An industry-based view of FDI – exploring the motivations for Chinese OFDI in Europe across industries

Abstract

Although research on the stimulants for Foreign Direct Investment (FDI) is extensive, analyses of FDI which differentiate between different motivations is limited. Rather, most research on the determinants of FDI explores the aggregate level. In this paper, we take a more disaggregated approach, which takes account of the heterogeneity, not only in FDI motivation, but across industry sectors in both source and host country. By using logistic and multinomial logistic models, our analysis confirms that the motivation for an investment is a key factor explaining location choice, as several key characteristics of the source and host countries and their industrial sectors interact differently, depending on the motivation of the investment. This confirms one of the key points of this paper: that exploring FDI in aggregate terms obscures important differences *within* FDI flows.

INTRODUCTION

Research on the stimulants for Foreign Direct Investment (FDI) is extensive, as the question of why companies accept the increased risk associated with overseas investment has long fascinated scholars. Yet several important aspects of the phenomenon remain underexplored. In early work, Dunning (1993) highlighted that a variety of motivations underlie FDI. Yet analyses which differentiates between these different motivations when exploring FDI is limited (Franco, Rentocchini and Vittucci Marzetti, 2010; He, Xie and Zhu, 2015; Makino, Lau and Yeh, 2002; Zhang and Roelfsema, 2013). Most research on the determinants of FDI looks at aggregate figures – which include investments with quite different underlying motivations. The fact that results of such empirical research are sometimes conflictual may be due, in part, to a failure to take account of this heterogeneity in the motivations for FDI (Franco et al. 2010). In this paper, we consciously account for FDI heterogeneity and highlight how different investment motivations interact with the industry characteristics of both source and host country.

In terms of the theoretical underpinnings of FDI research, while resource based and institution based views (Peng, Wang and Jiang, 2008; Gaur, Ma and Ding, 2018) have been the dominant framework for analysis, several authors refer to an 'industry-based view' approach to FDI. Indeed, this was already the basis for one side of the 'strategy tripod' proposed by Peng et al. (2008). Yet, this view has never been intensively operationalized. Rather, we observe a lack of attention to sectoral differences between industries in studies of FDI. Although services and manufacturing are sometimes distinguished, or analyzed separately (Li and Guisinger, 1992; Makino et al, 2002), all manufacturing sectors tend to be aggregated (e.g. You and Solomon, 2015, Makino et al, 2002), or industrial sectors are relegated to control dummies, or robustness checks, with no in-depth exploration (Shi et al, 2017; Gaur et al. 2018; Wang et al. 2012). This is curious, as large variations could be expected in the importance of different factors of production, not least technology, to different sectors. We believe that, given that push and pull factors are likely to vary across industries, when analyzing the determinants of FDI, it is important to differentiate adequately between

different manufacturing sectors. Although industry-level factors have occasionally been included in analyses of FDI adopting a multi-level approach (usually firm-industry-country) (e.g. Pak and Park, 2005; Wang et al. 2012), they have rarely been explored in depth.

This paper seeks to address this gap in the literature by exploring the interaction between industry-level characteristics in source and host countries and the motivations of Chinese Outward FDI (OFDI), focusing on the EU. Our objective is to highlight how the different motivations for OFDI interact with local industrial characteristics. In so doing, we draw attention to the pertinence of the industry-based view of OFDI. Furthermore, we contribute to the broader debate on OFDI by shedding light on the importance of the heterogeneity of motivations and industrial sectors across economies in explaining investment choices.

We make two key contributions to IB research. Firstly, we confirm that, as a result of the interactions between motivation and host country industry characteristics, the motivation for OFDI is a key factor explaining location choice. This finding is perfectly consistent with theory (Dunning, 1993) and yet has been rather under-acknowledged in analyses of OFDI. In aggregating all FDI, analyses risk erroneous findings, due to the important differences in location choice which are likely to emerge directly from the 'why' of investment. Secondly, we find that certain characteristics of the industrial sector, in both the host and source countries, encourage different types of FDI. For example, we find that higher sectoral productivity in the source country encourages OFDI that is more R&D-oriented, while higher investment levels, encourage OFDI which is more manufacturing-oriented. These findings suggest that the characteristics of the sectoral area of activity have important impacts on the nature of the OFDI undertaken by its constituent firms. Recent analyses have tended to focus overwhelmingly on the two other approaches in the 'strategy tripod' - the institution-based and resource-based views (Gaur, Kumar and Singh, 2014; Shi et al. 2017; Gaur et al. 2018). Our findings suggest that industry-based analyses can also inform our understanding of the complex interactions between source and host contexts and OFDI decision-making.

This paper is structured as follows. We firstly explore the key theoretical approaches to FDI, especially that from China and highlight the potential of the 'industry-based' view in this context. We then summarize the key insights, as well as inconsistences, which emerge from existing empirical analysis of aggregate FDI from China and into the EU. Drawing on work exploring FDI motivation and sectoral factors impacting on FDI, we propose a series of hypotheses on the interactions which we seek to explore. We then present our data and methodology and the results of our analysis. We close the paper by recalling the key conclusions which emerge from this work and the research avenues which they suggest for further work, while highlighting some research limitations.

THEORY AND HYPOTHESES DEVELOPMENT

Theoretical approaches to analyzing Chinese OFDI

The literature on FDI is vast, thus in this brief paper we will focus on the most pertinent studies which inform our understanding of Chinese OFDI. Although it is a relatively recent phenomenon, there is a burgeoning literature on the subject, which, by virtue of its contemporary nature, is often on the leading

edge of integrated approaches to understanding OFDI more generally. Until the late 90s, Chinese OFDI was virtually nonexistent, but between 1999-2001 and 2002-2003, its worldwide OFDI stock almost tripled (Buckley et. al. 2007) and it has continued to grow rapidly since. This growth led to increasing academic interest. Yet there are still many unanswered questions about this emerging phenomenon, especially the extent to which it can be explained by existing theories of FDI, or requires new theoretical lenses and/or empirical approaches (Ramamurti and Hillemann, 2018).

In terms of the theoretical lens through which Chinese OFDI (and FDI in general) has been analysed, researchers have taken a variety of approaches. Some authors have argued that the widely accepted theories and models used to interpret firms' internationalization patters fail to comprehensively explain the Chinese case (Alon, Child, Li, & McIntyre, 2011; Deng, 2012). This is why China-specific (or more broadly emerging-market) theories, have been developed to better explain the specific "how and why" of Chinese firms' internationalization (Alon et al., 2011; Ramamurti & Hillemann, 2018). The resource based view (Buckley et al., 2007; Ramamurti, 2009) and the institution based view (Zeng & Williamson, 2003; Rugman & Oh, 2008; Luo et al., 2010) are the literatures most commonly used to ground studies on Chinese OFDI.

