



What Drive Foreign Direct Investment from the South?

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List of Acronyms

FDI	Foreign Direct Investment
GDP	Gross Domestic Production
IFDI	Inward Foreign Direct Investment
IPRS	Intellectual Property Rights
ISS	Institute of Social Studies
MNCs	Multi-national Companies
OECD	The Organisation for Economic Co-operation and Development
OFDI	Outward Foreign Direct Investment
OLS	Ordinary Least Squares
R&D	Research and Development
UNCTAD	United Nations Conference on Trade and Development

Abstract

As response to increasing Foreign Direct Investment outflow by developing economies, this paper reviewed theories and empirical studies to figure out what drives the phenomenon. Besides adopting wisdoms from literature, limitations and unsatisfying parts of former works have also been discussed. Therefore, an alternative explanation for FDI has been formed. Based the theoretical model, the share of Greenfield in Outward Foreign Direct Investment (OFDI) reflects the structure of an economy's OFDI. The higher the share of Greenfield is, the more the economy inclines to be interested in technology transfer; and the lower the share of Greenfield is, the more the economy inclines to be interested in technology acquisition. Furthermore, Fixed Effect model has been applied on panel dataset. The result of econometric test supports the theoretical framework. Finally, by using data of share of Greenfield in OFDI, a detailed comparison reveals that technology transfer is more popular in developing economies. Several big developing economies are changing close to the structure of developed economies, but most developing economies are still the same even more distant from convergence.

Relevance to Development Studies

Recently, developing countries have considerable share of Outward Foreign Direct Investment (OFDI). Firstly, this paper discusses how FDI is formed, which shed new light on understanding FDI. As the form of capital flows that is favoured by policy makers, it will be helpful to rethink the main motivations and driving factors of OFDI. Secondly, convergence between the South and the North is one of the most important issues in development studies. The recent rise of OFDI from the South implies this tendency on surface. This paper go further and check whether the South and North share similarity in terms of OFDI in different periods. Results for different stages can help us to figure out how the convergence between the South and the North is and which direction this tendency is going to develop toward.

Keywords

Outward Foreign Direct Investment, South, technology acquisition, technology transfer, Greenfield Investment

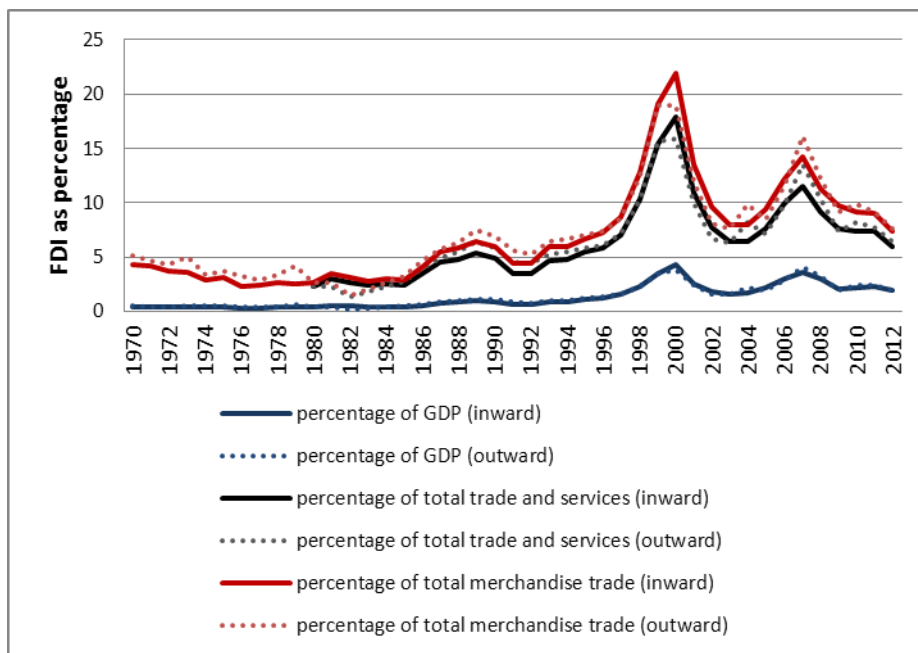
Chapter 1 Introduction

1.1 Background

Foreign Direct Investment (FDI) has been regarded as a significant phenomenon in international economic integration since 1990s, marked by not only its continuous increasing in volume but also the enhance weight with respect to other business activities such as trade, portfolio purchase. Although causes and consequences of FDI are still highly disputed, an increasing trend of FDI and furthering interaction with the global economy are probably undeniable. In order to display that phenomenon, the simplest and most straightforward sign of the rise of FDI is the ratio between FDI volume and Gross Domestic Production (GDP) for the entire world.

As the figure 1.1¹ illustrated, FDI in percentage of GDP (also for trade and service) for the entire world had continuously risen during the whole 1990s and experienced some fluctuations after 2000, while never shrink backward to the level before about 1997. Regardless of the denominators have been chosen, three indicators show a consistent result and basically tell the same story.

Figure 1.1 Total FDI in Percentage of GDP, Trade and Service and Merchandise Trade) (1970-2012)



Source: UNCTADstats- accessed 21/09/2013

¹ Each indicator has been measured by both inward and outward, which are supposed to be the same in theory. Measurement errors are captured by the gap between two lines for the same indicator. Full line in all indicators refers to inward data and dotted line indicates the onward flows.

If we roughly break down the global economy into developed countries and developing countries², more information is revealed and two observations are worthy to be noted. Firstly, the rise that happened in 1990s was driven by developed countries rather than developing countries in terms of both source and destination of FDI. In 1990, 95.1% FDI was sourced from developed countries (the North³) and 83.2% FDI flowed into the North countries as well, which means that the majority of FDI happened within North-North relations. Secondly, there is a future trend, if not on-going, of convergence between developed economies and developing economies. As the following figure 1.2 showed, developing countries⁴ have been getting more and more share in terms of Outward Foreign Direct Investment (OFDI) of the entire world. Not only the sources but also the destinations change dramatically. In 2010, it was the first time that less than half, 49.4% FDI, flowed into the North and this number dropped to 41.5%⁵ in 2012. Obviously, developing countries become a more crucial player in FDI market after 2000 both in the way of inward and outward.

Text Box 1 Definition of FDI

According to IMF glossary, FDI is defined as ‘*a category of international investment made by a resident entity in one economy (direct investor) with the objective of establishing a lasting interest in an enterprise resident in an economy other than that of the investor (direct investment enterprise)*’. Since ‘lasting interest’ implies a long-term relationship, it is necessary to clarify the threshold for that. Taken the glossary in the BD3 of the OECD, ‘*a direct investment enterprise is an incorporated or unincorporated enterprise in which a single foreign investor either owns 10 per cent or more of the ordinary shares or voting power of an enterprise (unless it can be proven that the 10 per cent ownership does not allow the investor an effective voice in the management) or owns less than 10 per cent of the ordinary shares or voting power of an enterprise, yet still maintains an effective voice in management.*’ Definitions from these two sources have been widely accepted and by UNCTAD as well, where most data of FDI in this paper come. Therefore in this paper, I take these two descriptions for FDI and direct investment enterprise regardless of disputed arguments for definition.

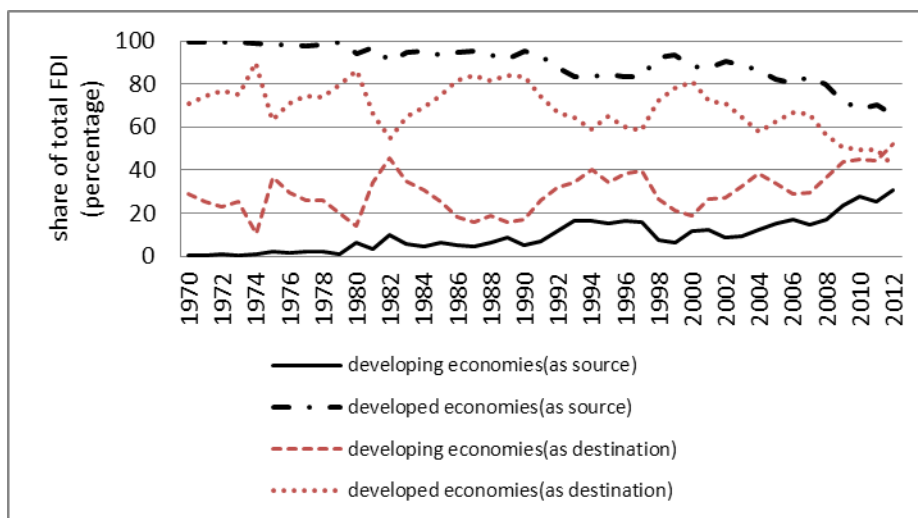
² Here, the definition of term, *developing economies and developed economies*, follows the category of UNCTADstats- accessed 21/09/2013.

³ ‘The North’ and ‘the South’ are widely used in this topic. The North refers to rich and developed countries and the South refers to poor and developing countries. Many usages are quite careless, while some studies gave clear definitions (reference default). In this paper, I would use these concepts but not try to clarify them because general tendency is not strongly affected and therefore conclusion should not be jeopardized.

⁴ According to UNCTAD categories, transition economies are put in one independent item and if taking it into account, OFDI from South would be more significant.

⁵ All these shares in this paragraph are calculated by author based on UNCTADstats - accessed 21/09/2013.

Figure 1.2 Share of total FDI for developing and developed economies



Source: UNCTADstats - accessed 21/09/2013

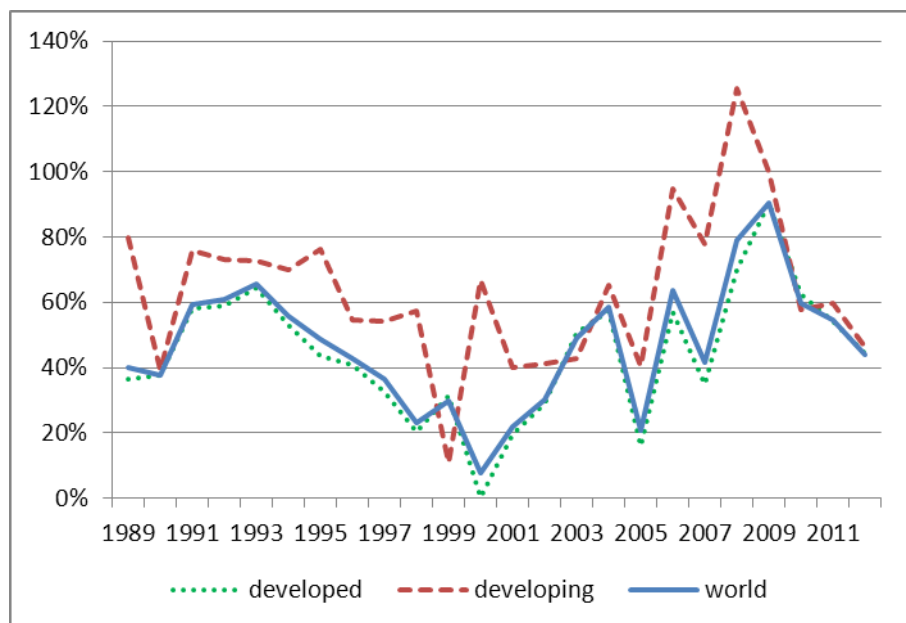
In order to check the details, a study decomposed total FDI, by putting North and South, into two different categories (source and destination), and therefore created a 2*2 matrix that separates total FDI into four parts: ‘North-North’, ‘South-South’, ‘North-South’ and ‘South-North’ (Aykut and Ratha, 2004). Their result, which focuses on South-South FDI relation, indicates that ‘South-South’ FDI as share of total FDI flows to developing countries had been increase from 6.0% in 1994 to 36.4% in 2000. Though the period they emphasised is not such long, that tendency has been precisely and clearly illustrated, coinciding with the general data in Figure 1.2. In addition, I take their matrix and conflate ‘South-North’ and ‘South-South’ into one category, which identifies OFDI from the South. And that is the research interest in this study.

