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of Direct Investment from China on Host Developing
Countries

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Abstract

This paper examines the growth impact of Chinese outward foreign direct investment (OFDI) on economic growth in host developing countries. Our results show that the net growth effect of Chinese OFDI is determined by the multi-dimensional complementarities between the FDI and the host economies. Chinese OFDI appears to have a significant positive impact on the long-run economic growth of host economies. It has contributed positively to economic growth in Africa and, less significantly, in Asia, but not in Latin America. Chinese OFDI in resource-rich countries shows a stronger growth effect in the short-run but a weaker effect in the long-run.

Key words: Outward direct investment, impact, growth, employment, China

Multi-dimensional Complementarities and the Growth Impact of Direct Investment from China on Host Developing Countries

1. Introduction

Since the 1980s, production has been increasingly fragmented and globalised. Value-added activities are mostly concentrated with the highest level of value added taking place at the two ends of the value chain. Firms controlling activities in the middle of the value chain have strong incentives to acquire the resources and competencies that will enable them to control higher value-added activities and implement “catch-up processes” within the systematic organisation of the “global factory” (Buckley, 2009). As a “world manufacturing plant” engaging mainly with activities in the middle of the value chain, China introduced the ‘going global’ strategy in the late 1990s in order to catch-up in the competition of value creation. Since then, outward direct investment from China has increased rapidly. This fast growth has attracted considerable attention from policy makers, academics and the public. What is the impact of outward direct investment (OFDI) from China on host countries, especially on the growth of host developing countries? Is the growth effect of OFDI from China different from that of conventional foreign direct investment (FDI)?

Outward direct investment from developing countries is not a completely new phenomenon. The first wave of OFDI from the South started in the 1970s when direct investment from the Newly Industrialised Economies became salient. There has been an academic and a policy debate regarding the determinants, behaviour and impact of developing country OFDI - both inconclusive. It was argued that in host developing countries, the emergence of developing country FDI provided a new source of capital, technology and skills and was hence a welcome development (UN, 1993). South-South FDI is also felt to have an advantage over the traditional FDI from developed countries (TFDI) because the technologies used by developing country FDI are ‘more appropriate’ (e.g., White, 1981; Aykut and

Goldstein, 2006). Moreover, developing country FDI appeared to flow more into growing sectors while FDI from the North did not (Bera and Gupta, 2009).

On the other hand, some scholars argue that, as far as developmental effects are concerned, developing country multinationals (DC MNEs) are not an obviously superior option to conventional MNEs (eg., Narula, 2010). It is argued that it is less clear DC MNEs represents a new source of technology or that they engage in activities that have greater opportunities to generate positive externalities. Moreover, DC MNEs are less experienced in building linkages and integrating themselves into local communities. Some also argue that the Chinese OFDI in developing countries is mainly resource and market seeking. It constrains African and Latin American countries to remaining resource-dependent economies and it crowds out local industries (Ademola et al., 2009).

This paper aims to contribute to the debate on the growth impact of developing country FDI (DC FDI) through a systematic theoretical discussion focusing on the multi-dimensional complementarities between FDI and the host economy. Its empirical analysis is based on a cross country panel dataset. It contributes to the literature in a number of ways. First, it provides the first systematic theoretical discussion of the growth impact of Chinese OFDI with a special focus on the major transmission mechanisms. Existing theory on the impact of FDI, e.g. the technology gap theory, is based on an important assumption that MNEs passes “ownership advantages” in technological, managerial and marketing knowledge. The emergence of infant emerging market MNEs has posed a challenge to existing theory in explaining the benefits of DC FDI (Buckley and Hashai, 2014). Although there has been substantial recent literature on DC OFDI, most of it focuses on the determinants of OFDI. Theoretical discussions of the growth impact of DC OFDI has, usually, centred on a few specific perspectives such as appropriateness of the technology (e.g. UN, 1993). As far as we are aware, this is the first theoretical and empirical article assessing multi-dimensional complementarities to argue that compatibilities in motivations and characteristics between the MNEs and the host countries, e.g. complementarities in capabilities, resources (including natural, financial, labour and knowledge

resources) and market size, play an important role in shaping the direction and significance of the impact of DC FDI on the host country. It suggests that, although many emerging market MNEs do not have the same level of ownership advantages as traditional western MNEs, they still can make a significant contribution to host economies. This depends, however, on the characteristics of FDI in individual host economies and the complementarities between them.

Second, research reported in this paper also contributes to the literature on the developmental impact of FDI on host countries. Earlier research by Kojima (1975) argues that Japanese FDI had more beneficial welfare effects on host countries than US FDI because Japanese-type trade-oriented FDI enhances trade and hence has greater welfare effects than US-type anti-trade-oriented FDI. Our theory examines the developmental effects of FDI by focusing on the complementarities in characteristics of the MNEs and the host countries, especially in alleviating the major constraints to growth using the financial, knowledge and marketing resources embedded in FDI, and the appropriateness of MNEs technologies in the host country context.

