini and Lopez (2013) find evidence for Chile, where people increasingly invest in their own education to benefit from the wage premium caused by trade liberalization. In the long run this has resulted in a narrowing wage gap between skilled and unskilled workers. Hence, I expect a negative sign for its coefficient estimate. Education is defined as: *"The total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. This variable can exceed 100% due to the inclusion of over-aged and under-aged students, because of early and late school entrance or grade repetition."*[23] Arguably, using this definition may not capture the supply of skilled labor in the economy accurately, but it has by far the best data coverage across time and space. Therefore, I also use *"the proportion of the labor force holding a secondary degree as a percentage of the total labor force"*[24] as an alternative education indicator for robustness purposes that should capture the supply of skilled labor better, but will generate more missing data points. Both education variables are downloaded from World Development Indicators database.

[23] Definition is from World Bank. See http://data.worldbank.org/indicator/SE.SEC.ENRR
[24] Definition is from World Bank. See http://data.worldbank.org/indicator/SL.TLF.SECO.ZS

5. R&D expenditures

Figini and Gorg (2011) point out in their methodology section that they were aware that some variables of which previous literature pointed them to be important were omitted when they were investigating income inequality. According to Acemoglu (2003) institutional variables such as the minimum wage and workers' rights can affect income inequality. What is more, any research investigating the income inequality- FDI nexus should control for other technology control variables such as R&D expenditures, because FDI is not the only reason for technological progress taking place (Berman & Machin, 2000). Otherwise, the FDI variables may be biased upwards in significance because they merely pick up the effect of technological progress that is the result of research and development in the economy. The minimum wage has the purpose of leveling incomes, but might lead to more unemployment among low skilled workers, because they are overvalued (Acemoglu, 2003).

Table 2, descriptive statistics

Variable	*Description*	*N*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
GINI	Gini index of estimated household income inequality	464	36,29	3,06	28,64	44,13
THEIL	UTIP-UNIDO Theil Index of wage inequality	477	19,1	12,27	3,02	72,86
IFDIOECD	Stock of inward FDI as a percentage of GDP coming from OECD countries	484	25,91	29,86	0,32	205,13
IFDIWORLD	Stock of inward FDI as a percentage of GDP coming from non-OECD countries	521	3,19	6,81	0	113,75
TRADE	Total imports plus exports as a percentage of GDP	635	76,91	48,58	15,92	333,53
GDPCAP	GDP per capita measured in purchasing power parity US dollars	648	25.990,68	11.560,43	4364,50	88780,62
EDUC	Students enrolled in secondary education regardless of age as percentage of the population at secondary education age	592	105,07	15,48	57,50	162,35
EDUCALT	Proportion of the labor force that has a secondary education as a percentage of the total labor force	401	41.90	12.29	2,9	68,9
RD	Expenditures on research and development in the economy as a percentage of GDP	326	2.07	0,8	0,46	4,13

Where Figini and Gorg (2011) stop by letting the reader know that the coverage of the data is far too scarce to include these controls, I make an attempt in the robustness part of the results section to include a variable controlling for technological change, namely R&D expenditures as a percentage of GDP defined as: *"Expenditures for research and development are current*

and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development."[27] R&D expenditures data are downloaded from Word Development Indicators database. For the same reasons as Figini and Gorg (2011), I do not control for institutional quality on labor legislation of workers' rights and minimum wages.[28] Table 2 presents the descriptive statistics of all variables involved.

IIIb: Methodology

1. The econometric specification

In fact there are two ways of estimating the within country effects in panel data: either by estimating a fixed effects model or making use of first differences (Wooldridge, 2002). Choosing between them essentially relies on the idiosyncratic error term. More specifically, on the assumption that the error term is serially uncorrelated over time. According to Wooldridge (2002), estimating the empirical specification using a fixed effects estimator is more efficient when the residuals are serially uncorrelated. This assumption may be violated in this sample because most variables are upward trending, possibly leading to biased standard errors. He advises to use the first differenced estimator when the idiosyncratic error term is serially correlated. Wooldridge (2002) proposes a test in which the correlation of the obtained residuals from the first differenced specification and its lagged values are examined. More specifically the error term of the panel regression, ε_{it}, is not serially correlated if $Corr(\Delta e_{it}, \Delta e_{it-1}) = -0.5$. The Wooldridge test on serial correlation regresses the obtained residuals from the first differenced specification on its one year lagged value and examines whether the estimated coefficient is equal to -0.5. I have performed the Wooldridge test on every model of interest and continuously needed to reject the null hypothesis of serially uncorrelated errors, which means the estimation in first differences leads to more reliable results. Thus I am interested in the following econometric specifications:

1) $\Delta INEQ_{it} = b_0 + b_1 \Delta IFDIOECD_{it} + b_2 \Delta IFDIOECD_{it}^2 + b_3 \Delta X_{it} + v_t + e_{it}$

[27] Definition is from World Bank. See http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.

[28] Labor Freedom from the Economic Freedom Index could be used as a proxy for institutional quality on labor legislation (Figini & Gorg, 2011), but data are only available from 2005 onwards. Including minimum wage data from OECD statistics reduces the amount of observations to a mere 40 which is far too sparse to draw conclusions from. Estimating in first differences at least controls for all time invariant possible omitted institutional variables.