As mentioned before, FDI convergence between the North and the South is on the track, at least quantitatively, neglecting industrial structure, technology difference, etc. Developing economies play an increasing important role in FDI, particularly in terms of OFDI. In 1990s, developing economies were only marked by considerable FDI flows from other countries due to the low labour price, natural resource, etc. But after 2002, the share of OFDI, as source, from the South is getting bigger. In other words, not only total volume but also the structure of FDI for entire world has been changed. With that process, developing countries get higher importance in terms of the source of FDI. Thus, it is attractive to investigate why developing economies have such a big share in OFDI, which is different from previous period. And what factors drive this phenomenon? Are those factors similar with developed countries’ or following a new pattern of OFDI?

For understanding transformation that reflected by increasing OFDI of developing countries, investigating the structure is necessary. Share of Greenfield in total OFDI, though many other methods might also quite useful, is straightforward and relevant. As Figure 1.3 illustrated, except going down in late 1990s, it moves up and down in other periods. But some rough tendency can be concluded from that figure: Greenfield was not dominant in the second half of 1990s and rise later. However, that fussy trend still needs more investigations. By comparing developing and developed countries, both of them fol-

low the global trend but there is a gap between the South and the North. It seems that the share of Greenfield in OFDI for the South is higher than the North. The average numbers of the share of Greenfield for 1989-2012 are 63.4% (for developing countries) and 44.3 % (for developed countries). The considerable difference of mean value indicates that there might be a discrepancy of structure between FDI from the North and South. Though the other statistic properties have not checked yet, such statistic facts motivates this study to investigate whether the South have different driving force for FDI from the North. Therefore, how share of Greenfield reflects structure of OFDI need to be explained in order to understand the discrepancy between the South and North.

Figure 1.3 Share of Greenfield FDI in Total OFDI for Developed, Developing countries and World



Source: Calculated by author based on UNCTADstats - accessed 21/09/2013 and World Investment Reports.

Confronting the increasing trend of the South FDI, some questions come out naturally: why FDI from the South increased and what drives it? Is OFDI from the South as same as the North or changed to another new pattern? As a response to those puzzles, topics of FDI, especially OFDI that is marked with the period in recent decade, from developing country become popular and attract more relevant studies. Though it is slightly oversimplified, I would summarize that one group inclines to treat FDI from South as a duplication of previous FDI from the North, by applying theories to developing countries or repeat empirical researches in the South context. For instance, application of ‘OLI’ theoretical framework (Dunning, 1988) are widely cited as the theory basis. Some general reasons for capital flows are also discussed in this topic, implying the homogeneity of all types of capital flows (Agenor, 1998; Fernandez-Arias, 1996). For the other group, the South FDI should be understood with some new theories and mechanism, which hardly be stressed in the North case. For instance, backward technology pursuing and better financial or

financial and political system (Forbes, 2010; Wei, 2013) are some reasons especially for the South OFDI.

In addition to aforesaid disagreement, there is no consensus, though they are not completely controversial, about which one plays a bigger role: host or parent country? Some of them hold the belief that destinations' conditions determine FDI. Those conditions are affected by local policy and therefore they focus on policies in host countries and why they make those policies, which usually leads a branch to check effects of FDI in host country. Another group emphasises on parent country, trying to understand what factors and how they motivate FDI outflow from a country. Due to the fact that developed countries seem not to make strong policies for attracting FDI from developing countries, the latter group of studies seems like more relevant in order to understand the new rise of OFDI from South at first sight.

In the literature review part, Chapter 2 will include a more detailed and well-organised discussion for preview academic work. But here, in a word, the approach for explaining and understanding the rising OFDI from the South hasn't been settled down and is still quite controversial.

1.2 Scope of Research

Admittedly, FDI sourced from the South still cannot be described as enormous, only about 30% as the share of total volume. However, for one thing, the increasing trend is stable and continues from late 1990s, particularly after 2002. For the other thing, the share of OFDI from the South has already exceeded the role they play in terms of GDP, which means the increasing speed of OFDI from the South is faster than their growth rate. For example, in 2012, the GDP of Euro area in percentage of total world is 19.8% while the outward FDI as percentage of total world is 14.3%. For developing economies, taking East Asia and Pacific as an example, the GDP as percentage of total world is 10.6%⁶ but the outward FDI is relatively high, 15.4%⁷. It is impressive because common view on developing countries' FDI is about how rich countries invest in the South. But the data shows that developing countries in East Asia and Pacific have a relatively huge number of OFDI. Therefore, this paper will focus on the phenomenon of rise of FDI sourced from the South.

1.2.1 Research Question

All the realities and existing academic discussions motivated and formed my research question:

“What factors drive OFDI from the South, in recent decade?”

⁶ GDP as percentage of total world are calculated by author based on World Data-bank – accessed 14/10/13.

⁷ Source: UNCTAD – accessed 14/10/13.

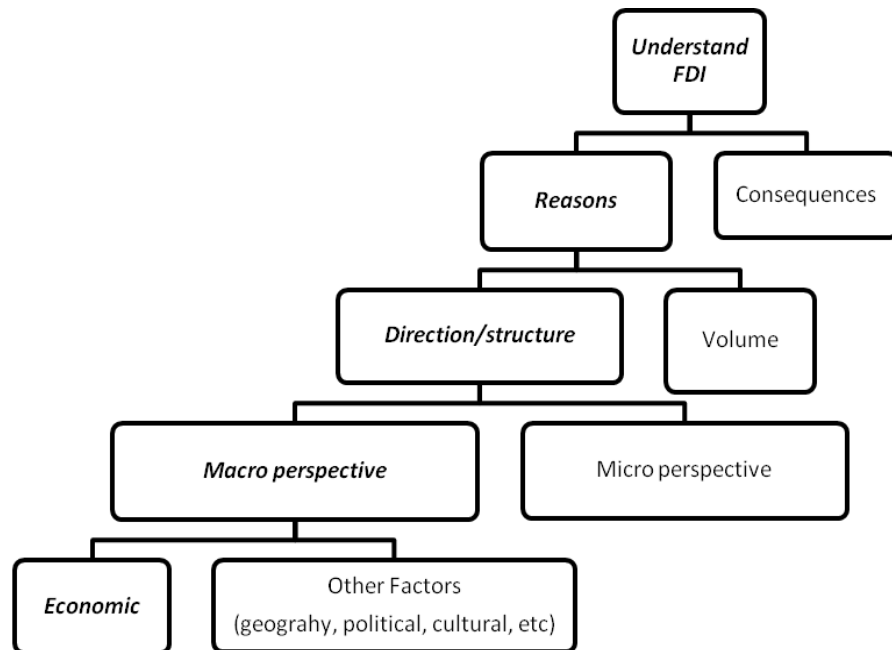
Based on that, whether the OFDI from the South is different from FDI that was mostly sourced by the North, whose emergence was in 1990s? For a complete and accomplished answer, this research is going to investigate two sub research questions:

- i) What drives OFDI in general at the country level?
- ii) By using criteria that based on the understanding of driving factors, does any fundamental difference between OFDI from the South particularly in recent decade and from the North?

1.2.2 Specified Area and Approach

Since the research question has been formed, an approach to investigate is demanded. To figure out whether two things are different or not, it is necessary to find out proper criteria for comparison. Before that, in order to justify the criteria I choose and make the comparison consistent and reasonable, how to understand FDI ought to be a presupposition for going further and a footstone for this research. Therefore, in this section, discussion about how I specify the area and approach will be presented, not only for validity of the way to investigate but also for clarifying simplifications and limitations in this paper. Figure 1.4 illustrates how I locate and specify the area to understand FDI in order to answer the research question.

Figure 1.4 The Specific Area and Perspective of This Paper’s Approach



Step 1, this paper will not focus on the effects of FDI but about the causes. Because of the concern of OFDI, variance of destination countries’ characteristics will complicate the research by requiring bilateral analysis. What this study cares is how and why developing countries, as investors, shift capital out in the form of FDI. For that, this paper does not discriminate ‘South-South’ from ‘South-North’ FDI. Instead, FDI from the South is the main interest. Abundant literature talks

about the spillovers effect of FDI and therefore many governments use preferential policies to attract FDI inflows. Though some studies found the heterogeneity between developing and developed countries in terms of spillovers effect, those analyses that focus on destinations are not so relevant and therefore not helpful to solve the problem about why OFDI from the South became much more. Based on these considerations, this paper will focus on causes and motivations for FDI outflows from the perspective of source rather than destination. For clarification, even if the literature about how FDI stimulates growth might be referred sometimes, the purpose is to explain why host country intentionally draws FDI inflows.

Steps 2, this paper will not emphasize on the volume of FDI but more about the direction, from which country flows to which country. This choice is seemingly not intuitive in the view of that such phenomenon is marked by its impressive volume. However, in fact, the alluring part is not only the growing OFDI from the South but also the increasing role of the South by taking over more and more share of the whole world. Particularly, developing economies were merely as destinations in early 1990s. For that, this paper is not trying to investigate the quantitative relation between FDI volume and independent variables. Instead, this paper attempts to know why the FDI sourced by the South become increasing bigger in terms of the share. Does the OFDI flow to poorer countries or uphill toward to richer countries? Quantitative analysis will be included but only an entry point for understanding the change of OFDI's share. From this perspective, direction is more relevant than volume.

Step 3, this paper will tackle the issue more from macroeconomics perspective rather than microeconomics perspective. The research interest is related to why FDI inflows in a certain way from one direction to another, instead of the other way around. Thus, theories and empirical results that come from studies base on firm-level and industry-level cannot be directly promoted to country-level. Only if theory or empirical evidence can directly support macro-level consequence, otherwise they would not be included in this study. Besides, data access will be a difficulty if starting from micro-level. Usually, most samples are not enough for generalize a country-level conclusion, especially dealing with such a long period. An ideal dataset is always tantalizing, but that seems not realistic here. Under this circumstance, macroeconomics factors are preferred.