Several scholars have sought to merge these different theoretical approaches, most notably Peng et al. (2008) with their 'strategy tripod' i.e. resource-based, institution-based and industry based views. In the context of this paper, the most pertinent is the latter, which Cui and Jiang (2010) explain thus*: 'From an industry-based view, each industry's unique competitive pressure is likely to result in different levels of globalization, which in turn affects the strategies firms utilize in these industries.' (op.cit. 754).* Jain, Kothari and Kumar (2016) also attempted to bring together these diverse theoretical approaches to FDI. Their work proposes a two-step approach, where one set of factors impacts on the choice of a firm to undertake FDI and a second set of factors determine location choice. The importance they attach to industry characteristics in the first step is coherent with our hypotheses that these factors have important impacts. However, no industry specific factors are proposed to impact location choice at host country level, while we believe that such interactions are crucial.

In this paper, we further develop this 'industry-based view' by proposing that a broad range of industry-level factors in both source and host country are important to FDI choices and, in particular, that they impact on different types of FDI differently. In developing our hypotheses below, we build on existing analyses which shed light on these relationships. We find that, although various industry level characteristics have been integrated into existing analysis of the determinants of FDI, much research ignores the inherent differences between industries. Furthermore, the research which does take the industry level into account, often focuses on a very limited set of relationships and impacts.

Studies on aggregate Chinese OFDI and EU Inward FDI (IFDI)

One of the earliest in-depth analysis of the motivations for Chinese OFDI was that of Buckley et. al. (2007). Analysing OFDI flows by destination over the period 1984-2001, they found that poor institutions, high GDP, high trade levels and cultural proximity were associated with increased Chinese OFDI. Strategic asset seeking (proxied by total patent registrations) was not a key motivation for OFDI. Later work by Zhang and Daly (2011) explored flows from 2003–2009. They also found that China's OFDI was attracted to countries

with a strong trading relationship with China – specifically high volumes of Chinese exports to the partner country - economic wealth (GDP/capita) and growth. Other important pull factors, were openness of economic regime and resources. Kolstad and Wiig (2012) confirmed the importance of large markets to encouraging OFDI, as well as the attraction of countries with a combination of extensive natural resources and poor institutions

Thus, early research on Chinese OFDI has tended to look at aggregate figures, with little attention to industry level differences. Our reading of the literature is that the industry-based view has been little explored in studies of OFDI, including Chinese OFDI. An early exception was Pak and Park's (2005) analysis of Japanese OFDI, which identified oligopolistic structures and research intensity as impacting on OFDI choices. More recent exceptions, on Chinese OFDI, are Yang et al. (2009), Wang et al. (2012), Lu, Liu and Wang (2011) and Gaur, Ma and Ding (2018), who develop hypotheses from resource-based, institutional and industry-based theoretical constructs (the latter two in the case of Gaur et al (2018)). Their work highlights the importance of factors at all these levels. Yet the industry level factors tend to be quite limited and restricted to level of competition from domestic industry (Yang et al. 2009; Lu et al. 2011; Wang et al. 2012; Gaur et al. 2018) and from abroad (Yang et al. 2009; Wang et al. 2012; Gaur et al, 2018), technology level of the industry (Lu et al. 2011; Wang et al. 2012) and lack of access to technology and human resources (Gaur et al. 2018). This paper seeks to build on this work by highlighting the interactions between a wider range of sectoral characteristics and FDI motivation.

In terms of IFDI into the EU, there have been several analyses of the determinants of FDI location in both the EU as a whole and its key members. Examples include Scaperlanda and Balough (1983), who find market size and growth to be key determinants for US investors, Barrel and Pain (1999) who identified labor costs as a key factor, Ford and Strange (1999), who find GDP/capita, local industry output, educational attainment and English language ability had significantly positive effects, while wage levels, unionization and local industry productivity had negative effects. Since the EU enlarged in the mid-2000s from 15 to 25, and now 28 (soon to be 27) members, there have been several studies exploring FDI to the 'new' member states, most of which are in Central and Eastern Europe (CEEC). These studies have highlighted the positive impact of classic factors including size of the economy (Carstensen and Toubal, 2004; Janicki and Wunnava, 2004; Rasciute and Pentecost 2010), country risk (Janicki and Wunnava, 2004), labor cost differential between source and host countries (Carstensen and Toubal, 2004; Janicki and Wunnava, 2004; Rasciute and Pentecost, 2010) and openness to trade (Janicki and Wunnava, 2004). The most recent of these studies, by Rasciute and Pentecost (2010), underlined that firm level factors have important mitigating effects. They conclude: *'…country, industry and firm-level factors simultaneously determine the firm level investment location decision.*' (op.cit. :39). Thus, the stimulating factors for EU IFDI tend to conform to 'classic' factors found in other studies, although there are some differences across countries.

The mediating role of FDI motivations

As highlighted above, firms invest in foreign countries for a variety of reasons. Dunning (1993) defined four key motivations of FDI – Market seeking, efficiency seeking, resource seeking and strategic asset-seeking. Depending on their motivation, one would expect different factors to be considered by investors. For

example, one would expect that companies which are seeking new markets, would be attracted by different host country attributes to those seeking more efficient production networks, or high-tech knowledge. However, as Franco et al. (2010) point out, much research on FDI disregards this important framing factor. Their work highlights the importance of taking underlying motivation into account when analyzing FDI. Indeed, they consider that failure to do so has been a key reason behind the sometimes conflictual findings of different studies on the stimulating factors for FDI. Illuminating this factor is a key motivation for our analysis.

Franco et al. (2010) was a conceptual study. One of the few empirical analyses which did differentiate between different motivations of FDI was by Makino et al. (2002). They focused on investment by Newly Industrialized Economies (NIE). Their work was based on the simple, yet underexplored fact that we also highlight: '*…the firms' motivation directly influences its location decision…*' (op.cit. 408). Their analysis differentiated between asset exploiting FDI (where firms seek to exploit their existing assets) and asset-seeking FDI (where the motivation is to develop or acquire assets). Their results, that technology- and market- seeking motivations are more strongly associated with developed countries while labor-seeking is more associated with developing countries were interesting, if rather intuitive.

Several analyses have differentiated between motives of Chinese OFDI. Zhang and Roelfsema (2013) mainly explore the dynamics of these motivations over time, however, they also differentiate between different types of host country – specifically less advanced and advanced economies. They find that Chinese FDI to the former is mainly motivated by a desire to exploit regional markets and secure natural resources, whereas, in the latter, motivations were more related to exploiting network linkages and acquiring strategic resources. Lu et al. (2010) explore the interaction between motives and firm, industry and institutional factors. They conclude that the key industry factors which impact on motives of OFDI are level of competition, which encourages market-seeking OFDI and R&D intensity, which encourages strategic asset seeking OFDI. Lv and Spigarelli (2015) analyse the factors behind the flow of Chinese investments in the EU renewable energy sector and found distinct differences in the favored destination countries, depending on the motivations for investment*: 'Market-seeking investors tend to enter countries with both well-developed institutional environment and industry development base. R&D-oriented investments are more likely to flow to countries with well-developed institutional environment.*' (op.cit.: 14).