2) $\Delta INEQ_{it} = b_0 + b_1 \Delta IFDIWORLD_{it} + b_2 \Delta IFDIWORLD_{it}^2 + b_3 \Delta X_{it} + v_t + e_{it}$

INEQ is a measure of income inequality, $IFDIOECD$ is the total inward FDI stock originating from OECD countries as a percentage of GDP, $IFDIWORLD$ measures the same as $IFDIOECD$, but then originating from non-OECD nations, X is a vector of control variables which are also linked to income inequality according to theory, v_t is a vector representing time dummies to control for exogenous shocks that could occur across time, and e_{it} represents the idiosyncratic error term. In the econometric specifications a quadratic FDI term is added to allow for non-linearity for the reasons described in detail earlier.

2. Interaction effects

Following Figini and Gorg (2011) interaction effects are examined. The supply of skilled labor might react to the increased demand. For example Emami Namini and Lopez (2013) found that Chilean manufacturing workers have invested in their own skills as a reaction to increased demand of skilled labor due to trade liberalization. When supply follows demand, the skill biased effect is expected to be reverted.

3. Lagged effects

It may take time before FDI in the host country increases the wage premium. In the HL theory it assumed that workers learn the more advanced technology MNEs possess after one period of working in a two period model (Malchow-Moller, et al., 2013). Thus, the firm needs to pay its workers a wage premium after one period of working. Additionally imposed reorganizations by EM MNEs tend to reduce unemployment in the five years following the acquisition (Chari, et al., 2012). In general, wages are not adjusting very fast to changing conditions. That is why the lagged effects model includes all predictor variables in an one year lagged form.

4. Different periods

It is known that emerging market FDI is something of recent years. It is therefore that the periods 1985-1999 and 2000-2007 are investigated separately. Expected is that for the period 1985-1999 FDI flows from non-OECD to OECD countries does not play a significant role in explaining income inequality while this is totally different for the period 2000-2007 in which this direction of FDI flows skyrocketed.

5. Sensitivity Analysis

One of the robustness checks performed in every regression is the use of two income inequality measures. Secondly, Iceland will be left out since it is a negative outlier with respect to inward FDI coming from non-OECD countries. Third, an alternative measure of the educational background of workers will be used because it better represents the amount of skilled workers in the economy. At last, R&D expenditures will be controlled to account for skill biased technological change.

Section IV Results

IVa: Regressions

1. Basic OLS

Table 3, inward FDI split by origin: OECD versus non-OECD

	(1) ΔGINI	(2) ΔTHEIL	(3) ΔGINI	(4) ΔTHEIL
ΔIFDIOECD	0.0294	0.143		
	(0.0251)	(0.111)		
ΔIFDIOECD2	-0.000294*	-0.00104+		
	(0.000127)	(0.000576)		
ΔIFDIWORLD			0.0186	0.141
			(0.0192)	(0.0833)
ΔIFDIWORLD2			-0.0000921	-0.000853
			(0.000157)	(0.000691)
ΔGDPCAP	-0.0000761	-0.0000889	-0.0000186	0.000117
	(0.0000458)	(0.000205)	(0.0000395)	(0.000172)
ΔTRADE	0.0213	0.0578	0.0224*	0.0730*
	(0.0141)	(0.0507)	(0.00848)	(0.0311)
ΔEDUC	-0.0206*	-0.0409	-0.0148+	-0.0236
	(0.00934)	(0.0289)	(0.00797)	(0.0249)
CONSTANT	0.433*	1.169+	0.404**	0.938
	(0.167)	(0.600)	(0.137)	(0.553)
N	261	267	297	305
R^2	0.150	0.108	0.132	0.100

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

From Table 3 it can be read that at first sight there is evidence for a long term negative relationship between both measures of inequality and inward FDI originating from OECD countries. There is no evidence that the wage premium first increases because of inward FDI from OECD countries Second, the signs of the IFDIWORLD variables are not as expected, being that the relationship seems similar as for IFDIOECD. Nevertheless, the IFDIWORLD variable is insignificant in both short and long run. Not surprisingly, GDPCAP seems to be

insignificant in all regressions. This underlines that the countries in the sample are indeed of similar levels of development. Education is significant only with respect to GINI as the dependent variable. The TRADE variable is only significant in the IFDIWORLD regressions and has the expected positive sign. This could indicate that omitting IFDIOECD (IFDIWORLD) from the IFDIWORLD (IFDIOECD) regressions leads to biased standard errors in either the IFDIOECD or the IFDIWORLD regressions. That is why I continue by including both variables in one model (Table 4).

Table 4, IFDIOECD and IFDIWORLD in one regression

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.0276	0.132
	(0.0254)	(0.118)
ΔIFDIOECD2	-0.000296^{+}	-0.000903
	(0.000154)	(0.000734)
ΔIFDIWORLD	0.0986	0.217
	(0.0934)	(0.232)
ΔIFDIWORLD2	-0.00400	-0.0124
	(0.00339)	(0.00898)
ΔGDPCAP	-0.0000774^{+}	-0.0000870
	(0.0000445)	(0.000207)
ΔTRADE	0.0195	0.0480
	(0.0152)	(0.0550)
ΔEDUC	-0.0208*	-0.0413
	(0.00975)	(0.0300)
CONSTANT	0.426*	1.114^{+}
	(0.171)	(0.610)
N	261	267
R^2	0.154	0.109

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 4 shows the combined results of IFDIWORLD and IFDIOECD and their squared terms in one regression. IFDIOECD2 loses its significance to a mere 10 percent level in the GINI regression and it is no longer significant in the THEIL regression. Suddenly, the level of development seems to be significant at the 5 percent level in the GINI regression. The TRADE variable loses its significance completely. A possible explanation for the insignificant results is that IFDIOECD and IFDIWORLD could be strongly collinear, but the summary statistics show a correlation of 0.52 which is high but not severe. Therefore, as proposed by Figini and Gorg (2011) including interaction effects might tell more.