Step 4, this paper emphasises economic causes than other factors such as culture and politic condition. Admittedly, many other factors do have influence on FDI decision. An influential example is that gravity model has also been applied in FDI studies and some researchers expanded the connotations of 'distance' by including political distance, cultural distance, financial distance, etc (Wei, 2013). However, there are a several reasons to stop me from dealing the issue by those methods. For one thing, cultural and political factors vary across countries and have no clear dynamic trend for the whole, which means probably hard to explain a macroeconomics trend of developing and developed economies during a two-decade period. For the other, according to existing literature, the results are quite disputed for studies that check those factors. For example, Krug et al. (2013) argue that the governmental policy guidance may not significantly affect OFDI of China by using a so-called 'signalling' method. Therefore, at this stage, I take the risk and decide to ignore other factors except economic causes. Although the assumption might seem unrealistic to some extent, a long term rough tendency is supposed to be captured by main economic factors.

Based on the specification as I discussed, this paper is interested on the decision between two forms of FDI: Greenfield and M&A. According to the theory

of FDI, which will be elaborated in Chapter 3, the paper argues that technology gap between parent and host countries should affect the decision between Greenfield and M&A and consequently affect the share of Greenfield FDI for a whole country. The mechanism provides a way to use the share of Greenfield FDI (or the share of M&A is also feasible) as a criterion for comparing OFDI from the South and the North. Since they started to rise in different periods, I will also compare two periods to get dynamic conclusion. Finally, by decomposing FDI and comparing the share, it is expected to answer the research question that: Is OFDI from the South different from the North or not? And it is important to remind that all of those discussion and consequent conclusions are only within the framework as I specified in this section.

1.3 Limitations

In this section I will present the challenges that I had during this research process. Limitations will be clarified.

First of all, I ignore heterogeneity intra-countries and regard all firms produce with same level of technology. This simplification has been applied for capturing macro-level economic changes. Lucas' model (1990) that talked about capital flows also simplified in this way. Despite this is not uncommon, I should be more cautious because FDI is served by MNCs, most of which are relatively big companies who might have enough force to affect market and therefore make perfect competitive assumption unrealistic. Comparing to all the trade business, the market structure of OFDI is far from perfect market, which implicates this assumption could be distant from reality. Particularly I am going to explore OFDI from the South. For the South, market structure in many countries cannot be regarded as competitive market, leading that the heterogeneity problem may be considerably bigger than developed countries and therefore jeopardize the empirical result. To sum up, from this point of view, my research only capture an important motivation for FDI in the macro-level, which I regard it as the most basic and fundamental one. For empirical test, the model should be more specific if can be tested with detailed micro-level data; otherwise the assumption of homogeneity within country maybe not realistic thus, undermines the validity.

Secondly, my explanation for FDI only tries to identify the general motivation for the country level FDI flows. Even though I gave my consideration for only taking economic reasons into account, there is a risk of applying it on reality because of the characteristics of MNCs, who are the actors of FDI. Most MNCs are so big that their decisions are usually serving for multiple goals. In other words, if I only assess the project itself rather than consider other benefits, sometimes the decisions of FDI seems unreasonable and unprofitable. For instance, serving FDI overseas maybe not profitable but that is a necessary way to access to foreign market. Other methods such as export maybe not available or with extremely high cost. The behaviours are reasonable in fact but not profitable for itself. Let alone the strategy for getting brand value is too difficult to be calculated precisely thus, not easily be included in quantitative analysis. Moreover, some MNCs in developing countries are state owned enterprises, for instance China. Those MNCs might be designed for fulfilling complicated targets including political interests instead of pure market purposes. To sum up, despite assumptions are always not perfect matching

with the real world, my explanation inclines to be undermined more seriously due to the MNCs' characteristics.

Thirdly, data of FDI is not as reliable and complete as most macroeconomic indicators. For one thing, data is not complete or inaccessible. In this study, data of bilateral FDI flows decomposed into Greenfield and M&A is demanded but cannot be accessed. Moreover, data is incomplete in many countries during many periods. Due to that, only 58 economies had been kept in dataset. There is no data selection based on other reasons. Detailed clarification for dataset will be presented in Chapter 4. For the other, data of FDI itself is not accuracy. The measurement error of FDI statistic data is too big to be reliable. Consequently, the quality of data has obvious influence on the part of empirical analysis.

Last but not the least; empirical test in this paper is only necessary but not sufficient to verify the explanation. Each firm's decision ought to be determined by technology levels of the firms who invest and are invested on. If we accept the justification of homogeneity assumption within country, we can conclude this to macro-level. Thus, investment decision is determined by technology levels of both the parent and host countries, which needs bilateral data for FDI flows in the form of two separated sections: Greenfield and M&A. But original econometric model needs bilateral FDI data with two decomposed sections. Lack of data access forces the model to be modified. Eventually, an econometrics model is designed to check the correlation between a country's technology level and structure of OFDI (share of Greenfield). If the explanation works in reality, the test result is supposed to be in accord with theory. However, even a consistent econometrics test result is not sufficient to verify the theoretic explanation. Due to that, I will clarify the explanation in theory in Chapter 3 and econometric test's results, limitations and contributions will be presented in Chapter 4.

1.4 Structure of Paper

The main content will start from literature review in order to put my own work into academic context. Looking as those discussions, not only the globalization in economic terms but also the literature for that entire phenomenon can be regarded as an evolutionary process. From how to understand FDI as general capital flow to specific on OFDI from the South, the theories have left lavish legacies and also been changed a lot. By inheriting and criticising previous academic work, this paper will focus on a relatively small area in order to crack the research problem. All discussions about literature are intended to show justifications and limitations of my research approach, original contribution for this topic and justifications for those choices.

Based on literature, this paper will propose an alternative explanation for general FDI. Different from other forms of FDI, such as portfolio or bonds purchasing, FDI is regarded as a further process for achieving higher technology and consequently expand the possible production frontier in this explanation. The theory implicates different tendencies for Greenfield FDI or M&A in different countries, which could be criteria for investigating the underlying structure of FDI, particularly for the South and the North issues.

In order to check the theory in this paper, an econometric model will be tested for the validity of my candidate explanation for FDI. But it is worthy to point out that the econometric test in the paper is not perfect matched with the theory I proposed as the consequence of data imperfection. The econometric analysis that I am going to present is *Necessary* for the theory but not *Sufficient*. Limitations and results analysis will be provided in the same part. Nevertheless, the result still can roughly provide some empirical supporting to the theory.

To apply theories to reality, this paper will decompose FDI into Greenfield and M&A for some groups during many years. The result would show whether the South OFDI is different and a dynamic process can be described. Due to the complexity of China, more analysis is expected to be done in addition to the general conclusion. By dividing into two periods, 2002-2007 and after 2007, it is designed for more specific findings.

In Chapter2, literature review of FDI theories will be presented. This part bases on literature and talks about FDI as a general capital flow, FDI as a different special type of capital flow and FDI from South, respectively. In Chapter3, the candidate explanation for FDI will be proposed. This chapter focuses on the motivation of FDI and also includes hypocrisies and limitations. In following Chapter4, empirical analysis has two sectors. The first part will test the theory by using econometric model. And the second part will conclude and try to answer the research questions by combing reality data and theoretical mechanism. Finally, Chapter5 will include basic conclusions, contributions and limitations.

Chapter 2 Literature Review

The literature about how FDI is formed and which factors drive FDI is copious, varying from macroeconomics to microeconomics aspects. For macroeconomics perspective, some of them emphasise policy influence or macroeconomics conditions such as interest rate, exchange rate or other economic indicators for a country. Meanwhile, since the subjects in FDI activities are Multinational Corporations (MNCs), it is also reasonable and cogent to discover in microeconomics view such as how companies make decision related to FDI, how is the performance of MNCs, etc. It is always easy but careless to put them into such categories: macroeconomics versus microeconomics, push factors versus pull factors and so on. However, in order to find dominant and consistent causes for FDI, this chapter will be organized as a line of evolution for academic works and debates. The literature review start from regarding FDI as a general capital flow to finding specific features for it, and finally introduce relevant theories and empirical results for FDI from the South.

2.1 FDI as a General Capital Flow

FDI is defined as one type of international capital flow, as well as portfolio flows, bonds, lending and borrowings⁸. Dunning (1971, p.15) says at the beginning of his well-known book: “Economic agents have long traded with each other across national boundaries; to this extent, the internationally-oriented enterprise is no new phenomenon.” Despite that he did ample works for exploring specific feature of FDI, his words implicates that general feature as capital flow lay the foundation of understanding FDI. Therefore, before scrutinize special features of its own; it is better to check the general attributes at first. In a more extreme view, represented by Krugman (2008), claims that topic about FDI and MNCs is not quite attractive because they are not fundamentally different from other production factors flows. As had been stated by Krugman (2008), all those activities and capital flows would happen even without MNCs. In his opinion, MNCs are only the actors of capital flows and therefore it is unnecessary to discriminate FDI from other forms of capital flows. Apart from how accurately and cautiously they made those claims, starting the analysis from regarding FDI as a general capital flow can capture the basic and inherent causes of capital flow, which undoubtedly can be applied on FDI as well.

When comes to dramatic rise of FDI volume for the total world in 1990s, the ‘push factors’, which regard host countries’ conditions as the dominant causes, are favoured to explain such phenomenon. In that view, low interest rate in United States made overseas investment opportunities with higher re-

⁸ According to OECD Glossary of Statistic Terms, financial account, which records an economy transaction in external financial assets and liabilities, includes major components as followed: direct investment, portfolio investment, other investment, and reserve assets. Source: <http://stats.oecd.org/glossary/detail.asp?ID=158> last updated on Tuesday, March 26, 2013.

turn more attractive and therefore the capital moved out for foreign investment, which marked with the first distinct global FDI rise (Kalemli-Ozcan, 2013). Regardless those other factors may create perturbations; low interest rate is an indicator for the price of capital and therefore reflected the low marginal return to capital at that time in United States. Interestingly, when Lucas (1990) tried to explain why capital does not flow from rich country to poor country, in the case of United States and India, his framework follows the same logic. By taking human capital and technology level⁹ into account, Lucas found that same or similar marginal returns to capital for two countries can well explain the lack of abundant unidirectional capital flows because there is no motivation for shifting capital from one to the other. Though these two groups of works seem to discrepant at first glance, one for why capital flows and the other for why does not, in fact they tackle this issue through the same method. The explanation about interest rate tries to say that low interest rate in United States displays low return to capital, so capital flowed out. And Lucas' model deals with relation between India and United States says that equalized returns to capital can explain why capital does not flow. In a word, all of them regard marginal return to capital as the key factor influencing FDI-flow direction. Besides, combining them can implicate that FDI as well as all other forms of capital flows would not flow into one-way direction if there is a bilateral equilibrium marked by same marginal returns to capital for both countries.

Furthermore, Lucas (1990)'s work also provide a straightforward way to do calculations and comparisons for returns to capital, by using Cobb-Douglas production function and identifying marginal effect as a function of key variables such as gross production per capita, human capital index, technology level. Contrast to explanation by interest rate, which is easily affected by political influence, market fluctuations or shocks, this framework by using production function can serve for explaining primary causes during a relative long period, if the indicators and estimations are convincing.