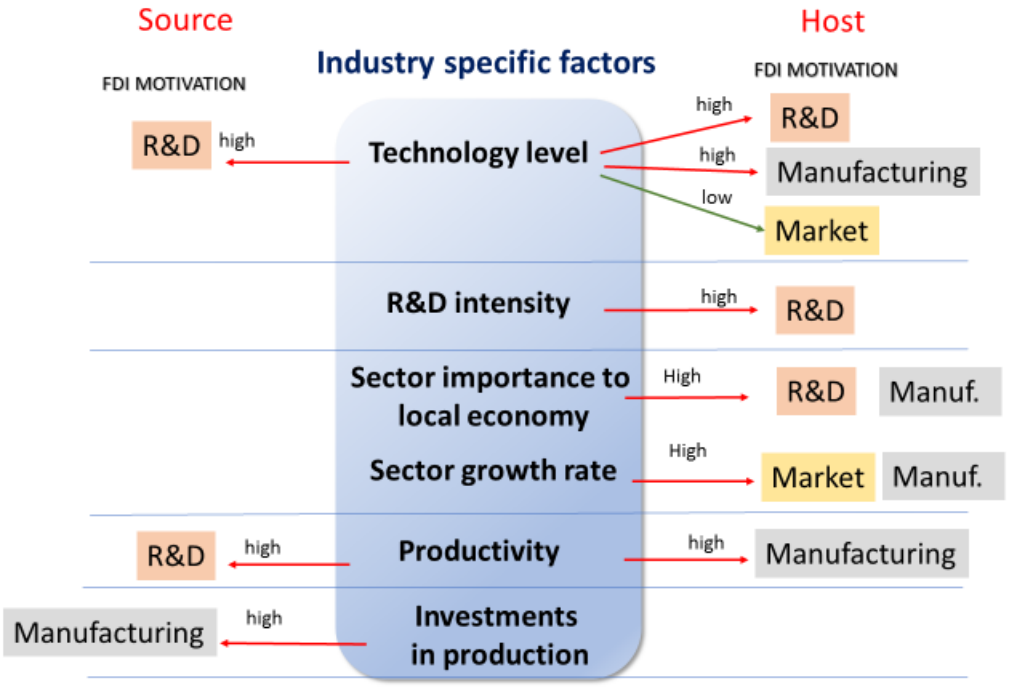
Thus, research indicates that different types of OFDI are encouraged by different country and industry level characteristics. In this paper, we seek to incorporate this observation explicitly by differentiating by the investment motivation in our analysis of the interactions between OFDI and source and host country characteristics.

The mediating role of sectoral specificities

In addition to differences related to the motivating factors behind FDI, explaining aggregate flows of OFDI to a given country is also complicated by the very different push and pull factors which exist at industry level. The sector of activity seems very likely to impact on investment decisions, indeed that is the basis the industry-based view of FDI proposed in the 'strategy tripod' of explanatory factors (Peng et al. 2008;

Cui and Jiang, 2010). Yet, as discussed above, there is a dearth of studies that explore Chinese OFDI (and indeed FDI in general) across different types of industries. Given that there are huge differences in the likely 'pull' factors of local resources and capacity between sectors as diverse as automobiles and clothing, the aggregation of all manufacturing sectors in research seeking to deconstruct the motivations and/or stimulants of investments seems, to us, to be problematic. Several sectoral characteristics could be expected to impact on the extent and nature of FDI, which could be integrated into an industry-based view of FDI. Figure 1 proposes a series of interactions with the factors which we will integrate into this research, explained in more detail below.

Figure 1 An industry-based view of FDI



Firstly, the technological level of the industry (which is linked to its R&D intensity (OECD, 2013)) has been shown to impact on the OFDI activity of firms (Lu et al. 2010; Wang et al. 2012). The impact of host *country* technological capacity on Chinese OFDI has been explored by several authors. Ramasamy, Yeung and Laforet, (2012) found technological capacity to be negatively correlated with Chinese OFDI, although He, Xie and Zhu (2015), working on a later dataset, found, it to be positively correlated. The failure to find a consistent relationship between R&D intensity and OFDI in aggregate figures may be related to the fact that, as outlined above, research-intensive companies are likely to engage in different *types* of OFDI to other companies (Lu et al., 2011). Zhang and Roelfsema (2013) find that the importance of technological level to Chinese OFDI varies by type of country (with it being important in developed countries) and over time (it has been more important in more recent years). The importance of host country technological level to Chinese OFDI has therefore been found to be variable and may be changing over time.

Most existing analyses explore technological capacity in the overall economy. However, technological capacity has differing impacts depending on both the motivation of investment and the type of industry. We propose that existing analysis suggests that high tech sectors are more likely to seek strategic assets in developed countries like the EU (Makino et al. 2002; Lu et al. 2011). Thus, they are more likely to invest in R&D and manufacturing. We explore the interaction between the technology level of the industry and FDI motivation through the following hypotheses:

H1a: Higher technology sectors are more likely to attract R&D and manufacturing FDI, while lower technology sectors are more likely to attract market seeking FDI.

H1b: Firms in industries with higher R&D intensity in the source country will be more likely to engage in R&D activities abroad.

H1c: Host industries with higher R&D intensity are more likely to attract R&D oriented investments.

In addition to technological capacity, industries also vary across other important characteristics, like productivity, investment and importance to the local economy. As with sectoral differentiation, these latter factors have been little studied in FDI research. The exception is productivity, which has attracted a lot of study, but this research is almost entirely focused on the impacts of FDI on productivity (in the host and source countries) (e.g. Lipsey, 2002; Gorodnichenko, Svejnar and Terrell, 2014; Knoerich, 2017). What interests us here is the inverse – how productivity in the industries of both host and source countries interacts with FDI motivation. This interaction has been very little studied.

The results of research on the spillover effects of IFDI on host country productivity are ambiguous (Gorodnichenko et al. 2014). This ambiguity may be linked to the heterogeneity of FDI and, especially, to the differing productivity effects of different kinds of FDI. For example, Driffield and Love (2007) explored the spillover effects of FDI into the UK and found that they were only positive where the investing company had strong technology ownership advantages, while Gorodnichenko et al. (2014) find that 'backward linkages' from foreign companies to local suppliers showed positive effects on efficiency, but horizontal or forward linkages to foreign firms had no significant effect.

In spite of extensive research on the impact of FDI on host country productivity, the impact of the latter on inflows of FDI has been much less studied. One exceptions is the work of Zhang (2002), which finds a bidirectional relationship, in that productivity both encouraged IFDI and was increased by it. In other words, higher host country productivity was both a motivator and a result of IFDI into China. Early work by Cushman (1987) explored the impact of host country productivity on US FDI, finding it to be positive. Indeed, it was the most important variable explaining changes in US and foreign FDI stocks from 1963-1982. In spite of this work, little research since then has explored the linkage. Exceptions are Ford and Strange (1999) exploring Japanese OFDI in Europe and Bellak, Leibrecht and Riedl (2008) exploring IFDI into CEEC countries. The former found that host country productivity reduced FDI, while the latter found the opposite. Ford and Strange (1999) postulate that their finding may indicate that Japanese businesses favour low productivity areas, as there is low local competition and potential government incentives, while they anticipate being able to secure large increases in productivity through transfer of technology and

modern production practices from the source country. It seems unlikely that Chinese businesses could anticipate similar post-investment upgrading, thus we anticipate that productivity will be more of a driver for manufacturing FDI than the opposite. This productivity effect would be expected to be most significant in productive (manufacturing) activities, thus we propose the following hypothesis:

H2a: Host industries with higher labor productivity are more likely to attract manufacturing oriented investments.