2. Interaction effects

Figini and Gorg (2011) find a strong link for developed countries between the supply of skilled workers, incoming FDI and income inequality. Table 5 shows the results when

accounting for possible interaction effects between education and the FDI variables. The interaction effects do not show any significance, neither do their individual components.

Table 5, interaction effects

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.0778	0.531
	(0.116)	(0.556)
ΔIFDIOECD2	0.000616	0.00117
	(0.00171)	(0.00581)
ΔEDUC*IFDIOECD	-0.000293	-0.00303
	(0.00114)	(0.00527)
ΔEDUC*IFDIOECD2	-0.0000101	-0.0000234
	(0.0000174)	(0.0000587)
ΔIFDIWORLD	-0.142	-1.542
	(0.695)	(2.771)
ΔIFDIWORLD2	0.0366	0.0495
	(0.0668)	(0.199)
ΔEDUC*IFDIWORLD	0.00240	0.0149
	(0.00614)	(0.0237)
ΔEDUC*IFDIWORLD2	-0.000378	-0.000519
	(0.000611)	(0.00181)
ΔGDPCAP	-0.0000644	-0.0000299
	(0.0000420)	(0.000188)
ΔTRADE	0.0166	0.0367
	(0.0164)	(0.0572)
ΔEDUC	-0.0134	0.00758
	(0.0187)	(0.0676)
CONSTANT	0.381*	0.862
	(0.170)	(0.623)
N	261	267
R^2	0.164	0.117

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

3. lagged effects and interactions

The previous results could be questioned since none of the variables of interest, though strongly linked with theory, showed significance. From Table 6 it becomes clear that the omission of any lag structure is the reason for that statistical failure. The most important observation to discuss is that no significant effect on income inequality can be found as the result of FDI coming from other OECD countries, whereas the opposite is true for FDI coming from non-OECD countries.

At the 10 percent significance level in the THEIL equation, the one year lag of IFDIWORLD shows a negative effect on income inequality, but this effect is not robust in the GINI equation. However, the one year lag of the interaction term EDUC*IFDIWORLD shows a positive effect on income inequality at the 10 percent significance level robust for both dependent variables.

Table 6, lagged effects

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.101	0.624
	(0.117)	(0.595)
ΔIFDIOECD (-1)	-0.0538	-0.313
	(0.155)	(1.037)
ΔIFDIOECD2	-0.000548	0.000477
	(0.00174)	(0.00845)
ΔIFDIOECD2 (-1)	-0.00124	-0.000776
	(0.00275)	(0.0146)
ΔEDUC*IFDIOECD	-0.000509	-0.00334
	(0.00113)	(0.00559)
ΔEDUC*IFDIOECD (-1)	0.000109	0.00151
	(0.00136)	(0.00852)
ΔEDUC*IFDIOECD2	0.000000282	-0.0000201
	(0.0000167)	(0.0000808)
ΔEDUC*IFDIOECD2 (-1)	0.0000161	0.0000184
	(0.0000248)	(0.000126)
ΔIFDIWORLD	0.664	-0.672
	(0.699)	(4.668)
ΔIFDIWORLD (-1)	-1.060	-5.380^{+}
	(0.700)	(2.662)
ΔIFDIWORLD2	0.00201	-0.0161
	(0.0685)	(0.347)
ΔIFDIWORLD2 (-1)	0.118	0.465
	(0.0721)	(0.351)
ΔEDUC*IFDIWORLD	-0.00310	0.0102
	(0.00648)	(0.0393)
ΔEDUC*IFDIWORLD (-1)	0.0106^{+}	0.0494^{+}
	(0.00607)	(0.0241)
ΔEDUC*IFDIWORLD2	-0.000166	-0.000160
	(0.000651)	(0.00306)
ΔEDUC*IFDIWORLD2 (-1)	-0.00123^{+}	-0.00450
	(0.000668)	(0.00333)
ΔGDPCAP	-0.0000860	-0.000145
	(0.0000512)	(0.000250)
ΔGDPCAP (-1)	0.00000149	0.000112
	(0.0000467)	(0.000231)
ΔTRADE	0.0239	0.0331
	(0.0161)	(0.0708)
ΔTRADE (-1)	-0.0146	-0.0180
	(0.0165)	(0.0742)
ΔEDUC	-0.00832	0.0125
	(0.0152)	(0.0759)
ΔEDUC (-1)	-0.0222	-0.163
	(0.0242)	(0.164)
CONSTANT	-2.878	-11.33
	(3.985)	(27.44)
N	237	242
R^2	0.233	0.143

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

A suggestive explanation is that when the relative supply of skilled workers is higher, unskilled labor wages are relatively high in the host country as well. This might trigger EM

MNEs to relocate unskilled labor intensive activities to their low-wage home countries even more.

