

# **Attracting FDI as a Development Strategy**

## **An Analysis of the Effects of Foreign Direct Investments on the Economies of Developing Countries**

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### **Abstract**

This paper is written in order to study the effects which foreign direct investment firms have on developing host countries in order to find if countries' policies to actively attract FDI are a good development strategy. In order to find how FDI effects the countries are a big set of possible effects discussed and empirically tested using firm level data from 126 different developing countries. As such, the paper discusses the issue of the effectiveness of FDI attracting policies on an as broad and inclusive base as it finds possible. The result of doing this is it finds FDI firms, through being superior to domestic firms and thereby more efficient and increasing the wage level, do likely cause an increase in economic growth in the less advanced economies; as a positive correlation between economic growth and FDI is also found. However, it is also shown FDI firms by competing out the domestic companies might have long run detrimental effects to the country's own industry. This, combined with the result showing effects likely differ depending on the country, shows caution needs to be taken in implementing FDI attracting policies. As such, the developing countries which do implement FDI attracting policies are likely to get positive effects of doing so but should watch out or they might in the end end up being worse off.

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# I. Introduction

An increased interest among firms to engage in foreign direct investment (FDI) can be seen in the rapid pace with which FDI increase, something which was noted already in 1993 when it had tripled since the mid 80' (Froot, 1993). The great increase in FDI in this period is possible to confirm with data from UNCTAD (2015) when adjusting for inflation using CPI based inflation data (Bureau of Labour Statistics, 2015). The data also shows FDI in the mid 80's was down below 0.5% of world GDP and grew to become 0.9% of world GDP in 1993. The data also shows the world FDI increased further with more than six times the amount between Froot's observations in 1993 until 2007, at which point it was up in 4% of world GDP, after which it has declined slightly likely due to the crisis. Further, the data makes it is clear a lot of the FDI in the world goes from developed countries to developing countries, even though FDI seem to also occur between developed countries and possibly also between developing countries. This is to an extent where countries in Eastern Africa, South-East Asia, and Latin America receive over 5% of their annual GDP as FDI and in many developing countries has FDI become the dominant source of funding (Calderón & al., 2004). Thus, it is important to study what the effects of FDI on the host country is as the effects are likely to increase with the increasing streams of FDI and as the host country's which likely get the most effected is the less developed countries in the world.

The reason why firms engage in FDI, and thereby become multinational enterprises (MNE), has been a hot topic since the 1960's (Velde, 2006). Further, one of the earliest still relevant theories; the OLI framework; was proposed by Dunning already in the 1970's (Neary, 2008). What the theories of firms decisions to engage in FDI (Brainard, 1997; Helpman & al, 2004; Neary, 2008) have in common is the idea of firms engaging in FDI due to it being beneficial for them; which likely is the reason due to basic economics. It would be beneficial either through the host country being a beneficial site of production even though not the intended market, so called vertical FDI, or as an alternative to exports due to benefits of being close to the market, so called horizontal FDI. These reasons are all regarding the self-interest of the firm and risks of the FDI firms crowding out the domestic market and causing damage seems to exist, which has caused outcries calling the MNEs "neo-collonial" (Vidal, 2009; Grammaticas, 2012). Nonetheless, policies in developing countries in order to attract FDI are by now common and started to come into place since the 1990's, which means this form of "neo-collonialism" seem to be welcomed and wanted by the host country and might even have positive effects for the host country, even though the firms engaging in it do it due to it being preferable for them. The FDI attracting policies are in many cases in the form of special economic zones (SEZ) which are areas of a country in which different trade and tax

policies apply in order to accommodate trade and exports. The SEZs have been arranged all across the developing and newly industrialized countries which famous examples existing in China and the most recent examples existing across the African continent (Farole & Akinci, 2011; Woolfrey, 2013). However, what the benefits or potential harms to developing of them attracting FDI are is still generally unclear. Hence, a study of the effects of inward FDI to a developing country is important to understand the future of economic development in the world and to evaluate if what these weak economies are doing is beneficial for their people.

The point of this paper is to make a broad study of the possible effects which FDI can have on developing host countries, as to understand if it is positive to attract FDI. Plenty of studies have been done in the past but all of which have focused on just one or two aspects, despite the papers finding a series of aspects exists. Hence, what the paper will add to current research is a combined study of a great extent of effects to get a bigger picture. Further, existing papers generally focus on just one or in some cases a few countries in order to find detailed results for how the chosen effect of study effects the chosen country on a more detailed level and it is not uncommon to use agglomerated data for the research. This paper will differ in its use of an international data set, from which 126 different developing countries will be included in the analysis, which has data on a firm level. Hence, the paper will attempt to bring together a huge set of possible effects FDI can have on developing countries on a global scale by studying how FDI affects the firms of the country.

This paper will mainly focus on horizontal FDI, despite vertical FDI likely having effects as well. This is since horizontal FDI firms produce their main product, which they are most specialist in, in the host country and since horizontal FDI firms are more likely to be more engaged in the country as they produce for the country's market and not just to ship their products out of there. Further, it is also because firms who only are in a foreign country to produce exports for other markets are likely doing more short term planing and generally not behaving like normal firms sine they due to the nature would move if a country with better opportunities came about. However, only firms who solely export will be excluded as all firms who at least partly engage on the host country's market can be thought of as roughly equal in terms of engagement since they all are somewhat tied to the market. Similarly, only less advanced economies will be used as host countries as advanced economies seem to exchange FDI with each other while less advanced economies in an other way have a one way inward stream of FDI. As such, the less advanced host countries for FDI differ from the advanced and are more interesting for this study from a development perspective. As such, there are certain limitations on what FDI and what host countries will be considered in this paper.

In the following chapters will the possible benefits and harms of FDI be theoretically and

empirically discussed from the aspect of the host country as to find whether FDI can be a big help in the development in less developed countries. In chapter II will economic theory and a literature review be used to find a bigger group of sub-hypotheses to in a systematic way discuss and test different possible ways through which FDI can affect a country. Chapter III will contain an analysis of the data which will be used in chapter IV to test sub-hypotheses empirically. Chapter V will be used to combine the result from all sub-hypotheses theoretical and empirical part to answer the main question, what are the total effects of FDI on a host country. Finally, chapter VI will conclude the paper.

## **II. Literature Review and Hypothesis**

Since FDI investments are growing internationally and an increasing amount of countries change their policy in order to attract FDI is the paper's main hypothesis

- FDI do have primarily positive effects on the developing host country.

However, in order to test and discuss this hypothesis in more detail will a review of previous work be conducted to find which effects FDI are likely to have on the host country. The debate regarding what the host country earn or loses on attracting FDI did take off in the 1960's and which is at the same time as research on why firms would engage in FDI at all (Velde, 2006). However, in difference from the multitude of theories regarding why firms do engage in FDI are there no generally recognized economic theories regarding what the effects of FDI are on the host country, instead there are big set of separate hypothesis which have been tested empirically in a great amount of papers. Hence, the literature review will instead of a look at theories consists of a summary of mainly randomly chosen peer-reviewed papers who have commented and done empirical work upon the topic of the effects of FDI. The positive effects can come either from the bigger and more efficient FDI firms; which they are likely to be since it is the most efficient firms that engage in FDI (Heplman & al, 2004); benefiting the host country by their presence or through the FDI firms having spillover effects on domestic firms.

FDI can cause production and innovation improvements in the host country by setting an example and by spreading technology through better processes and superior physical capital, in a way which they could not do if they werent present in the country, and by this induce economic growth (Johnson, 2006). This can be done through either reverse engineering or through a demonstration effect. In the case of export can the product itself be reverse engineering, while FDI by being present on the market makes reverse engineering of the production process itself possible. The demonstration effect works in a similar way by inspiring firms which operates in the vicinity of

the more efficient FDI firm, in accordance with the theory of agglomeration externalities (Jacobs, 1969). FDI firms has been shown to work as examples for domestic firms and as sources of modern technology for example using data from 1980-2002 over Swedish MNEs (Johnson, 2006) and data from 1995-2000 in China (Cheung & Lin, 2004). Further, if the FDI firms themselves are more productive, as they in all studies above have been shown to be, does this mean a more efficient use of the means of production of the country which also should contribute to an increased growth through increased production.

Foreign firms are likely to pay higher wages than domestic firms, in order to attract the top workers, which both spillover into an overall higher wage level in the economy and which under the assumption of consumption lead growth would cause economic growth and therefore a higher welfare for the country. This has been shown to be the case, for example using 1996 data from Indonesia (Lipsev & Sjöholm, 2004).

The employees of a firm get trained both through practical knowledge from working in the firm as well as from employee education programs. Since, the foreign firms are assumed to be more efficient than the domestic firms would experience from them increase the employees knowledge and productivity more than in domestic firms. This part can be tested more directly by comparing how much foreign firms spend on employee education compared to domestic firms. FDI's ability to cause a more educated work force has been shown in terms of labor productivity with 1990-1995 Indonesian data (Takii, 2005) as well as in terms of skill labor turnover with 1995-2000 Chinese data (Cheung & Lin, 2004).

There are papers suggesting FDI can contribute to increased research and development (R&D) in the country both by bringing their own R&D and by encouraging domestic firms to engage in R&D as well. Papers finding this to be the case have used 1995-2000 (Cheung & Lin, 2004) as well as 1998-2003 Chinese data (Guoming & Bing, 2005). Thus, studied previous papers have unfortunately just showing this to be the case in China. However, if the firm decides to engage in FDI is that not the full story regarding R&D as the firm can either decide to start up their own enterprises in the new country, greenfield FDI, or by buying themselves into existing domestic firms through merging and acquisitions (M&A). This is relevant since a study done on data from 1970-1998 over Swedish MNEs show there is a between M&A establishments and greenfield establishments, by the M&A establishments investing more in R&D than what the greenfield do. (Bertrand & al., 2007) However, the data set which will be used include no data regarding greenfield or M&A and this must therefore be dropped from the hypothesis despite being interesting.

Similar to the crowd-out effect caused by government investment can foreign firms crowd

out domestic investment by fierce competition, not only on the goods market but also on the labor market and other resource markets. This is not per se a negative effect in the short run since it do mean less productive firms are replaced with more efficient foreign firms, given the profits stay in the host country. However, this could be negative if the foreigners sent the profits back to their country of origin. Further, in the long run is this negative for the country in a case where the FDI is retracted since this means the domestic firms would in such case be left with only underdeveloped firms. Both in a paper using 1971-2000 data from 36 countries; 12 African, 12 Asian, and 12 Latin American; (Agosin & Machado, 2005) and in a paper using 1983-1999 data from China (Liuyong & Guoliang, 2002) has this been shown to possibly be the case. Therefore, it is clear there are not only upsides for the host country in attracting FDI.

A further possible effect not found in any already publish papers is FDI firms ability to increase gender equality in the host country. This idea is supported by a UNDP (2013) report ranking countries according to a gender inequality index, which shows the advanced economies; which are generally the economies investing in FDI (UNCTAD, 2015); have clearly higher levels of gender equality than the poorer nations which in this paper are measured as the receivers of FDI. Hence, under the assumption the firms from the advanced economies bring with them the views on gender equality which exists in their home countries will the FDI firm by their presence raise the gender equality in the host country and hopefully also cause spillovers to domestic firms.

