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**The Determinants of Chinese and Brazilian Foreign
Direct Investment Outflows**

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To my life partner Shu Kaida

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Abstract

This study investigates the determinants of Chinese and Brazilian outward foreign direct investment (OFDI) and conducts a comparison between China and Brazil in terms of FDI determinants and general FDI features like volume, location choice. Based on an extensive and in-depth theoretical review of main FDI theories in first article, we, in second article, test empirically our hypotheses suggested by Dunning's Eclectic Paradigm theory and others FDI literature through a panel data model, using Brazil and China official data collected between 2006 and 2012. We find same results of main variables that both Chinese and Brazilian OFDI have significant motivations of market-seeking, efficiency-seeking and asset-exporting (contrary to hypothesis), but resource-seeking OFDI is insignificant for both countries. We also find their difference in results of control variables.

Keywords : China; Brazil; Outward Foreign Direct Investment; Determinants; Multinational Enterprises.

Resumo

O presente trabalho investiga empiricamente os determinantes de investimentos chineses e brasileiros no exterior e faz uma comparação entre a China e o Brasil no sentido de determinantes e características gerais de investimento no exterior, como o volume, a escolha de destinação. Em base de uma revisão teórica da área de investimento no exterior no primeiro artigo, testamos empiricamente, no segundo artigo, as hipóteses sugeridas pela teoria de Paradigma Eclético do Dunning e pelas outras literaturas nesta área pelo modelo de painel, utilizando os dados oficiais do Brasil e da China coletados no período entre 2006 e 2012. Encontramos os mesmos resultados de variáveis principais, os quais indicam que investimentos no exterior de ambos dois países tem motivação significativa de buscar mercado, eficiência e exportar capital intelectual, mas a busca de recurso natural é uma motivação insignificante para os dois países. Encontramos também os diferentes resultados em variáveis controladas entre dois países

Palavras-chave: Determinantes; China; Brasil; Investimento no Exterior; Empresas Multinacionais.

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Overview

Many Foreign Direct Investment (FDI) theories seek to provide explanatory model on understanding why foreign direct investment occurs and what determinates its direction and shapes its pattern. The first article is a literature review, aiming to review main theories of FDI field. Both mainstream theories that based on experience of developed countries and the subsequent wave of theories which focus on MNEs from developing country will be reviewed. These theories present the theoretical source and background of several key hypotheses of the dissertation. A special attention is given to mainstream theories, particularly, Dunning' Eclectic Paradigm theory for its spectacular role of general theory of FDI field.

The second article investigates empirically both the determinants of Chinese and Brazilian OFDI and compares their similarities and differences. China and Brazil are two important emerging FDI investors, they are good cases to test the applicability of general theory to emerging country. The result of theoretical discussion shows that the general theory fit well with China and Brazil in explaining their determinants of OFDI. The empirical analysis is done within a panel data model using each country's official data and a wide range of main and control variables. The main findings indicate Chinese OFDI is influenced by market size (market-seeking), inflation rate (efficiency-seeking), exports, exchange rate and intellectual capital (asset-exporting). No evidence supports that resource-seeking, import and political risk affect Chinese OFDI. The findings also indicate Brazilian OFDI is affected by market size, inflation rate, intellectual capital (asset-exporting), imports, exchange rate and political risk. Others determinants suggested in hypotheses are found to be insignificant.

Article 1:

A Review on Main Foreign Direct Investment Theories

Introduction

The fundamental questions of Foreign Direct Investment (FDI) literature seek to answer are in three aspects. The first is motivation, it focus on the reason why FDI occurs, what determinate the decision of a firm to take international operation rather than domestic production and to service a foreign market through FDI rather than exporting or licensing arrangements. The second is pattern, which involves around how FDI occurs, like FDI distribution, location choice and more important, underlying determinants of that pattern. The third one is effect, mainly discuss what kind of effect FDI may bring to home country and host country. In home country perspective, FDI has a significant impact on its international balance of payments, adjustment of industrial structure, international trade and employment, the effect to home country could be positive or negative depending on the type of FDI. When in host country perspective, FDI usually has been welcomed for its positive effect on promoting economic growth, employment, technological spillover, etc.

A significant growth of FDI through expanding Multinational Enterprises (MNEs) since 1960s has led to a boom of theoretical studies seeking explanatory model of FDI, a group of groundbreaking theories emerged trying to explain the core questions of FDI: Capital Market Imperfections theory by Stephen H. Hymer (1960), Product Cycle theory by Vernon (1966), Internalization theory by Buckley and Casson (1976) Eclectic Paradigm theory by John Dunning (1976). They are considered as mainstream theories for their great influence in shaping the present field of FDI theory.

Dunning's Eclectic Paradigm theory is worth a special attention for being

regarded as the general theory of FDI. Its compatibility with almost all kinds of established FDI theories makes it to be a general comprehensive theoretical framework, provides explanation for not only various types of foreign investment behaviors and international operation, but also FDI geographical distribution, Mergers and Acquisitions (M&A) activities. In further development of Eclectic Paradigm theory, Dunning suggests three main motivations determining firms' decision of international operation through FDI, Market-seeking, Resource-seeking (including Asset-seeking), Efficiency-seeking, which are four important hypotheses of this paper.

As FDI are nearly all from MNEs of developed countries in years 1960s and 1970s, the mainstream theories are almost all based on experience of MNEs from developed countries. Since 1980s, developing countries are playing an increasing important role on both inward and outward FDI, in some respects, there might be some gaps in applying the mainstream theories to emerging investors because of a remarkable disparity of their magnitude, technological capability and management skill among MNEs from emerging countries and from developed countries.

The mainstream FDI theories of developed countries laid an indispensable foundation for the formation and development of FDI theoretical framework. A subsequent wave of theoretical works which focus on developing economy, provides different explanatory model in understanding FDI from developing economies. They mainly are Small Scale Technology by Louis J.Wells (1977), State on Localized Technological Capacities by Sanjaya Lall (1983), Technology Innovation and Industry Upgrade by John A.Cantwell and Paz Estrella Tolentino (1990s).

In this literature review, the primary purpose is to review main theories of FDI theoretical field to see the discussion about "what motivates a firm's FDI decision" and "what shapes FDI pattern". Both mainstream theories that based on experience of developed countries and the subsequent wave of theories which focus on MNEs from developing country will be reviewed. These theories present the theoretical source and background of several key hypotheses of the dissertation. A special attention is given to mainstream theories, particularly, Dunning' Eclectic Paradigm theory for its spectacular role of general theory of FDI field.

The mainstream FDI theories

1.1 Capital Market Imperfections Theory

Stephen H. Hymer, is the undisputable pioneer in the field of FDI theory, his Capital Market Imperfections theory (1960), also known as monopolistic or oligopolistic power theory, was put forward to when he try to explain the wide spread of the US multinationals, he argues, in perfect competition market, enterprises do not possess power to control market, equal rights for all kinds of enterprises to acquire means of production and they sell same products in same price, this obviously, cannot bring any benefit for enterprise if they choose to move production activity abroad. Perfect competition market is merely an ideal status, not exist in the real world, because economies of scale, technology monopoly, trademark, differentiation of products and government restriction measures could all lead to an imperfect competition market, thus, the real market is constantly in imperfect competition state and monopolistic market structure is the primary form of imperfect competition market.

MNE's operation in a given host country faces an additional cost comparing with local companies, this cost includes adaption to differentiation of legal system, institution, language and culture, lack of acknowledge of local market, disparate treatment of local government, consumer, supplier, transportation and communication expenses, foreign exchange fluctuation risk, etc. To compete with local company, Hymer argues MNE must have some specific advantages or ability to remove competition, the monopolistic market structure allows enterprise with firm-specific advantage keep in the domination position, which motivates them to invest overseas through FDI to better use and keep its monopolistic advantage, remove competition and conflict.

Kindleberger, further developed Hymer's theory mainly in following three aspects. First, he further confirmed that capital market imperfections is the precondition of FDI occurrence, FDI could occur only under the condition of imperfective operation of goods and factor market. Second, he sought to explore why a firm choose to internationalize operation through FDI, he argues by doing so a firm would lower labor cost, enlarge market domination and more importantly, to fully use its firm's specific advantage and obtain maximum gains from it. A firm chooses to the form of FDI only when believes in gains brought by monopolistic advantage are more over than the extra cost generated by international operation. Third, Kindleberger categorized four market imperfections that contributed to create a firm's domestic monopolistic advantage as follows

- (a) imperfections in goods market: ownership of a brand name, product differentiation, marketing skills and administered pricing
- (b) imperfections in factor markets: unavailability of technology, discrimination in access to capital market, and differences in skills of managers,
- (c) economies of scale both external and internal to market,
- (d) government limitations on output or entry" (Kindleberger, 1969).

Capital Market Imperfections theory plays a fundamental role on FDI literature, many economists consider it as starting point to study and develop FDI theories. It well explained foreign direct investment in knowledge intensive industry, such as petroleum refining, pharmaceutical, chemical, information technology sectors, it also provided explanation for mutual investment among developed countries. Nevertheless, it's incapable to explain the reverse investment from developing country to developed country and their cross investment, obviously, firms from developing country generally do not possess technological monopolistic advantage.

Cantewell, Dunning, Rugman and Caves gave their insights on the limitations of applying Capital Market Imperfections. First of all, Capital Market Imperfections theory provided explanation for the initiate activity of a firm's internationalization, but was unable to explain the expansion of their international operation and strategic asset seeking FDI, the latter limitation is a natural result as at Hymer's time, strategic

asset seeking FDI was not even emerged (Cantewell, 1989).

Second, although Hymer's theory was aware of imperfect competition market, failed to explore implication of market failure, which limits its theoretical development (Dunning & Rugman, 1985).

Third, firm's own specific advantage is a necessary, not sufficient condition for firm's FDI decision, there was a theoretical gap to explain why a firm with own specific advantage must internationalize operation through FDI rather than exporting or licensing arrangements. Moreover, Hymer's theory ignored the importance of host country advantage for MNEs, the question of location choice, therefore, failed to be answered (Caves, 1982).