Thirdly, empirical evidence to date on the impact of Chinese OFDI on the host economy is mainly based on case studies (eg. Mlachila and Takebe, 2011; Gu, 2009; Kaplinsky and Morris, 2009; Renard, 2011). Evidence from a large database is rare. The only study is carried out Weisbrod and Whalley (2011) using a growth accounting exercise to evaluate the contribution of Chinese FDI to Africa's pre-crisis growth surge. Focusing on FDI's role in capital accumulation, their analysis of data for 13 Sub-Saharan African economies suggests that a 0.5 per cent increase in GDP growth in some of these countries is due to Chinese OFDI. The research reported in this paper is the first empirical analysis evaluating the growth impact of the Chinese OFDI on all host developing countries. This study specifically estimates the differential impact on long and short term growth and on host countries with different characteristics.

The paper is organised as follows. Section II reviews the theory and literature on FDI and economic growth in developing countries. In this section, we first develop a general theory of multi-dimensional

complementarities and the growth impact of FDI on host economies, and then present specific hypotheses in the case of Chinese OFDI. Section III describes the methodology and data. Section IV reports the results. Section V concludes.

2. FDI and economic growth in developing countries:

The literature and theoretical framework

(a) Received wisdom

Theoretically, there are substantial gains to income growth from inward FDI. These include 1) development financing; 2) knowledge transfer and spillovers through demonstration effect, movement of trained labour, and transfers within the supply chain; and 3) competition effect where foreign entry forces local firms to enhance efficiency so as to compete with foreign invested firms (Blomstrom & Kokko, 1997; Borensztein, et al., 1998; de Mello, 1999; Javorcik, 2008). Forming joint ventures with foreign investors and sub-contracting to foreign invested firms are also argued to be effective channels for local firms to enter into global production chains (Pietrobelli and Saliola, 2008).

Of course, FDI is not an un-annoyed blessing. There may also be negative effects of FDI on the host economy. These include the crowding-out effect when the affiliates of multinational enterprises (MNEs) eliminate domestic firms from the local market. Although there will be efficiency gains from crowding-out, this is also likely to weaken the domestic industries, especially the young small firms or firms in infant industries. FDI may also create high foreign dependence in the host economy and divert the limited resources in the host economy from developing indigenous economic and technological capabilities. There are also opportunity costs of resources, such as land and labour, as well as costs of damage to the environment. Moreover, foreign invested firms may remain as enclaves in the host economy and thus create polarization or sharpened dualism within the economies of the host country (Singer, 1975; Lall, 2003; Fu, 2004).

It is hence argued that the benefits from FDI are subject to pre-conditions. For example, the strength of the growth effect of inward FDI depends on the presence of effective linkages between foreign and domestic firms (Rodriguez-Clare, 1996); the absorptive capacity of the domestic firms in the host economy (Girma, 2005; Fu, 2008), and the presence of complementary institutions and infrastructure (Balasubramanyam, et al., 1996; Narula and Dunning, 2010). Therefore, the strength of the growth effect of FDI depends on the characteristics of FDI and the host country (Javorcik, 2008). For example, FDI from innovation-active countries may have greater knowledge spillover effects than FDI from innovation lag countries. FDI in resource exploitation activities has been found to have fewer local linkages and more limited spillovers than FDI in knowledge intensive manufacturing and services sectors (UNCTAD, 2007).

(b) *The emergence of FDI from developing countries*

The emergence of these macro flows of OFDI from China takes place within the context of global commodity chains with an embedded power structure (Gereffi, 1999) and within the systematic organization of the "global factory" (Buckley, 2009). Firms controlling activities in the low value added middle of the value chain have strong incentives to acquire the resources and competencies that will enable them to control higher value-added activities and implement "catch-up processes". This catch-up process does not only mean technological catch-up, but a catch-up in a wider respects along the value chain, e.g. acquiring resources, brands, as well as capacities in design and marketing. Thus, firms from emerging market economies like China move to invest in advanced economies to develop their R&D capabilities, brands and marketing expertise so as to increase their control over the upstream or downstream ends of the value chain, or to move to resource rich countries to enhance their control over the upstream end of the value chain (Mudambi, 2008; Zahra and George, 2002; Buckley, 2009). Firms also choose a the specialisation strategy and move to make horizontal investments in developing countries for market expansion, scale economies and greater efficiencies (Mudambi, 2008).

Firms driven by different motivations and strategy, which are related to their home country characteristics, will decide where to locate their overseas direct investment (subsidiaries). They are most likely to locate their overseas investment in countries with the kind of characteristics that match their strategy. Such investment decision may not always have the expected developmental effects on the host countries because the investors (MNEs) normally have choices in selecting the location of FDI and negotiating power in the terms of the bargaining process.

(c) Multi-dimensional complementarities and impact of DC FDI on host economies

Existing theories of the growth impact of inward FDI on host economies are derived in the context of traditional developed countries' OFDI investing in developing host economies. The expected gains and costs of FDI are based on the assumption of the ownership advantages that traditional MNEs enjoy and a considerable gap in technological and managerial knowledge between the investing and the host country. With the emergence of the 'infant' outward FDI from the developing countries which do not possess the ownership advantages as traditional FDI does, the growth impact of these DC FDI on host economies becomes unclear because some of the traditional assumptions do not hold. It is alleged that existing theory cannot fully predict the possible gains and costs. Is the growth impact of DC FDI inferior to that of the traditional FDI because most of DC FDI is not as strong as the traditional FDI?

The possible growth effects, either positive or negative, take place through specific effects, including financing, competition effects and knowledge spillover. Due to the differences in these aspects between home and host economies, the net growth effect of DC FDI on the host economy is a result of the overall complementarity in all the growth-affecting dimensions between each pair of FDI investing and receiving countries.