In terms of the interactions between FDI and productivity in the source country, this relationship has been less intensively studied than for the host country. The main research interest in terms of the interactions between OFDI and the home economy has been in terms of (potentially negative) effects on exports and jobs (Lipsey, 2002). Those studies which have addressed potential links to productivity in the source country have tended to indicate that OFDI has positive impacts (Hijzen, Inui and Todo 2007; You and Solomon, 2015). However, the type of FDI and the nature of the industry have been found to have an impact (Hayakawa, Matsuura and Motohashi, 2016; Imbriani, Pittiglio and Reganati, 2011; You and Solomon, 2015).

Several studies have explicitly explored whether there are variations in the relationship between OFDI and productivity in the source country depending on FDI motivation, although the direction of impacts is the opposite to that explored in our study. For example, Driffield and Love (2006) explored the relationship between the motivation for FDI and productivity. Specifically, they differentiate between FDI aimed at technology-exploitation and FDI for technology-sourcing. The former is found to have positive effects on productivity in the source country, whereas the latter has negative effects. Hsu et al. (2011) explore the impact of OFDI on productivity in Chinese Taipei. They find no overall effect, although when they differentiated between host countries, they found that OFDI in countries other than China increased productivity in the source country. Thus, research indicates that strategic asset seeking OFDI has positive impacts on productivity in the home economy, but we have identified little substantial research exploring whether source country productivity impacts on either OFDI itself, or its motivation. The exception is the work of Herzer (2011) on the productivity effects of IFDI on developing countries. He draws on theoretical work on firm-level heterogeneity which highlights that only the most productive firms invest abroad. As he notes *'…a macroeconomic implication of heterogeneous-firm models is that the aggregate amount of outward FDI should increase as total factor productivity increases.*' (op.cit: 775-6). His research confirms this effect and thus highlights a bi-directional relationship between, such that: *'…increased productivity is both a consequence and a cause of increased outward FDI.'* (op.cit.: 767).

Although Herzer's work stresses the importance of different motivations to post-entry effects on source country productivity, he does not postulate on the interactions between source country pre-entry productivity and FDI motivation. It seems likely that productive industries would be less interested in efficiency seeking investments and more motivated by market and strategic asset seeking. We therefore postulate that industries with higher productivity at home may be more likely to engage in market seeking and knowledge seeking, through R&D investments.

H2b: Firms operating in industries with higher labor productivity in the source country will be more likely to engage in marketing and R&D activities abroad.

In terms of analysis of the interaction between source and host country investment and FDI, there is much less research. What exists tends to explore how FDI effects *host* country investment, specifically, whether IFDI crowds-out domestic investment (Kamaly, 2014; Rath and Bal, 2014). Results on this question are ambiguous and seem to depend on the country in question (Kamaly, 2014). A rare study on the effects of OFDI on investment in the source country, which also accounted for different FDI motivations, is Hejazi and Pauly's (2003) study in Canada. They found that OFDI to the UK and US (which were assumed to be more market seeking, or production sharing related), had positive impacts on domestic investment, while that to other destinations (which were assumed to be related to efficiency seeking production) had negative impacts. We have not been able to identify studies which explore the relationship between pre-entry investment levels in the source country and OFDI, although high levels of domestic investment could be expected to impact on both the decision to invest abroad and the type of investment which is undertaken. As with productivity effects, existing research does not suggest a clear interaction between domestic investment and FDI motivation. One possibility, highlighted by Leonidou et. al. (2007), could be that high levels of domestic investment would encourage firms to seek new markets in order to exploit their capacity to the full and secure economies of scale. Thus, high investment levels in the source country would be expected to be associated with marketing oriented OFDI.

H3: Firms in industries with higher investment in production in the source country will be more likely to engage in investment in marketing activities abroad.

With respect to the industry-level competitiveness of the host country, we consider the importance of an industry to the economy and its growth rate to be potentially important determinants on investment motivations of OFDI, as they reflect the level of accumulated knowledge and the stage of the industry life cycle. Firstly, an industry which represents a high share of manufacturing in the local economy seems likely to be an industry at a more mature stage of development, with high levels of competition, but extensive knowledge. There has been some research on the effect of competition in the source country on OFDI, but little exploring competition in *host* countries. Industries in which are important to the local economy are likely, not just to be very competitive, but to have strategic assets of interest to less mature 'infant' industries, such as those in China (Ramamurti and Hilleman, 2018). For such mature and sophisticated industries in the host country, it seems likely that the market will be less of a draw than the accumulated knowledge. Thus, firms investing in industries of this kind seem likely to be more motivated by technology or manufacturing know-how in the host country than sales or marketing factors.

H4a: Industries which represent a high share of total manufacturing in the host country attract R&D and manufacturing oriented investments.

On the other hand, an industry with a higher growth rate is likely to be at a fast-growing stage, indicating lower levels of accumulated knowledge and technology but interesting market opportunities. At the same time fast growing industries may require actors to be close to the market, in order to react quickly to

emerging trends. This may encourage Chinese firms to invest in manufacturing or marketing activities, rather than more long term research oriented investments.

H4b**:** Host industries with higher growth rates will attract more marketing or manufacturing oriented investments.

METHODOLOGY

Data and Samples

Our research target is all Chinese manufacturing firms with foreign subsidiaries in the EU. The analysis is based on industry-level data from the National Bureau of Statistics of China (NBSC) and Statistical Office of the European Communities (Eurostat). Our firm-level data comes from Ministry of Commerce of China (MofCom), covering both greenfield and non-greenfield (e.g. M&A, joint venture) investments. The starting sample included 1,199 investments by Chinese manufacturing firms in the EU from 2002 to 2015. However, as industry-level data for some host countries was missing, the final sample includes 794 investments over the period from 2006 to 2015.

Although our database is longitudinal, covering investment over a ten-year period, the analysis in this study is cross-sectional rather than panel[1]. Existing research in the field of international business and FDI have applied similar discrete choice models. For example, Disdier and Mayer (2004) analysed FDI from French companies into Western and Eastern European destinations using the conditional logit model and nested logit model. Kheder and Zugravu (2012) tested a conditional logit model using French firm-level data from 1996 to 2002, while Rasciute and Pentecost (2010) applied the Nested logit model to a three-level dataset to examine the factors explaining foreign investment location decisions into 13 CEECs.

Dependent variable

In line with the objectives of this study, the dependent variable is a firm's motivation for OFDI. Within the database, firms can declare three motivations: manufacturing, marketing and R&D. These motivations are not exclusive i.e. a company can declare its investment to cover more than one category (for example, R&D and manufacturing).