Forth, Hymer's analysis was conducted in a static view, rather than dynamic view, that's why his theory found powerless to explain firms with own specific advantage choose to service foreign market through FDI and FDI outflows from developing country to developed country. If we see the FDI activity dynamically under a long-run term, we notice that FDI activity itself helps to shape the firm's own specific advantage and international market structure, which also explains why of the previous two phenomenon.

1.2 Internalization Theory

Capital Market Imperfections theory didn't provide a fully explanation of why a firm make decision of internationalizing production through FDI rather than exporting or licensing arrangements. Buckley and Casson attempted to further explore this question through The Internalization Theory (Buckley & Casson 1976). They asserted that when market imperfections in intermediate products causes a high trade cost, firms will choose to internalize external market in order to increase profits and avoid certain costs, internalizing markets across national boundaries leads to MNEs. Market

imperfection in this theory is no longer focus on product character, economies of scale, government intervention on market access, but firm's competition cost in market.

Buckley and Casson found four groups of factors that determinate firm's internalization decision:

(1) industry specific factors relating to the nature of the product and the structure of the external market, (2) region specific factors relating to the geographical and social characteristics of the region linked by the market, (3) nation specific factors relating to the political and fiscal relations between the nations concerned, (4) firm specific factors which reflect the ability of the management to organise an internal market. (Buckley&Casson, 1976:74)

They also noted internalization generally is realized in two forms, vertical integration and horizontal integration. Market imperfections in physical intermediate products like raw material, components motivates firms to make decision of vertical integration, firms reorganize production activity by transferring some production stages to various countries to achieve lower costs or higher revenues, the question of which host countries those production activities go to is closely related to factors such as comparative advantage of host country and home country, trade barrier among them, host country government incentives for foreign production activity, etc. Horizontal integration is motivated by market imperfections in invisible intermediate products like knowledge, technology, commercial reputation, managerial skill. As intangible assets have a pretty high trade cost, thus internalizing this activity helps firms to reduce cost caused by uncertainties, information barrier. It well explained the frequent merger and acquisition on knowledge and technology intensive industries.

Buckley and Casson further claimed that firms only grow through internalizing markets when the benefits of further internalization are outweighed by the transaction costs.

The Internalization Theory and Capital Market Imperfections Theory are both stress on internal motivations critical to FDI decision, much less attention on external determinants. Capital Market Imperfections emphasizes firm's specific advantage in a static view, while the Internalization Theory has a dynamic view on firm's

accumulation of comparative advantage, firms internalize markets cross boundaries to optimize production cost and organization efficiency, this internalization activity helps firms to accumulate comparative advantage.

The Internalization theory combines microeconomic theory with transaction cost theory, it accepted the pursuing profit maximum hypothesis of microeconomic theory and utilized cost benefit analysis approach of transaction cost theory to explore what motivate a firm's FDI decision. This theory is no longer focus on imperfections on final product market but on intermediate product market, this distinctive approach enriched literature on FDI area, it's also considered as one of most important theory on FDI study.

However, there are some limitations of applying the Internalization theory to explicate firm's FDI behavior as well, the most criticized one is its failure to answer the questions of where FDI goes to and why, in other words, the FDI location choice and its determinants. Short-term investment activity, specifically small investment in one or two foreign markets seems to be not fit well with theoretical framework. Resource-seeking and export-oriented investment was clearly out of theory explanatory scope.

1.3 Product Cycle theory

In line with Hymer's capital market imperfections theory, Vernon argued that technological innovations in consumer and industrial goods could explain firm's international investments. His product cycle theory experienced two versions, the first version (1966) tend to explain how USA firms turn to be MNEs and what determinate their investment location choice. In this version, Vernon distinguished three different stages in the life of a product, the phase of introduction, the phase of maturation and the phase of standardization.

At the first stage, new products emerged and are manufactured in USA, a small quantity of products sold to Europe by exporting. Because of the technological monopoly of USA firms over new products and little competitors and alternative products at the moment, producers are able to sell products in a high price, cost of production was not the crucial factor at this stage. New products are not mature yet, need to be modified accordingly on the basis of feedback received from the domestic market, all these factors determinate firm's activity pattern, which is domestic manufacturing and provide products to foreign markets by export.

At the second stage, new products begin to emerge in Europe and export to developing country, the technological gap between USA and Europe is narrowing, Europe's growing innovation ability lead to a preponderance of new products, finally, Europe, instead of USA, becomes the main source of new products and exporter to developing country. In order to maintain or even increase competence, American firms need to lower production cost to achieve a certain degree of standardization, thus they transfer manufacturing process to Europe by establishing affiliate through FDI and keep Research & Development (R&D) center in USA. At this stage, new products have been modified accordingly, matured and prepared to be manufactured on a large scale, technological factor investment declines and the cost of production gains more attention and importance. With the expanding demand of markets, more counterfeits and alternative products appear, especially in foreign market. Local producers, comparing with USA firms, gain advantage of customs duties free, international transport cost free, little investment in R&D, thus they are able to offer a lower price. Host country government, under domestic pressure, usually carries out protective tariffs and market access restriction to protect domestic industry, which makes exportation of USA firms to foreign markets even harder. All these factors contributed to USA firms' decision of establishing affiliate in foreign market through FDI, by doing so, they are able to not only avoid tariffs and market access restriction, but also lower production cost as other economies generally have a lower labor cost.

The third stage is a phase of standardization, new products are standardized at

this stage, innovative firm's technological monopoly over new products are disappeared, the competition is focus on price now, who owns lower cost, gains in the intense competition. Hence, in order to achieve economies of scale to minimize production cost, both American and European firms move manufacturing stages to low income countries, then low income countries become new center of manufacturing industry, sell back products to high income countries in a low price.

The first version of Vernon's product cycle theory provided explanation for the internationalization process of USA firms, but, however, in the following years, many new MNEs do not exactly follow the routine of these three stages, some firms put R&D center in other country and start cross boundary manufacturing from the very beginning. Because of incapability in explaining this phenomenon, Vernon adjusted his theory by attributing MNEs to the oligopolistic behavior of firms. In second version (1974), the cycle has been changed into "Innovation-based oligopoly", "mature oligopoly" and "senescent oligopoly" three phases.

At the innovation-based oligopoly stage, new products emerged in advanced country with high technology, innovation level, firms possess oligopoly over new products, production cost is not the main concern of firms at this technology intensive stage. The location choice of the innovation-based oligopoly stage is basically the same as the first stage of version I. The mature oligopoly holds that the oligopolistic reaction of other firms within industry is intensifying with innovative firms' rapidly expanding, which makes innovative firms have to balance profit and security, the location choice and development strategy depends on competitors oligopolistic reaction. At the last senescent oligopoly stage, products have been completely standardized, market competition focus on price and production cost, just as third stage of version I expressed.

The version II of product cycle theory overcomes the shortcoming of version I regarding to investment from less developed country to advanced country by absorbing Oligopolistic Reaction theory of F • T Knickerbocker. Vernon's theory

utilizes the dynamic change of factor supply and product demand in different stages of life cycle to explain the motivation, location choice and pattern of FDI. It is the first theory that takes into account not only FDI's motivation and its pattern, but also location choice in FDI theoretical framework.

Some limitations of product cycle theory are expressed, Rugman argued that it did not take into account various comparative advantages of different countries at the initial stage of production, for instance, resource oriented MNEs do not fit in this theory. Vernon (1979) acknowledged that product cycle theory found powerless to provide explanation in massive investment from Japan and Europe to USA since 1970s, much less to investment from developing country to developed country in recent two decades.

1.4 Eclectic Paradigm Theory

Dunning's eclectic paradigm, also called OIL theory as it refers to three important conceptions, "Ownership", "Internalization", "Location". This theory states that a firm will take international production activities through FDI if these three advantages hold true.

In general, firms that possess specific ownership advantages are more likely to turn to be a transnational enterprise through FDI due to their comparative advantage in foreign markets. These specific ownership advantages include tangible advantages such as more advanced technology, better quality of products, own distribution channel, economies of scale and intangible advantages like brand, trademark, managerial skill etc.

Under the condition of market imperfection, when transition cost of servicing foreign markets is too high, it's more beneficial to the firm use these ownership advantage itself rather than to sell or lease them to foreign firms, that's why firms prefer to internalize its specific advantages through an extension of its own activities

rather than externalize its advantages through licensing arrangements or export. Internalization allows firms to maximize usage of firm's assets, reduce transaction cost, overcome obstacles of market access and also take advantage of host country resource endowment to in turn increase firm's ownership advantage. Dunning argues that firm's comparative advantage come from not only its specific ownership but also the will and ability of internalizing its specific ownership advantage.

In location aspect, Dunning (1977, 1993) suggests three primary motivations of FDI, foreign market-seeking, resource-seeking (including strategic-asset-seeking) and efficiency-seeking (cost reduction). He listed specifically a series of host country factors critical to firm's location choice, (1) Natural resource endowment, labor cost. (2) Governmental intervention, political risk. (3) Institutional and non-institutional infrastructure (4) cultural proximity. (5) Research and Development investment. All these factors are critical determinants in shaping FDI location distribution and location advantage. In general, countries that possess rich natural resource and low labor cost are more likely to be FDI destination and industrialized countries are more likely to be source of FDI. Through internalizing production activity in a certain foreign market, MNE could fully take advantage of host market endowment, such as special natural resource, low labor cost, which further increase MNE's comparative advantage, therefore, location endowment also contributes to accumulate firm's specific ownership advantage.

To sum up Dunning's eclectic paradigm theory, firms which possess specific ownership advantage are more likely to take international production activities due to its comparative advantage towards local firms. When the benefit from internalizing foreign markets outweighs transaction cost and profit from externalizing its advantages through licensing arrangements or export, firms are more likely to have international operation. Host country resource endowment, environment could contribute to enlarge firm's comparative advantage. Ownership advantage,

internalization advantage and location advantage could be obtained only under the condition of market imperfection, and these three advantages are interrelated and interact on each other, firms will take international operation only when all of these three advantages are true.