The economic growth of an economy can be driven by the growth in capital (K), labour (L), and factors affecting productivity such as knowledge and competition. Inward FDI into the host economy may

affect changes in capital, knowledge and competition depending on the complementarities of FDI with the domestic economy.

First, with regard to the impact of FDI on financial capital in the host countries, despite the earlier debate on the relationship between FDI and domestic investment, i.e. crowd in versus crowd out (eg., Agosin & Machado, 2005), recent research suggests that greater inward FDI is positively associated with more domestic investment (Desai, et al., 2007; Ndikumana and Verick, 2007). Therefore, the impact of FDI on the formation of overall financial capital in the host country will be largely positive.

Second, the contribution of FDI to knowledge capital accumulation is subject to the technology gap between the investing and host economies as well as the appropriateness of the foreign technology to the local economic and technical conditions. With regard to the technological gap, in the scenario of an ownership advantage of MNEs over local firms, some argue a U-shaped relationship exists between the technology gap and the strength of knowledge spillovers to the local economy because firms that are technologically closer to the MNEs have greater absorptive capacity to learn and firms that have a large technology gap from the MNEs have a larger space to learn than those firms that fall in the middle (eg., Girma and Gorg, 2007). However, some argue for an inverted U-shaped relationship because a moderate gap allows local firms to identify foreign technology that could be useful to them and that they have the capacity to absorb (eg. Kokko, et al., 2001; Chen, et al., 2011). Therefore, here, the impact of FDI will be non-negative, although the strength of the positive contribution depends on the degree of the technology gap and the absorptive capacity of local firms.

In addition to the technology gap, the appropriateness of the foreign technology and management style in relation to the local economic, socio-technical conditions also affects the degree to which the advanced technology embedded in FDI is diffused and assimilated in the local economy. The theory of directed technology change suggests that new technologies will be designed to make optimal use of the factor that is abundant in the country where the technology is created. In other words, technologies

created in the North may not be appropriate for the countries in the South (Acemoglu, 2002). Of course, as the level of technology and skills of the host country improves, its appropriateness of a technology will also change.

Thirdly, inward FDI into the host economy will usually increase the level of competition in the product market in these economies. This competition effect is a two-edged sword for economic growth. On the one hand, competition will force domestic firms to improve to survive. Moreover, competition will crowd out inefficient firms. The exit of inefficient firms will enable more efficient reallocation of the resources in the economy. On the other hand, crowding out of local firms, especially SMEs, may curb the development of indigenous industrial capacity and create greater dependency on MNEs. The degree of the negative crowding out effect again depends on the comparative advantage of the investing and host economies, and the strength of local and foreign firms.

For countries with a high overall compatibility with that of the Chinese OFDI, especially when the strength possessed by Chinese OFDI can help host countries to overcome the bottleneck in their economic growth, the growth impact of Chinese OFDI is likely to be positive. Alternatively, for countries with a low overall compatibility match, the growth impact of Chinese OFDI is likely to be insignificant or even negative.

(d) Characteristics of Chinese OFDI and its growth impact in host countries

Therefore, in what follows, we analyse how the characteristics of Chinese OFDI (COFDI) and the compatibility between China and the host country in these three dimensions affect the growth impact of Chinese OFDI on host developing countries, and assess how this impact may be different from that of traditional FDI from industrialised countries.

Outward direct investment from China has grown rapidly since the late 1990s. The total value of OFDI from China increased from around USD 28,000 million in 2000 to USD 300,000 in 2010 (Figure 1). This investment went to all the continents of the world although Hong Kong, Macao, Taiwan and tax havens such as the Virgin Islands and Cayman Islands attracted a disproportionately large flow. The rest of Asia, Europe and Africa are the top 3 destinations. Latin America, excluding Virgin Islands and Cayman Islands, received the least Chinese OFDI (Figure 2). Contrary to the approach that labelled Chinese OFDI as resource seeking, mining accounted for only 14% of total OFDI stock from China in terms of both total value of OFDI stock and the number of overseas firms. In fact, Chinese OFDI has gone to a wide range of industries. In terms of number of overseas firms, the manufacturing sector is the largest by the year 2010, accounting for 29% of total overseas firm numbers (Table 1).

[Insert Figure 1 here]

[Insert Figure 2 here]

[Insert Table 1 here]

Development financing In general, the development financing effect of COFDI is similar to that of traditional FDI. There is likely to be a significant impact in situations where there is a shortage of funding for business and investment. In the case of low income developing countries, it is argued that the opportunity cost of accepting COFDI is very low because it often goes to sectors in which others normally do not invest (Brautigam, 2009).

Knowledge transfer and spillover As discussed earlier, the strength of knowledge spillovers is subject to the strength of the linkages between foreign and local firms. It is argued that Chinese-invested firms often employ Chinese workers and suppliers, although some researchers have pointed out that this was exaggerated in many reports (eg., Kragelund, 2009). Recent fieldwork study from Ghana suggests that, although the proportion of local employees in total labour force in Chinese MNEs are lower than the western MNEs in Africa, the proportion is not small, eg. 60% in Huawei Ghana, and that the total number of local employees is much larger than that of the western MNEs as Chinese MNEs often have

a much larger labour force (Auffrey, 2013). Therefore, the interaction between Chinese MNEs and the local community remains considerable in scale, although weaker in intensity.