In total are six channels through which FDI can affect a host country identified, even though more channels do likely exist. Of the six are five effects positive for the host country; the exception being the crowd-out effect; which can explain why many papers have found FDI spurs growth. Hence, it seems to be positive for a country to have high levels of FDI and therefore would policies which can increase FDI, such as those implemented around the world, possibly help developing countries grow. Hence, the main hypotheis of FDI primarily having positive effects finds empiric support.

The six channels through which FDI can effect the host country are in themselves not sub-hypotheses but inspire the creation of two sets of sub-hypotheses, one regarding the superiority of the FDI firms over domestic firms and one regarding these superior firms spillovers on domestic firms; by making domestic frims improve. As such, the first set based upon the six channels are:

- FDI firms have superior technology usage compared to domestic firms.
- FDI firms pay higher wages than domestic firms.
- FDI firms spend more on labor education than domestic firms.
- FDI firms spend more on R&D than domestic firms.

- FDI firms are a greater competitor to domestic firms than what domestic firms are to FDI firms.
- FDI firms run more gender balanced operations than domestic firms.

These all are straight forward in testing since they can be confirmed or rejected through comparing firms of different ownership, after first controlling for things like size and age.

Even though most papers do find FDI firms to be superior to domestic firms are spillovers not a given since they do depend upon how susceptible the domestic firms are to the FDI firms, which likely can be part of why some papers find a well developed financial market to be important (Azman-Saini & al., 2010). Further, even though most papers agree on the existence of spillover effects do some papers find empirical evidence contradicting this all together (Vahter & Masso, 2006). Hence, it is a point to testing spillover effects separately in order to see not just what FDI firms bring to the host country but also how the FDI firms effect the domestic firms. Based on the six sub-hypothesis in the first set can therefore a second set of spillover related sub-hypothesis be stated, all linked to one of the sub hypothesis in the first set. This since all spillovers work under the assumption the FDI firm is more efficient and as such can through inspiration and competition improve the domestic firms. These are:

- Domestic firms in countries with higher levels of FDI use better technology due to spillover.
- Domestic firms in countries with higher levels of FDI pay higher wages due to spillover.
- Domestic firms in countries with higher levels of FDI spend more on educating their labor force due to spillover.
- Domestic firms in countries with higher levels of FDI spend more on R&D due to spillover.
- Domestic firms in countries with higher levels of FDI have a harder time on the input and final goods markets due to crowding-out competition.
- Domestic firms in countries with higher levels of FDI have more gender equal operations due to spillover.

These are not as easy to test since the data set contains cross-sectional data without any real panel data aspect. As such, what will be found is a correlation but causation will be hard to assert. Further, issues of endogeneity can occur. However, given the size of the data set can a clear correlation hopefully still be found.

Finally, if the above hypotheses hold true and the main hypothesis; that FDI primarily have positive effects on the host country; also holds true should a country with higher levels of inward FDI experience higher growth. Overall, the papers finding a positive effects of FDI do also find FDI helps induce growth in the developing countries it occurs in; *exempli gratia* (Cheung & Lin, 2004),

(Damijan & al., 2008), and (Johnson, 2006). However, there are papers suggesting a well developed financial market is needed for this growth benefit of FDI to occur (Azman-Saini & al., 2010), other papers gets results showing the size of the effects; thus including the growth effect; differ between firms and between countries based on their ability to absorb the effects (Damijan & al., 2008), and finally as previously state some papers do not find any effects at all (Vahter & Masso, 2006). As such, it is relevant to in the end look into whether there is a correlation between inward FDI and economic growth in the developing host countries, as this over arches all the hypothesis and since it is unclear whether this is the case. Hence, the final hypothesis is:

- Countries with higher levels of FDI do experience higher levels of economic growth.

However, this hypothesis cannot be tested with the main data set as it is not on a firm level and a second data set will instead be used for this hypothesis, a data set which enables panel data analysis.

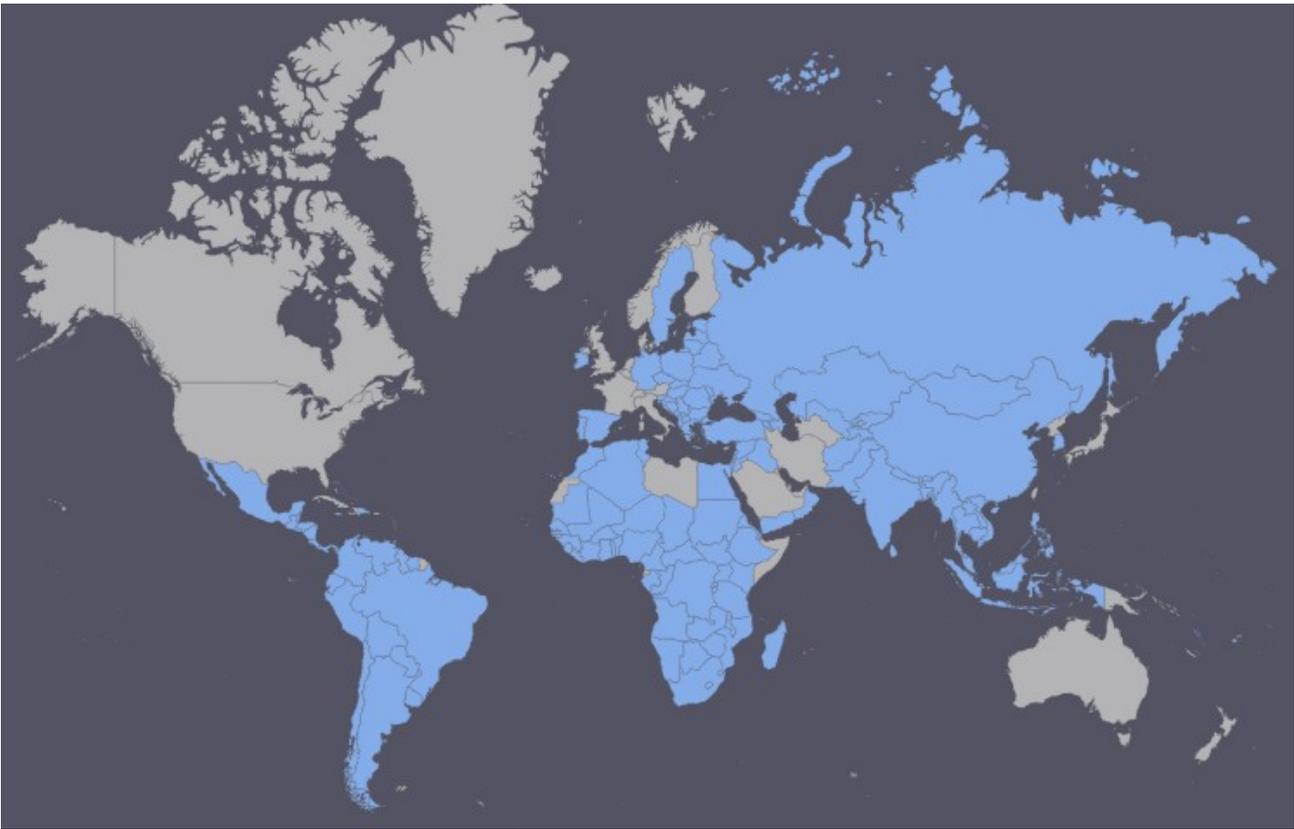
With the growth hypothesis, two sets of six sup-hypotheses each which are linked one-and-one between the sets are found as well as an over-arching final sub-hypothesis. All these will be tested, set by set separately, and discussed in order to find the effects for the host country of attracting FDI and thereby answering the main hypothesis.

### **III. Data Analysis**

Data for the empirical testing will primarily be picked from the World Bank Enterprise Surveys (World Bank, 2015a) but data will also come from the World Bank World Development Indicators (World Bank, 2015b). The first of them; The World Bank Enterprise Survey; contains survey data collected on a firm level in different locations and at different times while the second; The World Bank World Development Indicators; contains agglomerated national data from 1960 and forward.

#### **III.I. World Bank Enterprise Survey**

For the Enterprise Survey has two standardized surveys been used, one between 2002 and 2006 and one from 2006 onward. The 34 countries which were surveyed in 2006 were surveyed in both the old and the new system; except seven countries which only were surveyed in the old system, one country which was only surveyed in the new system, and Namibia for which two-thirds were only surveyed in the new system; and for them was the old survey data deleted in order to avoid duplicate data. The differences between the two survey systems lies mainly in the formulation and amount of questions asked, with it seeming like the new system implemented to make up for data lacking in the old system. A further difference is the way values are reported, the biggest difference being the old system reporting missing data as a dot while the new system to a certain extent report missing



*Illustration 1: The countries for which data exists  
Created with the use of: [amcharts.com/visited\\_countries](http://amcharts.com/visited_countries)*

data as negative numbers which has to be kept in mind and converting all negative numbers to dots is necessary to not end up with faulty data.

As of April 2015 does data exist from 147 states; whereof Serbia, Montenegro, and Kosovo are registered as one and separately, id est totally four countries, due to the recent independence of the three from each other. Further, a total of 323 survies have been conducted containing totally about 170'000 firms, meaning the average country has been survied more than twice since the first set of survies were published in 2002 and there are on average more than 500 firms per survey. Of which Bulgaria have been survied six times and 45 countries have only been survied once; and of which the biggest survey, India 2014, contains 9281 firms and the smallest survey, Micronesia 2009, only contains 68 firms. The countries for which data exists are shown in Illustration 1; including eleven Carribbean states, Cabo Verde, The Gambia, Djibouti, Mauritius, and five Pacific states which are in the illustration but due to their small size are not visible. All survies are regarding what the situation was in the survied establishment in he latest finish fiscal year, id est the year before the survey was conducted.

Since the host countries considered are the developing countries will the more advanced economies have to removed from the data set. Using the list of advanced economies which is

published by the International Monetary Fund (2015) in their annual publication *World Economic Outlook* are a few of the countries in the data set found to be advanced and should therefore be excluded. The economies to be excluded are the Euro Area economies, except Latvia; Sweden; Czech Republic; Israel; and the Republic of Korea. However, an exception will be done for Croatia as it joined the list first in 2013, as it became a part of the Euro Area and as it had not been an advanced economy before (IMF, 2013), and the latest data it has in the data set is regarding 2012 and thereby is there no conflict in including it. Further, due to the common market limiting the countries of the European Union, a union in which most countries are on the list of advanced economies, from setting their own FDI related policies and inability to in any way control their inflow of FDI will all the remaining European Union members be excluded as well in order for the union to not affect the result. Furthermore, the territory West Bank and Gaza will also be excluded since the data do not specify whether Israeli firms are seen as foreign or domestic in these areas, which means the territories might be included in the list of advanced economies. Hence, 129 countries, spread out over 269 surveys, containing about 150'000 firms remain to be used in the empirical work of this paper.