Dunning's eclectic paradigm is the most complete of the theories on FDI for its generalization and compatibility of most established FDI theories. It was highly considered as the general theory of FDI for its broad explanatory capability in almost all aspects of FDI, such as diverse investment behavior, international operation mode, FDI location choice, FDI determinants, mergers and acquisitions, etc.

A criticism made by Itaki (1991) towards Dunning's eclectic theory refers to four points. First of all, if without internalization, a large part of ownership advantages cannot be used or even will not exist. Second, ownership advantage and location advantage are usually combined together as firm's comparative advantage to compete with other firms. Third, the location factor is undefined, could be interpreted in various ways. Forth, there is some problem in conducting factor analysis with these three OIL advantages as all advantages are closely interrelated with each other.

The FDI theories of developing countries

2.1 Investment Development Path Theory

The Investment Development Path (IDP) theory, described originally in Dunning (1981) and later adjusted in the end of 1980s, is the development of Eclectic Paradigm theory from static state to dynamic state. It discusses an association between a country's net outward investment (outward less inward FDI) and its level of development (GNP).

According to IDP theory, a country's inward and outward FDI trends associate with the following four factors, (a) a country's level of development; (b) a country's

factor endowment and market structure; (c) Political and economic regime; (d) failure of intermediate products in international trade. In a view of whole country, firm's ownership advantage is associating with the level of national economic development. Countries tend to evolve through five stages, through which countries are distinguished by their propensity to be outward and/or inward investors.

The first stage is marked by very little inward and outward FDI. A few factors, such as rich natural resources might be the main ones that attract inward FDI. Local firms are not in a position to invest overseas as they don't possess many comparative advantages.

In the second stage, inward FDI begins increasing. There are some location specific advantages like basic infrastructure that result from government policies, and increased per capita income. The amount of outward FDI is still negligible in this stage.

Then in stage three, where the growth rate of inward FDI is expected to start declining, as the local firms become more competitive. Outward direct investment will gradually start rising since the domestic firms have acquired ownership advantages over the period of time and they will now start making investment overseas for asset-seeking, market-seeking, etc.

In the fourth stage, a country will become a net outward investor. In other words, the amount of outward FDI outweighs the amount of inward FDI. This change is attributed to the development of ownership advantages achieved by the local firms that make them increasingly competitive. In most industrialized countries, high labor cost, low growth rate of production, demand of some scarce material, trade barrier are all motivations that encourage firm's outward FDI.

In the fifth or final stage, the country's net outward investment (NOI) position tends to fluctuate around zero, with both increasing and nearly equal amounts of inward and outward FDI flows. Two new trends are observed in this stage, one is economic structure of many countries tend to be similar, some leading countries in

stage four are no longer have their hegemony positions in stage five, but share leadership with more countries. Another trend is the “catch up” effect, many backward MNEs now accelerate in international operation to catch up the leading MNEs. This stage is observed with today’s most developed countries.

IDP theory is an application of the Eclectic paradigm to explain the changing level and pattern of the MNEs’ activity and its interaction with a country’s investment path. It improves the Eclectic paradigm from static state to dynamic state and has been adjusted well to be able to provide explanations for understanding FDI from developing countries.

2.2 Theory of Small Scale Technology

The Small Scale Technology Theory, put forward by Louis J. Wells (1983), was considered as an essential theoretical work about FDI from developing country. He argues that MNEs of developing country may not possess equal level of technological and capital advantage as ones of developed country, possess, however, advantage of small scale production technology, which is a viable path for emergent MNEs to compete with established ones. Unlike technology-intensive, high production cost of activities of MNEs from developed countries, MNEs from developing country usually hold distinguishing features like labor-intensity, low production cost, flexibility, etc. Taking advantage of own comparative advantage allows developing country firms to gain marginal markets, mainly low income countries. Developed country MNEs concentrate on major markets, where they can obtain scale effect advantages through big scale production, so that leaves those low income markets near blank for small scale production firms to take advantage of their potential.

In manufacturing sector of developing country, firms increase ownership advantage through adjustment or a special application of new technologies from developed countries. Generally, a slight adjustment is required in order to better fit production environment of developing country. Because of rich and low cost labor,

firms may improve production line to make it more labor-intensive instead of capital-intensive.

The small scale technology theory affirms traditional comparative advantage of developing countries, provides theoretical support and a feasible approach for developing country's firms engaging in global competition. Even without absolute technological comparative advantage, firms from developing country are still able to have positions in market competition if they take good use of special advantages of developing country, such as low labor cost, flexibility of production, etc.

2.3 State on Localized Technological Capacities

Through a study on motivation and comparative advantage of Indian MNEs, Sanjaya Lall advance the theory of State on Localized Technological Capacities that argues the comparative advantage of developing country firms firmly root in introduction and improvement of advanced techniques and skills originated from developed country. Economic environment varies from country to country and the environmental distinction can be even bigger between developing country and developed country, advanced techniques and skills may not suit well when being applied directly in new environment without any local improvement. Imported techniques and skills need to be digested, assimilated, improved and innovated, not just a simple copy and paste. This localization process is key for creating own comparative advantage of developing country firms and how much comparative advantage they own depends on how much their localized technological capacities. Lall believes that when firms try to assimilate new technology, it must accompany with some irreversible innovation activities.

Compared with small scale technology theory, Lall's State on Localized

Technological Capacities Theory is more focus on process of technological reprocess, which drives FDI research into micro-level.

2.4 Technological Innovation and Industry Development Theory

Since 1980s, FDI from developing country starts booming, so do theoretical work around it, the theory of Technological Innovation and Industry Development put up by Paz Estrella Tolentino and John A. Cantwell is one of groundbreaking works in the field. Through analyzing location choice and sectorial distribution of FDI from developing country, they concluded with two paths via which their outward FDI usually follow, one path towards location choice is that developing country's firms begin overseas investment from neighboring countries to developing countries, then to developed countries. Another path towards sectorial distribution is from natural source oriented to import substitution and export oriented. The theory emphasis on great impact of domestic industrial structure and technology innovation capacities on driving outward FDI, technological accumulation is the key factor that determinates firm's decision of international production.

This theory contributed to provide an overall explanation why FDI from developing country occurs and why in that pattern since 1980s, it's also valued for making FDI activities dynamic and dividing whole process into various stages, offering evidence that supports possibility of firms from developing country could be become more competitive in international markets through technological innovation and industry development

Conclusions

A review of main theories displays theoretical efforts in explaining core questions in FDI field. The determinants of FDI are closely related to two questions of

them, “why FDI occurs” and “where FDI to go”, in other words, “motivation” and “pattern”. The mainstream theories since Hymer’s Capital Market Imperfections theory (1960), all attempted to provide explanatory to the questions about determinants. The mainstream theories emerged in 1960s and 1970s, are nearly all based on experience of MNEs from developed country, the FDI theories of developing country arise along with rapid growth of FDI from emerging countries in 1980s. A special attention is paid to Dunning’s Eclectic Paradigm theory as its recognized position of general theory of FDI, it integrates minds of established theoretical achievements, such as Capital Market Imperfections theory by Stephen H. Hymer, Product Cycle theory by Vernon, Internalization theory by Buckley and Casson. This general theory by Dunning also provides theoretical source for key hypotheses in the dissertation, mainly discussed in chapter 2.

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Article 2:

The Determinants of Chinese and Brazilian Foreign Direct Investment Outflows

Abstract

This study investigates empirically the determinants of Chinese and Brazilian outward foreign direct investment (OFDI) and conducts a comparison between China and Brazil in terms of FDI determinants and general FDI features like volume, location choice. We test our hypotheses suggested by Dunning's Eclectic Paradigm theory and others FDI literature using Brazil and China official data collected between 2006 and 2012. We find same results of main variables that both Chinese and Brazilian OFDI have significant motivations of market-seeking, efficiency-seeking and asset-exporting (contrary to hypothesis), but resource-seeking OFDI is insignificant for both countries. We also find their difference in results of control variables.

Keywords : China; Brazil; Outward Foreign Direct Investment; Determinants; Multinational Enterprises.

Resumo

O presente trabalho investiga os determinantes de investimentos chineses e brasileiros no exterior e faz uma comparação entre a China e o Brasil no sentido de determinantes e características gerais de investimento no exterior, como o volume, a escolha de destinação. Testamos as hipóteses sugeridas pela teoria de Paradigma Eclético do Dunning e pelas outras literaturas nesta área utilizando os dados oficiais do Brasil e da China coletados no período entre 2006 e 2012. Encontramos os mesmos resultados de variáveis principais, os quais indicam que investimentos no exterior de ambos dois países tem motivação significativa de buscar mercado, eficiência e exportar capital intelectual, mas a busca de recurso natural é uma motivação insignificante para os dois países. Encontramos também os diferentes resultados em variáveis controladas entre dois países

Palavras-chave: Determinantes; China; Brasil; Investimento no Exterior; Empresas Multinacionais.

Introduction

This paper aims to firstly examine the applicability of general theory of foreign direct investment (FDI) to emerging country. China and Brazil are two important emerging investors of FDI, utilized as two cases to test the explanatory ability of the general theory. The second objective is to investigate the determinants of Chinese and Brazilian outward foreign direct investment (OFDI) and also compare their similarities and differences between each other.

Through a well-specified model using each country's official data and a wide range of main and control variables, a series of determinants suggested by the general theory and other literature, such as natural resource-seeking, asset-seeking, market-seeking, host country political risk, exchange rate, bilateral trade will be verified to see whether they have a significant relationship with Chinese and Brazilian OFDI.

Foreign direct investment (FDI) refers to transnational investment made by a firm based in one country into a firm based in another country to obtain managerial control and rights. The investor country is called home country and the recipient country is called host country. There are two types of FDI according to its direction, Inward Foreign direct investment (IFDI) and Outward Foreign direct investment (OFDI), respectively refers to "come in" and "go out" of investment. This paper will merely focus on outward FDI.

Accelerating global economic integration process has a positive impact on promoting international trade and FDI. In recent decades, global FDI flows have increased remarkably, especially from developing countries. According to data from United Nations Conference on Trade and Development (UNCTAD), developing economies' FDI outflows accounted for 9.7% of the world total in 2000. In 2013, the amount reached \$426 billion, a record 31% of the world total in 2013.