Moreover, from the appropriateness perspective, technologies created in China embedded in Chinese FDI may be more appropriate in unskilled or semi-skilled labour-abundant countries. For resource-rich or land-rich countries, technology used by most COFDI may not be optimal. Finally, although most of the Chinese firms were immature when they started to invest abroad, they are more experienced in surviving and growing in adverse governance environments (Lecraw, 1993). Many Chinese MNEs may have learned how to fight against adverse governance environments, identify the opportunity and market space to grow in such external environments, and how to deal with uncertainties caused by political instability and weak institutions. They can share their experiences and lessons with the local firms and thus can help domestic firms to grow in adverse governance environments.

Competition and crowding out effect Most Chinese MNEs are different from traditional MNEs of industrialised countries, especially in the manufacturing industry as they are relatively small and technologically and managerially immature. The exceptions are some large state-owned enterprises (SOEs) in a few capital intensive industries such as resources, banking and transportation and a few exceptional private firms. In Africa, they go to the sectors that face a lack of investment due to non-industrialisation (Brautigam, 2009). By 2011 the top five industries of COFDI in Africa were mining (31%), finance (20%), building (16.4%), manufacturing (15.3%) and leasing and business services (5%) (SC, 2013). Therefore, although there will be a crowding out effect of COFDI on local firms, it is unlikely to be strong.

As a fast growing high-middle income country which enjoys nearly \$4 trillion foreign exchange reserves, China (and many of the Chinese MNEs) is rich in financial capital, short in natural resources, and uses middle-level labour-augmenting technologies. The complementarities between Chinese MNEs and host economies can be measured roughly by comparing the three important dimensions of

economic growth: financial capital, knowledge capital, and competition. As Mudambi (2008) and Buckley (2009) suggest,

Some of the firms move to invest in resource rich countries, e.g. Africa and Latin America, to enhance their control at the upstream end of the value chain. Because countries in Africa lack industrial investment and use a lower level of technology in production, Chinese OFDI presents complementarities in the dimensions of financial capital formation and knowledge transfer. Because of the reasons discussed earlier, although there will be both efficiency gains and crowd-out effects, the net competition effect is unlikely to be significant. Overall, there will be more complementarities in important growth drivers between Chinese OFDI and African economies. For countries in Latin America, many of them have been middle income countries since the 1970s or 1980s. There is not a significant shortage of capital and investment. The level of technologies in firms is also close to the level of technologies used in Chinese firms in general, since both are now middle income countries. Therefore, growth complementarities between the Chinese OFDI and Latin America economies are weak. Investment in extractive industries also creates limited linkages and spillovers.

Some of the firms may choose a specialisation strategy and move to invest in other countries, e.g. Asia, for market expansion and efficiency gains. Most of these COFDI are likely to focus on the use of cheap labour and land in these countries and engage in simple assembly production intensively using unskilled labour. They may also invest in sales, marketing and trading activities for expansion. The growth complementarities in knowledge transfer and capital formation are likely to be weak. These Chinese MNEs are likely to compete with and to displace local firms. The main gains may come from employment-driven growth if the crowd-out of local industries are limited.

Based on the above discussions, we can summarise the multi-dimensional complementarities between Chinese OFDI and the host economies as in Figure 3, which is a three dimensional representation of the

effect of COFDI on host country growth. The effects are resolved into a knowledge impact, an investment impact and a competition effect. The overall multi-dimensional effect will be moderated by the type of FDI and the characteristics of the host country that are theorised and tested in this paper. This analysis leads to the following hypotheses.

[Insert Figure 3 here]

Hypothesis 1: The net growth impact of COFDI on African economies is likely to be positive and significant.

Hypothesis 2: The net growth impact of COFDI on Asian economies is likely to be non-negative and of limited size and significance.

Hypothesis 3: The net growth impact of COFDI on Latin American economies is likely to be insignificant or negative.

3. Methodology and data

(a) Model

Following Bond, Leblebicioglu and Schiantarelli (2010), our baseline specification is as follows. Let y_{it} denote the logarithm of output per labour in country i at time t , and x_{it} denotes the logarithm of the share of investment in output. Assuming the behaviour of y_{it} can be represented by the autoregressive distributed lag model (ARDL), our base line ARDL (1,1,1) dynamic panel specification is

$$y_{it} = c_{it} + \alpha_1 y_{i,t-1} + \beta_0 x_{it} + \beta_1 x_{i,t-1} + \eta_i + \varepsilon_{it} \quad (1)$$

where c_{it} is a non-stationary process that determines the behaviour of the growth rate of y_{it} in the long run. The country-specific intercept (or fixed effect, η_i) allows for variation across countries in initial conditions or other unobserved factors that affect the level of the country's steady-state growth path. The residual (ε_{it}) reflects the influence of random shocks that affect the level of output per labour.

Our baseline specification further assumes that the long-run growth rate can be modelled as

$$\Delta c_{it} = \theta_0 + \theta_1 x_{it} + d_i + e_t + v_{it} \quad (2)$$

Here we allow the change in c_{it} to depend directly on the current share of investment, which we assume to be a stationary stochastic process. d_i allows for time-invariant unobserved heterogeneity in growth rates. e_t and v_{it} have zero mean and reflect ‘permanent’ shocks to the (log) level of output per labour that are common to all countries (e_t) and specific country i (v_{it}).