The survey contains some different country specific questions, however the big mass of questions are part of the new or the old standardized questionnaire; which of the two depends on whether the survey was taken before or after 2006. Therefore, the two standardized data sets will be used in this paper to limit the amount of possible data and therefore limit the possible errors. However, the two standardized questionnaires got a lot in common even though the old questionnaire data set only contains 541 variables while the new contains 952, meaning the data from the older data set might be excluded from some parts of the empirical testing; which is not a great problem since of the remaining data are 45 thousand observations in the old data set and 103 thousand in the new so the new data set is the more important.

In order to determine whether an establishment is part of an FDI firm or a domestic firm do both systems have a question regarding ownership; “what percentage of this firm is owned by:”<sup>1</sup>; which has the alternatives private domestic, private foreign, government, and other. From this will all private foreign be seen as the only FDI firms even though the category government might include foreign governments. Hence, in cases where there is insufficient or incorrect data; id est the sum of the values do not add up to 100%; in regard to the question will the firm have to be dropped. Further, all firms which are partially registered as “other” will be dropped as well due to the insecurity of what their ownership status really is. In the old system do 333 firms from different surveys have insufficient data and of the remaining are 857 partly owned by “other”. Thus, a total of

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1 Question 3 in the old questionnaire and question B2 in the new questionnaire.

1190 are therefore deleted; of which no full survey has insufficient data. From the new survey data set are 1891 firms lacking data on the topic and of the remaining are 2570 firms partially owned by “other”. Therefore, a total of 4461 firms have to be deleted; in this case did all 500 firms from the survey Venezuela 2006 get deleted.

In order to determine whether a FDI firm engages in horizontal FDI at all; id est the FDI products are at least partially sold in the host country's market; is there question in each survey regarding what percentage of sales are sold domestically, what percentage is sold as indirect exports, and what percentage are sold as direct exports<sup>2</sup>. From this will all domestic sales be seen as horizontal FDI as they would otherwise have to be imported or not entered the market at all. Thus, as in the case of determine ownership will all firms with insufficient or incorrect data have to be removed; id est all firms for which the three do not sum to 100%. In the old data set are 1201 firms removed due to lacking this data. From the new data set are 918 firms dropped due to lacking data. From the two systems are no survey affected in particular by this removal.

The private owned and government owned will be used as benchmarks to compare the FDI firm and are therefore useful for the paper. However, as the paper will mainly focus at the behavior of horizontal FDI firms will all FDI firms, for now defined as any firm owned at least partly by a foreign private owner, who have 0% of their sales in the host country be excluded. Since they in such a case are not even partly engaging in the market of the host country and therefore is it questionable to which extent they can effect the domestic firms. Further, if a survey has not a single firm with any foreign ownership left after this removal are the whole survey removed since it then give no useful data. In the old data set are 1084 of the 5327 partially or fully foreign owned firms not selling anything on the domestic market and are therefore uninteresting for this paper; of which no survey had all its data deletedbut firms in South East Asia were over-represented. However, the old data set did contain one survey, Peru 2002, which after this contained 41 firms whereof none was a FDI firms and therefore was the survey removed. From the new data set did this cause the deletion of 927 of the 9914 remaining FDI firms; whereof South East Asia once again was over-represented. However, the new data set contain three survies; Afghanistan 2014 with 371 firms, Azerbaijan 2013 with 390 firms, and Kosovo 2009 with 258 firms; which after all removals contain no FDI firms and where therefore deleted.

Of the remaining firms are 13'230 partially or fully foreign owned, 4697 are fully foreign owned, and of the fully foreign owned firms are 3883 only selling their products on the domestic market. However, this means many of the remaining FDI firms are just partially foreign owned. The firms which only have a partial foreign ownership will either be classified as fully foreign or

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2 Question 11 in the old questionnaire and question D3 in the new questionnaire

removed depending on whether the control of the firm is foreign, id est if the foreign owners have 50% of the ownership or more. The reason for this is since firms who are FDI owned but not controlled have an unknown degree of foreign involvement. Doing this removes 1036 firms from the old data set and 1915 firms from the new data set. However, it also leaves the survey Kosovo 2013 without any FDI firms and its 199 firms are therefore removed.

Remaining in the end are 128 countries; since both Kosovo survies were lacking FDI firms; spread over 263 survies; still roughly two survies per country; containing a total of about 134'000 firms; still about 500 firms per survey. Of this are 10'279 firms foreign controlled, which is more than 39 firms per survey, which means each survey contains about 460 control firms which are either private domestic or public owned. Hence, there is a big enough set of firms remaining to conduct meaningful empirical studies of the two sub-hypotheses which is combined into one big data set.

### **III.II. World Bank World Development Indicators**

In the World Development Indicators (WDI) is there different kinds of agglomerated national data from 1960 and forward for 214 countries and territories. The data from here which will be used in empirical testing of the sub-hypotheses is most importantly the data concerning FDI net inflows in percentage of GDP as well as in total numbers, which will be used in the empirical testing of the spillover hypothesis as well as the growth hypothesis. Additional data, growth data and a few control variables, will also be picked from this source for the testing of the growth hypothesis. The issue of using this data is it will not enable a study on the behavior, conditions, and attitudes of firms; as the other data set can; but the benefit is it will provide a greater time dimension through being proper panel data. The data which will be used is from 2000-2013 and only for the 128 countries which are remaining in the Enterprise Survey data. However, also Serbia and Montenegro will be dropped from the survey data, as it does not exist in the WDI, resulting in 127 countries remaining in both data sets.

## **IV. Empirical Testing**

The empirical testing will be conducted using cross-sectional analysis for the two first sets but with an element of panel data analysis in the second set and with pure panel data for the growth hypothesis. This is since in the survey data are only 78 of the 128 included countries being survived more than one year; 40 countries are survived twice, 22 countries are survived thrice, 10 countries are survived four times, and a mere 5 countries are even survived five times; which do make it hard to

include any greater time aspect for most countries. Further, it is unclear to what extent it is the same firms survived in the countries survived more than one year since the survey is anonymous.

For the first set of sub-hypotheses; regarding the superiority of FDI firms; must domestic private and public firms be used as a benchmark toward which the FDI firms will be compared. Similarly, for the second set of sub-hypothesis; regarding spillover effects; will only data from private domestic firms be used. Hence, three groups need to be created as dummies depending upon firm ownership: one for the more than 10'000 FDI firms; defined as all firms who are at least 50% foreign owned; one for the more than 3'000 public domestic owned; defined as all firms who are at least 50% public owned given it is not already defined as an FDI firm; and one for the more than 120'000 private domestic firms; defined as all firms who are more than 50% private domestic owned. Hence, all firms are registered in only one of the three categories and the reason for prioritizing FDI and secondarily prioritizing public firms is due countries which actively try to attract foreign firms likely let them lead the firm if FDI/public owned and because both foreign and public owners likely have more power than private domestic firms in the cases with 50/50 ownership. Further, of 50/50 owned firms were only 80 firms owned public/private domestic, 21 firms public/FDI, and 979 firms FDI/private domestic; as such is this unlikely to skew the data to any greater extent. Also, cases with triple split ownership did not exist in the data set at all. In sum, the quality of the FDI firms will be possible to test by dummy variable analysis in a comparison between different survies respectively in comparison with dummies for two other kinds of firms while the spillovers will be possible to estimate by isolating the private domestic firms.

#### **IV.I. Discussion of Variable Measurement**

The measures of the hypothesis specific data; even though they for set one will be used as dependent variables and for set two as independent variables; are the same for both the two big sets of sub-hypothesis within each connected pair of hypotheses, with the exception of the competition hypotheses. However, the sub-hypothesis regarding the connection between inward FDI and growth is measured differently and will be discussed later. These hypothesis specific measurements of data are:

- Firm technology is measured in whether the firms uses e-mail and website in contact with suppliers and costumers<sup>3</sup> and how high their revenue is per employee; calculated by dividing the revenue<sup>4</sup> with the amount of employees after converting the revenue values to 2005 US\$

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3 Question 24 in the old questionnaire and question C22 in the new questionnaire.

4 Question 74a1y in the old questionnaire and question D2 in the new questionnaire

to have it all in the same units<sup>5</sup>. The issue with employee numbers are there exists both permanent employees and temporary employees, which means three separate revenue per employee measures will be created: one using only permanent employees<sup>6</sup>; in the result tables referred to as (1); one using all employees<sup>7</sup> (2), and one using all employees but weighing the temporary employees by how many months they on average are employed<sup>8</sup> (3). In the calculation of the three employment measures were data from firms claiming to have no employees removed and all weights over one year temporary employment as if it was one year. Hence, a total of five measurements is used for these two hypotheses.

- Wages are, due to a lack of data in many questions, measured based on the total cost of labor which includes “wages, salaries, bonuses, social payments”, “[a]llowances, [...] and other benefits”<sup>9</sup>. In order to calculate wages will this measure be divided by the amount of workers, using the same three methods of calculating workers as for the previous hypothesis specific variables, resulting in a total of three closely linked measures for these two hypotheses.
- Education of the labor force is hard to survey due to varying quality and format, thus the data which exists and will be used is data regarding whether if formal “off the job” training programs exists<sup>10</sup>. The reason why this is used instead of existing survey measures regarding percentage receiving training is due to the relative lack of data and higher degree of uncertainty in the percentage data. Thus, only one measurement exists for these two hypotheses.
- R&D expenditure is measured by whether the firm during the last three years have undertaken the development of a new production line, upgrading of an existing line, and the introduction of new substantial technology; for which data only exists for firms in the old data set<sup>11</sup>; and how much the firm in the past year spent on R&D; for which data also only exists for firms in the old data set<sup>12</sup>. Thus, four variables exists for these two hypotheses. However, all four only cover a small section of the total amount of surveies, but the covered survies are well covered.
- Firms level of competition is measured in share of the local market and of the national

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5 The old data set have data in thousands while the new data set has data in singles, which also is taken care off. The conversion is done using exchange rate data (World Bank, 2015b).

6 Question 62a1y in the old questionnaire and question L1 in the new questionnaire.

7 Temporary employees are in question 63a1y in the old questionnaire and question L6 in the new questionnaire.

8 Question 63c1y in the old questionnaire and question L8 in the new questionnaire.

9 Question 74j1y in the old questionnaire and question N2a in the new questionnaire. NB, the old questionnaire report values in thousands and the new report in singles.

10 Question 67a in the old questionnaire and question L10 in the new questionnaire.

11 Question 58 in the old questionnaire.

12 Question 80 in the old questionnaire.

market; for which data only exists for firms in the old data set<sup>13</sup>; in whether the firm has sees its technology as inferior or superior; also limited to the old data set<sup>14</sup>; the average education of a typical production worker; which is calculated differently in the two data sets thus will be used as two different measures in the regression<sup>15</sup>; and in how big obstacle access to good labor<sup>16</sup> and access to land is<sup>17</sup>. Hence, there exists five measures for this couple sub-hypotheses, whereof the five three have limited data. However, only the last two; regarding access to resources; are applicable for the group two sub-hypothesis.