In our empirical analysis, we represent the three types of motivation with three dummy variables which are labeled as 1 when the OFDI record belongs to that specific category and 0 otherwise. The coverage of each motivation is shown in Table 1. The number of observations of firms without marketing motivation is quite low and thus this category is to some extent underrepresented. This could hinder the significance of relevant empirical results. As explained below, we undertake some further adjustment in the following sections to address this issue.

Table 1. The three dependent variables

[1] The data of home and host country variables is one year lag of the investment. For example, if the investment occurs in 2010, we use the data of home and host country variables in 2009.

Dependent variables	Dummy	Number	Percentage (%)
Manufacturing	0	409	51.5%
	1	385	48.5%
Marketing	0	52	6.5%
	1	742	93.5%
R&D	0	538	67.8%
	1	256	32.2%
Total		794	100.0%

In terms of dynamics over time, the motivation of Chinese OFDI in EU manufacturing sectors has evolved to some extent. The proportion of companies indicating a marketing motivation has declined from nearly 70% in 2006 to less than 50% in 2015. At the same time, the share of the other two motivations (i.e., manufacturing and R&D) have both increased. This is especially the case for R&D, which rose from 9% to 21%.

Independent variables (industry-level factors)

Our theoretical framework emphasizes the impact of industry-level factors on the investment motivation of Chinese firms. In our analysis manufacturing is sub-divided into 18 NACE sectors. For the independent variables for this study, in line with our hypotheses, we selected measures reflecting the industrial competitiveness of the source and host countries. Regarding source country factors, labor productivity is usually represented by value added (VA) divided by total employment in the specific industry sector (Source_VAbyEmp). However, given that data availability of VA is poor in China, we chose to use the revenue from core business divided by total employment (Source_REbyEmp) as a proxy for sector level labor productivity. Comparing the limited available data of VA with the value of revenue from core business we find the two to be very similar, supporting the use of the latter as proxy. Similarly, to measure the evolution of sectoral productivity performance over time, we include the variable growth rate of revenue from core business divided by total employment in the sector (Source_REGrowthbyEmp). To capture the investment in the sector, we use investment in fixed assets divided by sectoral employment (Source_InvestByEmp). Finally, to capture R&D intensity we use the sectoral expenditure on R&D divided by the revenue from core business (Source_RDexpendByRE).

In terms of host country factors, we include the ratio of VA of the sector to total manufacturing GDP i.e. its relative weight in manufacturing (Host_VAweight), to measure its importance in the productive economy. To capture growth, we use the growth rate of sectoral VA (Host_VAGrowth). As for the source country, industry level labor productivity is operationalized as VA divided by employment in the specific

industry sector (Host_VAbyEmp). Finally, the industry-level R&D intensity of host countries is measured by business enterprise R&D expenditure (BERD) of the sector divided by its' VA (Host_RDexpendbyVA). [2]

Control Variables

In addition to the industry-level characteristics, we also incorporated several control variables. In order to assess the impact of different sectoral technological intensities on the investment motivation by Chinese firms, we classify manufacturing industries into four categories based on the OECD's classification i.e. high-technology, medium-high-technology, medium-low-technology and low-technology. On this basis, we created four dummy variables which are equal to 1 if the OFDI is in that category and 0 otherwise.

As indicated in the above literature review, the size of the market and its growth rate are consistently found to be important motivators for FDI. We control for the market effect on Chinese OFDI by including host country GDP as a measure of market size and GDP per capita as a measure of market affluence. Furthermore, previous studies indicate that FDI is attracted to areas where other firms are already clustered because of the positive effect of knowledge spillover, although they may also avoid these areas because of increased competitive pressure (Disdier and Mayer, 2004). We control the effect of agglomeration defined as the cumulated number of Chinese investments in all manufacturing located in the same host country in the year before the new OFDI occurs (consistent with Disdier and Mayer, 2004).

The measurements of all variables and data sources are listed in more detail in Table 2. Table 3 shows the correlations of the variables used in our analysis. Their variance inflation factors are further tested to be below 10, indicating our data does not show serious multicollinearity.

Table 2. Variables and data sources

Variables	Measurement	Data sources
Dependent variables		
Motivation in logistic regressions	1=the specific motivation, 0=otherwise	Ministry of Commerce
Motivation in multinomial logistic regression	1= manufacturing oriented, 2=marketing oriented, 3=R&D oriented	Ministry of Commerce
Independent variables		
Industrial competitiveness of source country		
Sectoral labor productivity	The revenue from core business divided by total industry employment (Source_REbyEmp)	China Statistical Yearbook
Evolution of sectoral productivity performance	Growth rate of the revenue from core business divided by total industry employment (Source_REGrowthbyEmp)	China Statistical Yearbook

[2] The definition of Host_RDexpend is different with Home_RDexpend in that the indicator VA is applied here rather than the revenue from core business due to the limitation of data availability in the home country side. In Eurostat, VA is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.

Propensity of individual firms to invest in the sector	Investment in fixed assets divided by total employment (Source_InvestByEmp)	China Statistical Yearbook
Industry R&D intensity	Sectoral expenditure on R&D divided by the revenue from core business (Source_RDexpend)	China Statistical Yearbook
Industrial competitiveness of host country		
Importance of Industry in the economy	Percentage of VA in total manufacturing GDP (Host_VAweight)	Eurostat
Evolution of the total VA of the sector	Growth rate of sector VA (Host_VAGrowth)	Eurostat
Sectoral labor productivity	VA divided by total employment in the specific industry (Host_VAbyEmp)	Eurostat
Industry R&D intensity	Business enterprise R&D expenditure (BERD) divided by VA of the sector (Host_RDexpend)	Eurostat
Control variables		
Industry category	1=belonging to the category, 0=otherwise	Ministry of Commerce
Market size	Log of GDP	Eurostat
Market affluence	Log of GDP per capita	Eurostat
Agglomeration effect	Cumulated number of Chinese investments in all manufacturing sectors located in the same host country in the year before the new OFDI occurs	Ministry of Commerce

Table 3. Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11
1	GDP	1										
2	GDP per capita	0.632**	1									
3	Agglomeration	0.647**	0.451**	1								
4	Source_VAbyEmp	0.167**	0.242**	0.448**	1							
5	Source_VAGrowthbyEmp	-0.053	-0.035	-0.209**	-0.230**	1						
6	Source_InvestByEmp	0.172**	0.215**	0.515**	0.719**	-0.259**	1					
7	Source_RDexpend	0.256**	0.333**	0.460**	0.359**	-0.163**	0.403**	1				
8	Host_VAweight	0.190**	0.125**	0.295**	0.282**	-0.144**	0.409**	0.049	1			
9	Host_VAGrowth	-0.073*	-0.023	0.023	0.109**	0.119**	0.056	0.107**	0.050	1		
10	Host_VAbyEmp	0.301**	0.600**	0.294**	0.444**	0.141**	0.360**	0.413**	0.166**	0.175**	1	
11	Host_RDexpend	0.082*	0.290**	0.149**	0.095**	0.005	-0.026	0.506**	-0.042	0.212**	0.296**	1