Taking first-difference of equation (1) and substituting for c_{it} from equation (2), we have

$$\Delta y_{it} = \theta_0 + \alpha_1 \Delta y_{i,t-1} + \beta_0 \Delta x_{it} + \beta_1 \Delta x_{i,t-1} + \theta_1 x_{it} + d_i + e_t + v_{it} + \Delta \varepsilon_{it} \quad (3)$$

where Δy_{it} is the growth rate of output per labour between time $t-1$ and t ; and Δx_{it} is the growth rate of investment between time $t-1$ and t . Country specific fixed effects in income levels (η_i) are eliminated by the first-differencing transformation. Here β_i indicates the impact of x_{it} on the short-run growth rate, and θ_i represents the impact of x_{it} on the long-run growth rate.

For empirical estimation, we include a vector of major determinants of growth suggested by the literature as control variables. These include openness - measured by total trade to GDP ratio; industry structure measured by the percentage of agricultural value-added in total GDP; and resource endowment of a country measured by natural resource rents as a percentage of GDP. The literature on the impact of FDI on host country economic growth suggests that the presence of a threshold level of human capital in the host country is a crucial condition. Empirical research in this field suggests that secondary school education of the labour force has the most significant impact (e.g. Borensztein et al., 1998; and Xu, 2000). Therefore, we chose the percentage of secondary school enrolment in gross population as a proxy for labour skills. Definitions of variables are given in Table 2.

(b) Data

We test the hypotheses using cross country data for 97 developing countries for the 2004-2010 period, compiled from various sources including Ministry of Commerce (MOC) of China, World Development Indicator (WDI) published by the World Bank, UNCTAD and International Labour Organisation (ILO). The value of Chinese OFDI stock in 97 developing countries over the 2004-2010 period was collected from the Bulletin of Chinese Outward Direct Investment published by MOC. The stock of total inward FDI in each of these countries were collected from UNCTAD. Information on other variables were collected from World Development Indicator. Since the developing host country is the main focus of the research, we concentrate our empirical test on these countries. We use the World Bank's classification of developing countries which include the middle- and low-income countries. A list of the countries that are included in the sample are reported in Appendix 1.

Although the official Chinese OFDI data provided valuable information for research, it has some problems which should be taken into account in our analysis. First, the official data is likely to underestimate the scale and scope of Chinese OFDI as many SMEs do not register. Second, a large quantity of investment goes to Hong Kong, Macau, Taiwan and a small number of other tax havens. Because the tax havens are not the final destinations for the COFDI, investment arriving here is often re-directed to other destinations, affecting the overall picture of Chinese OFDI.

However, comparing the different available data sources, the data published by MOC is still the one with the most comprehensive coverage. First, comparing the MOC data (i.e. the data registered with the Ministry of Commerce) and that of the State Administration of Foreign Exchanges (SAFE), the data from MOC is more comprehensive than SAFE because SAFE registers only those investment which needs to be approved by SAFE. All the Chinese OFDI projects have to be approved by Ministry of Commerce no matter whether they need foreign exchanges from SAFE or not. Investment made by subsidiaries overseas, e.g. from Hong Kong, should also be registered with MOC, especially if they want to remit the dividends back to China.

Second, comparing MOC data with that of the Heritage Foundation's data on large Chinese OFDI projects, although the Heritage's data may be more timely than the MOC data, it covers only large COFDI projects, and only from the year 2005 onwards. Therefore, not only is the Heritage's data compressed in time compared to MOC data, it may also lose Chinese OFDI in medium and small projects and in some sectors where large projects are rare. A closer look at the Heritage data, in 2005 for example, the projects recorded are mostly in the area of energy and resources. According to a report by Scissors (2011) published by Heritage, "Heritage's figures are similar to those released by China's Ministry of Commerce. [although] This is somewhat odd. ... Heritage data are biased toward state entities because they have an inordinate share of the capacity and backing to make the large deals."

Thirdly, COFDI going to Hong Kong, Macau, Taiwan, and a few other tax havens affects the true picture of Chinese OFDI. Admittedly, the funds that flow to the tax havens and Hong Kong can be re-invested in other countries. But, only a proportion of it will be used as direct investment to a third country because these funds can also be used for portfolio investment. Moreover, since the Chinese government encourages firms to 'go global', most of the Chinese firms which would like to make real direct investment in manufacturing and other productive sectors need not to go via the Virgin or Cayman islands to make their investment. Finally, as widely recognized, there are substantial funds round-tripping via these tax havens back to China. Therefore, although the funds that were re-directed invested to third countries may affect the true picture of Chinese OFDI, the effect is not as large as speculated. Moreover, we cleansed the data and focused on the cross country panel excluding Hong Kong, Macao and Taiwan, Virgin Islands, Cayman Islands and Lichtenstein from our empirical sample to further reduce the distortion of the true picture. One more benefit arising from the exclusion of these destinations from our sample is the correction of industry misrepresentation. MOC (2010) suggests that the largest industry recipient of Chinese OFDI in Hong Kong, Virgin and Cayman Islands and Luxemburg is business services. Therefore, the exclusion of these destinations also removed this industrial outlier in the sample.