- Gender equality within the firm is measured in percentage of senior management is female<sup>18</sup> the percentage of total workers, management, professional workers, skilled-production workers, unskilled-production workers, and non-production permanent workers who are female<sup>19</sup>; whereof all only exist in the old data set. The variables is also measured by whether any owners are female<sup>20</sup> and the percentage of production and non-production permanent full-time workers who are female<sup>21</sup>; whereof all only exist in the new data set. As such, a total of ten measure exists for this variable, but not a single of them exists for all survies which is a restriction on the regressions.

As such, all six sub-hypothesis in the two sets; which means twelve of the totally thirteen suggested hypothesis; are possible to measure; using the data from the enterprise survies. All but two are possible to measure in more than one way, the benefit of which is more measures provides different angels of the same hypothesis and as such all possible measures were chosen. However, the different measures will be used in separate regression after which the combined result will be used to discuss whether the hypothesis should be rejected.

All the measures have their observation amounts, ranges, means, and standard deviations, as well as description of what their values stand for described in further detail in Appendix Table 1. In it is it clear the measures are skewed differently and have different amount of observations, meaning their results are likely to differ in uncertainty.

Upon running a preliminary regression; using the first set of sub-hypotheses' OLS regression shown later in equation 1 and giving the result of which is shown in Appendix Table 2; was an issue found with some values producing poor results. Looking at the details of each measure, as shown in

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13 Question 10 in the old questionnaire.

14 Question 56 in the old questionnaire.

15 Question 70 in the old questionnaire and question L9 in he new questionnaire.

16 Question 18I in the old questionnaire and question L30b in the new questionnaire.

17 Question 18D in the old questionnaire and question G30a in the new questionnaire.

18 Question 72 in the old questionnaire.

19 Question 62 in the old questionnaire.

20 Question B4 in the new questionnaire.

21 Calculatable by using question L5 and question L3 in the new questionnaire.

Appendix Table 1, was a possible issue with outliers found. The issue of outliers exists for all the productivity measures, wage measures, and the R&D expenditure measure, which all have a big mass of low values and then a skew toward higher values with major gaps to the top firms and which likely is the reason why these measures give nonsensical results. The cause of this outliers is not due to an error in a specific survey or an issue with converting from local currency to 2005 US\$ as the extreme firms are generally spread over countries and over years. However, the cause can either be extremely great firms which simply behave differently from all other firms or just misreported information. Since the aim of these survey is not to study these effects in detail and discuss why the outliers might exist is the data quickly adjusted so these handful of firms will not cause out of proportion results; apart from removing all firms reporting no sales and all firms reporting no wages since no sales and no wages do not make sense; by setting the top 1% of firms for each measure to unknown. These measures have between over 100'000 and over 22'000 firms and as such removing 1% is not doing severe harm to the credibility of the data. Hence, all these seven measures still have values skewed toward higher values but now without any major gaps.

All six hypotheses couples therefore got a series of possible measures which will be used. All measures got sufficient with data, the least existing measure containing 6'677 observations, and after cutting outliers from seven of the measures is the spread of all measures in a way which is makes reliable regressions possible; for further details see the preliminary results in the Appendix Table 2.

## IV.II. Control Variables

The two big sets of sub-hypothesis will include the same control variables in their regressions. The regression regarding the growth hypothesis on the other hand have a separate set of control variables which will be discussed later. These seven control variables for the two sets, based upon what has been suggested in the papers in the theoretical part of this paper, are:

- Industry of the firm, since the effects likely depend upon the industry of production since different industries act under different conditions. Data for this exists on a separate sheet in the old questionnaire set but is incorporated in the new questionnaire, as it is question A4. In both data sets is the industry classified based upon the World Bank's own system consisting of a total of 26 different categories, including "other unclassified".
- Legal status of the firm, since in most countries do different rules apply to firms of different legal status and therefore are they meeting different conditions<sup>22</sup>. A total of 7 different legal statuses are included in the questions, including "other", and it ranges from sole

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<sup>22</sup> Question 2 in the old questionnaire and question B1 in the new questionnaire.

proprietorship to publicly listed company but with a slight issue of not having same names in the two questionnaires.

- Size of the firm, as a bigger firm can spend more, have bigger competitive power, and can take greater liberties. This is measured partly in annual sales<sup>23</sup> and it is also measured in the weighted measure of employment numbers which is calculated in the same way as for the hypothesis specific measurement of data regarding firm productivity.
- Age of the firm in relation to the country in question, since older firms have had longer time to establish themselves on the market. Data for this is possible to calculate based on the year of foundation<sup>24</sup>. However, it is unclear if the firm has changed owner since it was founded which is a limitation to this data.
- The skills of the top manager, since a better manager can make a firm perform better independent of the ownership of the firm. This is estimated by the number of years of experience the top manager have with working in the sector the firm operates within<sup>25</sup>.
- Country the firm operates in, since different countries have different opportunities and different possibilities for the firms due to location and due to politics. This is measured in the reported country of the survey and as such implemented through country dummies.
- Year the survey is regarding, since different years means different settings, economies, and slightly different survies. This is measured as the year before the survey was conducted, in accordance with what says in the survey.

There was also a possible eight and ninth control variable regarding whether the firm had been previously public owned and whether how big the firm was upon start-up. However, both these were shown to be poor fits as control variables as they had very limited data. In contrast, all included control variables contain data for over 100'000 firms; for further details see Appendix Table 1.

When the preliminary regression, result of which is shown in Appendix Table 2, was run did these seven control variables all seem to be relevant. However, there is an issue with high levels of uncertainties in the result which causes inconclusive results in many cases. A likely cause of the high levels uncertainty is the vast amount of control variables; given it is one for each of the 127 countries, each of the 12 years, each of the 26 industries, and each of the 7 legal statuses. Hence, there is a need to simplify the measures of these four control variables compared to how they are measured above.

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23 Question 74a1y in the old questionnaire and question D2 in the new questionnaire. NB the old questionnaire has data in thousands while the new questionnaire has data in singles.

24 Question 1 in the old questionnaire and question B5 in the new questionnaire.

25 Question 73 in the old questionnaire and question B7 in the new questionnaire.

- The 127 country variables can be simplified into 16 location variables in which countries in the same region is grouped together; which works under the assumptions of countries in the same locality in general having similar political policies, culture, and economic situation. This is done by grouping the countries based upon the United Nations Statistics Divisions' (2013) way of dividing the world; but changing Mexico to a Central American country as well as making one group out of Micronesia, Polynesia, and Melanesia called Oceania in order to leave no country alone.
- The 12 year variables can be simplified into one variable based upon whether the data is from the old data set or the new data set, since this both catch issues caused by the differences between the two standardized survies but also since the switch between the two; which came in 2006; almost coincides with the 2007 economic crisis and as such shows two generally different situations in the world economy.
- The 26 industries can; based upon ISIC Rev. 4 (UNSD, 2008); be reduced to four by combining ISIC category A to F; which is different kind of primary and secondary production; into one, keeping ISIC category G on its own; as it is retail which is the biggest category in the data; and by combining ISIC category H to S; which are different kind of services; into one.
- The 7 legal statuses can be reduced to 4 by putting cooperatives, limited partnerships, and partnerships in the same category; as they are similar in structure; and by classifying the smallest group; publicly listed companies; as “other”.

As such, the regressions will instead of 172 control dummy variables only include 25 control dummy variables. The slimming of the amount of control variables in the regression hopefully gives better results without lowering the quality of the control variables. Further problems have been extreme outliers in employment numbers, which was corrected by cutting the top 1%, and some managers reporting experiences in the field being as long as over two millennium, solved by setting all manager experience on 100 years or more to unknown.

#### **IV.III. Empirical Testing of Set One: The Superiority of the FDI Firms**

The first set of sub-hypothesis included a total of six sub-hypothesis:

- FDI firms have superior technology usage compared to domestic firms.
- FDI firms pay higher wages than domestic firms.
- FDI firms spend more on labor education than domestic firms.
- FDI firms spend more on R&D than domestic firms.

- FDI firms are a greater competitor to domestic firms than what domestic firms are to FDI firms.
- FDI firms run more gender balanced operations than domestic firms.

These will all be tested one by one using the standard OLS regression shown in equation (1)

$$\text{hypothesis specific variable} = \text{firm ownership dummies} + \text{control variables} \quad (1)$$

The hypothesis specific variable vary between the six hypothesis; as it is the different above listed measures for the different hypothesis run one measure per regression. In contrast, the firm ownership dummies; one for FDI firms, one for private domestic firms, and one for government owned firms; and the control variables; industry, legal status, annual sales, amount of employees, age of the firm, skills of the top manager, geographic location, and the year it is in regard to; will remain the same for all regressions regarding the first set of sub-hypotheses. As such the dependent variable differ depending on hypothesis and the independent variable of interest is the ownership dummies.

When the preliminary regression was run did the Breusch-Pagan test show every single regression had an issue with heteroscedadicity, as shown in Appendix Table 2, which likely is a result of a difference in diversity between the different types of firms. Trying with the exchanging the test for the White test, running the test on a regression free from control variables, nor exchanging to running a preliminary regression using equation (2); an equation which is discussed later; gave the same result an indicated heteroscedadicity existed in all regressions. Further, running the regressions using robust standard errors did not significantly change any of the results nor any of the uncertainties. However, all presented regressions are still done using robust standard errors, in case an issue would exist, but all have also been run without robust standard errors; even though not presented; without any difference in result.

Running each of the measures for the different hypotheses regarding the superiority of the FDI firms over domestic firms through equation (1) give the result which is shown in a simplified format in Table 1 in which the result of the regressions is shown and discussed for each hypothesis, for further detail of the result see Appendix Table 3 in which one of the firm ownership dummies always is omitted due to the way the regressions are calculated. As is clear in Table 1 did the measures of a variable in general agree in their result, even though some regressions gave inconclusive results. Further, it is clear three hypothesis have been empirically supported out of doubt, one has some but weak empirically support, one is empirically inconclusive, and the last have weak but still existing empirical suggestions the opposite to the hypothesis holds true. However, the  $R^2$  for the regressions vary between 0.038 and 0.22 meaning the regression do not fit all the data very well and there exists a great possibility of firms breaking the general result.

**Table 1: Result of regressing the first six sub-hypothesis.**

Hypothesis	Result
FDI firms have superior technology usage to domestic firms	All regressions clearly showed FDI firms had superior technology than both private and public domestic firms, through better use of computers and through higher productivity per worker.
FDI firms pay higher wages than domestic firms	All regressions clearly showed FDI firms payed higher wages per worker than both private and public domestic firms.
FDI firms spend more on labor education than domestic firms	It is even within a 95% uncertainty interval more common for FDI firms to offer formal training to their workers compared to private and public domestic firms.
FDI firms spend more on R&D than domestic firms	It is uncertain what type of firm invent most products and technology, however FDI firms clearly spend more on R&D than both private and public domestic firms.
FDI firms are a greater competitor to domestic firms than vice versa	All seven measures are partly or fully inconclusive between the three ownership types of firms. The only conclusive is FDI firms have higher national market shares than public domestic firms, have self-reported better technology than private domestic firms, and have harder to access land compared to public domestic firms.
FDI firms run more gender balanced operations than domestic firms	Inconclusive for all variables except percentage female owners where it is clear FDI firms have, contrary to the prediction, fewer women than both private and public domestic firms and as such are less equal.