The BRICS countries (Brazil, the Russian Federation, India, China and South Africa) are the leading sources of FDI among emerging investor countries. Flows from these five economies rose from \$7 billion in 2000 to \$145 billion in 2012, accounting for 10% of the world total. Their MNEs are becoming increasingly active, including in Africa. In the ranks of top investors, China moved up from the sixth to the third largest investor in 2012, after the United States and Japan. Brazil has high stock of FDI outflows and was the highest among BRICS countries before 2000, albeit a growth after 2000 has not been that remarkable as China.

Studies about the rise of emergent countries as investors mainly concern about two questions, one is the driving forces of rapid growth of FDI from emergent countries; another one is the applicability of existing FDI theories on explaining this phenomenon, Eclectic Paradigm theory by Dunning in particular. BRICS countries, as leading emergent investors in terms of FDI stock and outflows growth, are the most studied cases in works seeking explanation for these two questions. Many studies discuss the applicability of general FDI theory to emerging country through cases of BRICS country and investigate the determinants of FDI from each country through empirical analysis to conduct a comparison among these five countries (e.g., Wei, 2008; Han, 2009). However, these kinds of works seem to commonly have insufficient exploration in each country's domestic discussion and country-specific implications for final results. Less cases comparative studies have relatively more in-depth discussion over selected countries, such as a comparative study between two economies.

In Chinese FDI field, besides numerous comparative studies about determinants of FDI from BRICS countries, there are many studies addressed to compare China and Russian, China and India, only a few studies about China and Brazil, much less empirical comparative study about determinants of FDI from China and Brazil. Looking at Brazilian domestic FDI field, there are a great number of one country-specific studies investigating FDI determinants, but comparative study

between China and Brazil in this aspect is nearly blank, albeit China is Brazil's biggest commercial partner since 2009. It could be a result for language barrier, geographic distance, paucity of knowledge about each other or a lack of awareness on other's deserved importance.

China and Brazil are important emergent investors due to China's role as top one developing country investor and Brazil's high FDI stock with rapid growth in recent decades. They are good cases to test explanatory ability of existing theory to emerging investors. What's more important, an investigation of their FDI determinants and a further comparison between them and also in aspects of FDI volume, location choice, sectoral distribution may fill up the gap of little scholar attention received, which indicates the relevance of this paper.

In order to examine the driving forces of Chinese and Brazilian OFDI, it is therefore critical to conduct a formal empirical analysis with a well-specified model using each country's official data and a wide range of main and control variables, a series of determinants suggested by the general theory and other literature, such as natural resource-seeking, asset-seeking, market-seeking, host country political risk, exchange rate, bilateral trade will be verified to see if they are associating with Chinese and Brazilian OFDI.

As we know, this paper is the first attempt to conduct a comparative analysis of Brazilian and Chinese FDI determinants empirically. Available access of literature in Chinese, Portuguese and English helps this paper to have a deep insight in Chinese and Brazilian domestic discussion over this subject. All these factors highlight the significance and possible contribution of this paper.

The dissertation consist of two articles, the first is an article of literature review, which provides a theoretical review on main foreign direct investment theories, showing the theoretical source and background of key hypotheses; The second article is the main body of dissertation which presents theoretical discussion and empirical analysis over the determinants of Chinese and Brazilian OFDI.

This paper is organized as follows. The first chapter provides a general introduction about the research, presenting research objective, its relevance, how the research was conducted and dissertation structure. Second chapter presents a theoretical discussion about determinants of Chinese and Brazilian outward foreign direct investment. According to the review of main FDI theories in another paper, Dunning's Eclectic Paradigm is considered as the general theory of FDI, in which he suggests four motivations in driving firm's overseas investment, market-seeking, resource-seeking, asset-seeking, efficiency-seeking. We discuss the possibility of each kinds of motivation in driving Chinese and Brazilian OFDI, by doing so, we also examine the applicability of the general theory to China and Brazil as two important emergent investors.

In third chapter, we describe the volume and location choice of Chinese and Brazilian OFDI in a descriptive statistic way. Then in the fourth chapter, we describe a number of variables proposed in the literature to have a significant influence on FDI outflows, and hypotheses on their ability to explain Brazilian and Chinese OFDI patterns. We test empirically the variables in a same model of Brazilian and Chinese OFDI using each other's official data collected between 2006 and 2012. We obtain the empirical results and go on to have a discussion over them. We conclude by presenting our main findings that Chinese OFDI is influenced by market size (market-seeking), inflation rate (efficiency-seeking), exports, exchange rate and intellectual capital (asset-exporting); Brazilian OFDI is affected by market size, inflation rate, intellectual capital (asset-exporting), imports, exchange rate and political risk.

Theoretical discussion on Chinese and Brazilian OFDI determinants

One of the core questions of FDI theories aim to explore is the determinants that motivate occurrence of FDI and shape its pattern. The question is mainly about what determinate the decision of a firm to take international operation rather than domestic production and to service a foreign market through FDI rather than exporting or licensing arrangements. The FDI determinants include motivations that lead to a firm's decision of investment abroad and also host country factors critical to FDI location choice. The general theory in explaining FDI determinants, as encapsulated in Dunning's eclectic paradigm, suggests three primary motivations: (1) **Resource-seeking**, here including a subset that known as **strategic asset-seeking**. Resource-seeking FDI occurs to acquire or secure the supply of raw material or energy which in short at home country. Strategic asset-seeking FDI occurs to acquire intangible assets like R&D capacity, brand which is generally embedded in advanced country firms. Strategic asset can usually be accessed by takeover of these firms or their subsidiaries. (2) **Foreign-market-seeking** FDI occurs for traditional trade supporting reasons, to facilitate products supply in host country, to obtain larger distribution networks and to enhance exports from domestic producers (Buckley, 2006). (3) **Efficiency-seeking** FDI will occur when firms seek locations with lower operation cost and stable macroeconomic environment, it's usually undertaken by high income per capita country firms in low income per capita countries.

As it has been built largely on the experience of industrialized country investors, there is a long and heated discussion about its applicability to emerging economy investors. Do they require a special application of the general theory? Does the general theory fit well in China and Brazil?

Case of China

China, with a worldwide recognized position of world factory, its economy heavily relies on export. Servicing foreign markets through FDI allows Chinese firms to expand and secure distribution networks, enhance visibility of brand, promote Chinese firms' export, thus market-seeking FDI is highly possible to be true for China.

In the last decade, Chinese global merge & acquisition (M&A) in energy and resource sectors perform strongly, with transactions soaring in volume and continuing to rise in value, dominated by Chinese state-owned firms. Chinese demand for natural resource is considered as prime overseas investment motivation by many foreign specialists and media. What's more, Chinese government has a deeper involvement in M&A activities in energy source sector, which is regarded as China's energy diplomacy to secure energy supply. However, Chinese authority sees "go out" of major equipment, technological skill and "get in" of foreign advanced technology, expertise through projects cooperation with various countries as their main investment motivations in energy and resource sectors, which attribute to market- and asset-seeking, not necessarily natural resource-seeking. Although resource-seeking FDI is a questionable motivation, it's still possible to be true.

Considering Chinese firms' strong manufacturing capacity but relative weak brand names, innovation ability, it's possible for Chinese firms to seek strategic asserts like talents, new technology, managerial skill, brand through M&A activities in various countries, particularly advanced countries which own high R&D capacity, design facilities and brand names. Thus there are grounds for occurrence of asset-seeking FDI.

Lots of literature concerning about the determinants of Chinese OFDI confirm the three motivations above, market-seeking, resource-seeking and strategic asset-seeking. Cai (1999), discussed Chinese outward foreign direct investment in terms of motivation, institution, government policy and trends, he found four

motivations in driving Chinese firms go abroad, market-seeking, resource-seeking, technology & managerial skill-seeking, capital-seeking. Deng (2004) further developed Cai's argument and added two another motivations, asset-seeking (brand, network) and diversification-seeking. Poncet (2007) argues, limited domestic demand, competition pressure brought by access of foreign firms into Chinese market, relative weak R&D capacity and brand of Chinese firms, a shortage and increasing price of raw material are all contributed to motivate FDI decision of Chinese firms.

As for efficiency-seeking FDI, it is the most criticized point when applying Dunning's eclectic paradigm theory to China, Buckley is one of the main critics and he requires a special application of the general theory to emerging investors like China. He argues, efficiency-seeking FDI occurs when firms seek lower operation cost location, particularly in the search for lower labor cost, given China's comparatively low labor cost levels, efficiency-seeking FDI is unlikely to occur (Buckley, 2006), he eliminated efficiency-seeking when applying the general theory to China. It is worthwhile to note that the study period of Buckley's research was from 1984 to 2001 when low labor cost was true for China, nevertheless, China's labor cost was raised remarkably in recent years due to China's rapid economic growth, firms of labor intensive industries (e.g., textile), including foreign and China domestic, largely transfers manufacturing process to lower labor cost areas, mainly Southeast Asian countries like Vietnam, Indonesia. Efficiency-seeking might has been a driving force of Chinese overseas investment now, that's why empirical analysis with updated data and information towards this topic is vitally important.

Case of Brazil

According to Brazilian outward foreign direct investment report 2013¹ published by Brazil national industry confederation², there are mainly ten motivations driving Brazilian firms to be transnational firms through FDI: (1) Access new markets. (2) Reduce dependence on internal market. (3) Lower production costs to improve

¹ Relatório dos Investimentos Brasileiros no Exterior 2013

² Confederação Nacional da Indústria, CNI

competitiveness. (4) Obtain advanced technology and managerial skill. (5) Seek lower costs of inputs. (6) Access markets which have signed free trade agreement with Brazil. (7) Impact of exchange rate. (8) Avoid trade obstacle. (9) Avoid tax by investing in tax heaven countries and regions. (10) Acquire natural resource.