Therefore, although there are limitations of the MOC data, it is the dataset that has the most comprehensive coverage and availability. As a result, we use this data for our analysis while recognizing its limitations and are cautious when we draw up conclusions. Of course, the relatively short time span of the data restricts us from using the Mean Group Estimator method which requires that both the number of cross-section observations and number of time-series observations are large (Pesaran, Shin and Smith, 1997, 1999).

Before proceeding to the estimation, we carried out unit root tests on the main variables because the estimated coefficients can be spurious if the variables are non-stationary. Given the nature of the data, i.e. $N > T$, we employed the LLC (Levin, Lin and Chu, 2002) and IPS (Im, Pesaran and Shin, 2003) methods, with the null hypothesis that the variable contains a unit root and the alternative that the variable was generated by a stationary process. Unit root test results reported in Appendix 2 suggest that the variables are stationary at 1st order.

(c) Estimation Strategy

The empirical test is carried out in three steps. First, we assess the impact of Chinese OFDI by regression equation (3) with the full sample of the cross country panel data. Second, we test the multi-dimensional complementarity hypothesis by examining the geographical variation of the effect. Thirdly, we examine the growth effect of Chinese OFDI in resource rich countries.

For the test using cross country data, one thing to take into account is heterogeneity across countries. Pooled Mean Group Estimator is ideal. However, as discussed earlier, we are constrained by the relatively short time series in the panel data. So the dynamic fixed effects model is used for the estimation; first with country fixed effects in the model, then removed by taking first differences.

There is also an issue of endogeneity between the investment, FDI and openness variables and the lagged dependent variable on the one hand and economic growth on the other hand. We have tested the

significance of the endogeneity between investment and growth formally using the Davidson-MacKinnon test of exogeneity. Following Bond et al. (2010), the lagged inflation rate variable is used as an instrumental variable. We have also used the lagged private credit by deposit money banks to GDP ratio as another instrumental variable. The data is collected from the Financial Structure dataset of World Bank. The Hansen test and Sargan test were carried out to test for the validity and over-identification of the instruments. Reassuringly, the estimated results suggest that the instrumental variables are appropriate on all counts.

Another way to tackle the possible endogeneity between investment and growth variables is to use lagged explanatory variables. Therefore, we also use one- and two-year lagged FDI variables as alternative measures of FDI stock in the regression. The use of a lagged FDI variable also allows us to account for the fact that it takes time for the impact of FDI to take effect. Finally, as a robustness check, we have carried out the test also using 2-stage least squares (2SLS) method. The results are broadly consistent with the dynamic fixed effects estimators.

4. Results

(a) Dynamic fixed effects

Table 3 reports the estimated results of the dynamic fixed effects model for the full developing country sample. With regard to the role of overall FDI in economic growth, consistent with the findings in the literature (e.g. de Mello, 1999), the net inflow of FDI as a percentage of GDP shows a significant and positive association with the long run economic growth of the host economy and is robust across different models. A one per cent increase in the FDI-GDP ratio is associated with a 0.03 per cent increase in the growth rate of per capita income.

With regard to the role of the Chinese OFDI, the estimated coefficient of the variable COFDI is positive and significant at the one per cent significance level in long run growth equation. This indicates a

significant and positive effect of the Chinese OFDI on the long-run income growth in host countries. The result is consistent in both the base model and the full model when other important factors affecting growth are also controlled for. A one per cent increase in the share of the COFDI in total inward FDI in a developing country is associated with 0.04 per cent increase in the country's per capita GDP growth. In our sample, the average share of Chinese OFDI in total inward FDI in developing countries increased from 2.05 to 3.62 per cent. This means the contribution of the Chinese OFDI to the average per capita income growth in developing countries is 0.06 per cent. This is about 13% of the overall average per capital income growth in the sampled developing countries over the 2004 to 2010 period.

However, in the short run, FDI, including Chinese FDI, does not appear to have a significant impact on per capita income growth in the host economies. Moreover, when other control variables are included in the regression, Chinese OFDI seems to have a negative association with income growth in host countries, which is plausible. As a latecomer in overseas direct investment, (and for political reasons), Chinese OFDI is more likely to go to countries with low income growth such as Sudan and Angola.

As expected, fixed capital formation has a positive and significant association with both short and long term economic growth, suggesting the growth in developing countries is still an investment driven process instead of productivity driven growth. A ten per cent increase in the ratio of fixed capital formation to GDP is associated with a two per cent increase in per capita income. This is much larger than that of the FDI variables. The industrial structure of the economy, measured by agricultural value added as a percentage of GDP, appear to have a significant negative association with economic growth in the short term. This is consistent with the findings from the literature arguing that structural change and industrial upgrading are important for economic growth. Unexpectedly, the estimated coefficient of trade openness though bearing a positive sign, is not statistically significant. This may be due to a high correlation between trade openness and a country's openness to FDI, which causes the statistical insignificance of the trade openness coefficient. The estimated coefficient of the secondary school enrolment variable is not statistically significant either, though it too bears the expected positive sign.

This may be due to the lack of variance in this indicator across countries and over time. Alternative measures of labour skills should be considered in the estimation in the future.

[Insert Table 3 here]

(b) Robustness check: estimated results of lagged FDI

Taking into account the lagged effects of FDI and a possible endogeneity between investment, FDI, openness and the lagged dependent variable on the one hand and economic growth on the other, we used 2SLS estimates for robustness checks. Table 4 reports the results. One- and two-year lagged FDI variables are included as alternative measures of FDI investment. The DM test of exogeneity suggests the presence of significant endogeneity problem in the base model. Therefore, the 2SLS estimates are preferred in this regression.