In order to test the empirical result, the five hypothesis with some empirical support or opposition gets one of their measures; the weighted labor measure in the cases of productivity and wages and the measure with most available data in the case of the other three; and get regressed one more time using the measures for the other hypothesis as control variables to find if this changes the result. However, due to lack of data regarding R&D expenditure in relation to the other measurements are R&D expenditures forced to be excluded from these regressions. The result, shown in detail in Appendix Table 4, is no change from the result shown in Table 1 with regard to FDI firms still offering more education to its workers but still having less equality. However, the result is more interesting in regard to FDI firms higher productivity and higher wages, which is when controlling for the other are these both inconclusive; id est FDI firms pay higher wages because they are more productive or alternative FDI firms are more productive because they pay higher wages.

In conclusion, the only sub-hypothesis in this set which held without problem was “FDI firms spend more on labor education than domestic firms”. However, also “FDI firms have superior

technology usage to domestic firms” and “FDI firms pay higher wages than domestic firms” found empirical support but this support seemed to be interlinked suggesting one of them holds just because the other one holds. Also the sub-hypothesis “FDI firms spend more on R&D than domestic firms” gained empirical support in finding FDI firms do in fact spend more than domestic firms. However, contradictory to this increased spending did FDI firms not seem to invent more than domestic firms; which either makes the R&D investment questionable investments, means domestic firms are stealing the FDI firms inventions which a form of spillover, or shows the questions regarding whether new products and technology are flawed in they do not measure quality of the inventions. Finally, the “FDI firms are a greater competitor to domestic firms than vice versa” found no support at all and surprisingly did regressions on data regarding “FDI firms run more gender balanced operations than domestic firms” show FDI firms seem to in fact be more male dominated than domestic firms. Hence, the first four sub-hypothesis in set two are therefore likely to find empirical support, while sub-hypothesis five is questionable, and the equality related sub-hypothesis might find contrary support.

#### **IV.IV. Empirical Testing of Set Two: The spillover effects**

The second set also contains a total of six sub-hypothesis, each linked to a sub-hypothesis in set one, and these are:

- Domestic firms in countries with higher levels of FDI use better technology due to spillover.
- Domestic firms in countries with higher levels of FDI pay higher wages due to spillover.
- Domestic firms in countries with higher levels of FDI spend more on educating their labor force due to spillover.
- Domestic firms in countries with higher levels of FDI spend more on R&D due to spillover.
- Domestic firms in countries with higher levels of FDI have a harder time on the input and final goods markets due to crowding-out competition.
- Domestic firms in countries with higher levels of FDI have more gender equal operations due to spillover.

In order to test for possible spillover effects will an OLS regression of the type shown in equation (2) be used:

$$\text{hypothesis specific variable for private domestic firms} = \text{inward FDI} + \text{control variables} \quad (2)$$

In it are the hypothesis specific variables, just as in the regressions for set one, the dependent variable and are all the above listed hypothesis measures, used one per regression.

**Table 2: Result of regressing the second six sub-hypothesis**

<b>Hypothesis</b>	<b>Result</b>
Domestic firms in countries with higher levels of FDI use better technology	It is unclear how their productivity is affected, however it is clear private domestic firms in countries with more FDI do, in contrast to prediction, use computers less
Domestic firms in countries with higher levels of FDI pay higher wages	All the measures supports this idea within a 95% confidence interval
Domestic firms in countries with higher levels of FDI spend more on educating their labor	Domestic firms in countries with higher levels of FDI offer fewer education opportunities, in contrast to theory.
Domestic firms in countries with higher levels of FDI spend more on R&D investments	Unclear whether domestic firms in countries with higher levels of FDI spend more or less on R&D, but clear they make fewer new products and technologies.
Domestic firms in countries with higher levels of FDI have a harder time on the input and final goods markets due to crowding-out competition.	Domestic firms in countries with higher levels of FDI have lower national market shares and harder to access land, in accordance with theory, but also have easier to access labor.
Domestic firms in countries with higher levels of FDI have more gender equal operations	The different measures on this hypothesis are either unclear or contradict each other, hence it is not clear what the result is

However, in different from the regression to the first set of sub-hypotheses will only data from private domestic firms be used in the testing of spillovers, as it is to these firms FDI effects can spillover. The measures of inward FDI; which is taken from the WDI; is a measure of net inward FDI as a percentage of GDP and as such unfortunately contains both vertical and horizontal FDI. Finally, as before are the control variables industry, legal status, annual sales, amount of employees, age of the firm, skills of the top manager, geographic location, and the year it is in regard to. As such, the dependent variable differ for each regression depending on the measure which is in use and the independent variable is the inward FDI. Also, in similarity to the regression of the first set are all presented regressions using robust standard errors as the issue still existed but once again without any changes in results.

The result of running the regressions; in detail showed in Appendix Tabel 5; is shown in Tabel 2 in a more simplified form, similar to Table 1. As seen do these hypotheses have a harder time finding empiric support, as only the wage spillovers seem to clearly exist while the other have more unclear results. Also the hypothesis regarding how private domestic firms have a harder time reaching the market if more FDI is in the country gets some support, since they get lower national share and harder to access land but contrary to the hypothesis get easier to access labor. The

hypothesis regarding technology usage, labor education, and R&D do have some inconclusive results but the results which are not are instead contradicting theory, hence the three hypothesis should be rejected. Finally, the hypothesis regarding whether “domestic firms in countries with higher levels of FDI have more gender equal operations” reach contradictory results as some data from the old data set oppose this idea while some data from the new data set supports it. However, it should be restated there is an issue with this regressions being done with cross-sectional data as the spillovers likely occurring over time. Further, the  $R^2$  were equally low in these regression, suggesting plenty of space for the firms to differ from the result shown.

A possible issue is the levels of FDI which have been used are the ones corresponding to the year in which the survies were conducted even though the FDI firms might take a few years to cause spillovers. However, including FDI data which is lagged one, two, and three years and using this both as the dependent variable and as control variables; in different regressions; do not change the result shown in Table 2 in any substantial way. The reason for this is likely because net inflow of FDI seem to be a generally slowly changing value; as an investment is a big undertaking; and as such is the contemporary net inflow of FDI already capturing the lagged effects since the inflow today depend on what it was last year. The reason can also be because the dependent variable in all these cases remains stuck to a specific year thus is lagged variables not enough to find the effect.

Another issue with this regression is the use of cross-sectional data. The effects shown here can be country specific to an extent greater than what the country related control variables can control for and therefore not show the effects of FDI but instead show the inflow of FDI is affected by something else which also affects the measures. However, five of the countries have data regarding all control variables and inward FDI for five different years each and can as such show how changes in FDI over time affect the different measures. However, as stated previously is it unclear if it is the same firms interviewed all five years, but these countries are still the closest to panel data this data set can come. Running regressions for firms only within these countries, country by country, in order to see if changes in FDI over time affects anything gives the result shown in Table 3. As shown, only twelve of the measures had data for all five countries and the result coming forth is all the way through contradictory to each other or just inconclusive. However, Table 3 suggests the technique measurement “Website usage” should probably be positive instead of negative as it was in the main regression and that the crowd-out measurement “Labor access obstacle” should indeed be negative; which means increase FDI leads to a decreased obstacle and which is in line with previous results but in contrast to predictions. Further, given wages was the only clear positive spillover found in Table 2 is it interesting one of the countries in Table 3 experienced lower wages in domestic firms in years with higher levels of FDI.

**Table 3: Result of regressing data country by country from five consecutive years.**

<b>Variable</b>	<b>Observations Range</b>	<b>Result Within 95% Confidence Interval (Number of occurrences of result)</b>
E-mail usage	317 - 1'468	Positive(1), Inconclusive(3), Negative(1)
Website usage	317 - 1'464	Positive(3), Inconclusive(1), Negative(1)
Revenue per employee (1)	317 - 1'463	Positive(1), Inconclusive(3), Negative(1)
Revenue per employee (2)	317 - 1'459	Positive(1), Inconclusive(3), Negative(1)
Revenue per employee (3)	317 - 1'460	Positive(1), Inconclusive(3), Negative(1)
Wages (1)	300 - 1'216	Positive(2), Inconclusive(2), Negative(1)
Wages (2)	300 - 1'216	Positive(2), Inconclusive(2), Negative(1)
Wages (3)	300 - 1'216	Positive(2), Inconclusive(2), Negative(1)
Formal Training	228 - 1'274	Inconclusive(5)
Labour access obstacle	316 – 1'460	Positive(1), Inconclusive(1), Negative(3)
Land access obstacle	307 - 1'365	Positive(2), Negative(3)
Any female owner	316 - 1'467	Positive(1), Inconclusive(4)

The biggest conclusion which can be drawn from Table 3 is the question of spillovers is not straight forward, an increase of FDI in a country over time will not automatically result in higher computer usage, higher productivity, higher wages, more training opportunities for workers, changed access to inputs, or changed gender balances. Instead, many factors play into these changes and the influence of FDI firms on domestic firms can likely be both positive and negative depending on different circumstances, likely the reason why previous papers seem to disagree even within the same years and same country.

In short, positive spillovers were only found in terms of wages, since the main regression clearly showed domestic firms in countries with higher levels of inward FDI do pay higher wages; even though one of the five most survived countries experienced lower wages in domestic firms in years with higher levels of FDI. Most other correlations which were found were negative, suggesting possible negative spillovers; as domestic firms in countries with higher levels of FDI did use computers less, educated their labor less, put forward fewer new products, had lower market shares, and had harder to access land. However, it should be noted the negative correlation between FDI and market share as well as the negative correlation between FDI and land access were predicted in the hypothesis: “domestic firms in countries with higher levels of FDI have a harder time on the input and final goods markets due to crowding-out competition” which as such found support. In contrast, the same hypothesis was contradicted by it being easier for domestic firms in

FDI heavy countries to find labor since FDI firms should be competitors on the labor market. Remaining measures were found to be inconclusive, or in the case of gender equality contradicting each other. As such, only the sub-hypothesis “domestic firms in countries with higher levels of FDI pay higher wages due to spillover” found greater empirical support while the hypothesis “domestic firms in countries with higher levels of FDI have a harder time on the input and final goods markets due to crowding-out competition.” found limited support. The other sub-hypothesis were generally contradicted by the empiric result, with the exception of the equality hypothesis which found no reliable support for it nor any reliable results contradicting it.