The first, second and eighth motivations may all attribute to market-seeking category, to expand markets, to avoid trade obstacles and government restriction, to better service foreign clients and increase export by internalizing foreign markets all support firm's market-seeking FDI. Hiratuka and Sarti (2011) confirm marketing-seeking motivation of Brazilian OFDI, they argue that it is a natural result of firms with competitiveness to explorer foreign markets, to secure or enlarge foreign distribution networks and finally enhance their export. The third and fifth reveal firm's efficiency-seeking motivation to cut down operation cost through either economies of scale or lower cost of inputs. The forth one is apparently asset- seeking and the tenth one is undoubtedly resource-seeking. As for the rest three factors, they are the sixth, access markets which have signed free trade agreement with Brazil, the seventh, exchange rate and the ninth, avoid tax. To access markets which have free trade markets with Brazil, such as Mercosul, will certainly be easier than access those without free trade markets, that's why countries with institutional advantage are more attractive to firm's investment. Exchange rate has an impact on firm's decision of FDI, either positive or negative. When home country exchange rate appreciates, there are more profitable chances for outward FDI as foreign currency denominated assets become cheaper and a depreciation of home country exchange rate will discourage outward FDI. As instability of Brazilian exchange rate towards US dollars, exchange rate is an important determinant that influences Brazilian firm's decision of outward FDI. Tax avoidance refers to firm's outward FDI flows to tax-free or low tax duty countries and regions in search for avoidance or reduction of tax, because of its illegality, this motivation generally will not be addressed in study of determinants of FDI.

Therefore, the four motivations, market-seeking, resource-seeking, asset-seeking, efficiency-seeking, suggested by the general theory are all likely to be true for outward FDI from Brazil.

To sum up the previous discussion, the general theory can be well applied to China and Brazil in explaining their FDI determinants, both China and Brazil have possibility of occurrence of all these four kinds of motivations, market-seeking, resource-seeking, strategic asset-seeking, efficiency-seeking, which will be main hypothesis of the present work and will be verified empirically in the following chapters.

Various studies also identify many other important determinants to firm's internationalization process, particularly host country characteristics which are key factors to location choice of OFDI. Exchange rate as mentioned previously, trade relation among host and home country, institutional factor such as government effectiveness, political stability and control of corruption, regulatory quality all have significant impact on shaping firm's internationalization pattern. Examples supporting such argument are to be found in work on MNEs from China (Dan, 2007; Li and feng, 2008; Jun, 2009), Brazil (Amal, M., Raboch, H., and Tomio, B, 2009, Mohamed A. and Bruno T. T., 2012), India (Subramanian, Sachdeva, and Morris, 2010).

The volume and location choice of OFDI from Brazil and China

The phenomenon of rapidly increasing outward foreign direct investment (OFDI) from developing and transition countries has gained widely attention. 2006 World Investment Report of UNCTAD, which was dedicated to the subject of FDI from developing and transition economies shows the evidence of growing importance of non-developed economies in driving world's FDI outflows. In 1990, the share of OFDI sourced from developing economies only accounts for 6.9 percent of total world OFDI stock. While in 2012, it grows to 18.9 percent of world total, reaching USD 4,459,356 million. This growth has accompanied with a relative decline of the share of developed economies from 93.1 percent to 79.1 percent of world total (see table 1).

Table 1: Outward foreign direct investment stock & share by country group

(Millions USD)

YEAR	1990	1995	2000	2005	2010	2011	2012
World	2091496	3791296	8025834	12575883	21130046	21441873	23592739
Share	100	100	100	100	100	100	100
Developing economies	144663.7	330343.2	905228.9	1447274	3484157	3928686	4459356
Share	6.916759	8.713201	11.27894	11.50833	16.48911	18.32249	18.90139
Transition economies	560.1018	4337.145	21365.56	152193.1	404802.3	405604.8	460760
Share	0.02678	0.114397	0.26621	1.210198	1.915766	1.891648	1.952974
Developed economies	1946272	3456615	7099240	10976416	17241087	17107583	18672623
Share	93.05646	91.1724	88.45485	87.28147	81.59512	79.78586	79.14563

Elaborated based on source from UNCTAD database

Emerging countries, such as BRIC's countries (Brazil, Russia, India, China, South Africa) have showed an increased and significant presence in world FDI outflows, a remarkable increase sourced from China in last two decades gains special attention, Brazil has experienced a relative high stock of OFDI in 1980s and rapid

growth in last decade although not so dramatically as China.

For better understanding Brazil and China FDI outflows, a comparative way will be conducted in this chapter through a following comparison in aspects of OFDI volume, location choice.

Volume: OFDI flows and stocks

In decade of 1980, Brazilian economy was stagnant, there was little change in stock and flows of its OFDI (see figure 1 and 2), these ten years was considered as the “lost decade” in the institutional, economic, technological contexts (Ferraz et al, 1992). In the nineties, stock of Brazilian OFDI has increased and its flows was fluctuating, albeit very slightly (see figure 1 and 2). The Fernando Collor government promoted a major effort to increase the exposure of firms to international competition, with trade liberalization efforts. The imports substitution model gave way to greater exposure of national firms to foreign competition, with the removal of some former protectionist measures. Although such events increased internal competitiveness, they occurred in a disorderly manner (Concer et al, 2010).

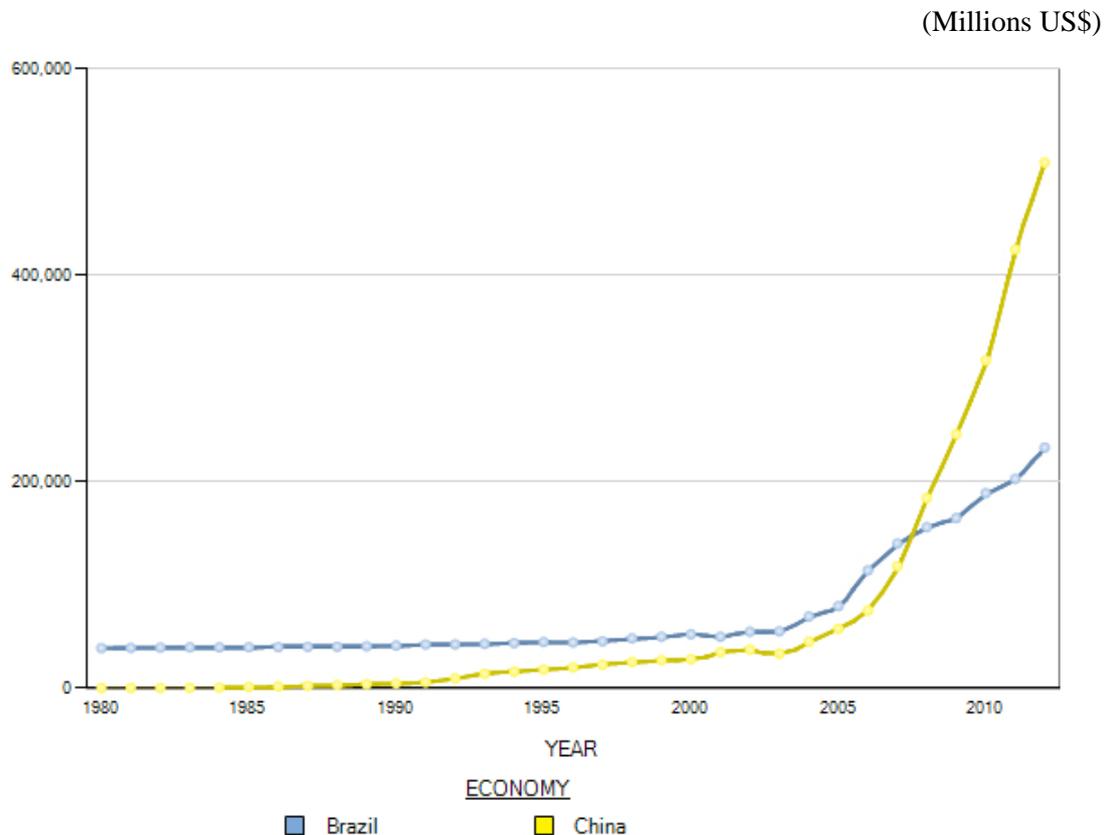
According to the figure 1, we can see Brazilian FDI stock was pretty high in 1980s, 1990s and FDI activities started early. While at the same period, Chinese FDI was almost zero and only started to grow in the beginning of 1990s. In China, FDI was formally permitted under the “open and reform” policies in 1978. However, the internationalization of Chinese firms was tightly controlled by national and provincial government, via economic policy and other measures designed to advance the economic development agenda over the following ten years, that’s why we see Chinese OFDI stock and flows are almost zero in 1980s in figure 1 and 2.

With Deng Xiaoping's tour of South China in 1992, the government-led “go out” initiative, which was instigated in 2001, aims to promote the international competitiveness of Chinese firms by further reducing or eliminating foreign-exchange-related, fiscal and administrative obstacles to international

investment, this started the Chinese process of accelerated outward investment liberalization and growth, which can be observed in figure 1 and 2.