However, Lucas's data was not recent enough for being relevant to the change in 1990s. In his work, the human capital index he used was calculated in Anne Krueger's work in 1968. Meanwhile, the others' work did not calculate marginal return but only used interest rate as an explanation. Interest rate may reflect the return to capital but is also deeply influenced by many other factors. Though following same underlying thought, literature that used interest rate as explanation is not detailed to some extent. It is possible to assume that conditions might change at that moment and the discrepancy of marginal returns to capital appeared, as reflected in the low interest rate of United States, and therefore caused the rise in 1990s. But this procedure and mechanism haven't clearly stated in those work. If Lucas' estimate is correct, what led the transformation from equilibrium to discrepancy? Under that circumstance, it left a puzzle of how these conditions had been changed deeply if they achieved equilibrium before. Besides, since those theories can be applied on any form of capital flows, the fact of decreasing portfolio flows undermines the hypothesis. Existing literature does provide inspiring thoughts but is not satisfactory enough for the case of FDI. The fact that portfolio and FDI had totally differ-

⁹ In his paper, technology level is expressed as a function of human capital.

ent performances motivates more investigations for FDI itself. Thus we need to go through the legacy that endows FDI with specific marks.

2.2 FDI as a Specific Type of Capital Flow

The reality implies that differentiating FDI from other forms of capital flows is necessary and therefore motivates more detailed theoretical construction or empirical studies for FDI its own.

Dunning (1977; 1981; 1988c) highlighted the purpose of purchasing *intangible assets* in his *eclectic theory* (also called as *OLI theory*). OLI theory includes ownership, location, and internalization advantages and companies determine licence, trade or FDI based on the three dimensions. Because the intangible assets are difficult to be traded (Krugman, 2008), MNCs can reduce a considerable cost or fulfil some difficult targets through FDI. The core idea of this widespread comprehension is to regard FDI as a process special for attaining know-how and accomplishing technology transportations. Due to these advantages, FDI, as they explained, is preferred rather than other international business activities such as trade or other forms of capital flows. As B.S. Javorcik (2013) depicts, undoubtedly, FDI is highly correlated with technology activities:

“The data confirm that multinationals are responsible for a vast majority of the world’s research and development (R&D) activities. In 2002, 700 firms, 98% of which are multinational corporations, accounted for 46% of the world’s total R&D expenditure and 69% of the world’s business R&D. Considering that there are about 70000 multinational corporations in the world, this is a conservative estimate. In 2003, the gross domestic expenditure on R&D of 3.84 billion dollars by the eight new members of the European Union 2 was equal to about half of the R&D expenditure of Ford Motor (6.84 billion), Pfizer (6.5 billion), DaimlerChrysler (6.4 billion), and Siemens (6.3 billion) during the same year. It was comparable to the R&D budget of Intel (3.98 billion), Sony (3.77 billion), Honda and Ericsson (3.72 billion each) (see UNCTAD, 2005). More than 80% of global royalty payments for international transfers of technology in 1995 were made from foreign subsidiaries to their parent firms (UNCTAD, 1997).” (Javorcik, 2013, p.312)

With respect to the motivations for FDI, market-oriented purpose has been illustrated. It views FDI as a promotion for market access, which implies trade, particularly export, is supposed to be positive correlated with FDI’s increase. When FDI is functioned for exploiting factors and producing intermediate inputs, this process usually accompanies with expanding of trade. Some empirical studies found evidences for supporting this hypothesis. For instance, a positive relation between FDI and trade has been verified based on China-Africa data during period 2004 -2009 (Zhang Z., 2011). In those studies, vertical FDI are usually highlighted and have stronger effect because it usually stimulates local economy and improve infrastructure, which can consequently propels trade.

Contrast to the theory describing the *complementation* relation between FDI and trade, the *substitution* relation is also developed for understanding how FDI forms. Melitz (2003) developed a model to describe the substitution relation between FDI and trade, by regarding both of them as a way to serve business in overseas market. In his theory, FDI has higher fixed cost and sunk costs but lower per-unit costs while export is the opposite situation. The trade-

off between sunk costs and per-unit costs determines the decisions of firms with respect to FDI or export. It is worthy to point out that in this research, Melitz clearly exclude vertical FDI at the beginning. Similarly, Markusen and Venables (1998)'s work of 2*2 model, which includes fixed cost and also takes market features and endowment into consideration, tells an analogous story and supports this idea. Even though these two lines of thoughts, substitute and complement, are absolutely the opposite, both of them put the relation with trade, particularly export, into a vital position for explaining why MNCs choose FDI.

Not only the source country, but also the destination country and the relations between them made difference. For clarification, I will address this more lucid here. This paper is not going to figure out why FDI flows in a certain country and the relations between source and destination. The causes drive FDI outflows are my interests. But through their ideas, it can provide some relevant contributions for understanding OFDI formation. Due to that consideration, sizeable gravity models have been developed for testing which factors have significant influences. In this process of expanding models, distance is not only confined to geographic distance, but also includes others abstract distances such as political distance, financial distance, cultural distance, etc. The significance of each variable provides information about which factors are important and how risky if I exclude some variables for simplification. For instance, if political system makes difference, it is probably risky to ignore political causes for FDI flows. The gravity models have been applied on issues about the South, which I will discuss more in next section.

To sum up, when academic legacies start to identify the special characteristics of FDI, more disagreements come out. First of all, a nearly consensus is that the intangible or non-tradable goods transfers motivates MNCs. Indeed, it captures the unique part of FDI, which other forms of capital flows do not have. However, those theories, represented by Dunning (1977; 1981; 1988)'s eclectic theory, seems more applicable for micro-level cases instead of macro level-level. OLI framework targets how firms make decision at some static point but not applicable enough for the increasing FDI during 1990s in macro-level. If the theory cannot properly explain that dynamic process by providing new driving force, it would implicate that motivations for FDI existed before 1990s but impediments inhibited it. And in 1990s, those impediments had been eliminated during that period and therefore FDI started to soar. But this process of increasing had been continued for a long time. If the rise of FDI was as a result of market impediments reduction, it ought to achieve new equilibrium very soon. In order to answer what drives the rise of FDI and why the South plays bigger role, this paper tries to discovery underlying causes that drove and motivated FDI rather than emancipation from obstacles.

Secondly, the relation between FDI and trade elicits a great many arguments. Both sides present strong evidences. Regardless their discrepancy, all of them believe FDI is a consequence of furthering international integration and serving for trade in order to reduce costs and therefore maximize profit. Concluded from both sides, trade and FDI are highly related, which motivates the econometrics model to include variable about trade.

Thirdly, gravity models draw out attention on the so-called 'distance' between source and destination countries. Which distance is significant will implicate what relevant factors have influence at a macro-level.

Final point is about something has not received enough attention in literature. Although few scholars release FDI from technology transfers and moves, in fact this issue has not been clarified from source country's aspect. Most of literature focuses on technology spillovers in destination country. Maybe this justification for policies that incline to favor FDI can explain part of FDI flows. But considering how fickle the policies are and focusing on why FDI moves out, current wisdoms are not enough as a response to such a close relation between FDI and technology, which motivates further thoughts from other perspective.

2.3 FDI from the South

As a response to the phenomenon that FDI is increasingly sourced by the South, more literatures talk about OFDI from the South. A natural question will be asked about 'the newness of developing countries OFDI': is that a new pattern or just a duplication of FDI most sourced by the North in previous stage?

Many studies apply OLI theory on their framework, implicating an acceptance for regarding OFDI from the South as the same or duplication of the prior one from the North. Gravity models do not declare any changes for current burgeoning OFDI from the South. But their results capture some characteristics for OFDI from the South. For instance, Wei (2013) finds that geographic distance is insignificant as long as we control the other institutional variables based on China's data, which conclusion is supported by Zografova (2011) in the discussion of China as well. If their results are sound and applicable for all developing economies, the relation between trade and FDI would need more thinking, because trade is supposed to be closed related with geographic distance. The theories that link FDI with trade would be jeopardized no matter in complementation or substitution views. Wei (2013)'s another finding implies some new thoughts for OFDI from the South. Her result shows that FDI tends to flow to a better market with high-level financial development. This view is proposed especially for developing countries recently, because many developed countries' markets are relative mature at a similar level. Besides, Gravity models results sustain the causes presented by Forbes (2010): some investments are looking for a mature and developed financial market. He states that: "Countries with less developed financial markets tend to hold a greater share of their portfolios in the United States, and the strength of this relationship is inversely related to a country's income level. "(Forbes, 2010, p.4)

Another approach that treats OFDI from the South differently focuses on policy influence. Due to the justification of FDI positive effects, policy might inclines to favour FDI. Alfaro and Johnson articulately described this fact: "Anticipating potential benefits from FDI, many countries not only reduced barriers to FDI, but also offered incentives calculated to attract foreign firms and foster relationships between multinational enterprises (MNEs) and local firm s (especially suppliers) in last two decades". (Alfaro and Johnson, 2013, p.299) However, such a belief of benefit from FDI has been doubted by empirical results. In theory, spillovers effects can happen via many mechanisms such as competitive effect, labour mobility (Balsvik, 2011), vertical Spillovers (Javorcik and Spatareanu, 2009 ;), export effects (Chen and Swenson, 2007;

Javorcik and Li, 2009; Javorcik and Spatareanu, 2009), etc. Some of them found spillovers effects but the others did not. Harris and Robinson (2003) found there is a tendency to select local firms with better performance. Endogenous problem will fundamentally jeopardize empirical results under this circumstance. Gorg and Greenaway (2004) and Kokko (2003) only found weak evidence for Spillovers or not significant, even negative relation¹⁰. I do not know whether this disagreement changed the view of policy making and hence reduced FDI that was attracted by prior preferential policy. But the huge divergence in this issue exists for sure.

In addition, small/medium sized MNCs from the South, though normally be regarded as less competitive due to the size, has been found competitive advantage and therefore contribute to the burgeoning South-South FDI. (Aykut and Ratha, 2004) In contrast to former analysis, this group of work goes back to the competitive advantage and also back to regard FDI as a profit driving activities.

The literature that specific on OFDI from the South is lack of consensus due to the timeliness. In brief, first divergence in the literature is whether regard OFDI from the South as a new pattern or duplication that only need to be applied with old theories as reviewed in section 2.2. Gravity models show that some special characteristics ought to be responsible for OFDI from the South. For one thing, looking for a better political or financial system, instead of pure economic concerns, has been proposed as the cause for so-called 'up-hill OFDI'. For the other, insignificance of geographic distance might indicate a remote relation between OFDI from the South and trade. Besides, policy influence bases on the justification for the existence of spillovers effects. However, the empirical results are far from consistent and clear. Finally, the studies highlight MNCs from the South shed new light on this issue, despite that the research is too micro to generalise. It is almost impossible to form a long period and global business trend without dominant economic drive engine. Those works motivate me turn back to the competitiveness as key explanation. Through that, increasing OFDI from the South might be discovered more.

2.4 Conclusion

In this chapter, I reviewed relevant literature for understanding FDI. Regarding the literature as an evolution, general features as capital flows, specific features of FDI and FDI from the South have been introduced in order.