#### **IV.V. Empirical Testing Regarding How FDI Affects Growth**

Using the same countries as previously and data from the World Bank Development Indicators (WB, 2015b) can a fixed effects panel data regression be used to test the impacts of FDI on growth over time. The years which are used are the 14 years 2000-2013; the reason why 2014 is left out is due to the FDI data for 2014 has yet not published; and as such a total of 126 times 14 data points; 1'764; will be used in the regression which looks like equation (3).

$$Growth = inward\ FDI + control\ variables \quad (3)$$

In the regression is growth calculated as both the growth of GDP and the growth of GDP per capita and therefore will two separate regressions be needed. Inward FDI is, like for the spillover regressions, measured as net inward FDI as percentage of GDP. The control variables which will be used and measured are:

- Total GDP, since Brainard (1997) found this to be a factor which affects the inward FDI, since it seem to affect the firm decisions. This will be a continuous measure in constant 2005 US\$.
- GDP per capita, since it is unclear in Brainard (1997) whether it is the market size per se or the general wealth which really drives up inward FDI. This will be a continuous measure in constant 2005 US\$.
- Dominant industry of the host country, since the benefits of engaging in FDI compared to exports likely vary depending on industry due to internal public goods, trade costs, and economies of scale. This will be measured in percentage of the country's GDP which comes from agriculture; ISIC divisions 1-5; and what percentage of the country's GDP comes from industry; ISIC division 10-45; both calculated in value added.
- Stability of the country, since a more dangerous and volatile country might be to unstable to operate in, while it also might be preferable to be present over just exporting if it is too

unstable due to the increased possibility to protect once goods. This is hard to measure but the WDI contains a 13 degrees “strength of legal rights index” which attempts to do this by measuring laws and the enforcement of them to see stability of the business environment. As such with the use of these five measures for four different control variables do all parts of equation (3) have data and can therefore be run.

Running the fixed effects panel data regression gives the result shown in the first two rows of Table 4. In these two is it clear there is a positive correlation between growth and inward FDI for the less advanced economies included in the paper. Further, this result changes just marginally when exchanging GDP growth for GDP per capita growth as both are almost equally positive. However, it is also revealed only 1'109 of the 1'764 country-year combinations have sufficient data to be regressed. This means either a bottleneck exists or certain countries do not have data for all the fourteen years. Looking into this reveals a lot of countries have lacking data on certain years and not a single country have the stability index data for all the 14 years. This is solved by creating a set of edited data from which the stability measure is removed and all countries who do not have data for all 14 years are also removed. The reason for doing this is there exists a risk the countries with incomplete data might skew the end result and this is therefore a possible precaution. The result of doing this is the amount of countries are reduced to 92 and the total amount of data points is therefore 1'288. However, as seen in the last two rows of Table 4 are all these 1'288 included in the regression and as such is the used data in fact increasing from the reduction. The result of regressing the edited data, also shown in the last two rows of Table 4, is a still positive correlation between inward FDI and growth. This further supports the hypothesis of a positive relation between the two. Further, once again is there just a marginal difference between using GDP growth and GDP per capita growth. As such, it is clear there is a positive correlation between inward FDI and growth which is not due to skewed data, suggesting inward FDI might be able to cause economic growth, even though causality has not been proven.

To check whether the correlation between growth and inward FDI which was found is a more universal relation were the regressions done separately for each of the divisions of countries which were used as control variables for the regressions of equation (1) and (2), id est the divisions taken from United Nations Statistics Divisions (2013). The result is shown in Table 5; for more detail see Appendix Table 6; and it makes clear the result might not be universal. When using all the unedited data did the Caribbean, Central America, North Africa, West Asia, South East Asia, and South Asia all support the previous found result while the other groups gave inconclusive results, the reason for which can come from a lack of data as the biggest regression only had 141 data

**Table 4: Result of regressing the growth hypothesis**

Regression	Observations	95% confidence interval
All data, GDP growth	1'109	0.09 – 0.19
All data, GDP per capita growth	1'109	0.10 – 0.19
Edited data, GDP growth	1'288	0.08 – 0.17
Edited data, GDP per capita growth	1'288	0.08 – 0.17

**Table 5: Result of regressing the growth hypothesis region by region**

Data set	Observations Range	Result Within 95% Confidence Interval (Number of occurrences of result)
All data	20 - 141	Positive(6), Inconclusive(10)
Edited data	28 - 154	Positive(2),Inconclusive(13),Negative(1)

points and the smallest was down on 20. However, when doing the regression on the edited data; which generally increased the amount of observations; did only the Caribbean and North Africa show positive correlations while Middle Africa even showed a negative correlation, suggesting either inward FDI can under certain circumstances have a negative impact on growth or both inward FDI and growth are driven by common reasons and inward FDI do therefore not cause growth but occur together for other reasons.

These regressions have therefore found there internationally for less advanced countries do exist a correlation between inward FDI and growth over time, which do suggests inward FDI could cause growth. However, by regressing this for different regions separately was it found this is not necessarily a universal correlation as many regions show inconclusive results and Middle Africa with edited data even shows a negative correlation. This suggests the international result is either correlation without any causation or suggesting inward FDI under certain circumstances can have no impact or even a negative impact on growth.

## V. Analysis and Discussion

It was possible to empirically test all thirteen hypothesis. However, only seven of the thirteen were supported by the empiric results, two had inconclusive results, and four had to be rejected due to the results. As such, the hypothesis suggested can partly be seen as successful and the rejection of a few of them do not mean the main hypothesis should be rejected. However, it should be kept in mind all results are coming with uncertainty as survey data can contain untruthful answers , as errors can exist in the regressions, and as the spillover hypotheses had better been answered through the use of

panel data as there now might exist an endogeneity problem; but no such data is available on this scale. Also, in both the spillover result and in the growth effect result is only correlation shown and not causation, meaning the interpretation of the data might be contrary to reality. Further, even though the result to an extent can help show whether or not the sub-hypothesis holds true are none of them fully answering the main hypothesis. Hence, an analysis and discussion of the result is needed in order to combine the results from the sub-hypotheses in order to reach a conclusion regarding the main hypothesis.

The first set of sub-hypothesis; regarding the superiority of FDI firms; showed FDI firms do use technology more effectively, pay higher wages, educate their work force more, and do spend more on R&D than domestic firms. However, it was shown the reason why they pay higher wages is because they are more productive; due to better use of technology; or possibly vice versa; which would make sense under the theory of efficiency wages. Further, even though they do spend more on R&D are they not more innovative measured in quantity compared to domestic firms, suggesting they either are wasting money in their R&D, domestic firms benefit equally from their R&D investments; which would hint toward spillovers; or there being an issue with the measurement. Other results was also found suggesting FDI firms, contrary to predictions, are in many aspects not a bigger competitor to domestic firms than vice versa. Further, it was found FDI firms; despite likely coming from countries which generally rank high in gender equality; have less gender equal structures than domestic firms, which is highly surprising and contradicting the predictions. This means there is a risk for a negative spillover in which FDI firms from advanced economies spread inequality in less advanced countries. However, in total are FDI firms likely benefiting the host country through their presence since they provide the host country with more effective production, higher wages, and more investments which all can help to make the country grow. However, the gender imbalance in the FDI firms can in the long run be an issue, specially if it causes spillover effects to the rest of the society in the host country as inequality is damaging growth (Kabeer & Natali, 2013) by resulting in a sub-optimal use of the work force. The host country is also more likely to get spillovers if the FDI firms indeed are clearly better than the domestic firms, as only a better firm can be an inspiration and a leader.

The regressions regarding possible spillovers gave a more dreary outcome as the only possible spillover which was hypothesized and which found any support was a spillover in terms of wages, id est it is possible increased inward FDI results in increased wages in private domestic companies. Many other variables had instead negative correlations showing a negative impact on the domestic firms of the presence of the FDI firms; such as private domestic firms in countries with higher levels of FDI uses computers less, educate their labor less, innovate less, and had it

harder to access land for their production. These four factors together with the negatively correlated market access; private domestic firms in countries with higher levels of inward FDI have lower national market share; can all be signs of the crowd-out effect. This since if the FDI firms take over the most advanced and productive industries; which the industry control variable cannot control for; will the private domestic firms either be pushed to industries which uses computers, innovation, and labor education less or they will find themselves with a lack of land a low market share. As such, an effect of increasing the amount of FDI on the host country can be to compete and crowd the local industries out of business. However, domestic firms spend less on educating their workers might not be a bad thing as it combined with the positive result of a positive correlation between inward FDI and the domestic firms access to labor suggests FDI firms might educate the country's workforce so well the domestic firms do not have to. As such, a second spillover; this time in terms of an improved workforce, might have support in the results of the regressions. Another positive result was no clear correlation between FDI and gender equality was found, this means even though the FDI firms turned out to be less equal than the domestic firms are they not seeming to drag down equality in the rest of society and the potential harms of inequality are therefore less likely to show in the host country. Therefore, FDI firms seem to generally be great for the work force by possibly increasing the wages and maybe by increasing the level of education. However, evidence was found suggesting inward FDI not necessarily being good for the private domestic firms as they get crowded-out by the increased competitions from more efficient firms. Hence, the over all spillover effect on the host country of FDI firms have both positive and negative sides making the combined effect of the two unclear.

The last regressions were regarding whether there is a positive correlation between inward FDI and economic growth. The result was on an international level is there indeed a positive correlation between the two. This suggests there is a possibility of FDI causing growth in the host country, even though it also is possible countries with higher growth simply attracts more FDI. This would mean the previous suggestions of FDI firms being superior and possibly causing increased wages and increased labor skills would outweigh the negative effects of FDI firms crowding out the domestic firms; at least for now. In the opposite direction, the previous suggestions show how inward FDI possibly could cause economic growth which means the result do not contradict what could be expected. However, the result was not universal as when the regressions were run separately for different geographical regions did regressions using all the data only show a positive correlation for six of the sixteen regions; the remaining being inconclusive; and regressions using an edited data set showed positive correlations for two regions and interestingly a negative correlation for one region. Many regions having inconclusive results is in itself not an issue as this can be due

to data problems in these regressions, specially since just a few data points were used for many regions. However, one country showing a negative correlation is a greater enigma as this suggests in this region might FDI have been harmful to the economic growth. A reason for why this might be can however be found in knowing the region which showed a negative correlation was Middle Africa. This region is, according to the used GDP data, among the poorest regions together with West Africa and East Africa; while the six regions which had positive results all were clearly richer. Further, according to The Economist's Social Unrest Indicator (2010) is this region also among the most unstable regions in the world, far more unstable than the regions which showed a positive correlation, which is not surprising as for example The Democratic Republic of Congo under a long period had many of their private domestic firms run by local warlords (Doyle, 2014). Therefore, Middle Africa being the region showing the negative correlation between inward FDI and growth supports the idea of countries being effected differently by FDI depending on their ability to absorb it; as has been suggested by Damijan & al. (2008); which can depend upon Middle Africa likely having poorly developed financial markets; as suggested to be a factor by Azman-Saini & al. (2010); as well as other issues in the region. Hence, these regressions generally found a positive relation between inward FDI and growth, suggesting FDI might be positive for the host country in it might cause economic growth. However, features of the host country can determine how great the country's experience with FDI will be.

The results of testing the hypothesis was at certain times surprising or confusing but the analyze of it clarified and showed five main aspects of the impact of FDI on the host country can find support in the results despite no clear causation being possible to find, these are:

- FDI firms are more efficient than domestic firms and can therefore contribute to the host country by providing better production as well as higher wages which both can help to generate growth.
- FDI might be beneficial for the people of the host country by increasing the level of education and by increasing the wages even for the people working in domestic firms.
- FDI could possibly hurt the local industry by crowding it out, this can in the long run be harmful in case the FDI would decrease and foreign firms would start to pull out.
- FDI is generally positively correlated to growth, suggesting it might cause it which is a clear positive FDI could have on developing host countries.
- The effects of FDI likely depend upon features of the host country, meaning the effects and therefore the use of FDI might differ for different countries.