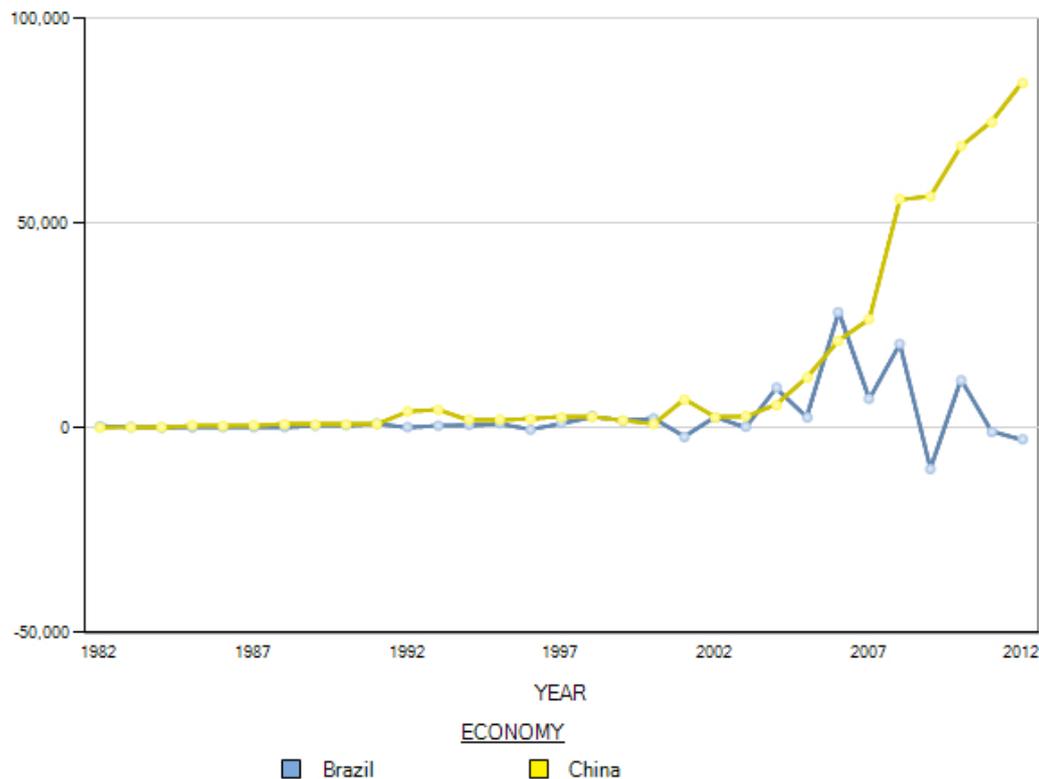
In the first decade of 21 century, both China and Brazil experienced a fast growth of FDI, which can be observed in figure 1. They are not only the hot destinations of foreign direct investment, but also playing an increasing important role as emerging source of FDI. The significantly accelerated process of internationalization of Chinese MNEs and its growing degree of activity in abroad lead a remarkable increase of Chinese OFDI scale in the last ten years and remain keep growing, resulted China as top emerging investor in the world. Brazilian OFDI stock grows considerably over this period, but in a fluctuated way (see figure 2). Before 2005, it grows as quickly as China, while after turning point of 2005, a tendency of reducing growth appeared and its OFDI flows remain fluctuated sharply (see figure 1 and 2).

Figure 1: Chinese and Brazilian outward foreign direct investment stock 1980-2012



**Figure 2: Chinese and Brazilian outward foreign direct investment flows
1982-2012**

(Millions US\$)



Note: Chinese OFDI flows data is not available in year 1980, 1981 in UNCTAD statistics database

Location choice

The diversity in political, economic, cultural, institutional and geographical conditions from country to country shapes each country’s different location advantage. How to obtain and take better advantage of other country’s location advantages is a key question concerned by many multinational enterprises. Emergent economy investors in the beginning stage of FDI activities, generally do not have so rich experience of international operation as developed countries, thus a priority of their location choice is commonly the countries among which have short geographical distance, culture proximity, intensive trade relation. Along with the rapid increase of OFDI from emergent countries, so does their international operation experience, emergent investors tend to involve more countries to strengthen competitiveness.

Table 2 shows the top 20 destinations of Brazilian and Chinese OFDI in stock by 2012. There is an impressive phenomenon of high levels flows to offshore financial centres (OFCs) or tax havens (Cayman Islands, British Virgin Islands, Hong Kong, Macau, Bermuda, Bahamas, Netherlands Antilles) and low tax countries (the Netherlands, Luxembourg, Singapore) of China and Brazil. FDI flows to OFCs do not stay there but are redirected. A significant part of inflows consists of “round-tripping” FDI to the original source countries, Hong Kong plays exactly this role to providing favourable tax benefits for many Chinese firms. Many firms established foreign affiliates in low tax countries or in countries that provide specific tax benefits, these special purpose entities (SPEs) are established in low tax countries with a specific purpose (e.g. administration, management of foreign exchange risk, facilitation of financing of investment) or a specific structure (e.g. holding companies). They may not conduct any economic activity of their own and have few employees and few non-financial assets. Both OFCs and SPEs are used to channel funds to and from third countries. That’s why FDI flows to OFCs and SPEs are not counted in UNCTAD’s FDI data. In empirical study of this paper, data of flows to OFCs and SPEs also have been eliminated.

After cleaning the interfering OFCs and low tax countries, the obtained true FDI destinations data may indicate some characteristics of location choice of Brazilian and Chinese outward FDI. Brazilian FDI outflows are obviously concentrated in Latin American countries with six Latin American countries among top thirteen destinations (after elimination of OFCs and low tax countries in rank of top twenty destinations). Argentina, Peru, Panama, Uruguay, Chile, Venezuela are the main recipients of Brazilian OFDI in Latin America. Brazil is also the most important FDI source country for the Latin American region. Some traditional commercial partner countries like United States, United Kingdom are also important destinations for Brazilian FDI outflows, especially United States, which accounts for 7.44% of Brazilian OFDI stock by 2012.

Table 2: Top 20 destinations of OFDI stock & percent by 2012

(Millions in USD)

	Brazil		China	
1	Austria		Hong Kong, China	
	56,618	22.91	30,637,200	57.6
2	Cayman Islands		British Virgin Islands	
	40,264	16.3	3,085,100	5.8
3	The Netherlands		Cayman Islands	
	28,186	11.40	3,007,200	5.7
4	British Virgin Islands		United States	
	22,291	9.0	1,707,977	3.2
5	United States		Australia	
	18,401	7.44	1,387,305	2.6
6	Spain		Singapore	
	15,376	6.22	1,238,333	2.3
7	Luxembourg		Luxembourg	
	14,719	5.95	897,789	1.7
8	Bahamas		Britain	
	14,500	5.9	893,427	1.7
9	Argentina		Kazakhstan	
	5,511	2.23	625,139	1.2
10	Hungary		Canada	
	3,207	1.3	505,075	0.9
11	Peru		Russia	
	2,986	1.21	488,849	0.9
12	Uruguay		South Africa	
	2,951	1.19	477,507	0.9
13	Panama		France	
	2,430	0.98	395,077	0.7
14	Portugal		Bermuda	
	2,139	0.9	337,311	0.6
15	Canada		Germany	
	1,804	0.7	310,414	0.6
16	United Kingdom		Indonesia	
	1,558	0.6	309,834	0.6
17	Netherlands Antilles		Burma	
	1,447	0.6	309,452	0.6
18	France		South Korea	
	1,230	0.5	308,232	0.6
19	Chile		Mongolia	
	1,107	0.4	295,413	0.6
20	Venezuela		Macau, China	
	1,083	0.4	292,945	0.5

Elaborated based on 2012 statistical bulletin of China's Outward Foreign direct investment and 2013 Brazilian Foreign direct investment Report

As for China, destinations of its FDI outflows are much more dispersed than Brazil (after elimination of OFCs and low tax countries). North America, Europe, Asia, Africa all account for a certain weight of Chinese OFDI. Developed countries are remain the main destinations for China (e.g., United States, Australia, Britain, Canada), although a tendency of increasing flows to developing countries has been observed in recent years, emergent countries in particular.

Empirical analysis

4.1 Hypothesis

Now we are going to check empirically the determinants of OFDI derived from the general theory and other studies on their ability to influence the Chinese and Brazilian OFDI distribution.

Market-seeking FDI

As theory suggests, firms with accumulated comparative advantage will benefit from serving foreign markets through production affiliate for the efficient utilization of firm's specific advantage, like R&D capacity and managerial skill. The larger market, the more profit will generate. Therefore, the hypothesis holds that market size associates positively with firm's OFDI. To measure market size, there are three alternative aspects may reflect it, absolute host country market size, host market growth per capita and host market growth, they will be applied in model one by one to see which one has best performance. Absolute host country market size will be measured by host country GDP, host market growth per capita will measured by host country GDP per capita and host market growth will measured by annual percentage increase in GDP.

Hypothesis China 1(a): Chinese OFDI is associated positively with absolute host country's market size.

Hypothesis China 1(b): Chinese OFDI is associated positively with host country's market size per capita.

Hypothesis China 1(c): Chinese OFDI is associated positively with host country's market growth.

Hypothesis Brazil 1(a): Brazilian OFDI is associated positively with host country's market size.

Hypothesis Brazil 1(b): Brazilian OFDI is associated positively with host country's market size per capita.

Hypothesis Brazil 1(c): Brazilian OFDI is associated positively with host country's market growth.

Natural resource-seeking FDI

Chinese massive global investment in energy and resource sectors gains widely debate over its demand of natural resource to ensure the supply of domestically scarce factor inputs. The resource domestically in short supply includes petroleum, minerals, agricultural products. Literature (CNI report 2013) also reveals Brazilian firm's acquisition of natural resource through FDI (Vale), mainly minerals. Thus a positive association between the natural resources endowment of host countries and home countries' OFDI is expected. Host country natural resource endowment will be measured by the ratio of ore and metal exports to merchandise exports of host country.

Hypothesis China 2: Chinese OFDI is associated positively with host country's natural resource endowment

Hypothesis Brazil 2: Brazilian OFDI is associated positively with host country's natural resource endowment.

Asset-seeking FDI

Asset-seeking FDI mostly occurs in firms from developing countries towards industrialized countries which have high levels of human and intellectual capital. Through green field entry and acquisition, firms from developing countries like China and Brazil can access strategic assets (e. g., advanced technology, managerial skill, brands), which is obviously very important to strengthen international competitiveness of Chinese and Brazilian firms. Therefore, the hypothesis is that OFDI from Brazil and China associates positively with host country intellectual endowment, which will be measured by total annual patent registrations in host country.

Hypothesis China 3: Chinese OFDI is associated positively with host country intellectual endowment.

Hypothesis Brazil 3: Brazilian OFDI is associated positively with host country intellectual endowment.