In the first section, general theories for capital flows can help us form the basic understanding of FDI, as a profit-purchasing process and therefore determined by return to capital. Besides, the work made by Lucas provided a simple way to estimate the marginal effects of capital. However, the biggest puzzle in their work could not be solved is the rising of FDI during 1990s, especially portfolio flow decreased during same period. Clearly, FDI and other forms of capital flows had dissimilar performances in that period. Thus, one general theory is far from enough to explain FDI properly.

¹⁰ A summary and discussion of those empirical results are cited in Alfaro and Johnson's work in 2013. More empirical studies' results are presented in that summary.

In the second section, literature is abundant but lack of agreement. The argument whether FDI is substitutive or complementary to trade has been highlighted. Meanwhile, OLI framework, including ownership, location and internalization advantages, was widely used. But their emphasis is MNCs at the microeconomics level, which is not quite suitable for the macroeconomics phenomenon. Even so, these three factors of FDI encourage my work to focus on location conditions and technology, which can be regarded as a form of ownership advantage.

In the final section, literature is very relevant to my research question. Some gravity models I discussed present insightful and inspiring ideas. In Addition, the insignificance of geographic distance might imply a weak correlation with trade. And uphill FDI is regarded as to purchase low risk in mature market or high technology, etc.

By absorbing those wisdoms and forming my understanding, competitiveness of return to capital is still the core idea, while technology transfer process must be involved. Based on them, next chapter is going to present an alternative explanation.

Chapter 3 An Alternative Explanation for FDI

3.1 FDI as a part of process

When we look back and try to explain international economic integrations, there is a tendency to ‘uniform’¹¹ various types of it: trade, capital flows, FDI, etc. Krugman (2008) states and also implicates in his analysis that international financial flows share the similar principles and economic consequences with international trade. Admittedly, by analyzing underlying causes, those works disclose the core ideas in international interactions. Moreover, if we review the trade theories by generation, from comparative advantage, endowment to increasing returns, the underlying idea is similar as well: expanding the production possibility frontier by allocating resource to sector with higher productivity. However, as I discussed in Chapter 2, many scholars try to find specific features for FDI. Instead of starting with analyzing FDI itself, I will present some facts and therefore regard FDI as a part of process of globalization.

Dramatic spring up of FDI has emerged since in the beginning of 1990s, whereas neither trade nor portfolio equity went up as prior decades. As illustrated in table 3.1, for trade, 1970s was marked by more than 20% average annual growth rate but had been slowed down after that. And portfolio equity flows, from 1960s to 1980s, increased with an impressive speed but got even negative growth rates in 1990s. On the contrary, FDI was almost negligible before early 1990s but increased during this period, when the other two forms of international interactions, trade and portfolio equity, declined. The emergence of each of them happened at different stages in sequence and therefore formed a furthering economic interaction between countries. Trade started to decline during 1970s and portfolio flows had experienced a big shrink during 1990s after its massive rise since 1960s. But FDI increased with a considerable volume in the period that neither trade nor portfolio did. In other word, whole economic climate could not be simply used as the cause of growth of FDI; otherwise it should also simulate trade and portfolio flows. Besides, it is worthy to point out that FDI and portfolio flows display entirely different properties here, which emphasizes the necessity of differentiating FDI from other forms of capital flows. Since FDI is more related with long-term interest and higher fixed cost, I suspect that FDI was increased because other forms of economic interactions had lower return to invest. Thus, investors had to invest in the form of FDI even with higher risks. In this view, the phenomenon represented in table 3.1 shows a process of globalization in different stages. But this argument need one more step for completeness: FDI could create higher return to capital at that stage.

¹¹ Just for clarification, I am not trying to say that their work regard all these forms of international interactions as the same. What I try to describe is a tendency to focus on economic effect. Therefore, they compare different forms in static and relatively ignore the other differences between each. For instance, which one had been emerged earlier does not matter.

Table 3.1 Average Annual Growth Rate of World Export, Portfolio Equity and FDI Flows

	1950 - 1960 ¹²	1960 - 1970	1970 - 1980	1980 - 1990	1990 - 2000	2000- 2010
World Export ¹³	6.5%	9.3%	20.4%	5.9%	6.7%	10.9%
Portfolio Equity Flows	N/A	33.4%	22.3%	37.9%	-532.7%	3.1% ¹⁴
FDI ¹⁵	N/A	N/A	21.7%	26.6%	42.6%	-1.4%

Source: UNCTADstats- accessed 21/09/2013 and World Development Indicators- accessed 27/10/2013

As Lucas (1990) elaborated, all the interactions would slow down (notice: neither stop nor decline) after achieving a close equilibrium. The rapid emergence of FDI was not predicted in Lucas' work because his framework was targeting general capital flows, which went down in fact.

To solve this puzzle, I explain it by regarding FDI as a process of globalization. Regardless economics of scale effects, globalization expand production possibility frontier by providing more options for allocating resources. And this process is going deeper until every economy and every sector has same return to each input. If and only if some condition changes, it moves toward new equilibrium point. After many years with international capital flows, the difference of return to capital between countries had been eliminated and equalized, if we take human capital and technology level into account according to Lucas (1990). From this perspective, FDI must change some conditions and therefore experienced a big rise during 1990s, which belies any simple idea that try to explain FDI by using a uniform principle for any capital flows.

Meanwhile, as mentioned in literature review, FDI has been related with technology activities closely. FDI, different from trade or portfolio flows, can change technology level that be used in production. Just think about myriad research about spillovers. No matter the spillovers effects are significant or not, it implicates that MNCs produce with higher technology level than other

¹² Period 1950 – 1960 is followed as UNCTADstats. But for portfolio equity flows, it is 1950-1959, 1960-1969 and so on. Here I do not put different sections in order to be concise.

¹³ UNCTADstats reports both export and import. There is only nuance between two measurements. Basically they can be regarded as the same here.

¹⁴ These growth rates are calculated by author based on World Development Indicators- accessed 27/10/2013 via suing difference value between the last and the first year divided by 10.

¹⁵ The data for FDI is calculated by author based on UNCTADstats- accessed 21/09/2013.

local firms, or at least they could. Besides, MNCs incline to protect their technology within the firms. As supportive evidences, many researchers found that protection of intellectual property rights (IPRS) has a significant influence on the composition and the knowledge content of FDI (Javorcik, 2013). In other word, those MNCs not only produce with different technology, but also maintain this technology gap at least in short term, if spillovers will happen in long term. Due to the disputed results for spillovers tests and indubitable fact that MNCs usually produce with their own technology, I will emphasize this difference of producing procedure between MNCs and local firms even in the same country. In other word, it is necessary to use at least two levels of technology levels rather than only one uniform macro-level productivity for the whole country factories that include both local companies and foreign companies.

3.2 Theoretical Framework

3.21 Lucas's model

This section will start with R. Lucas (1990)'s wisdom for capital flows. According to neoclassical models, it predicts that capital flow from rich to poor countries due to the difference of return to capital. In other words, if capital does not flow from one to the other country, it implies bilateral equilibrium as long as the ratio between returns to capital of two countries is or close to 1, approximately. In his paper, two countries' production functions obey a Cobb-Douglas-type constant returns technology with a common intercept:

$$(1) \quad y = Ax^\beta$$

Where y is the aggregate production per worker, A is the technology level (or *Solow Residual*), x capital per worker. But result based on (1) showed that the marginal return of capital in India was 58 times in the United States. Lucas argued that this discrepancy came from ignorance of human capital. By including human capital and technology difference, the production function takes the form:

$$(2) \quad y = Ax^\beta h^\gamma$$

Where h is human capital per worker. Eventually, the ratio of return to capitals in India and United States is 1.04 with the calculation based on (2). By that, Lucas explained why capital does not flow from rich, United States for example, to poor countries like India.

By adapting his model with a few modifications and clarification, two countries, 1 and 2, are assumed to produce with the Cobb-Douglas(C-D) production function:

$$(3) \quad y_i = \frac{Y_i}{N_i} = \frac{A_i K_i^\beta (E_i L_i)^{1-\beta}}{N_i} = A_i K_i^\beta E_i^{1-\beta}$$

Where, Y_i is aggregate production, N_i is population¹⁶, K_i is capital stock, E_i is effective labor coefficient, L_i is labor force and subscript $i=1,2$ refers to country 1 and 2.

In order to find the equilibrium where there is no more motivation for unidirectional capital flows, marginal returns to capital in two countries ought to be equalized. For that, marginal product of capital in terms of capital per worker can be easily calculated from (3):

$$(4) \quad r_i = y_i' = \beta A_i K_i^{\beta-1} E_i^{1-\beta}$$

Where r_i is the marginal return to capital. According to Lucas (1990)¹⁷, the condition for equilibrium is that two countries have the same marginal return to capital: $r_1 = r_2$. As long as the condition maintains, there is no more motivation for international capital flows, at least no significant net flows toward a certain direction.

However, as mentioned before, this explanation is convincing for other forms of capital flows but not enough for FDI. The discrepancy between emergence of FDI and prediction for equilibrium in Lucas' paper needs to be reconciled. Therefore, I am going to point out one crucial limitation in Lucas work: he assumed production process is conducted with same technology as the country where the factories locates on. It might be true in terms of portfolio investment, but not quite reasonable for FDI. According to the definition of FDI (see Text Box 1), investor must have an effective voice in the management. In addition, FDI is highly related with R&A and technology transfer, as I discussed in Chapter 2, which means parent companies can support sub companies in host countries in many ways such as know-how, high technical equipments, and sophisticated employees and so on. Therefore, it will be more realistic to consider the case that MNCs can produce with different technology from the country where their factories locate on. For instance, MNCs from developed countries may produce with their own technology in a poor country.

3.22 Alternative Model

Before going further, I will use another way to express Lucas's model in order to expand it to latter work. For one reason, Lucas' model predicts the equilibrium. In other words, there is no more capital flows from one to the other. Any extra unidirectional capital flow is not justified by breaking the equalized marginal returns to capital. That is why I transform the model by including an extra capital flow from one to the other country: K_0 . Any satisfied

¹⁶ Here I regard all population as labour force for simplification.

¹⁷ The model is not exactly the same as his. A few changes are implied here for later theory. He only used capital per work and regarded technology as a function of human capital. Firstly, here I put population (or say the number of workers) at the beginning in order to future investigation. Secondly, total factor productivity is given here without other index because I will not do further estimate by human capital. Lastly, it is useful to point out that his paper was frequently using marginal product of capital in terms of production per worker because he wanted to estimate the marginal product through production volume per worker. But here, I prefer to use marginal product of capital in terms of capital per worker because my framework is only for theoretically reasonability.

theory need to justify it. For the other reason, since Lucas' model was designed for explaining why the equilibrium exist, though his work can display the unbalanced situation when the marginal returns are different, it cannot predict the new equilibrium point precisely. By including K_0 in my model, a justified and calculated K_0 can show the volume and direction of extra capital flows in the form of FDI. Thus, the new equilibrium can be captured as well.

Assuming there is a certain amount of capital flows from country 1 into country 2¹⁸: K_0 . Then we try to determine the amount of K_0 that can satisfy the equilibrium condition: $r_1 = r_2$.