From these five can a general picture be seen in which FDI potentially causes growth and prosperity

in most host countries and as such could FDI attracting policies be a good investment for developing countries. The growth coming from the FDI firms increasing the average productivity, increasing the wages, and possibly also educating the population. However, FDI can in the long run be dangerous by out competing local industries and might not be as positive for all host countries, which means the policies has to be implemented with caution and policies to support the local industries could be a good complement to the FDI attraction policies. Despite this, the main hypothesis of FDI generally being positive for the host country is thereby generally supported.

## **VI. Conclusion**

Over the past decades has the world seen a rapid increase in FDI at the same time as an increasing amount of developing countries are implementing special policies to attract even more FDI. This means weak economies in the world have tried hard to tap in to the growing international flows of investments, likely in hope of it benefiting from them economically as a country. Despite this is it yet not clear what the greater effects of FDI are on developing countries. However, this paper hopefully came closer to revealing how the developing countries are affected by their FDI attraction policies.

The effects which FDI was found to have on the host country were both positive and negative. Positive was, they contributed to the developing country by bringing their superior technology, wages, methods, and research; which likely results in a higher productivity in the country; as well as by being superior to the domestic firms makes the domestic firms pay higher wages which resulted in an overall higher wage level. However, the negative side was these superior firms seem to cause such competition to the domestic firms they threat to in the long run wreck the domestic industry in the host country. Negative was also they, surprisingly, were less equal than domestic firms; something which however did not seem to rub of on the rest of the society and therefore hopefully does not do great harm. Despite this big negative effects was the overall effects still likely positive given a positive correlation between economic growth and inward FDI was found. However, there is a possibility the effects do differ depending on the features of the country in question as well as there is a risk the negative effects have a greater long term impact than the positive effects, as the crowd out effects can destroy the domestic industry. Hence, countries which do implement FDI attraction policies will not all necessarily experience the positive effects found in the paper and in the future might we start seeing a down side to these policies if the FDI flows would start to dry up.

The developing countries which do try to attract more FDI are due to the effects found in

this paper likely applying a smart development strategy as FDI in these countries seem to be able to help them grow. However, these should be done with caution as attracting FDI is not a sure way to reach the goals of growth as characteristics of the society might alter the experience the country has with FDI and since even if the direct effects of attracting FDI might be positive for the country's economy might there be harmful long term effects as the FDI firms can out compete the domestic industry. As such, FDI attracting policies can possibly with good results be paired with policies intended to strengthen the society; for example by improving the financial markets; which would improve the chances of having good effects and policies intended to strengthen the domestic industry; so it does not get crowded out and so the country do not depend on foreign firms to flourish.

Caution should also be in these policies since the research on the topic is far from over. Further research could specially benefit from collecting data which allows a greater time aspect while maintain the firm level analysis with as many countries as possible. This since the long run effects of FDI presented here are based upon assumptions and theory and could need support from panel data regressions. Moreover, future research could also include the aspect of greenfield FDI compared to M&A FDI. This since it has in previous papers been indicated to have some differences in effect and also can be attractive with different policies, but due to data limitation was not possible to include in this paper.

In sum, this paper has found the FDI attracting policies are, as hypothesized, overall positive for the developing country which implements them, by providing better firms who are leaders on the labor market and who might cause economic growth. However, it also finds there might be differences in how positive it is to attract FDI depending on the country. Even worse, it do find these policies might have long run harms as they can hurt the domestic industry. As such, the FDI attracting policies which are implemented by many of the worlds weakest economies do look very attractive as a boost to the economy, but if they are not implemented with caution might these already weak countries grow even poorer.

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## Appendix

**Table 1: Descriptive statistics of the data for all data used in the empiric testing of the two big sets of sub-hypothesis.**

Measure	Observations	Mean	Standard Deviation	Range
E-mail usage	127'454	0.66	0.47	0 or 1 (no or yes)
Website usage	126'952	0.42	0.49	0 or 1 (no or yes)
Revenue per employee (1)	111'224	$2.5 \cdot 10^6$	$9.7 \cdot 10^7$	$0 - 2.7 \cdot 10^{10}$
Revenue per employee (2)	99'341	$2.1 \cdot 10^6$	$9.8 \cdot 10^7$	$0 - 2.7 \cdot 10^{10}$
Revenue per employee (3)	99'341	$2.1 \cdot 10^6$	$9.8 \cdot 10^7$	$0 - 2.7 \cdot 10^{10}$
Wages (1)	100'293	$2.3 \cdot 10^5$	$1.1 \cdot 10^7$	$0 - 3.3 \cdot 10^9$
Wages (2)	91'974	$1.8 \cdot 10^5$	$9.0 \cdot 10^6$	$0 - 2.6 \cdot 10^9$
Wages (3)	91'974	$1.9 \cdot 10^5$	$9.1 \cdot 10^6$	$0 - 2.6 \cdot 10^9$
Formal Training	110'903	0.40	0.49	0 or 1 (no or yes)
New Product	29'962	0.40	0.49	0 or 1 (no or yes)
Improved Product	31'588	0.57	0.49	0 or 1 (no or yes)
New Technology	32'298	0.36	0.48	0 or 1 (no or yes)
R&D expenditure	22'501	$7.5 \cdot 10^5$	$2.6 \cdot 10^7$	$0 - 2.8 \cdot 10^9$
Local Share	6'677	27%	29%	0% - 100%
National Share	15'523	22%	29%	0% - 100%
Technology compared to competitors	11'183	2.1	0.65	1, 2, or 3 (less, equal, or more advanced)
Average years of education of workers, old data	21'420	2.6	0.92	1, 2, 3, or 4 (0-5, 6-9, 10-12, or over 12)
Average years of education of workers, new data	14'311	2.9	0.96	1, 2, 3, 4, or 5 (0-3, 4-6, 7-9, 10-12, or over 12)
Labour access obstacle	127'487	1.3	1.3	0, 1, 2, 3, or 4 (no, minor, moderate, major, or very severe)

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Range</b>
Land access obstacle	126'191	1.0	1.3	0, 1, 2, 3, or 4 (no, minor, moderate, major, or very severe)
Percentage female top manager	8'288	21%	30%	0% - 100%
Percentage female in total workforce	24'275	28%	29%	0% - 100%
Percentage female managers	12'063	20%	30%	0% - 100%
Percentage female professionals	12'021	23%	31%	0% - 100%
Percentage female skilled production workers, old data	18'293	24%	33%	0% - 100%
Percentage female un-skilled production workers, old data	16'214	27%	34%	0% - 100%
Percentage female non-production workers	12'034	34%	36%	0% - 100%
Any female owner	86'609	0.32	0.46	0 or 1 (no or yes)
Percentage female production workers, new data	47'380	0.24%	0.32%	0%-8.5%
Percentage female non-production workers, new data	44'386	0.34%	0.42%	0%-25%
Industry	133'545	-	-	-
Legal Status	124'750	-	-	-
Annual Sales	113'326	$1.8 \cdot 10^8$	$1.5 \cdot 10^{10}$	$0 - 4.1 \cdot 10^{12}$
Employment (1)	132'433	109	604	$0 - 6.8 \cdot 10^4$
Employment (2)	116'857	122	755	$1 - 8.0 \cdot 10^4$
Employment (3)	116'857	121	753	$1 - 8.0 \cdot 10^4$
Firm Age	129'378	17	16	0 - 304
Manager Experience	108'742	16	13	0 - 2001

**Table 2: Regression of the first set of sub-hypothesis without editing measures**

Hypothesis	Measure	Observations	Breusch-Pagan Chi2	FDI firm 95% confidence interval	Private domestic firm 95% confidence interval	Government firm 95% confidence interval
Technology Usage	E-mail usage	82'846	4.97*10 <sup>3</sup>	0.12 – 0.19	0.00 – 0.07	omitted
	Website usage	82'593	2.12*10 <sup>3</sup>	0.12 – 0.20	-0.03 – 0.04	omitted
	Revenue per employee (1)	83'905	1.65*10 <sup>7</sup>	-8.7*10 <sup>6</sup> - 4.9*10 <sup>6</sup>	-9.3*10 <sup>6</sup> - 4.6*10 <sup>6</sup>	omitted
	Revenue per employee (2)	83'905	1.97*10 <sup>7</sup>	-6.9*10 <sup>6</sup> – 3.3*10 <sup>6</sup>	-7.3*10 <sup>6</sup> – 3.1*10 <sup>6</sup>	omitted
	Revenue per employee (3)	83'905	1.95*10 <sup>7</sup>	-6.7*10 <sup>6</sup> - 3.4*10 <sup>6</sup>	-7.2*10 <sup>6</sup> - 3.1*10 <sup>6</sup>	omitted
Wages	Wages (1)	78'384	8.93*10 <sup>5</sup>	omitted	-1.3*10 <sup>5</sup> - 1.3*10 <sup>5</sup>	-3.3*10 <sup>5</sup> – 9.0*10 <sup>4</sup>
	Wages (2)	78'384	1.03*10 <sup>6</sup>	omitted	-1.0*10 <sup>5</sup> – 1.2*10 <sup>5</sup>	-2.6*10 <sup>5</sup> – 1.0*10 <sup>5</sup>
	Wages (3)	78'384	1.00*10 <sup>6</sup>	omitted	-1.1*10 <sup>5</sup> – 1.2*10 <sup>5</sup>	-2.8*10 <sup>5</sup> – 9.3*10 <sup>4</sup>
Labour Education	Formal Training	67'330	790	0.02 – 0.09	-0.11 - -0.04	omitted
R&D	New Product	5'978	91.5	omitted	-0.07 – 0.03	-0.06 – 0.12
	Improved Product	6'765	7.13	omitted	-0.03 – 0.04	-0.07 – 0.05
	New Technology	6'934	250	omitted	-0.03 – 0.05	-0.06 – 0.07
	R&D expenditure	6'107	1.2*10 <sup>5</sup>	-1.6*10 <sup>6</sup> – 1.5*10 <sup>7</sup>	-4.6*10 <sup>5</sup> – 4.7*10 <sup>6</sup>	omitted
Level of Competition	Local Share	2'170	80.5	-15 - 15	-11 - 18	omitted
	National Share	4'890	783	-1.2 – 8.1	-1.9 – 6.0	omitted
	Technology compared to competitors	2'935	6.36	omitted	-0.26 – -0.07	-0.26 – 0.30
	Average years of education of workers, old data	4'679	64.1	0.03 – 0.30	-0.14 – 0.09	omitted
	Average years of education of workers, new data	13'071	0.21	-0.33 – 0.12	-0.45 - -0.01	omitted