The estimated results show that the two-year lagged Chinese FDI has a significant and positive effect on income growth in host developing countries. The result is robust across different model specifications. All these results attest to the significant positive impact of the Chinese OFDI on economic growth in the host countries in the long run, which is in fact consistent with the findings from the fixed dynamic model reported in Table 3. The estimated coefficients of the lagged total inward FDI to GDP ratios are statistically insignificant for all the model specifications. This is different from the results reported in Table 3 when general FDI also has a significant positive contribution to the long run economic growth in the host developing countries probably due to two years may not be sufficient for traditional FDI to exert a significant positive growth impact and the uneven presence of the pre-conditions for a successful FDI-led growth process (Balasubramanyam et al., 1996; Javorcik, 2008) . In a way, this can also be explained by our argument in this paper that the net growth effect of FDI depends on the multi-dimensional complementarities between the particular inward FDI flow and the host economies.

The estimated coefficients of the control variables are broadly consistent with the estimated results of the fixed dynamic model. Fixed capital formation remains to be a significant determinant of income growth in developing countries. The estimated coefficients of secondary education enrolment also bear the expected positive sign but are still statistically insignificant. The estimated coefficient of the share of agricultural value-added in GDP variable turns out to be positive and marginally significant, suggesting the contribution of agriculture growth to income growth in developing countries.

[Insert Table 4 here]

(c) The growth effect of Chinese OFDI in different country groups

Due to the difference in economic and technical development levels and factor endowments between countries located in different continents, we also investigate whether the growth effect of the Chinese OFDI varies by multi-dimensional complementarities between China and the host countries. We have done this by splitting the sample by Continent. Given the widely acknowledged existence of potential endogeneity between the dependent variable on the one hand and the investment, openness and lagged dependent variable on the other, we use the 2SLS method to control for this. Nevertheless, we also report the fixed effects model estimates for comparison. The estimated results are reported in Table 5.

Interestingly, the main drivers of economic growth and the role of the Chinese OFDI in the growth process indicate different growth patterns in different continents. In Africa, the two-year lagged COFDI variable show a positive and significant effect on per capita income growth, suggesting a significant positive contribution of Chinese OFDI to income growth. A ten per cent increase in the share of COFDI in total inward FDI in an African country will lead to an increase of 0.09 per cent in per capita GDP two years later. The average share of COFDI in total inward FDI in Africa increased from 1.85 per cent in 2004 to 6.85 per cent at its peak in 2007. This suggests COFDI's contribution of 0.045 per cent to per capita income growth in Africa over this three year period. Arguably such a positive association between COFDI and income growth in the African countries may be due to the price increase in raw

materials that occurred during the same period. Since we have controlled for the share of agriculture and natural resources rents in the model, the identification problem that may arise due to the rising commodity prices should have been reduced to a great extent. Another important driver of economic growth in Africa is human capital accumulation, measured by the percentage of secondary school enrolment in total population. The estimated coefficient of the total fixed capital formation variable is insignificant. This suggests that domestic investment has not played a significant role in African economic growth largely because Africa is still lacking of investment for economic growth.

In Asia (not including Hong Kong, Macao and Taiwan), although the estimated coefficient of the two-year lagged COFDI variable bears a positive sign, it is only statistically significant in the 2SLS model. This may be due to the market-seeking nature of most of the Chinese OFDI in this region and a relatively weaker complementarity between the Chinese MNEs and the host Asian economies over the sample period. The estimated coefficient of the secondary school education variable bears the expected positive sign, and is statistically significant in the 2SLS model. The factor that shows a significant effect on per capita income growth in Asia over the sample period is fixed capital formation which is mainly driven by domestic investment. This result is consistent with the arguments of Krugman (1994) and Young (1992) that the growth in East Asia is mainly driven by capital accumulation.

The effect of the Chinese OFDI on the growth of the countries in Latin America is not significant in either of the 2SLS model specifications. Only the estimated coefficient of the one-year lagged COFDI variable is statistically significant at the five per cent level in the base model estimated using FE method while the rest relevant coefficients remain insignificant. This is probably due to the relatively low complementarity between the Chinese MNE and the middle income countries in this region and a high concentration of COFDI in the resource sector in these countries. Similar to Asia, fixed capital formation appears to be the main driver of economic growth in these countries over the sample period. Different from results in Asia and Africa, secondary school enrolment ratio does not appear to have a

significant effect on growth in this region, probably due to the lack of variation in this variable across countries in this region.

[Insert Table 5 here]

(d) Chinese direct investment in resource-rich economies

The impact of COFDI on resource rich economies is much contested, given the debate on the resource-seeking nature of Chinese OFDI and its negative effect on the host economies. The debate on the “resource curse” hypothesis has already attracted a substantial literature. The quality of institutions has been identified as one of the important factors that moderates the effect of resource abundance. Even so, it is worthwhile investigating whether Chinese OFDI is different from traditional FDI and also from investment in general. We proxy resource abundance of a country using the total natural resource rents as percentage of GDP, and include this variable and the interaction term of resource abundance and Chinese OFDI into the regression. Figure 4 shows the estimated effects in the short and long run. Regression results are reported in Table 6. As Figure 4 indicates, in the short run, Chinese OFDI shows a greater growth-enhancing effect in resource rich countries than that in non-resource rich countries. However, in the long run, Chinese OFDI going to non-resource rich countries appears to have a greater impact on long run economic growth than in the resource-rich countries.