The long-run interaction variable, EDUC*IFDIWORLD2 in its one year lagged form is negatively significant at the 10 percent level in the GINI equation, but not robust with respect to the THEIL index. This could indicate that the short term deteriorating effect on income inequality because of inward FDI from non-OECD countries, depending on the educational level of workers, diminishes over time.

However, the results are not conclusive as they are only observed at the highest significance level and two out of three results are not robust with both inequality measures. Another possibility is that the relationship between FDI from non-OECD countries and inequality in OECD countries is something of recent years, since the FDI flows from non-OECD countries only skyrocketed after the millennium. Regressing for different periods is needed.

4. Different periods

The most obvious contrast between the two periods is that in the 1985-1999 period (Table 7) IFDIWORLD has a significant positive effect in the short run which decreases in the long run, while the opposite is true for the 2000-2007 period (Table 8), but only in the GINI regression.

Also, the interaction terms EDUC*IFDIWORLD and EDUC*IFDIWORLD2 are significant at the 1 percent level, having a negative sign for its short term effect and a positive sign for its squared term. In addition, in the GINI regression is the one year lag of trade highly significant at the 1 percent level with a negative sign, which highly contradicts known theory. One can also observe that IFDIOECD2 is negatively linked in the 2000-2007 period with income inequality at the 5 percent level in the GINI regression, but the result does not hold at the THEIL regression. In the 2000-2007 period, TRADE shows a significant positive effect on income inequality, and the negative effect found in the 1985-1999 period of its one year lag is no longer significant in the 2000-2007 period regressions.

6. Sensitivity Analysis

As mentioned in the methodology some robustness checks need to be performed. Due to data availability I am forced to only investigate the 2000-2007 period further for some additional checks. From Table 9 it becomes clear that when excluding Iceland and using an alternative measure of education, the number of people employed with a secondary education degree,

which should better fit the definition of a skilled worker, changes some results. Suddenly, the IFDIOECD variables are significant and show a non-linear relationship.

Table 7, period 1985-1999

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	-0.558	-0.526
	(0.717)	(4.236)
ΔIFDIOECD (-1)	-0.708	-2.440
	(0.702)	(3.848)
ΔIFDIOECD2	0.0179	0.0323
	(0.0185)	(0.118)
ΔIFDIOECD2 (-1)	0.0136	0.0563
	(0.0147)	(0.0988)
ΔEDUC*IFDIOECD	0.00574	0.00616
	(0.00643)	(0.0377)
ΔEDUC*IFDIOECD (-1)	0.00710	0.0224
	(0.00675)	(0.0331)
ΔEDUC*IFDIOECD2	-0.000163	-0.000277
	(0.000155)	(0.000996)
ΔEDUC*IFDIOECD2 (-1)	-0.000138	-0.000503
	(0.000127)	(0.000829)
ΔIFDIWORLD	6.831**	16.64
	(1.925)	(9.599)
ΔIFDIWORLD (-1)	1.802	-1.451
	(1.743)	(8.267)
ΔIFDIWORLD2	-1.766**	-3.669
	(0.482)	(2.486)
ΔIFDIWORLD2 (-1)	0.831	1.216
	(0.787)	(2.357)
ΔEDUC*IFDIWORLD	-0.0635**	-0.153
	(0.0179)	(0.0892)
ΔEDUC*IFDIWORLD (-1)	-0.0201	0.00279
	(0.0157)	(0.0793)
ΔEDUC*IFDIWORLD2	0.0158**	0.0326
	(0.00423)	(0.0218)
ΔEDUC*IFDIWORLD2 (-1)	-0.00651	-0.00988
	(0.00664)	(0.0200)
ΔGDPCAP	-0.000171	-0.000443
	(0.000166)	(0.000918)
ΔGDPCAP (-1)	-0.000263*	-0.000644
	(0.000121)	(0.000390)
ΔTRADE	0.0275	-0.0187
	(0.0221)	(0.153)
ΔTRADE (-1)	-0.0686**	-0.154
	(0.0202)	(0.0934)
ΔEDUC	-0.0276	0.00335
	(0.0335)	(0.240)
ΔEDUC (-1)	-0.0479	-0.234
	(0.0495)	(0.290)
CONSTANT	-4.101*	-11.77
	(1.718)	(9.000)
N	133	137
R^2	0.276	0.129