Efficiency-seeking FDI

Efficiency-seeking FDI occurs when firms seek lower operation cost location, including lower labor cost, lower transportation cost, stable macroeconomic environment. Some specialists (e.g., Buckley, 2006) argue that there are no grounds for occurrence of efficiency-seeking FDI in Chinese firms because of China's low labor cost levels. However, a remarkable rise of Chinese labor cost in recent years has led to a wave of transference of manufactory both foreign and domestic to Southeast Asian countries. With the updated data and information, the efficiency-seeking FDI of China is not necessarily absent. It is common for Brazilian firms, particularly in labor intensive sectors, seek lower operation costs location with stable macroeconomic environment through FDI to ensure their competitiveness in domestic market, which was considered as defensive strategy by many Brazilian firms. Thus, the lower production costs of host country is, the more possibility of efficiency-seeking FDI occurs, OFDI associates negatively with host country operation costs. Inflation rate will be used as indicator of efficiency-seeking, it implies macroeconomic stability and potential risk for foreign investors. Botric and Skuflic (2005) have used inflation as an efficiency seeking factor. High rate of inflation and volatile inflation is a sign of macroeconomic instability and also considered as an impediment to FDI Botric and Skuflic (2005). Volatile inflation rate of host country will discourage market-seeking FDI because of uncertainty of profit expectations, high inflation rates may reduce the real value of earning as devaluation of host country currency and also cause problem in price-setting. Thus a negative relationship is expected between host country inflation rate and home country outward FDI. Inflation rate will be measured by annual inflation rate.

Hypothesis China 4: Chinese OFDI is associated negatively with host country annual inflation rate.

Hypothesis Brazil 4: Brazilian OFDI is associated negatively with host country annual inflation rate.

Political risk

Political risk refers to a country's institutional quality and investment environment, usually it's measured by the political risk index, which reflects and evaluates political risk level in six aspects, voice and accountability; political stability and absence of violence; government effectiveness; regulatory quality; rule of law; control of corruption. The sum of these six aspects' value indicates general political risk value. The higher political risk host country experiences, the more sunk cost MNEs have to pay. Internalization theory predicts that in countries with high political risk, market-oriented firms will prefer to own directly local production unit rather than exporting or licensing, and resource-oriented firms are discouraged from heavy cost of low institutional quality (Buckley, Casson, 1981, 1999). If higher risk countries also offer higher returns, then FDI will still flow to them. As higher value of political risk indicates greater political stability, the positive relationship between dependent and independent variables will be expected.

Hypothesis China 5: Chinese OFDI is associated positively with rising levels of host country political risk

Hypothesis Brazil 5: Brazilian OFDI is associated positively with rising levels of host country political risk

Exchange rate

A low or undervalued exchange rate will encourage exports and discourage outward FDI (Steven, 1993), the same logic, a high or overvalued exchange rate will discourage export and encourage outward FDI. When the home country exchange rate

appreciates, foreign products and assets become cheaper, it will be a profitable chance for firms to import or establish own local unit through outward FDI at this period. The exchange rate will be measured by host country official annual average exchange rate against home country currency.

Hypothesis China 6: A relative depreciation of the host country's currency leads to an increase in Chinese OFDI.

Hypothesis Brazil 6: A relative depreciation of the host country's currency leads to an increase in Brazilian OFDI.

Exports and imports

Exports and imports situation reveal the trade intensity relation between home and host country. Markets which have close traditional trade relationship with home country are more likely to be destination for FDI. Market-seeking FDI mostly takes places to support domestic firm's exports, asset-seeking FDI occurs to substitute their imports of foreign products which were usually embedded with high technology or other intangible assets. Thus, the outward FDI associates positively with the volume of imports and exports between home and host country.

Hypothesis China 7: Chinese OFDI is associated positively with imports volume between home and host country.

Hypothesis Brazil 7: Brazilian OFDI is associated positively with imports a volume between home and host country.

Hypothesis China 8: Chinese OFDI is associated positively with exports volume between home and host country.

Hypothesis Brazil 8: Brazilian OFDI is associated positively with exports volume between home and host country.

The model

The previous discussion suggests the following log-linear model:

$$\text{LOFDI} = \beta_0 + \beta_1 \text{LGDP} + \beta_2 \text{LPGDP} + \beta_3 \text{LGGDP} + \beta_4 \text{LENEGY} + \beta_5 \text{LPATENT} \\ + \beta_6 \text{LINFLA} + \beta_7 \text{LRISK} + \beta_8 \text{LEXRATE} + \beta_9 \text{LIMPORT} + \beta_{10} \text{LEXPORT} \\ + \mu_{it}$$

Table 3: The determinants of Chinese and Brazilian OFDI and data source

Variable type	Variable name	Expected sign	Meaning	Data source
Dependent variable	OFDI		Annual outflows of FDI from China/Brazil	State official data
Main	GDP (H1)	+	Host country GDP	World Bank database
Alternative	PGDP(H1)	+	Host country GDP per capita	World Bank database
Alternative	GGDP(H1)	+	Annual percentage increase in GDP	World Bank database
Main	ENERGY(H2)	+	The ratio of ore of metal exports to merchandise exports of host country	World Bank database
Main	PATENT(H3)	+	Total annual patent registrations in host country	World Intellectual Property Organization
Main	INFLA(H4)	-	Host country official annual inflation	World Bank database
Control	PR(H5)	+	Host country political risk rate	The PRS Group
Control	ERATE(H6)	+	Host country official exchange rate against home country currency	World Bank database
Control	IMPORT(H7)	+	Home country's imports to the host country.	World Bank database
Control	EXPORT(H8)	+	Home country's exports to the host country	World Bank database

Note: Sign + represents positive correlation between dependent and independent variable

Sign - represents negative correlation between dependent and independent variable

The data are transformed into natural logarithms as non-linearities in the relationships based on theory and previous empirical work. The determinants are divided into main variables and control variables, the four motivations suggested by the general theory will be observed as main variables through their corresponding indicators. Host country political risk, exchange rate, import and export are also determinants to FDI inflows, they will be observed as control variables.

Data and method

The empirical analysis was conducted under the study of period from 2006 to 2012 of both China and Brazil. The data of the dependent variable was retrieved from each country's official database, China's annual FDI outflows data was sourced from "Statistical Bulletin of China's Outward Foreign direct investment", published annually by National Bureau of Statistics of People's Republic of China, the data of Brazilian annual FDI outflows was retrieved from Brazilian central bank database.

The data refer to host country's GDP, GDP per capita, GDP growth, the ratio of ore of metal exports, annual inflation, exchange rate, the volume of imports and exports were all sourced from the World Bank database. Political risk data was derived from political risk index provided by the Political Risk Service Group (PRS group). The last one, asset-seeking OFDI, which towards to host country human and intellectual capital, will be interpreted as total annual patent registration in host country, including resident and non-resident, the data was retrieved from the World Intellectual Property Organization (see table 3).

There are thirty-four countries are host to Chinese OFDI and twenty-two countries are host to Brazilian OFDI in the dataset (See Appendix). We firstly selected top 100 Brazilian and Chinese OFDI destinations in 2012, then excluded countries without available data and offshore tax avoidance countries (Cayman Islands, British Virgin, Bermuda, Hong Kong, Macau, Switzerland, Panama, Luxembourg), resulting the present two select groups in the dataset.

As for method, a panel data model was employed to examine the correlation

between dependent variable and independent variables. We firstly presented correlation matrix between variables and made Variance Inflation Factor test to see correlation coefficient and its reliability. Generally VIF value superior to 10 indicates the significant existence of multi-collinearity in data, which makes the regression coefficients unreliable. We then conducted Lagrangian Multiplier (LM) test to identify whether pooled ordinary least squares (POLS) model is applicable. Both China and Brazil's LM test results show rejection to POLS model. Therefore, we will choose random effect model (RE) or fix effect model (FE), Hausman test was applied to identify whether RE model or FE model fit China and Brazil. A value for the Hausman test that is significantly different from zero means acceptance of null hypothesis which indicates RE estimation is preferable model, otherwise, FE estimation will be applied.

Results and discussion

In preliminary regressions, two of the three alternative indicators of host market size (GDP per capita and GDP growth) never attained significance and therefore GDP was the only indicator of host market in all following regressions.

Table 4: Correlation matrix-China

	LOFDI	LGDP	LENERGY	LPAT	LINFLA	LPR	LERATE	LIMPO	LEXPO
LOFDI	1.0000								
LGDP	-0.0052	1.0000							
LENERGY	0.0850	0.1060	1.0000						
LPAT	0.3403	0.2129	0.2413	1.0000					
LINFLA	0.0333	0.0433	0.0039	-0.3495	1.0000				
LPR	-0.0750	0.0319	0.1220	0.4250	-0.6102	1.0000			
LERATE	-0.0160	-0.0867	-0.3563	-0.3729	0.3495	-0.4950	1.0000		
LIMPO	0.5001	0.0984	0.1352	0.7844	-0.2949	0.2637	-0.2577	1.0000	
LEXPO	0.3354	0.1347	0.1121	0.7676	-0.3326	0.4308	-0.1670	0.7726	1.0000

Table 5: Correlation matrix-Brazil

	LOFDI	LGDP	LENERGY	LPAT	LINFLA	LPR	LERATE	LIMPO	LEXPO
LOFDI	1.0000								
LGDP	0.1605	1.0000							
LENERGY	0.0931	0.0369	1.0000						
LPAT	0.0533	0.1258	0.1427	1.0000					
LINFLA	0.1418	0.1525	0.1808	-0.1657	1.0000				
LPR	0.2406	-0.0845	0.0841	0.1088	-0.4131	1.0000			
LERATE	-0.0025	0.0086	0.3244	-0.2081	0.2233	-0.3597	1.0000		
LIMPO	0.2156	-0.0148	0.1937	0.8108	-0.0215	0.0732	-0.1333	1.0000	
LEXPO	0.1946	0.0477	0.1395	0.6492	0.0429	-0.1227	-0.1918	0.8079	1.0000

VIF test results (table 6 and 7) show both China and Brazil have no problem with their data and the correlation coefficients in table 3 and 4 are reliable. POLS model was rejected in LM test of both two countries. The result of Hausman test of China indicates a fixed effects (FE) model is preferable and the result of Hausman test of Brazil indicates in favor of a random effects (RE) model. Therefore, only the results of China obtained from FE equation and the results of Brazil obtained from RE equation are discussed.