<b>Hypothesis</b>	<b>Measure</b>	<b>Observations</b>	<b>Breusch-Pagan Chi2</b>	<b>FDI firm 95% confidence interval</b>	<b>Private domestic firm 95% confidence interval</b>	<b>Government firm 95% confidence interval</b>
Level of Competition	Labour access obstacle	83'149	592	-0.12 – 0.06	-0.18 - -0.01	omitted
	Land access obstacle	81'536	1.57*10 <sup>3</sup>	0.02 – 0.20	0.11 – 0.29	omitted
Gender Equality	Percentage female top manager	2'432	172	omitted	-1.09 – 7.42	-4.78 – 15.4
	Percentage female in total workforce	7'657	400	omitted	-2.16 – 1.32	-3.04 – 2.51
	Percentage female managers	4'027	406	omitted	-2.74 – 3.01	-3.34 – 8.18
	Percentage female professionals	4'525	377	omitted	-1.47 – 3.68	-3.84 – 5.62
	Percentage female skilled production workers	5'484	560	-7.02 – 1.93	-4.46 – 3.64	omitted
	Percentage female un-skilled production workers	4'795	441	omitted	0.22 – 5.75	-4.99 – 5.33
	Percentage female non-production workers, old data	3'659	175	omitted	-4.52 – 2.60	-7.85 – 2.83
	Any female owner	70'761	2.54*10 <sup>3</sup>	omitted	0.13 – 0.15	0.13 – 0.22
	Percentage female production workers	40'054	3.31*10 <sup>3</sup>	-0.07 – 0.00	-0.06 – 0.01	omitted
	Percentage female non-production workers, new data	37'487	2.34*10 <sup>3</sup>	-0.09 - -0.02	-0.08 - -0.01	omitted

**Table 3: Regression of the first six sub-hypothesis**

Hypothesis	Measure	Observations	R <sup>2</sup>	FDI firm 95% confidence interval	Private domestic firm 95% confidence interval	Government firm 95% confidence interval
Technology Usage	E-mail usage	82'846	0.22	0.11 – 0.18	0.01 – 0.07	omitted
	Website usage	82'593	0.17	0.13 – 0.20	-0.01 – 0.06	omitted
	Revenue per employee (1)	83'149	0.085	1.2*10 <sup>5</sup> - 4.4*10 <sup>5</sup>	-1.8*10 <sup>5</sup> - 1.2*10 <sup>5</sup>	omitted
	Revenue per employee (2)	83'145	0.083	1.0*10 <sup>5</sup> – 3.6*10 <sup>5</sup>	-1.4*10 <sup>5</sup> – 1.0*10 <sup>5</sup>	omitted
	Revenue per employee (3)	83'155	0.086	omitted	-3.1*10 <sup>5</sup> - -2.1*10 <sup>5</sup>	-3.6*10 <sup>5</sup> - -9.5*10 <sup>4</sup>
Wages	Wages (1)	77'413	0.043	omitted	-2.2*10 <sup>4</sup> - -1.1*10 <sup>4</sup>	-4.1*10 <sup>4</sup> – -8.6*10 <sup>3</sup>
	Wages (2)	77'455	0.046	omitted	-2.2*10 <sup>4</sup> – -1.1*10 <sup>4</sup>	-4.0*10 <sup>4</sup> – -1.1*10 <sup>4</sup>
	Wages (3)	77'456	0.046	omitted	-2.1*10 <sup>4</sup> – -1.0*10 <sup>4</sup>	-4.0*10 <sup>4</sup> – -1.1*10 <sup>4</sup>
Labor Education	Formal Training	67'330	0.14	0.05 – 0.12	-0.09 - -0.02	omitted
R&D	New Product	5'978	0.091	omitted	-0.08 – 0.01	-0.07 – 0.09
	Improved Product	6'765	0.20	omitted	-0.05 – 0.03	-0.08 – 0.04
	New Technology	6'934	0.078	omitted	-0.04 – 0.04	-0.03 – 0.09
	R&D expenditure	6'051	0.050	omitted	-1.1*10 <sup>5</sup> – -4.3*10 <sup>4</sup>	-2.3*10 <sup>5</sup> - -1.3*10 <sup>5</sup>
Level of Competition	Local Share	2'170	0.056	-11 - 14	-7 - 16	omitted
	National Share	4'890	0.15	3 – 12	3 – 11	omitted
	Technology compared to competitors	2'935	0.052	omitted	-0.28 – -0.10	-0.20 – 0.32
	Average years of education of workers, old data	4'679	0.15	0.15 – 0.46	-0.05 – 0.21	omitted
	Average years of education of workers, new data	13'071	0.16	-0.37 – 0.12	-0.50 - -0.03	omitted

Hypothesis	Measure	Observations	R <sup>2</sup>	FDI firm 95% confidence interval	Private domestic firm 95% confidence interval	Government firm 95% confidence interval
Level of Competition	Labour access obstacle	83'149	0.087	-0.08 – 0.10	-0.16 - 0.00	omitted
	Land access obstacle	81'536	0.038	0.02 – 0.21	0.09 – 0.27	omitted
Gender Equality	Percentage female top manager	2'432	0.070	omitted	-0.7 – 9.1	-8.0 – 14
	Percentage female in total workforce	7'657	0.12	omitted	-1.4 – 2.8	-0.3 – 6.2
	Percentage female managers	4'027	0.065	omitted	-2.46 – 4.3	-4.5 – 7.9
	Percentage female professionals	4'525	0.068	omitted	-1.6 – 4.1	-1.6 – 8.2
	Percentage female skilled production workers	5'484	0.075	-8.8 – 1.2	-4.1 – 4.5	omitted
	Percentage female unskilled production workers	4'795	0.090	omitted	1.6 – 8.2	-0.4 – 11
	Percentage female non-production workers, old data	3'659	0.11	omitted	-4.8 – 2.9	-9.3 – 2.9
	Any female owner	70'761	0.079	omitted	0.12 – 0.15	0.14 – 0.24
	Percentage female production workers	40'054	0.092	-0.10 – 0.02	-0.05 – 0.03	omitted
	Percentage female non-production workers, new data	37'487	0.095	-0.11 - 0.03	-0.09 - 0.03	omitted

**Table 4: Result of regressing the interesting measures from the first six sub-hypothesis using the other of them as control variables.**

Hypothesis	Measure	Observations	FDI firm 95% confidence interval	Private domestic firm 95% confidence interval	Government firm 95% confidence interval
Technology Usage	Revenue per employee (3)	51'489	$-1.9*10^5 - 6.1*10^4$	$-3.0*10^5 - 6.1*10^4$	omitted
Wages	Wages (3)		$-6.4*10^3 - 2.6*10^4$	$-1.5*10^3 - 3.0*10^4$	
Training	Formal Training		$2.9*10^{-3} - 0.11$	$-0.14 - -0.04$	
Gender Equality	Any female owner		$-0.25 - -0.14$	$-0.11 - -0.01$	

**Table 5: Regression of the second six sub-hypothesis**

Hypothesis	Measure	Observations	R <sup>2</sup>	95% confidence interval
Technology Usage	E-mail usage	66'770	0.25	$-3.4*10^{-3} - -1.4*10^{-3}$
	Website usage	66'523	0.19	$-6.1*10^{-3} - -3.9*10^{-3}$
	Revenue per employee (1)	66'834	0.10	-3300 - 7500
	Revenue per employee (2)	66'831	0.098	-3100 - 5800
	Revenue per employee (3)	66'843	0.10	-4400 - 4800
Wages	Wages (1)	61'896	0.041	1300 - 2400
	Wages (2)	61'930	0.043	830 - 1800
	Wages (3)	61'934	0.044	770 - 1800
Training	Formal Training	52'523	0.14	$-5.8*10^{-3} - -3.2*10^{-3}$
R&D	New Product	5'249	0.091	-0.018 - -0.013
	Improved Product	5'727	0.21	$-0.017 - -2.0*10^{-3}$
	New Technology	5'873	0.082	$-0.017 - -1.8*10^{-3}$
	R&D expenditure	5'187	0.030	-7400 - 5000
Competition	Local Share	1'973	0.058	-1.0 - 1.3
	National Share	4'112	0.16	-3.1 - -1.7
	Average years of education of workers, old data	4'102	0.15	-0.079 - -0.036
	Average years of education of workers, new data	11'801	0.16	0.029 - 0.041
	Labour access obstacle	66'870	0.093	$-7.2*10^{-3} - -1.1*10^{-3}$
	Land access obstacle	65'495	0.048	$1.3*10^{-3} - 7.6*10^{-3}$

<b>Hypothesis</b>	<b>Measure</b>	<b>Observations</b>	<b>R<sup>2</sup></b>	<b>95% confidence interval</b>
Gender Equality	Percentage female top manager	2'163	0.070	-1.4 – 0.93
	Percentage female in total workforce	6'489	0.11	-1.8 - -0.89
	Percentage female managers	3'476	0.066	-1.5 - -0.063
	Percentage female professionals	3'849	0.081	-2.5 - -1.3
	Percentage female skilled production workers	4'750	0.073	-2.1 – -0.95
	Percentage female un-skilled production workers	4'167	0.086	-2.3 - -0.99
	Percentage female non-production workers, old data	3'092	0.11	-1.6 – 0.11
	Any female owner	56'561	0.060	$-8.6 \cdot 10^{-4} - 1.6 \cdot 10^{-3}$
	Percentage female production workers	30'730	0.057	$2.2 \cdot 10^{-3} - 4.9 \cdot 10^{-3}$
	Percentage female non-production workers, new data	28'338	0.080	$3.6 \cdot 10^{-3} - 7.1 \cdot 10^{-3}$

**Table 6: Regression of the growth hypothesis region by region**

<b>Data, Region</b>	<b>Observations</b>	<b>95% confidence interval</b>
All data, Carribea	82	0.16 – 0.62
All data, Central America	78	0.05 – 0.58
All data, Central Asia	39	-0.20 – 0.46
All data, East Africa	129	-0.11 – 0.15
All data, East Asia	20	-0.03 – 0.62
All data, East Europe	40	-0.41 – 1.02
All data, Middle Africa	67	-0.47 – 0.02
All data, North Africa	50	0.04 – 1.07
All data, Oceania	36	-0.33 – 0.21
All data, South East Asia	78	0.14 – 0.89
All data, Southern Africa	46	-0.79 – 0.08
All data, South America	100	-0.12 – 0.65
All data, South Asia	70	0.05 – 1.64
All data, South Europe	57	-0.20 – 0.20
All data, West Africa	141	-0.07 – 0.10
All data, West Asia	76	0.18 – 0.69
Edited data, Carribean	126	0.14 – 0.49
Edited data, Central America	84	-0.48 – 0.09
Edited data, Central Asia	56	-0.12 – 0.39
Edited data, East Africa	154	-0.10 – 0.12
Edited data, East Asia	28	-0.05 – 0.31
Edited data, East Europe	56	-0.56 – 0.61
Edited data, Middle Africa	70	-0.32 - -0.01
Edited data, North Africa	70	0.12 – 0.83
Edited data, Oceania	28	-0.47 – 0.48
Edited data, South East Asia	98	-0.04 – 0.46
Edited data, Southern Africa	42	-0.33 – 0.34
Edited data, South America	126	-0.09 – 0.39
Edited data, South Asia	70	-0.56 – 0.85
Edited data, South Europe	56	-0.01 – 0.57
Edited data, West Africa	154	-0.10 – 0.15
Edited data, West Asia	70	-0.05 – 0.34