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 8, period 2000-2007

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.435	0.0893
	(0.332)	(0.128)
ΔIFDIOECD (-1)	0.141	0.0818
	(0.192)	(0.0949)
ΔIFDIOECD2	-0.00597*	-0.00105
	(0.00269)	(0.000933)
ΔIFDIOECD2 (-1)	-0.00211	-0.000521
	(0.00157)	(0.000772)
ΔEDUC*IFDIOECD	-0.00433	-0.000728
	(0.00298)	(0.00115)
ΔEDUC*IFDIOECD (-1)	-0.00151	-0.000783
	(0.00189)	(0.000906)
ΔEDUC*IFDIOECD2	0.0000546*	0.00000860
	(0.0000245)	(0.00000869)
ΔEDUC*IFDIOECD2 (-1)	0.0000228	0.00000526
	(0.0000160)	(0.00000772)
ΔIFDIWORLD	-2.073*	-1.463*
	(0.931)	(0.598)
ΔIFDIWORLD (-1)	0.812	0.0715
	(1.399)	(0.614)
ΔIFDIWORLD2	0.195**	0.0952**
	(0.0597)	(0.0296)
ΔIFDIWORLD2 (-1)	-0.0567	0.00348
	(0.135)	(0.0530)
ΔEDUC*IFDIWORLD	0.0230*	0.0142*
	(0.00863)	(0.00531)
ΔEDUC*IFDIWORLD (-1)	-0.00620	-0.0000472
	(0.0130)	(0.00554)
ΔEDUC*IFDIWORLD2	-0.00196**	-0.000909**
	(0.000574)	(0.000276)
ΔEDUC*IFDIWORLD2 (-1)	0.000374	-0.0000769
	(0.00129)	(0.000497)
ΔGDPCAP	-0.000000352	0.0000162
	(0.0000201)	(0.0000128)
ΔGDPCAP (-1)	-0.00000577	-0.00000105
	(0.0000173)	(0.00000846)
ΔTRADE	0.0402+	0.0218*
	(0.0196)	(0.00992)
ΔTRADE (-1)	-0.00669	-0.00286
	(0.00536)	(0.00337)
ΔEDUC	0.00223	-0.0130
	(0.0730)	(0.0267)
ΔEDUC (-1)	0.0482	0.0207
	(0.0279)	(0.0137)
CONSTANT	0.151	0.0556
	(0.418)	(0.231)
N	87	88
R^2	0.531	0.389

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

That is, income inequality increases in the short run, while this effect diminishes over time. The effect is robust to the THEIL measure of inequality, although the squared term is significant in its one year lagged form. On the contrary, the IFDIWORLD variables are much less significant and only apparent in the THEIL regression. In the short run, at the 5 percent significance level, inward FDI from non-OECD countries has a negative effect on wage inequality, while in the long run the sign changes to positive at the 10 percent significance level. Some interaction terms are also significant, but this is dependent on which measure of inequality is used. In the GINI regression there seems to be a non-linear interaction effect present for inward FDI coming from other OECD countries and the alternative education measure that shows a negative sign in the short run and a positive sign in the long run. Interpreting this result is quite hard, but I suspect that as the level of skilled workers is higher if multinational firms from OECD countries are more present. More multinational activity means that the workers that are still less educated can also benefit from the gains of learning new technologies and/or benefiting from the premium. This process of decreasing income inequality stops in the long run when all workers earn the premium. The interaction terms EDUCALT*IFDIWORLD and EDUCALT*IFDIWORLD2 show the same relationship as in Table 8 with the THEIL coefficient. Nevertheless, it is reduced in significance and not robust to the GINI equation.

The most important robustness check is to control for skill biased technological change that might be omitted from previous models. In Table 10 this is done by including the RD variable and its one year lag. It is obvious that including this variable has changed some results to great extent. TRADE is positive significant at the 5 percent level and robust to both measures of inequality, in line with known theory. The IFDIWORLD variables have lost their significance almost completely, only the negative short run effect is present at the 10 percent level, but not in the GINI equation. One of most important findings is that the RD (-1) variable is significantly linked with income inequality, at the 10 percent level in the GINI regression and the 5 percent level in the THEIL regression. Skill biased technological change is thus a profound predictor of increasing income inequality. How do the results compare with those found by others that have studied the FDI-inequality nexus? The most reliable regressions are those of Table 10, including R&D expenditures to simulate skill biased technological change. It is therefore that the comparison will be done solely referring to the results presented in Table 10.

Table 9, Iceland excluded and alternative education measure, period 2000-2007

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.469*	1.473+
	(0.192)	(0.847)
ΔIFDIOECD (-1)	0.117	0.905
	(0.0889)	(0.582)
ΔIFDIOECD2	-0.00685*	-0.0135
	(0.00289)	(0.0120)
ΔIFDIOECD2 (-1)	-0.00129	-0.0155*
	(0.00118)	(0.00669)
ΔEDUCALT*IFDIOECD	-0.0114+	-0.0317
	(0.00562)	(0.0222)
ΔEDUCALT*IFDIOECD (-1)	-0.00249	-0.0245
	(0.00227)	(0.0148)
ΔEDUCALT*IFDIOECD2	0.000162*	0.000298
	(0.0000765)	(0.000303)
ΔEDUCALT*IFDIOECD2 (-1)	0.0000311	0.000380*
	(0.0000284)	(0.000167)
ΔIFDIWORLD	-0.809	-6.615*
	(0.960)	(2.969)
ΔIFDIWORLD (-1)	-0.544	-4.367
	(0.709)	(4.200)
ΔIFDIWORLD2	0.127	0.518+
	(0.0866)	(0.251)
ΔIFDIWORLD2 (-1)	0.109	0.646
	(0.122)	(0.588)
ΔEDUCALT*IFDIWORLD	0.0295	0.166*
	(0.0255)	(0.0763)
ΔEDUCALTIFDIWORLD (-1)	0.0172	0.123
	(0.0182)	(0.106)
ΔEDUCALT*IFDIWORLD2	-0.00346	-0.0126+
	(0.00225)	(0.00656)
ΔEDUCALT*IFDIWORLD2 (-1)	-0.00309	-0.0168
	(0.00316)	(0.0151)
ΔGDPCAP	-0.0000199	0.0000949
	(0.0000339)	(0.000131)
ΔGDPCAP (-1)	0.0000193	0.000147
	(0.0000228)	(0.0000852)
ΔTRADE	0.0481+	0.253*
	(0.0235)	(0.115)
ΔTRADE (-1)	-0.00968	0.0254
	(0.00761)	(0.0334)
ΔEDUCALT	0.130	0.334
	(0.0824)	(0.445)
ΔEDUCALT (-1)	0.00849	-0.00866
	(0.0317)	(0.179)
CONSTANT	0.585	1.832
	(0.396)	(1.586)
N	82	83
R^2	0.435	0.495