After the capital flows, the new marginal products of capital in terms of capital per worker are for each:

$$(5) \quad r_1 = \beta A_1 \left(\frac{K_1 - K_0}{N_1} \right)^{\beta-1} E_1^{1-\beta}$$

$$(6) \quad r_2 = \beta A_2 \left(\frac{K_2 + K_0}{N_2} \right)^{\beta-1} E_2^{1-\beta}$$

In order to satisfy the equilibrium condition, we need $r_1 = r_2$. By simply combining equations (4) (5) (6) with equilibrium condition, we can solve¹⁹:

$$(7) \quad K_0 = 0$$

Till now, the story is as same as what in Lucas' model, which means no more motivation for international capital flows, as (7) shows. However, as I mentioned before, MNCs may use their own technology if that is more profitable. In other words, the production function of MNCs can be different from host country if their technology level is higher than the host country level. Therefore, the production function can be changed by this process. Following the same settings before, the only fundamental difference is that technology level for the extra capital flow is optional. To clarify this mechanism, it is convenient to set: $A_1 > A_2$, which means country 1 has higher productivity than country 2. Consequently, firms from country 1 will keep using their own technology when they invest FDI in country 2. Thus, marginal return to the extra capital flow is transformed from (6) to:

$$(8) \quad r_2 = \beta A_1 \left(\frac{K_2 + K_0}{N_2} \right)^{\beta-1} E_2^{1-\beta}$$

Using the same method of calculation²⁰, then we can solve:

¹⁸ That is just an assumption. If $K_0 > 0$, FDI flows from country 1 to 2; if $K_0 < 0$, FDI flows from country 2 to 1.

¹⁹ We can get $A_1 K_1^{\beta-1} E_1^{1-\beta} = A_2 K_2^{\beta-1} E_2^{1-\beta}$ from (4); and $A_1 \left(\frac{K_1 - K_0}{N_1} \right)^{\beta-1} E_1^{1-\beta} = A_2 \left(\frac{K_2 + K_0}{N_2} \right)^{\beta-1} E_2^{1-\beta}$ by substituting (5) and (6) into equilibrium condition. Combing these two equations can easily solve the value of K_0 .

²⁰ we put new equations (5) and (8) into equilibrium condition and combine the equation with former equilibrium point from (4):

$$\beta A_1 K_1^{\beta-1} E_1^{1-\beta} = \beta A_2 K_2^{\beta-1} E_2^{1-\beta}$$

$$\beta A_1 \left(\frac{K_1 - K_0}{N_1} \right)^{\beta-1} E_1^{1-\beta} = \beta A_1 \left(\frac{K_2 + K_0}{N_2} \right)^{\beta-1} E_2^{1-\beta}$$

$$(9) \quad K_0 = \frac{K_1 K_2 (1 - (\frac{A_1}{A_2})^{\frac{1}{\beta-1}})}{K_2 + K_1 (\frac{A_1}{A_2})^{\frac{1}{\beta-1}}}$$

Because $A_1 > A_2$, $0 < \beta < 1$, $K_1 > 0$ and $K_2 > 0$, so the result is:

$$K_0 = \frac{K_1 K_2 (1 - (\frac{A_1}{A_2})^{\frac{1}{\beta-1}})}{K_2 + K_1 (\frac{A_1}{A_2})^{\frac{1}{\beta-1}}} > 0$$

3.3 Conclusions and Implications

A strictly positive K_0 in my model justify the extra capital flows and the precise volume is determined by K_1 , K_2 , A_1 , A_2 and β . Positive K_0 indicates that the equilibrium point changes in the direction from country 1 (high technology country) into country 2 (low technology country). This model shows that motivation for FDI flows exists even under the condition of equilibrium as Lucas described for general forms of capital flows. It is because of that higher technology level country can maintain a higher return to capital when they shift the capital to relatively poorer country by using the technology from parent country. With that process, FDI expands production possibility frontier with respect to former equilibrium for other forms of capital flows. Similarly, relatively low technology countries can get more profits by using higher productivity; if they get backward technology purchase via M&A. Underlying logic is as same as the model has been discussed. In brief, FDI increase return to capital by making technology in produce function optional, which is limited to the location in other forms of capital flows.

This model implicates a difference between two major forms of FDI: Greenfield and M&A. For Greenfield FDI, MNCs build new factories and even bring their own employees in some cases. According to the model for FDI, Greenfield inclines to produce with the technology in parent country or say parent firm, as exactly the same as elaborated in section 3.2. For M&A FDI, MNCs involve local firms by either mergers or acquisitions, showing strong interest on intangible assets such as technology of local firms. As mentioned in literature review, backward technology ‘spillovers’ happens in this case. In fact the so-called spillovers seem more like a strategy on purpose instead of spontaneous effects. Due to that, the share of Greenfield in total OFDI of an economy can display the basic structure and driving powers for FDI in this economy. If the share is relatively high, OFDI from this economy probably is mainly looking for location advantage and producing with own technology. Otherwise, relatively low share of Greenfield implies that the economy tends to use technology of host countries.

At last, there is a limitation in this model because companies’ behaviors of M&A probably have been over-simplified. M&A could be served for many reasons and may not mainly for acquisition of technology. In this sense, Greenfield FDI is more clear and consistent with theory comparing to M&A. As a consequence, I use the share of Greenfield in total OFDI as key indicator, partly because of the limitation just be discussed.

Chapter 4 Empirical Analysis

4.1 Econometric Analysis

The alternative explanation, which has been illustrated in previous Chapter, regards technology acquisition as the core driving force. According to that, two kinds of FDI work in different ways: Greenfield inclines to invest in the country or economy with relatively lower technology level but M&A prefers host countries with relatively higher technology. Either way can expand the production probability frontier and therefore creates more products in the sense of total amount. This model predicts that the share of Greenfield in total FDI can be a good indicator for understanding the structure of OFDI from a country. However, we do not know whether driving force dominants in reality or not since many other factors have influence but not been included in the model. Hence I need econometric analysis to test the validity of model in real world.

4.1.1 Considerations regarding the Econometric Model

As an important implication from the model, the form (Greenfield or M&A) of FDI that MNCs invest in foreign countries is determined by whether the companies want to acquire higher technology or use their own technology, which is as a result of technology gap between parent and sub companies. After controlling other factors, each FDI decision is supposed to be significantly related with technology gap between two companies. Therefore, an econometric model can be presented as followed, directly transformed from theoretical model:

$$(10) \quad \text{Prob}(\text{Greenfield} = 1) = \Phi(\beta_0 + (\text{techgap})\beta_1 + \gamma_i \sum_{i=1}^k x_i + \epsilon)$$

Where *techgap* is different value between parent company's technology level minus sub company's technology level. x_i are controlled variables such as companies' properties. Dependent variable is dummy variable in order to capture each decision made for FDI in terms of whether in form of Greenfield or M&A. The correlation between *techgap* and *Greenfield* dummy is showed by coefficient β_1 . In accord with the model, β_1 is expected to be positive, which means the firms would prefer Greenfield if they have higher technology in the bilateral relation. On the contrary, if their technology is inferior to the other, the FDI is probably in form of M&A.

However, for one thing, it is too difficult to access enough micro-level data to test this model. Since I need the conclusion for macroeconomic phenomenon, insufficient and incomplete data will definitely jeopardize the conclusion. For the other, many inspirations and feasible assumptions are learnt from the model formulated by Lucas, which proved equilibrium had existed already. In other word, such equilibrium had been achieved or at roughly achieved before. Thus I have reasons to assume the market as competitive enough and technology as equalized in one area, for instance within a country. Due to that, it is reasonable to expand the model to country-level at the expense of ignoring information of heterogeneity in firms from the same country. The modified model tries to capture the correlation between technology gap

between parent and host countries and the share of Greenfield in total OFDI. Therefore, the econometrics model has been modified in the followed form:

$$(11) \quad \textit{Share of Greenfield} = \beta_0 + (\textit{techgap})\beta_1 + \gamma_i \sum_{i=1}^k x_i + \epsilon$$

Where *Share of Greenfield* is the share of Greenfield in total FDI in percentage for a country, *techgap* is the difference value between technology level in parent country minus the technology level in host country. x_i are controlled variables such as GDP per capita, export as the share of GDP in parent country, etc. To be clarified, this model tries to control parent country's prosperities rather than host countries or 'distance' between them, because I try to find the cause of OFDI from the parent country. In accord with the model, β_1 is expected to be positive, which means the country that has higher technology than host country would have higher share of Greenfield in total FDI because they prefer to use their own technology in general.

In this econometrics model, countries are the agents and basic units for analysis instead of firms. However, this model can be tested only if bilateral data of FDI with decomposed parts of Greenfield and M&A is available, while it is not. As a consequence, I transform the model into individual country's technology level instead of technology gap. If the theory works in reality, generally high technology countries ought to have relatively higher share of Greenfield FDI and low technology countries might have relatively lower share of Greenfield FDI. This modification is risky for two reasons. For one reason, the econometrics model is not sufficient to test the theory but necessary. In other words, if the theory works well, the test is expected to be accord. But even if the test result is as expected, it is not enough to prove the theoretical model's validity. For the other reason, this test bases on strict assumption of theoretical model, which means only if the theatrical model works perfect well, the result can show the accordance. For example, if the theory does not work for some countries, we could identify the heterogeneity for each country in former model. But in the modified model, we cannot test bilateral relations and therefore regard each country as individual. In this case, inapplicability for some countries may have bigger influence on result. Limitations and risks are presented as dissuasion above. Nevertheless, due to the data availability, the followed econometrics model is alternative:

$$(12) \quad \textit{Share of Greenfield} = \beta_0 + (\textit{techlevel})\beta_1 + \gamma_i \sum_{i=2}^k x_i + \alpha + \epsilon$$

In this model, *techlevel* refers to technology level of parent country who invests to other countries. Total factor productivity could have been a matched index for technology, but only growth rates have been estimated and reported. Logarithmic GDP per capita is regarded as the alternative index. *Share of Greenfield* refers to the share of Greenfield in total OFDI. x_i are controlled variables in order to capture influences from other features of parent country. To be specific, they contain the ratio between export and GDP and the ratio between industry added value and GDP as control variables. As I discussed in Chapter 2, FDI is highly related to trade and industrial product. For that reason, these two variables are included. α is included for unobserved variables effects and whether using Fixed Effect model or Random Effect model will be discussed and tested by Hausman Test later. The value and significance of coefficient β_1 are what we focus on. The theory in Chapter 3 predicts a positive β_1 in this model. Because countries with relatively high technology level have inclination to dominant on host country in terms of technology when they

have OFDI, they might have higher share of Greenfield in total OFDI, at least in the view of theoretical model.

4.1.2 Data

The data in this study comes from World Investment Report (2002, 2003, 2004, 2005, 2006, and 2012), UNCTADstats and World Development Indicators. 58 economies²¹ are included in dataset and the rests are eliminated only because of FDI data incomplete. For the countries cannot report more than half number of years during 1989-2012, they are dropped. However, some countries in the 58 economies also suffer from data incompleteness to some extent. For them, only the observations with incomplete data in each year will be omitted. The selection of individual observations are applied both in regression and analysis. In other words, data completeness is the only criterion for selecting observations. Based on the selection, this study is going to use a panel data with 58 countries from 1989 to 2012.