[Insert Figure 4 here]

[Insert Table 6 here]

5. Conclusions and discussions

The impact of MNEs on the host country is an important aspect of development studies. This paper contributes to the debate on the impact of developing country MNEs on host economies by analysing the growth impact of the Chinese OFDI on host countries using a cross country panel dataset for 97 developing countries over the 2004-2010 period. First, findings from the research suggest that Chinese

OFDI in developing countries has a positive and significant impact on their long run economic growth. After a certain time to build up the production capacity, with a two-year lag as found in this research, the Chinese OFDI has started to show a significant contribution to host country economic growth, especially in Africa. However, in the short run, there is a negative association between Chinese OFDI and the current economic growth of the host country. Although this result sounds self-contradictory at the outset, it does in fact shed important light on the determinants and impact of the Chinese OFDI. As Mudambi (2008) and Buckley (2009) suggest, the international expansion of Chinese MNEs is intended to acquire resources and competences for catch-up through direct investment abroad in activities at the upstream and downstream ends of the value chain. As a latecomer in the world of MNEs, entry is often affected by political differences between China and some of the major host or investing country governments and so Chinese MNEs often choose to (or have to) invest in countries with poor growth performance where the traditional MNEs normally do not want to invest (Brautigam, 2009). This explains the contemporaneous negative association between the proportion of Chinese OFDI in total FDI and the income growth of the host country. However, given the factors that we discussed earlier in terms of development financing, knowledge spillover, and competition effects, the real growth impact of Chinese OFDI on host economies needs some time to take effects. These effects are in fact positive and significant in the long run. This finding adds to the ongoing debate on the impact of Chinese MNEs by adding systematically analysed empirical evidence based on a large database.

Second, the evidence from empirical tests support our hypotheses of a differentiated growth impact of Chinese OFDI based on the multi-dimensional complementarity between Chinese OFDI and host country conditions at a given time. Chinese OFDI has not only contributed positively to economic growth in Africa but also in Asia over the sample period, though the degree of significance is less in Asia. However, its contribution in Latin America is insignificant. The impact of FDI, no matter from developed or developing countries, depends on the overall compatibility of that FDI and the host economy in terms of financing, knowledge, resources and the status of competition. This finding supplements the previous literature on the different developmental effects of FDI from different country

sources, for example, the Kojima Hypothesis which approaches the problem from a trade complements or substitutes perspective.

The reason why the complementarities in several major production inputs are important is that economies are often constrained by the lack of one or a few inputs for production. Without the presence of other necessary productive factors, even a country is abundant in one of these factors, e.g., labour or land or resources, they cannot create effective productive capacity. As argued by Fu and Balasubramanyam (2005), capital, technology, managerial skills and marketing networks brought about by FDI can turn the previously idle labour and resources into effective productive capacity. The lack of one or several of such growth divers can significantly hinder economic growth. Therefore, for host country government and MNEs, taking these complementarities into greater consideration enables more positive growth outcomes. Of course, complementarities are time-specific, relative to a particular stage of development. As conditions in the host country evolve, (capabilities upgrade, macroeconomic environment changes), the extent of complementarity will change. Hence the growth effects of an MNE on the growth of a given host country will also change.

Thirdly, a careful analysis of the sector distribution of Chinese OFDI indicates that the representation of Chinese FDI as mainly resource-seeking is exaggerated. MNEs in extractive industries can contribute to income growth in the host countries through direct government income or rents from the MNEs' participation in the value chain, or through indirect linkage effect. However, such indirect linkage effects and the spillover effects are found to be weak in these industries (UNCTAD, 2007). Will Chinese OFDI make a difference? Our evidence suggests that, although in the short run the Chinese OFDI leads to an immediate fast growth in resource rich countries, in the long run the growth effect of the Chinese OFDI is smaller in these resource rich countries than that in non-resource rich countries. So, in this respect, the effect of Chinese OFDI is similar to traditional FDI from developed countries.

Findings from this research have important policy implications. First, evidence from this research attests to the long run benefits of the Chinese OFDI on host economies. Therefore, despite the different and sometimes negative views regarding the effect of Chinese OFDI, host country governments should encourage and engage with the Chinese OFDI instead of restricting it. Secondly, middle income countries that share a similar economic and technological development level with to China should work on effective strategies to benefit from Chinese OFDI. For Asian economies, policies should address how to encourage the Chinese OFDI into the sectors that have the greatest complementarities with Chinese OFDI and discourage pure market seeking Chinese OFDI. In Latin American economies, it is important to diversify Chinese OFDI from the resources sector to other sectors that are the priorities for long run economic growth and industrialisation. Finally, it has become an important task for both China (including government and the MNEs) and the host country governments to find effective ways to help resource rich economies to sustain economic growth in the long run, through environmentally friendly production activities and activities that build up local production capabilities for industrial diversification. For these countries themselves, great efforts should be made to improve the quality of institutions and to reinvest the revenues of resource rents to areas such as education and infrastructure, which are important keys to the promotion of long term growth.

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