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 10, Iceland excluded, alternative education measure and R&D expenditures, period 2000-2007

	(1) ΔGINI	(2) ΔTHEIL
ΔIFDIOECD	0.473^{+}	1.973^{+}
	(0.267)	(1.088)
ΔIFDIOECD (-1)	0.188	1.993^{+}
	(0.234)	(0.964)
ΔIFDIOECD2	-0.00728^{+}	-0.0219
	(0.00359)	(0.0147)
ΔIFDIOECD2 (-1)	-0.00171	-0.0323^{+}
	(0.00415)	(0.0169)
ΔEDUCALT*IFDIOECD	-0.0114	-0.0414
	(0.00660)	(0.0257)
ΔEDUCALT*IFDIOECD (-1)	-0.00418	-0.0513^{+}
	(0.00578)	(0.0247)
ΔEDUCALT*IFDIOECD2	0.000171^{+}	0.000482
	(0.0000895)	(0.000357)
ΔEDUCALT*IFDIOECD2 (-1)	0.0000438	0.000803^{+}
	(0.000102)	(0.000417)
ΔIFDIWORLD	-0.753	-6.301^{+}
	(1.088)	(3.476)
ΔIFDIWORLD (-1)	-0.243	-9.088
	(1.932)	(8.183)
ΔIFDIWORLD2	0.136	0.551
	(0.117)	(0.340)
ΔIFDIWORLD2 (-1)	0.00415	1.160
	(0.291)	(1.182)
ΔEDUCALT*IFDIWORLD	0.0283	0.150
	(0.0281)	(0.0877)
ΔEDUCALT*IFDIWORLD (-1)	0.00893	0.233
	(0.0471)	(0.199)
ΔEDUCALT*IFDIWORLD2	-0.00372	-0.0128
	(0.00298)	(0.00872)
ΔEDUCALT*IFDIWORLD2 (-1)	-0.000407	-0.0294
	(0.00740)	(0.0300)
ΔGDPCAP	0.0000414	0.000342^{+}
	(0.0000495)	(0.000194)
ΔGDPCAP (-1)	-0.0000389	-0.0000303
	(0.0000383)	(0.000182)
ΔTRADE	0.0547*	0.293*
	(0.0256)	(0.122)
ΔTRADE (-1)	-0.00820	0.0553
	(0.0126)	(0.0599)
ΔEDUCALT	0.141	0.521
	(0.124)	(0.509)
ΔEDUCALT (-1)	0.0689	0.288
	(0.0868)	(0.392)
ΔRD	0.0775	2.470
	(1.081)	(4.258)
ΔRD (-1)	0.351^{+}	1.475*
	(0.178)	(0.695)
CONSTANT	-0.159	-0.506
	(0.458)	(2.052)
N	74	74
R^2	0.489	0.536

Clustered standard errors in parentheses
All regressions include time dummies
Dependent variable is GINI or THEIL
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

The non-linear effect found for FDI coming from other OECD countries is in line with technology spillover theories and findings as presented by Figini and Gorg (1999) and Herzer and Nunnenkamp (2013). The findings also compare with Figini and Gorg (2011) and Chintrakarn et al. (2012). That is that FDI to developed countries is negatively linked with inequality in the long run. For FDI flowing from developing countries to developed countries no significant effect on inequality is found. Several reasons might explain this. First, FDI motivated by efficiency seeking strategies would not necessarily increase income inequality as discussed by Arndt (1997), Slaughter (2000), Marin (2004), and Becker et al. (2005). A second explanation could be that EM MNEs increase mainly the amount of skilled jobs through an increase in R&D expenditures (Milelli, et al., 2010). Thus including this variable in the regressions might have captured the effect. Last, the data covers until 2007 and therefore limits the quantitative importance of this direction of FDI flows which became much more apparent after this period.

IVb: Discussion

Regression analysis is often plagued by various statistical issues that could bias the OLS residuals, especially in testing macro-economic relationships (Bosker, 2013). Bosker (2013) especially refers to endogeneity issues such as reverse causality, omitted variable bias, and measurement error. In regression analysis you can never be one hundred percent sure that a causal relationship is found. The trick is to become as close as possible. To do this, one needs to know the possible problems that might exist and try to tackle these problems at hand. Indeed, the objective of this subsection is to outline that the regression results were carefully examined with respect to possible endogeneity issues. In addition, multicollinearity is discussed as well.

To begin with, reverse causality should not be a problem in this research. Theories have only linked FDI to income inequality and not the other way around. The only reason I can think of is that more unequal countries attract less FDI because firms might be hesitant to invest in countries where political stability is questioned. Having a sample of developed OECD countries where political stability is not an issue in general, this bias should be negligible.