Data of FDI is not as satisfying as other macroeconomic indicators, which leads that the accuracy of the data and therefore this empirical study needs to be regarded cautiously (See Text Box 2). Some observations for Greenfield FDI flows are negative or in excess to the total capital flows, which should not be in that way. Exchange rate change, assets price fluctuation and measurement errors can be responsible for that. Even though, for the reason that they are supposed to be unbiased, I did not exclude all the numbers out of range of (0-1). But extremely abnormal data has to be omitted. It is helpful to check statistical property of the variable of the share of Greenfield in total OFDI, which is defined as value of Greenfield as sources divided by total FDI outflows. Table 4.1 illustrates the distribution of dependent variable by presenting the percentile, which suffers from data accuracy to some extent as I discussed. The table shows that only 80% observations are within the range (-81%, 153%). In order to include at least 90% observations, I take the range of (-3, 3). Due to that consideration, all the observations out of the range of (-3, 3) were eliminated from dataset and the rest has been kept. This elimination can reduce the risk that empirical test is undermined by some abnormal observations. And that more 90% observations are included assures econometric test representative. Moreover, it is worthy to clarify that the selection is only applied for individual countries but not for groups like world, developing

21 Since Taiwan, Hong Kong are included in discussion, using 'country' may create misunderstanding. Due to that consideration, I will use economies to refer countries and economic zones and so on. Those economies included in are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden, United Kingdom, Norway, Switzerland, Canada, United States, Australia, Israel, Japan, New Zealand, Egypt, Morocco, South Africa, China, Hong Kong, China, Korea, Republic of , Taiwan Province of China, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam, India, Bahrain, Turkey, United Arab Emirates, Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay, Venezuela, Bolivarian Republic of, Costa Rica, Guatemala, Mexico, Panama, Bahamas, Croatia, Kazakhstan, Russian Federation, Ukraine. Selection bases on country list in World Investment Report (2002, 2003, 2004, 2005, 2006, and 2012) Annex.

economies and developed economies. Thus, discussion and data for groups will not be affected.

Table 4.1 Percentile of the observation for share of Greenfield FDI

Percentile (% Below)	5%	10%	90%	95%
The Share of Greenfield FDI	-287%	-81%	153%	290%

Source: calculated by author based on UNCTADstats- accessed 21/09/2013

Text Box 2 Accuracy of FDI data

In general, according to definition of FDI from UNCTAD, data incompleteness for FDI is not uncommon. It says: "As countries do not always collect data for each of those components, reported data on FDI are not fully comparable across countries. In particular, data on reinvested earnings, the collection of which depends on company surveys, are often unreported by many countries." Therefore, what they reported is jeopardized for that reason and not complete, especially for developing countries.

Moreover, if we break FDI into two sections: Greenfield and M&A, the data inaccuracy and incompleteness are more serious. FDI inflows and outflows in total are reported from 1970s. But World Investment Report only contains value of Greenfield FDI projects after 2005. Before 2005, only cross-broad M&A are recorded. This study uses the data collected from these three ways and did the calculation by author. During 2006-2012, Greenfield FDI data comes from the reports and M&A data is calculated by subtracting Greenfield from total number. On the contrary, during 1989-2005, M&A data comes from the reports and Greenfield data is calculated by subtracting M&A from total number. In theory, it is supposed to be consistent. But due to the inaccuracy of FDI data, it is necessary to point out the risk of using these data.

In addition, Bergeijk (1995) investigated FDI data for 20 OECD countries during 1950-1989. His result casts more worry about accuracy issue for FDI data, which shows that the minimal measurement errors are higher than 10% and had not significantly been improved during the period he focused on. Let alone the data for developing countries.

After selection, summary of dataset shows basic statistic information of each variable, as presented in table 4.2 as below.

Table 4.2 Basic Statistic Summary for Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Country	1392	29.5	16.74669	1	58
Year	1392	2000.5	6.924674	1989	2012
shareofgreenfield	1055	0.4856927	0.76129	-2.668694	2.986089
Log(gdppc)	1341	8.872928	1.587843	3.544504	10.85363
Export/GDP	1333	42.00394	34.14677	6.566741	233.3484
Industrial/GDP	1156	32.06929	8.007447	6.961228	60.56079
Developed dummy	2.986089	0.4137931	0.4926893	0	1

4.1.3 Estimation

4.1.3.1 Model for Estimation

The model to be estimated is (12). Panel data can be designed for eliminating unobserved variables that can possibly affect dependent variable. In my study, only two relevant control variables are included. Obviously, many other factors do have influences but hard to be captured in quantitative way such as culture, political factors and business climate for a country. In literature review, those factors have been widely discussed. It is reasonable to try to rule out unobserved variables. Therefore, OLS model is probably not suitable in this case.

Two candidature models are available: Fixed Effect model or Random Effect model. Hausman Test is applied here, for choosing a model with better validity. As followed Figure 4.1 shows, low value of **Prob>chi2 (0.0012)** rejects the null hypothesis that assumes that the heterogeneity term and the independent variables are not correlated. The result indicates that Fixed Effect model is preferred here. Besides, the result is consistent with theoretical understanding. For instance, Forbes (2010) argues that developing countries have worse political systems and financial systems and therefore they moved investment into advanced economies. Considering Hausman Test in sense of statistic and theoretical comprehension, a fixed effect model will be used for this panel data in order to rule out unobserved variables' affects.

Figure 4.1 Result of Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(v_b-v_B)) S.E.
	(b) fixed	(B) .		
lg_gdpcapita	.5485212	.0008831	.5476381	.149351
exportgdp	-.0059834	.0007331	-.0067165	.0032121
indusaddgdp	-.0014115	.0033052	-.0047167	.0076976

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(3) = (b-B)'[(v_b-v_B)^{-1}](b-B)$$

$$= 15.86$$

$$\text{Prob>chi2} = 0.0012$$

Besides, it is reasonable to take heterogeneity with different countries into account instead of homogeneity. For one reason, difference inter-countries are considerable and therefore FDI is influenced in various levels. For the other reason, the econometrics model is predicted by theoretical model, which assumes that there was market equilibrium for other capital flows before FDI emergence. But it is an overall tendency for global economy rather than all the individual countries. In other words, some countries, particularly developing countries, might do not achieve equilibrium before and therefore had a very different process of FDI emergence. Thus, *robust and cluster* are added in the regression for validating result.

4.1.3.2 Result and Analysis

OLS, Fixed Effect model and Random Effect model results are presented in Table 4.3. As I discussed in previous section, Fixed Effect model is the most reasonable model by considering unobserved variables' effect, heterogeneity, fixed effect and the result of Hausman Test.

According to the result, P-value (**0.083**) shows that β_1 is statistically significant at the level of 10%, which is a conventional significant level. And the coefficient is positive (**0.55**), indicating that each 1% of GDP per capita higher is correlated with 0.55 percentage point higher share of Greenfield in OFDI. But in this test, logarithmic GDP per capita is more as index of technology than mathematic transform for indicator of GDP per capita. Thus, it will be proper and cautious to interpret the result as countries with higher technology level tend to have higher share of Greenfield in total OFDI. Impropriety of ignoring unobserved variables' effects and Hausman Test Result, which statistically rejects Random Effect model, are in line with the result of OLS and Radom Effect model. Neither of them is significant because model's assumptions are jeopardized.

Based on the model I chose and its result, the alternative theory presented in Chapter 3 is supported by empirical test, which means that the explanation of FDI works in reality. FDI, as a process of pursuing technology, has two forms: Greenfield and M&A, which fulfil the task in different ways. For Greenfield FDI, the investor can maximize the return to capital by shifting capital to the relatively poor country, which has lower technology but cheap labour or other advantages. Since there was equilibrium before, this action brings more profits. On the contrary, investors incline to use M&A to acquire high technology in more developed countries. The principle for expanding production possibility frontier is as same as Greenfield except in reversed direction. Therefore, the share of Greenfield FDI can be regarded as an indicator for discovering the structure of OFDI of a country, a region or a group of economies.

Table 4.3 The result of test based on three models

	OLS	p-value	Fixed Effect	p-value	Random Effect	P-value
Log(gdppc)	0.000883	0.988	0.549*	0.083	0.000883	0.988
Export/GDP	0.000733	0.568	-0.00598	0.112	0.000733	0.568
Industry/GDP	0.00331	0.517	-0.00141	0.915	0.00331	0.517
Developed	-0.0755	0.621	(omitted)		-0.0755	0.621
Number of observations	828		828		828	

Note: * significant level 10%

4.1.4 Limitations of Econometrics Result

This econometrics model simply tries to check applicability of the model in real economy, which is validated by the result as presented and analyzed. Even though, several limitations have to be emphasized here.

Firstly, the index of technology has not been fully justified. The original test was trying to capture the correlation between technology and the share of Greenfield in total OFDI. But as the result of data inaccessibility, I have to use logarithmic GDP per capita as the index of technology. Other possible indexes include human capital, total factor productivity, etc. None of them can support a panel data analysis. It could be better to have cross-section analysis based on more reliable indexes and compare these two studies' results.

Secondly, the model chosen is arguable. Not all the models are showing a consistent result. Instead, most of coefficients are insignificant. I explained that because they have inappropriate model settings with unmatched assumptions. However, my explanation can only prove that Fixed Effect model as I chose is the best in three models in discussion but cannot show that this model is reasonable and valid enough.

Thirdly, lack of bilateral data fundamentally undermines the support to theory from the empirical result. For one thing, only a model with bilateral data is sufficient to test the model. But the econometrics model in this study is only necessary but not sufficient. Therefore, the verification from empirical test, which sustains the theory, has been weakened to some extent. For the other thing, data for each individual country instead of bilateral data omits abundant information which can possibility have influence on FDI decision. Due to that, many factors cannot be capture and included in econometrics test. Fixed Effect model tries to rule out those unobserved variables, but regarding them as fixed term still can be argued.

Finally, the data inaccuracy, as I have explicated already before, also casts doubt to some extent. Though this study does not suffer from biased selection or significant endogeneity issues, data inaccuracy itself ought to be worried. As the Text Box 2 discussed, UNCTAD warns that the data of FDI cross countries are not comparable enough. But the panel dataset has to deal with both inter and intra group differences. In other words, the warning from UNCTAD in definition of FDI data may make this result less convincing.

4.2 Comparison between OFDI from the South and the North

In this section, I try to answer my research question directly: what drive FDI from the South and whether it is different from the North, particularly for the period with considerable rise after 2002. Based on the theoretical framework in Chapter 3 and empirical test in section 4.1, the share of Greenfield in total OFDI can be regarded as an indicator to understand the structure of OFDI. Therefore, the following result presents a detailed comparison.