Notes: *p<0.05; **p<0.01

Table 4. Logistic regressions

Logit	Manufacturing				Marketing				R&D			
	Model A1	Model A2	Model A3	Model A4	Model B1	Model B2	Model B3	Model B4	Model C1	Model C2	Model C3	Model C4
high-tech industry	0.701**	1.330**	1.327***	2.415***	1.445*	1.670	1.036	1.489	2.160***	0.965	1.682***	0.964
Medium-high tech industry	0.261	0.179	0.392	0.659	0.061	0.422	0.056	0.352	1.670***	0.959**	1.599***	1.087**
medium-low tech industry	0.204	0.063	0.211	0.000	0.321	0.581	0.368	0.663	1.299***	0.877*	1.289***	0.858*
low-tech industry	-1.166*	-1.572***	-1.931***	-3.074***	-1.827	-2.673	-1.460	-2.504	-5.129***	-2.801	-4.570***	-2.908
GDP	0.084	0.260**	0.050	0.215*	-0.066	-0.277	-0.113	-0.339	-0.088	-0.080	-0.053	-0.054
GDPpercapita	-1.061***	-1.216***	-0.747**	-0.567*	0.683	0.790	0.527	0.500	0.177	0.115	0.009	0.096
Agglomeration	0.002**	-0.001	0.001	-0.002	-0.004*	0.000	-0.003	0.000	0.003***	0.003*	0.003***	0.002*
Source_VAbyEmp		-0.015		0.036		-0.033		-0.045		0.070*		0.084**
Source_REbyEmp		-0.028		0.001		0.127		0.168*		0.043		0.062**
Source_REGrowthbyEmp		0.074***		0.076***		-0.032		-0.021		-0.030*		-0.024
Source_RDexpend		-0.394		-0.735*		-0.060		-0.139		0.831**		0.600
Host_VAweight			0.081***	0.065***			-0.038	-0.023			0.004	0.017
Host_VAGrowth			0.001	0.001			-0.018**	-0.023***			-0.007	-0.009*
Host_VAbyEmp			-0.070**	-0.164***			0.022	0.038			-0.016	-0.044
Host_RDexpend			-0.004	0.002			0.024	0.031			0.030***	0.027**
Constant	9.148	8.025	6.184	2.073	-3.215	-1.293	-0.851	2.357	-3.182	-3.124	-1.973	-3.387
N	794	794	794	794	794	794	794	794	794	794	794	794
Chi-squared	29.387***	59.906***	52.410***	84.613***	10.886*	18.351**	16.574*	24.912**	76.206***	84.504***	86.369***	94.822***
Pseudo-R2	0.048	0.097	0.085	0.135	0.036	0.060	0.054	0.081	0.128	0.141	0.144	0.157
Estimation accuracy	0.553	0.603	0.596	0.623	0.935	0.935	0.935	0.935	0.681	0.694	0.699	0.699

Notes: *p<0.1; **p<0.05; ***p<0.01

Analytical approach

For this study, we firstly perform an econometric analysis through three distinct logistic regression models related to the three types of investment motivations. The three models have the same independent variables, but different dependent variables related to the three typologies of OFDI. Our choice of technique is based on the dichotomous attributes of the dependent variables.

Table 4 presents the estimation results of the three logistic regressions, with model A for manufacturing OFDI, model B for marketing, and model C for R&D, respectively. The significance of model B is associated with the underrepresented observations of firms without marketing motivation. Further analysis is conducted below to address this issue.

Model 1 only includes the control variables related to industry classification and the country-level characteristics. Model 2 incorporates also industry-level variables of the source country, while model 3 includes those of the host country. Model 4 presents the full model with all variables. As discussed above, the logistic regressions handle the three motivations of OFDI separately. However, each individual OFDI might have multiple motivations. For example, a firm might conduct OFDI for the purposes of both manufacturing and marketing. Logistic regression alone is not sufficient to analyze the interactions between such different investment motivations. Therefore, we pool the three types of motivations and conduct further multinomial logistic regression. Table 5 presents all the possible combination of the three types of investment motivations.

Table 5. Combinations of the three types of investment motivations

Motivations	Number of OFDI
1 only manufacturing	27
2 only marketing	319
3 only R&D	9
4 only manufacturing and marketing	192
5 only manufacturing and R&D	16
6 only marketing and R&D	81
7 three types of motivations	150
Total	794

Table 5 indicates that the number of observations for some sets is inadequate for a reliable analysis. Chinese OFDI with only manufacturing motivation, R&D motivation and both manufacturing and R&D motivation are clearly underrepresented. We solve this problem by aggregating the underrepresented categories into wider sets (consistent with Plechero and Chaminade, 2013). We operationalize set 3, 5, 6, and 7 as one category: 'at least' R&D (R&D oriented). Set 1 and 4 are grouped as category 'at least' manufacturing (manufacturing oriented), set 2 is retained alone as the new category 'only' marketing (marketing oriented). Our new categories of investment motivation are presented in Table 6. All three categories have sufficient observations for analysis, while each also has one defining motivation. In addition, OFDI which focuses 'only' on marketing tends to be much less anchored in the local industrial

context than that which addresses either R&D or manufacturing, such that the stimulating factors for a sales office could be expected to be markedly different to both those for a factory and an R&D lab.

Table 6. The dependent variable of the multinomial logistic regression

Motivations	Number of OFDI
1 At least manufacturing (manufacturing oriented)	219
2 Only marketing (marketing oriented)	319
3 At least R&D (R&D oriented)	256
Total	794

Table 7 reports the results of the multinomial logistic regression. Here the dependent variable is a multi-categorical one as shown in Table 2. The model has been tested to satisfy the assumption of independence from irrelevant alternatives (IIA), which requires that the choice between any two categories in the dependent variable is not related to other categories, using the method developed by Hausman and McFadden (1984).

Table 7. Multinomial logistic regression

		Model D1	Model D2	Model D3	Model D4
Manufacturing	High tech industry	0.402	0.790	1.081**	1.758**
in contrast to	Medium-high tech industry	-0.080	-0.546	-0.067	-0.217
Marketing	Medium-low tech industry	0.453	0.109	0.422	0.120
	GDP	0.067	0.344**	0.061	0.299*
	GDP per capita	-0.960***	-1.211***	-0.807**	-0.729*
	Agglomeration	0.002	-0.003*	0.001	-0.004**
	Source_REbyEmp		-0.008		0.021
	Source_REGrowthbyEmp		-0.009		0.010
	Source_InvestByEmp		0.104***		0.099***
	Source_RDexpend		-0.221		-0.424
	Host_VAweight			0.105***	0.086***
	Host_VAGrowth			0.005	0.005
	Host_VAbyEmp			-0.030	-0.116**
	Host_RDexpend			-0.013	-0.005
	Constant	8.281	6.409	6.263	1.976
Manufacturing	Industry 1	-1.930***	-0.514	-1.019*	0.129
in contrast to	Industry 2	-1.720***	-1.299**	-1.645***	-1.177**
R&D	Industry 3	-1.055**	-0.819*	-1.077**	-0.740
	GDP	0.149	0.318*	0.121	0.276*
	GDP per capita	-0.740**	-0.825**	-0.513	-0.553
	Agglomeration	-0.002	-0.005***	-0.003**	-0.005***
	Source_VAbyEmp		-0.073*		-0.077
	Source_VAGrowthbyEmp		-0.049		-0.059*
	Source_InvestByEmp		0.089***		0.082***
	Source_RDexpend		-0.951**		-0.887*
	Host_VAweight			0.059**	0.034
	Host_VAGrowth			0.010*	0.012**
	Host_VAbyEmp			0.000	-0.017
	Host_RDexpend			-0.038**	-0.028*
	Constant	7.038	5.656	4.766	3.458
Marketing	High tech industry	-2.332***	-1.304*	-2.100***	-1.629**
in contrast to	Medium-high tech industry	-1.639***	-0.753	-1.579***	-0.960*
R&D	Medium-low tech industry	-1.509***	-0.928*	-1.499***	-0.859*
	GDP	0.082	-0.027	0.061	-0.023