Second, any variable that has been linked with income inequality in theory so far has been implemented in the regression analysis. Furthermore, the one year lagged values of all control variables were added to control for possible sluggish adjustments of incomes. Also, first differences and period dummies were used to control for time invariant and time specific

factors possibly affecting incomes. Therefore, the size of the omitted variable bias should be negligible as well. However, this is only true for the 2000-2007 period in which R&D expenditures are included to control for skill biased technological change. It is therefore that an omitted variable bias might be present in any regression that does not include this variable. That is why the 2000-2007 period regression results are much more reliable than the 1985-1999 regressions.

Third, measurement error might arise when data is not properly reported. Although international reporting guidelines such as the OECD's definition of FDI and balance of payments (BOP) reporting standards should be implemented by the various reporting countries to create comparable and reliable FDI data (OECD, 2008), this is not always the case. Especially developing countries tend to deviate from the guidelines when reporting FDI data (Fujita, 2008). It is known that measurement error biases the coefficient estimates towards zero (Bosker, 2013). This might lead to incorrectly not rejecting the null hypothesis. In the sensitivity analysis it is found that when controlling for skill biased technological change, the affect of FDI from non-OECD countries becomes insignificant. In addition to the reasons already mentioned, measurement error is another possible reason for finding this result.

Another concern might be the issue of multicollinearity, which arises when two or more predictor variables (nearly) perfectly correlate with each other. It causes the standard errors to become too large and increases the chance of incorrectly not rejecting the null hypothesis (Verbeek, 2012).

Table 11, correlation matrix of predictor variables (2000-2007 period, Iceland excluded)

	ΔIFDIOECD	ΔIFDIWORLD	ΔTRADE	ΔGDPCAP	ΔEDUC	ΔEDUCALT	ΔRD
ΔIFDIOECD	1						
ΔIFDIWORLD	0,52	1					
ΔTRADE	0,07	-0,22	1				
ΔGDPCAP	0,10	0,03	0,20	1			
ΔEDUC	-0,11	-0,07	-0,17	-0,11	1		
ΔEDUCALT	-0,06	-0,10	-0,02	-0,33	0,05	1	
ΔRD	-0,15	0,02	0,03	-0,25	0,25	-0,11	1

Table 11 shows the correlation matrix of the predictor variables for the period 2000-2007, excluding Iceland, which corresponds with the regression results from Table 10. Table 11 reveals that multicollinearity is not an issue. One might argue that interaction terms and squared terms strongly correlate with their individual linear terms, but this type of high

correlation does not cause the p-values to change and therefore is not a problem for reliable statistical inference (Allison, 2012).

Section V: Conclusions

This thesis investigated the link between FDI and income inequality in a panel of 23 developed OECD countries over the period 1985-2007. Within this thesis I tried to do two things. The first one is to give a complete overview of all possible channels that are linked with income inequality in order to have full understanding of the possible mechanisms that are at work. Secondly, to disentangle the effects of FDI with respect to the development of the source country. More specifically, to address possible different effects on income inequality depending if the source of FDI is a developing or developed country.

With respect to the main results, for the 1985-2007 period no significant effects of either type of FDI were found. Investigating two different periods, 1985-1999 and 2000-2007, gave more insights. For the 1985-1999 period there is a non-linear correlation between inward FDI from developing countries and income inequality. On impact, income inequality is increased on average, while this effect diminishes over time. For this period no significant effect could be found for FDI coming from other developed countries. In this period trade openness had a one year lagged negative effect on income inequality. During the 2000-2007 period a non-linear relationship was found between FDI from developing countries and the Theil coefficient. First wage inequality decreased during this period because of this type of FDI whereas in the long run it increased. FDI from OECD countries had a non-linear impact on inequality, first increasing it and in the long run this effect evaporates.

As for policy implications, there is an indication that effects of emerging market FDI on income inequality are positive. Add this to the other concerns raised by policymakers with respect to this type of FDI and one could conclude that in some instances developed countries want to have the ability to block certain takeovers by EM MNEs of their domestic firms. However, putting up the barricades in general is unwise as this might be seen as protective measures which could scare off other potential investors too. Another concern is that beggar-thy-neighbor policies might be implemented by disadvantaged parties. For example, if the US make it unattractive for Chinese companies to invest in their country, the Chinese might do the same to preclude MNE activity by the Americans in their own country.

However, the effect of FDI from developing countries disappears when controlled for R&D expenditures. It might indicate that FDI from developing countries do not have such a big effect on relative wages, or that emerging market FDI has mainly a deteriorating effect on the income distribution through an increase in R&D expenditures which raises the demand for skilled labor, or that it is quantitatively less important in explaining inequality. Also, measurement error might have led to underestimation, because it biases the coefficient estimate towards zero. The suggestion of data unavailability addresses the most important limitation of this thesis. That is not having data of past seven years in which emerging market FDI became much more prominent than any period before. The data does not allow me to capture adequately the quantitative importance of emerging market FDI nowadays. It is therefore recommended that a similar empirical research will be done once data of recent years is available. On the theoretical side a big contribution would be an investigation of the channels through which emerging market FDI affects incomes as the channels that have been opted in this thesis are rather suggestive.

Additionally, it is found that both trade liberalization and skill biased technological change significantly explain rising income inequality for the period 2000-2007.