Table 6: Variance inflation factor test - China

Variable	VIF	1/VIF
LPAT	3.78	0.264595
LEXPO	3.62	0.276617
LIMPO	3.55	0.281480
LPR	2.26	0.442109
LERATE	1.73	0.579568
LINFLA	1.70	0.588650
LENERGY	1.21	0.824724
LGDP	1.08	0.923988
Mean VIF	2.37	

Table 7: Variance inflation factor test – Brazil

<u>Variable</u>	<u>VIF</u>	<u>1/VIF</u>
LIMPO	5.79	0.172598
LEXPO	3.56	0.280534
LPAT	3.50	0.285514
LPR	1.73	0.579201
LERATE	1.60	0.625101
LINFLA	1.42	0.704683
LENERGY	1.36	0.734325
LGDP	1.13	0.888616
Mean VIF	2.51	

We now discuss the results (see table 8) by beginning with China. We find that host country market size (measured by GDP, LGDP), efficiency (measured by inflation rate, LINFLA), export (export volume to host country, LEXPO), exchange rate (host country exchange rate against home country currency, LERATE) are all significant and correctly signed. These findings support Hypotheses China 1(a), 4, 6 and 8. By contrast, asset-seeking (measured by total annual patent registration, LPAT) is found to be significant but with a contrary sign to expectation as predicted in Hypothesis China 3. Natural resource endowment (measured by the ratio of ore of metal exports to merchandise exports, LENERGY), imports (imports volume from host country, LIMPO) and political risk (LPR) are found to be insignificant. Therefore, Hypotheses China 2, 5 and 7 are not supported.

As regards of Brazil, market size (LGDP), import (LIMPO), exchange rate (LERATE) and political risk (LPR) are all found to be significant and correctly signed, which support Hypotheses Brazil 1(a), 5, 6 and 7. However, asset-seeking (LPAT) and inflation rate (LINFLA) are found significant but with signs contrary to expectation as predicted in Hypotheses Brazil 3 and 4, respectively. Natural resource endowment and export are both insignificant. Therefore, Hypotheses Brazil 2 and 8 are not supported.

Table 8: Results for the determinants of Chinese and Brazilian OFDI

Variables	China-FE	Brazil-RE
LGDP	0.17* (0.01)	0.036** (0.015)
LINFLA	-0.365* (0.188)	0.565*** (0.201)
LENERGY	-0.101 (0.476)	-0.25 (0.248)
LIMPO	0.371 (0.478)	0.709* (0.406)
LEXPO	1.749*** (0.413)	0.327 (0.433)
LERATE	2.056** (0.881)	0.168* (0.101)
LPAT	-0.569* (0.326)	-0.412** (0.195)
LPR	-2.983 4.249	4.467*** 1.701
CONS.	-12.037 8.571	-22.612 6.05
N	212	124
Adj. R ²	0.34	

Notes: t values are in parentheses

***, ** and * indicate that the coefficient is significant at the 1, 5 and 10% levels, respectively

We now discuss in more detail each of these main findings by beginning with four main variables. Host country market size (LGDP) has a positive influence on Chinese OFDI as predicted in Hypothesis China 1(a), with a 1% rise in the variable increasing Chinese FDI outflows by 0.17%. Market size is also found to be significant and has a positive relationship with Brazilian OFDI, a 1% increase in host country GDP is associated with an increase in Brazilian OFDI of 0.036%, which supports Hypothesis Brazil 1(a). These results confirm the market-seeking motivation of both Chinese and Brazilian OFDI. We also find the Chinese coefficient (0.17) is much bigger than Brazilian one (0.036) on market size, it indicates stronger driving force of market size in motivating Chinese OFDI than Brazilian OFDI, large markets are more

preferable as investment destinations by Chinese firms.

Host country intellectual capital (LPAT) is found to be significant in both two countries' result but both with a contrary sign to expectation as predicted in Hypothesis China 3 and Hypothesis Brazil 3. A 1% increase in host country intellectual capital is associated with a 0.57% reduction in Chinese OFDI and a 1% increase is associated with a 0.41% reduction in Brazilian OFDI. The unexpected negative effect of host country intellectual endowment to Chinese and Brazilian OFDI may indicate a shifting role of emerging investors towards asset input and output. The results show that a decrease of host country intellectual capital encourages Chinese and Brazilian OFDI under our period of study from 2006 to 2012. Chinese and Brazilian firms assume a new profile as asset exporting investors and this kind of investment mainly flows to developing and less developing countries. The frequent investment activities of Chinese and Brazilian firms in Africa and Latin America in recent years might be evidence of this asset-exporting FDI. This finding is quite surprise and contrary to our general understanding of FDI from emerging investors.

Inflation rate (LINFLA), as indicator of efficiency-seeking, is found to be significant in China's result and correctly signed as predicted in Hypothesis China 4. However, inflation rate is also found to be significant in Brazil's result but with a sign contrary to expectation as predicted in Hypothesis Brazil 4. For China, inflation rate has a negative effect on Chinese OFDI as expected, with a 1% rise in inflation rate decreasing Chinese OFDI by 0.37%. For Brazil, inflation rate has an unexpected positive effect on motivating Brazilian OFDI, each 1% increase in inflation rate leads to a rise of Brazilian OFDI by 0.57%. Inflation rate indicates stability of macroeconomic and social efficiency, high inflation rate decreases the real value of firm's earnings, increases operation costs and potential risk. The positive effect of inflation rate to Brazilian OFDI might be interpreted as seeking more potential opportunities because moderate inflation rate helps to promote economic growth in certain degree. These results confirm the presence of efficiency-seeking motivation of

both Chinese and Brazilian OFDI over the period of study, they also indicate that increase in inflation rate (means low social efficiency) discourages Chinese OFDI but encourages Brazilian OFDI.

Natural resource endowment (LENERGY) is found to be insignificant in both two countries' results, there are no evidence supporting Hypothesis China 2 and Hypothesis Brazil 2, which indicates that Chinese and Brazilian OFDI are not motivated by host country natural resource in period of study. The finding of absence of Chinese resource-seeking FDI is quite unexpected because so much international debate over Chinese demands of natural resource and its energy strategy. Our interpretation is that Chinese global investment in energy and resource sector is more driven by profit maximization. To promote heavy equipment export and benefit from wider utilization of techniques are firms' main concern.

Now we discuss four control variables. The coefficient on exchange rate (LERATE) of both China and Brazil are significant and positive, indicating that a 1% increase in the variable is associated with a high increase in Chinese OFDI of 2.56% and a moderate increase in Brazilian OFDI of 0.17%. These findings support two Hypotheses 6 that exchange rate has a positive effect on Chinese and Brazilian OFDI.

Two trade related variables, import (LIMPO) and export (LEXPO), when viewed together, indicate the export-oriented nature of Chinese OFDI and import-oriented nature of Brazilian OFDI. Import is found to be insignificant in relationship with Chinese OFDI, but export is found to be very significant and has a high positive effect on Chinese OFDI, each 1% increase in export volume to host country leads to a rise of Chinese OFDI by 1.75%. Contrary to China, import is found to be significant and associates positively with Brazilian OFDI, with 1% increase in import volume from host country increasing 0.71% in Brazilian OFDI, while export is found to be insignificant. Thus we find evidence for Hypothesis China 8 and Hypothesis Brazil 7, no evidence was found to support Hypothesis China 7 and Hypothesis Brazil 8. The findings about China suggest that one of the key motivations of Chinese OFDI has been to promote domestic exports, which also supports market-seeking motivation. The findings about Brazil indicate that Brazilian OFDI follow imports, substitute

import of foreign products by FDI.

The last variable is political risk (LPR), we find that the coefficient of this variable in China's column is insignificant, but coefficient of political risk in Brazil's column is significant and indicates an extremely positive relationship with Brazilian OFDI, with a 1% increase in political risk associating with a rise in Brazilian OFDI of 4.48%. Therefore, Hypothesis Brazil 8 is supported and Hypothesis China is not. As higher value of political risk indicates greater political stability, Brazilian OFDI follows the conventional behavior as expected.

To sum up, we find evidence supporting market-seeking (Hypothesis China 1a and 8), efficiency-seeking (Hypothesis China 4), exchange rate (Hypothesis China 6), asset-seeking (negative effect, Hypothesis China 3), exports (Hypothesis China 8) as determinants of Chinese OFDI. Our main findings also support market-seeking (Hypothesis Brazil 1a), efficiency-seeking (Hypothesis Brazil 4), asset-seeking (Hypothesis Brazil 3), imports (Hypothesis Brazil 7), exchange rate (Hypothesis Brazil 6) and political risk (Hypothesis Brazil 5) as determinants of Brazilian OFDI.

Conclusions

This paper is the first attempt, by our knowledge, to investigate empirically both the determinants of Chinese and Brazilian OFDI and compare their similarities and differences. The first objective of this paper is to test the applicability of general theory to emerging country, China and Brazil are two important emerging investors of FDI, the result of theoretical discussion shows that the general theory fit well with China and Brazil in explaining their determinants of OFDI. The second objective is to investigate which determinants are influencing Chinese and Brazilian OFDI respectively and also compare their similarities and differences. The empirical analysis is done within a well-specified model using each country's official data and a wide range of main and control variables. The main findings indicate Chinese OFDI is influenced by market size (market-seeking), inflation rate (efficiency-seeking), exports, exchange rate and intellectual capital (asset-exporting). No evidence supports that resource-seeking, import and political risk affect Chinese OFDI. The findings also indicate Brazilian OFDI is affected by market size, inflation rate, intellectual capital (asset-exporting), imports, exchange rate and political risk. Others determinants suggested in hypotheses are found to be insignificant.

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Appendix I:

34 countries host to Chinese OFDI in the dataset

Algeria, Australia, Belgium, Brazil, Bulgarian, Canada, Czech Republic, France, Germany, Hungary, India, Ireland, Italy, Japan, Madagascar, Malaysia, Mexico Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland Republic of Korea, Romania, Russian Federation, South Africa, Spain, Sweden Thailand, United Kingdom, United States, Vietnam

Appendix II:

22 countries host to Brazilian OFDI in the dataset

Argentina, Austria, Belgium, Canada, Chile, China, Colombia, Denmark, Ecuador, France, Germany, Hungary, Italy, Japan, Mexico, Netherlands, Peru, Portugal South Africa, Spain, United Kingdom, United States