	GDP per capita	0.220	0.386	0.294	0.176
	Agglomeration	-0.004***	-0.001	-0.003***	-0.001
	Source_REbyEmp		-0.065		-0.098**
	Source_REGrowthbyEmp		-0.040		-0.069**
	Source_InvestByEmp		-0.014		-0.017
	Source_RDexpend		-0.730		-0.463
	Host_VAweight			-0.046**	-0.052**
	Host_VAGrowth			0.005	0.007
	Host_VAbyEmp			0.030	0.098**
	Host_RDexpend			-0.025**	-0.024*
	Constant	-1.243	-0.752	-1.497	1.482
	N	794	794	794	794
	Chi-squared	97.023***	146.850***	131.928***	175.251***
	Pseudo-R2	0.130	0.191	0.173	0.223
	Estimation accuracy	0.452	0.479	0.489	0.496

Notes: *p<0.1; **p<0.05; ***p<0.01

FINDINGS AND DISCUSSION

Industry and country-level differences in OFDI motivation

The results confirm that, as in aggregate studies, market size impacts on OFDI in manufacturing. The coefficient of GDP is positive and significant for manufacturing motivation at the 10% level (models A4 and D4), indicating that larger host country market size attracts investment by Chinese firms engaged in manufacturing in the EU. However, the negative and significant coefficient of GDP per capita in the logistic regressions (models A1 and A4), indicates that market affluence discourages firms which invest for the purposes of manufacturing. This result is generally confirmed in the multinomial logistic regression (models D1 and model D4) where manufacturing subsidiaries, in contrast to marketing or R&D, are less attracted to countries with higher income per capita. This result is unsurprising given that wealthy countries pay higher wages and higher wages have been found to discourage aggregate FDI in Europe (Barrel and Pain, 1999; Ford and Strange, 1999). Efficiency seeking FDI would be expected to be particularly susceptible to this effect.

In model A1, B1 and C1, the coefficient for high-technology industries is positive and significant for all three types of OFDI motivations (manufacturing, marketing and R&D) of individual firms. When introducing the industry-level variables, it loses significance for marketing and R&D, while it becomes more significant for manufacturing motivation (models A4, B4 and C4). The results are also confirmed in the multinomial logistic regression in Table 11 (models D1 and D4). Together these findings suggest that compared with low-technology industries (the baseline dummy) Chinese firms investing in high-technology industries are more motivated to invest in manufacturing and R&D, than marketing. The significant coefficient of medium-high-technology industries and medium-low-technology industries for R&D motivation (Industry 2 and Industry 3 in models C1, C4, D1 and D4), indicates that, in contrast to low-technology industries, OFDI by firms in these two industries are, in most cases, motivated by R&D rather than manufacturing or marketing. Thus, overall, our findings support Hypothesis 1a, that higher technology sectors are more likely to attract R&D and manufacturing FDI, while lower technology sectors are more likely to attract marketing FDI, although medium tech industries seem more motivated by R&D than manufacturing.

Finally, with regards to agglomeration effects, we found that Chinese manufacturing firms engaged in overseas R&D invest more in countries with a greater number of cumulative existing Chinese investments, than those engaged in manufacturing activities (models C1, C4, D1 and D4). This finding suggests that for firms with R&D motivation, agglomeration forces dominate over the dispersion forces which emerge as a result of increased competitive and cost pressures in areas with strong clustering effects.

Source and host industry-level factors and OFDI motivation

The outcomes for our above control variables may also reflect industry-level push and pull mechanisms. When we include the variables related to industrial competitiveness of the source and host countries in the logistic regression, the explanatory power of most of the control variables diminishes significantly, while the models as a whole become more significant, especially for marketing motivation (models A4, B4 and C4). This implies that the observed differences regarding the types of OFDI motivations can, to a large extent, be explained by industrial competitiveness factors in the home and host countries.

With respect to the industry-level factors in the source country, the significant coefficient of industry-level R&D intensity of the home country (Source_RDexpend) suggests that firms from industries with high levels of R&D intensity in China are more likely to be driven by R&D than manufacturing in their OFDI in the EU (models A2, A4, C2, C4, D2 and D4). Thus, H1b is supported.

We also find that, in most cases, sectoral labor productivity (Source_REbyEmp) and the sectoral productivity growth over time (Source_REGrowthbyEmp) have positive and significant effects on OFDI with R&D motivation, compared with the other two motivations (models C2, C4, D2 and D4). Thus, H2a is supported: firms operating in industries with higher domestic labor productivity were more likely to invest in R&D activities abroad.

In relation to investment levels in the source country (Source_InvestByEmp) the coefficient is positive and significant for manufacturing motivation in both the logistic regressions (models A2 and A4) and multinomial logistic regression (models D2 and D4). This indicates that, in contrast to marketing or R&D motivation, Chinese firms operating in industries with high propensity to invest in manufacturing domestically, tend to invest in the EU with manufacturing as a motivation. In contrast to expectations, domestic investment in manufacturing in a sector does not encourage market-seeking investments abroad. Rather it encourages further investments in manufacturing overseas. Thus H3 is not supported.

One possible explanation for this counter-intuitive result is that, although high levels of domestic investment could encourage firms to seek new markets, as suggested in our hypothesis, Chinese firms may encounter barriers to trading in overseas markets. In the EU market, actual or potential trade barriers linked to the preconceptions about the role of the state in the economy and questionable labor practices (Kolk and Curran, 2017) may discourage expansion through exports. In addition, domestic institutional constraints, such as lack of skilled staff, or internal barriers to inter-provincial investment (Huang, Zhang and Angelino, 2017), may push Chinese companies to expand their manufacturing capacity elsewhere. Finally, sectors with high levels of domestic investment may have mature and advanced production capability, which can be leveraged when investing abroad in similar activities. Together, these factors could

explain the observed tendency for firms in industries with high levels of domestic investment to invest in production in the EU (rather than sales and service).