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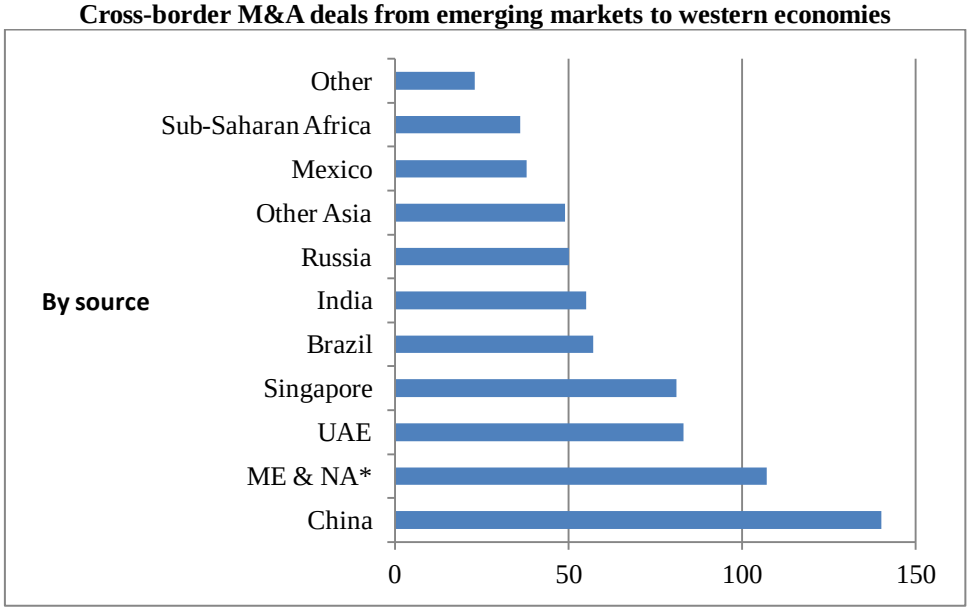
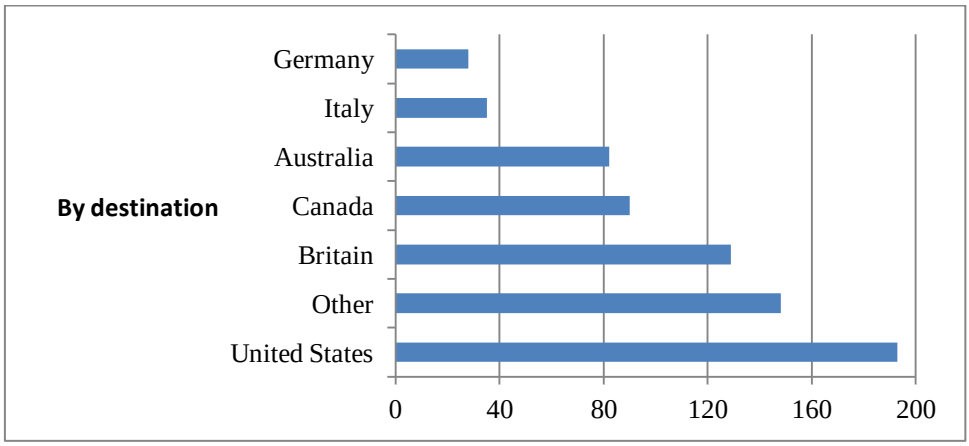
Appendix 1

Cross-border M&A deals from emerging markets to western economies





*Middle East and North Africa excluding United Arab Emirates

Source: The Economist

Appendix 2

Increasing income/wage inequality 1985-2007

	GINI			*THEIL*		
COUNTRY	**1985***	**2007****	**+/-**	**1985***	**2007****	**+/-**
Australia	34,18	36,27	+	8,67	12,59	+
Austria	34,46	35,55	+	17,17	16,30	-
Canada	37,06	38,55	+	20,95	16,13	-
Denmark	31,04	33,20	+	5,13	8,88	+
Finland	31,47	34,43	+	10,70	13,12	+
France	34,51	37,49	+	14,57	16,40	+
Germany	32,60	36,80	+	10,15	31,9	+
Greece	41,56	43,25	+	25,95	30,81	+
Iceland	32,70	32,57	-	12,46	8,23	-
Ireland	38,00	36,67	-	17,54	11,04	-
Italy	37,23	36,31	-	13,64	15,91	+
Japan	35,66	42,9	+	25,09	67,85	+
South Korea	38,54	38,76	+	23,69	24,17	+
Luxembourg	32,83	37,28	+	14,38	28,33	+
Netherlands	35,45	37,02	+	9,54	9,74	+
New Zealand	33,00	43,08	+	11,12	62,16	+
Norway	33,23	36,45	+	8,89	12,42	+
Portugal	39,51	39,91	+	30,84	41,40	+
Spain	38,92	38,26	-	18,71	19,16	+
Sweden	29,12	29,62	+	3,93	3,96	+
Switzerland	31,58	32,18	+	8,90	9,23	+
United Kingdom	33,80	37,58	+	14,61	14,1	-
United States	37,46	40,06	+	26,82	23,3	-

* Some countries do not have data for 1985 available. The nearest year is chosen as reference.
Countries included: Iceland (1989) and Switzerland (1997).

** Some countries do not have data for 2007 available. The nearest year is chosen as reference.
Countries included: Australia (2001), Iceland (1996), Korea (2006), Netherlands (2005), Norway (2006), Sweden (2000), and Switzerland (2001).