The discrepancy of OFDI from the South and the North in terms of the share of Greenfield was mentioned roughly in Chapter 1. In order to find detailed evidences in statistic terms, I break down the entire period into 1989-2002 and 2002-2012 because there is a clear increase for OFDI from the South since 2002. And I also include the statistic tests based on the dataset (see Text Box 2) with individual countries. For both three periods (entire period and two separated periods) and data sources (group data and individual countries' data), T-test is applied for checking whether they are statistically different. Therefore, results of six tests will be presented. For all of them, null hypotheses assume that two groups are equalled in statistic term. Rejecting null hypothesis indicates a considerable discrepancy between two groups.

Table 4.4 reports the results for all tests in different periods or from different perspective of data. From the results, several observations can be concluded.

First of all, for the entire period from 1989 to 2012, tests from both group data and individual data reject null hypothesis, which indicates that the South and the North are different with respect to the share of Greenfield FDI. The mean value of developing countries is 19.16 % (from group data) or 14.42% (from individual data) higher than developed countries. This result indicates that OFDI from the South and the North do have difference in general. In addition, although the South has relatively lower technology as a whole, their OFDI is more targeting on the market with even lower technology level. M&A and backward technology transfer activities are not their major characteristic comparing to the North.

Secondly, observations for the results show a paradox that two data sources have opposite results. When I break down the entire period into two sections, group data and individual data tell totally different stories. For group data, test results indicate that OFDI from the South and the North were statistically different before 2002 but null hypothesis cannot be rejected for the period 2002-2012, which means that they ought to be regarded as similar in this view. On the contrary, individual data indicates that OFDI from the South and the North ought to be regarded as similar in statistic term before 2002, but they were statistically different in period 2002-2012.

Thirdly, differences of mean, which shows the gap between the South and the North, also have different results from two data sources. For group data, the gap had been decreased by 4.18 percentage points. But the individual group data shows that the gap had been increased by 5.04 percentage points.

For point two and three, the discrepancy of results from group data and individual data can be explained by several reasons, such as data incompleteness, increasing heterogeneity intra-groups. Among all these explanations, the most important reason is that individual countries have the same weight in individual data set regardless of the volume of their OFDI. In other words, countries with enormous number of OFDI are regarded equally as countries with small amount of OFDI. But in group data, countries have influence on final result, automatically getting weight distribution by volume. Admittedly, group data is lack of observation numbers to some extent and omits all information for each country.

Table 4.4 The Results of T-test for Developed versus Developing Countries

	Mean	Difference(of)Mean	T-test P-value
Developed countries (group) 1989-2012	44.28%	19.16%	0.004***
Developing countries (group) 1989-2012	63.44%		
Developed countries (group) 1989-2001	38.21%	21.08%	0.009***
Developing countries (group) 1989-2001	59.29%		
Developed countries (group) 2002-2012	51.45%	16.90%	0.1
Developing countries (group) 2002-2012	68.35%		
Developed countries (individual) 1989-2012	41.56%	14.42%	0.002***
Developing countries (individual) 1989-2012	55.98%		
Developed countries (individual) 1989-2001	33.81%	12.31%	0.2
Developing countries (individual) 1989-2001	46.11%		
Developed countries (individual) 2002-2012	50.39%	17.35%	0.008***
Developing countries (individual) 2002-2012	67.75%		

Note: 1. *** significant level 1%

2. group in brackets means that the data is group data; individual in brackets means that data is calculated by the dataset I used(see Text Box 2) and mean value for them refers to average value of 1989-2012 and all individual countries.

Source: calculated by author based on UNCTADstats- accessed 21/09/2013 and World Investment Report.

Both group data and individual data have good and bad qualities. But through their discrepancy, we can find some impressive results. Using individual data distributes each country with same weight and therefore underesti-

mates big countries. The result shows that individual data inclines to state that the South was similar to the North before but became statistically different recently, and the mean gap increased. But using group data will get the absolutely opposite result. Due to that, it can be concluded that some big countries from the South tend to have increasingly lower share of Greenfield in total OFDI, which is a more similar way to the North. But for most other developing countries, their OFDI is still based on the form of Greenfield and targeting on comparatively lower technology market, which is different from the North and World tendency as well.

To investigate those big economies from the South with respect to OFDI, I ranked all developing countries by OFDI in recent years (2010, 2011 and 2012) and select following 5 countries that always in top 10 positions during these three years. Their average numbers of the share of Greenfield in total OFDI in two periods (1989-2001 and 2002-2012) are reported in table 4.5. Except Malaysia and Mexico, the other economies decreased the share of Greenfield in recent period. Meanwhile, these three economies are top 3 in terms of OFDI volume. For Mexico, data for 1989-2001 is incomplete, but the average number (42.19%) during 2002-2012 is lower than average number for all developing economies. Malaysia is the only exception in these top 3 economies as I selected, who has 88.91% high share of Greenfield in period 2002-2012. These data are in accord with my explanation for the discrepancy between group data and individual data. Many big economies start to share similar characteristic with developed economies. Higher percentage of M&A is probably related with backward technology acquisition rather than technology transfer to comparatively lower technology economies. Meanwhile, individual data implies that for most developing countries that are still relatively small with respect to OFDI, they show different characteristics from the North.

It is worthy to point out here that the result belies a straightforward speculation from the theory, which believes that poor countries will put most FDI on rich country in the form of M&A. In fact, many developing countries are looking for countries with even lower technology and invest in the form of Greenfield FDI. Obviously, in those bilateral relations, they are in 'relatively developed' position.

Table 4.5 Average of Share of Greenfield in total OFDI in Five Biggest Developing Countries

	China	Hong Kong, China	Russian Federation	Mexico	Malaysia
1989-2001	65.76%	78.13%	82.00%	Data incomplete	16.68%
2002-2012	64.82%	38.00%	41.74%	42.19%	88.91%

Source: calculated by author based on UNCTADstats- accessed 21/09/2013 and World Investment Report.

4.3 Conclusion

This chapter has linked theoretic framework to empirical data in reality. Econometrics test and comparison by using empirical data are presented respectively.

In section 4.1, econometrics test had been formed based on theoretical model presented in Chapter 3. The testable econometric model that I applied in this study is necessary but not sufficient to testify theoretical model. Limitations were fully discussed in that part since the gap between theory and reality. By running the Fixed Effect model, regression result supports the theory, which indicates that technology acquisition drives FDI flows in two forms: Greenfield and M&A. These two forms work for different purposes and in different methods. Therefore, the share of Greenfield in total OFDI reflects the structure of a country's OFDI and the main factors motivated the rises of OFDI.

In section 4.2, the research question has been answered. Several t-tests were applied for checking the difference between the South and North in statistic terms. Important conclusions will be reiterated here: first, with respect to long period from 1989 to 2012, the South and the North have different structures for their OFDI. Averagely, the South has higher share of Greenfield. That is slight against expectation since developing economies with lower technology were supposed to use another way to obtain higher technology. But the result reflects that business interactions are not active between the South and the North, which is in accord with the fact that most FDI happened within 'North-North' relation. Many reasons such as political difference, risks can be responsible but they are not in the scope of this study. In addition, the discrepancy of results from two data sources (group data and individual country data) implies that developing world is moving close to developed country recently but that tendency is attributed to several big economies. For most developing economies, they are still even more relying on FDI in the form of Greenfield. A rough check for several developing economies that have a big number of OFDI supports that speculation.

Chapter 5 Conclusion

This paper starts from the phenomenon of rising OFDI from the South. FDI emerged in 1990s but was dominated by developed countries, either in terms of source or destination. A few developing countries were involved in as the destination countries in that period. The continual growth of FDI sourced by developing countries has happened since early 2000s. Since the role of developing economies in FDI affairs has been dramatically changed, it puzzles me what drive increasing volume of FDI sourced by the South and whether the factors are the same as the North. Motivated by the puzzles, research question and relevant sub research questions had been formed and stated in section 1.3, Chapter 1.

Review of literature put my work in the context of academic discussions for this topic in Chapter 2. The review is ordered by general feature of capital flow, specific feature for FDI and FDI from the South, because literature always accompanies with reality and theories also had experienced a process of evolution. The first group of literature emphasises general characteristic of capital flows since FDI is one type of capital flows. Marginal return to capital is the key motivation for capital flows. But portfolio flows and FDI, two forms of capital flows, performed in opposite way during 1990s. Due to that, the second group is introduced for capturing special properties of FDI. Widespread OLI framework inspires my work a lot but not in direct way since the focus of OLI are firms at microeconomic level. The relation between FDI and trade also draw abundant arguments. There is no consensus about substitute or complement relation between them, but either of them shows a significant influence of trade. But they are at relatively micro-level and have too many disagreements that cannot be reconciled to explain a continual growth for more than 10 years. The third section presented theories and empirical results for FDI from the South. Some results of Gravity models inspire how to include dependent variables in regression equation. And also a few studies focuses back on competitiveness again, though they are in microeconomics view.

Chapter 3 bases on Lucas' model of capital flow. His model predicts equilibrium situation for capital flows, which does not work for FDI in 1990s. The fundamental modification of the alternative explanation is releasing a regulation that factories can only produce with technology of the local country. Many literatures support that MNCs sometimes inclines to produce with their own technology particularly in the case that host country has comparatively inferior technology. A theoretical model has been presented to explain why more capital flows in the form of FDI even at the equilibrium point as Lucas illustrated. This model also elaborates that two forms of FDI have two different mechanisms: one via technology acquisition and the other via technology transfer. And the result predicts that the share of Greenfield in total OFDI is a sound indicator for understanding structure of OFDI.

Chapter 4 has two main parts. The first part formed an econometric model. Since the study suffers from data incompleteness, econometric model is not fully matched with theoretical model in Chapter 3. To be specific, econometric model is necessary but not sufficient to verify the theoretical model. Even though, a consistent result has been found and supports that theoretical

model works in reality to some extent. The second part uses the share of Greenfield in total OFDI as indicator to compare the North and the South. Statistically, OFDI from the South is different from the North. Surprisingly, developing countries have averagely higher share of Greenfield OFDI, which indicates that most FDI sourced by developing economies happens within developing world. However, two data sources (group data and individual country data) have different results for tendency of changing from 1990s to 2000s. That discrepancy reveals the heterogeneity intra-developing economies. Big economies are transforming toward developed economies, maybe even not similar not but on the track of convergence. But for other relatively small developing economies, they still have very high level of share of Greenfield in OFDI and the gap between them and developed economies are increasing.

In brief, this study provides an alternative explanation for FDI formation from the aspect of invest country. The theoretical model emphasises marginal return to capital as key motivation and driving force. Based on the theoretical framework, Greenfield FDI is regarded as a process of technology transfer and M&A FDI is regarded as a process of technology acquisition. Both of them can expand production possibility frontier but in different way. Thus, the share of Greenfield in OFDI reflects the structure and pattern of some economies' OFDI. In general, there is a significant difference between the South and North. To be specific, the South has average higher share of Greenfield FDI. It may imply that developing economies do not take advantage of high technology of the North. However, policy conclusion is not included here since absent of further investigation. For dynamic change, the South tends to be similar to the North as a whole but the result shows that this tendency is driven by several big economies and the other most developing economies are going in the other direction.

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