On the host country side, both the logistic regressions and multinomial logistic regressions show that industries with higher R&D intensity (Host_RDexpend in models C3, C4, D3 and D4) are more likely to attract R&D oriented investments from Chinese investors. Thus, H1c is supported.

The results suggest that the importance of the industry in total host country manufacturing (Host_VAweight) is positively and significantly associated with OFDI for manufacturing (models A3 and A4). Models D3 and D4 also confirm that those industries which are important to the local productive economy tend to attract manufacturing or R&D oriented investments from Chinese investors rather than marketing, thus supporting Hypothesis 4a.

Industries where growth in VA is quicker (Host_VAGrowth) were more likely to attract Chinese firms motivated by manufacturing, rather than R&D (models D3 and D4). Thus, Hypothesis 4b is partly supported, although we did not find a preference of marketing motivation in this case. Rather, the logistic regressions suggest a negative relationship between sectoral growth rates and marketing motivation (models B3 and B4). This result is rather counter-intuitive. One possible explanation is that a high growth rate sector represents an emerging industry with high levels of sector-specific knowledge, where Chinese manufacturers might be not mature enough to compete or to risk overseas investments oriented towards the market. Investments in manufacturing in such sectors, on the other hand, could involve the acquisition of strategic assets – in the form of knowledge on new processes and emerging customer needs - from these high growth contexts. Certainly, these results call for further investigation.

Finally, host country sectoral labor productivity (Host_VAbyEmp) has positive and significant effects on marketing motivation of OFDI, compared to the other two motivations (models D3 and D4). Models A3 and A4 also suggest a significantly negative effect of host country sectoral labor productivity on manufacturing motivation. Thus, Hypothesis 2b is rejected. Rather than encouraging investment in manufacturing, high host country labor productivity discourages it and rather encourages marketing oriented FDI. Again, this result is counter-intuitive. One explanation could be that countries with high labor productivity also tend to have higher wages and thus greater market potential. This could cause investors to favor marketing in these locations, rather than (potentially expensive) manufacturing. As highlighted by Cushman (1987), the interactions between productivity and wages are vital to FDI. Even if certain EU industries are very productive, if their wage levels are much higher than in the source country, they will still represent unattractive manufacturing centers. However, as with the latter result, this outcome requires further analysis to explore the linkages.

CONCLUSIONS AND AVENUES FOR FURTHER WORK

In this paper, we have sought to identify the key interactions between the motivations of Chinese OFDI in the EU and its chosen location within the region, as well as the role of industry-specific characteristics in the investment decision. Our analysis confirms that the motivation for an investment is a key factor explaining location choice, as several key characteristics of the source and host countries interact

differently depending on the motivation of the investment. This confirms one of the key points of this paper: that exploring FDI in aggregate terms obscures important differences *within* FDI flows.

In terms of differences between industries, we find, as expected, that higher tech sectors are more likely to attract R&D and manufacturing FDI, while Chinese FDI in low tech industry is more focused on marketing. Both domestic and host R&D intensity within an industry are associated with greater R&D motivation in investments. This result is consistent with Lu et al.'s (2011) study on Chinese OFDI, which found strategic asset seeking FDI to be more prevalent in more technologically advanced companies and sectors. In addition, we find greater agglomeration effects for R&D FDI – Chinese R&D FDI tends to cluster more than other types of investments, probably because the scarce resources on which R&D depends also tend to be clustered. This is consistent with the literature on agglomeration (Disdier and Mayer, 2004).

The terms of the other industry level factors which we explored, industries with high domestic labor productivity are found to be more likely to engage in R&D FDI, while host country industries which are more productive, are less likely to attract FDI oriented towards manufacturing. Thus, domestic and host country productivity stimulate different types of FDI, the impacts of which on both economies are also likely to differ, as Driffield and Love (2007) suggest and as Knoerich (2017) has recently underlined in terms of the impact of OFDI on emerging countries. These findings support our proposition that the linkages between FDI and productivity are more complex than assumed in much of the literature on the subject, which has focused on spillover effects, usually assumed to be unidirectional (Knoerich, 2017). There is certainly a need for more detailed analyses of these interactions.

We also examined the impact of domestic investment levels on OFDI and found that firms in industries with higher investment in production in their home country were more likely to engage in manufacturing oriented investment in the EU, rather than marketing or R&D. This result indicates that rather than encouraging market-seeking investment, as we might expect, higher levels of domestic manufacturing investment could motivate firms to invest in such activities abroad. From a policy perspective, this may imply that increases in domestic investment could lead to increases in OFDI. These findings supplement work exploring the impact of IFDI on host country investment, which tend to assume that the effects are unidirectional (from FDI to host investment) (Kamaly, 2014; Rath and Bal, 2014). Investment levels in the source country also seems to impact on FDI choices.

A greater weight of an industry in the local economy was found to attract both manufacturing and R&D oriented investments, suggesting that in more mature, well established European industries, Chinese investors were more motivated by technology and know-how, than by the EU market – i.e. classic 'strategic asset seeking' FDI (Dunning, 1993). Finally, high growth industries in the EU were found to attract manufacturing oriented FDI, but not marketing FDI. Perhaps high growth industries are not yet mature enough to attract market oriented FDI, or Chinese firms are not yet mature enough to attack such high growth sectors. In conducting this work, we identified no substantial research on the interaction between either the weight of industry or its growth rate on FDI. Our findings suggest that there are linkages, but more research is certainly needed to better identify these across time and space.

Our findings support the key proposition of this paper that adopting an 'industry-based' view of FDI can enable us to identify supplementary interactions between FDI and source and host industry-level factors, which have been obscured in more firm (resource) based or institutional based approaches. There is no question that these other two approaches have provided useful insights. What we wish to underline here, is that an industry-based view also brings added depth to our understanding and yet existing research which takes such an approach is very limited.

Finally, a key finding of our work is that both the motivation for FDI and the sector in which it takes place impact on FDI. Thus, trying to draw conclusions about determinants across all FDI flows, seems, to us, to risk erroneous conclusions. Rather, our work indicates that future research on FDI flows needs to engage more seriously with the heterogeneous nature of FDI.

In terms of the limitations of our study, while we focus on the sectoral factors which we consider to be most likely to interact with FDI motivation in this paper, there are certainly other source and host level factors which could be explored. One factor which does seem likely to interact with FDI motivation is level of competition in the sector, especially in the domestic market, where Lu et al. (2010) found it to encourage market seeking OFDI. We initially sought to integrate competition in the model through growth in number of firms (the indicator used by Wang et al. (2012). However, it did not prove to be significant. Furthermore, it did not improve the model, so we excluded it from our analysis. Further research could certainly usefully explore this interaction.

The other key limitation of our study is that it has focused on one source country – China – which, as many scholars have pointed out, has quite specific characteristics (Buckley et al. 2007; Buckley et al. 2018; Ramamurti and Hilleman, 2018) and on one destination region – the EU. Yet we would expect that other source and host countries would also exhibit differences in locational determinants depending on the sector and the type of FDI involved. There is a need for more research which takes seriously the distinction between both different sectors and different FDI motivations, across a broader range of countries.

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