

The location of technology sourcing FDI: South Korean investment in the US.

“Paper presented at the 6th Copenhagen Conference on: 'Emerging Multinationals': Outward Investment from Emerging Economies, Copenhagen, Denmark, 11-12 October 2018”

Dr. Jae-Yeon Kim¹(corresponding author), Prof. Nigel Driffield² (*University of Warwick*)
and Prof. Jim Love³ (*University of Leeds*)

Abstract

This paper seeks to explain the location decisions by emerging market MNEs when entering an advanced such as the US. We argue that liability of foreignness, together with a desire for technological upgrading, encourage firms to seek collaborations with universities, and with public sector funded innovation, rather than seeking collaborations with leading firms directly. Using a unique database that captures the motivation for FDI, as well as its location we explore this in the context of the history of Korea's development, and the competitiveness of its leading firms. We show that universities and public sector R&D strongly attract both technology sourcing FDI and market seeking FDI into the US, and argue that this is consistent with US policy which seeks to attract inward investment in order to foster economic development.

KEY WORDS: Korean FDI motivation, FDI location choice, local R&D.

1 Email: Jae.Yeon.Kim@wbs.ac.uk

2 Email: Nigel.driffield@wbs.ac.uk

3 Email: j.h.love@leeds.ac.uk

1. Introduction

The traditional literature on Emerging Market Multinationals (EMNEs) has developed by comparing internationalising firms from emerging economies, with established “western” MNEs. This approach, which largely adopts the CSA / FSA framework of Rugman (1981, 1996) then argues that EMNEs have internationalised, not by exploiting firm specific assets (FSAs) that in turn yield an ownership advantage (or what Rugman, 2010) refers to as “Dunning advantages”, but on the basis of a wider set of advantages, resulting from their home location. As we explore below, the literature then characterises these advantages in a number of ways, but essentially considers these to be a range of factors, unrelated to technological advantage.

The EMNEs literature has since been modified (Bhaumik et al., 2016) to consider specific forms on internationalisation, notably the motivation for EMNEs to internationalise in order to access more advanced technology. This literature describes a process by which emerging market firms engage first in FDI in order to boost their own firm specific assets, either in terms of accessing technology, or alternatively in terms of re-aligning production to take advantage of location advantages elsewhere . Thus, the literature highlights both existential differences between EMNES and western firms, as well as similarities in the internationalisation process. For example, in comparing western MNEs and EMNEs, there are differences in the scale of scope of firm specific assets between the two groups. However, if one looks at a population of emerging market firms, then in common with the west it is those firms with FSAs who internationalise the most successfully (Bhaumik et al., 2010). However, the more interesting distinction concerns their subsequent development. The traditional literature based on OLI focusses on the interaction between place and space, with location decisions determined by the ability of firms to combine their FSAs with location specific assets. The technology sourcing literature offers a different perspective on this, exploring both the phenomena of knowledge flowing from local firms to foreign affiliates, and equally knowledge transfer from affiliates to parents (Driffield et al., 2016) while the literature seeking to explore EMNES technology sourcing activities focusses on acquisition of knowledge intensive assets in the west.

This leads to the purpose of this paper, which is to investigate the relationship between Korean outward FDI and the motivations of Korean firms for undertaking FDI in developed countries such as the US, with particular consideration given to the Korean industrial development process. Therefore, we explore to provide an organised investigation into the relationship between Korean outward FDI and its motivation: how Korean firms choose outward FDI location in a developed country in order to obtain a strategic asset (ie., a consideration of the process of obtaining high-technology knowledge and an examination of the relationship between FDI location choice and motives). These questions are inter-related and aim to study distinct aspects of internationalisation.

We seek therefore to extend this literature. Using a unique data set that captures FDI by emerging market firms, motivated by the desire to engage in technology sourcing, and explore their location decisions, in terms of the nature of host country innovation that attracts technology sourcing

EMNEs. We use project level data on South Korea, to investigate the correlation between EMNEs' FDI motives and their location decisions, targeting different kinds of assets in the United States. We show the changing FDI motives of Korean manufacturing firms' subsidiaries in the United States. We explain how knowledge seeking FDI varies across the US through a consideration of technology differences (measured by R&D intensity differentials), labour factor differences (measured by types of knowledge/technology labour) and the trend of Korean FDI by motive. Korean firms and the US policy makers should, in order to increase competition and productivity, give consideration to characteristics that may exist in specific regions/industries, which are beneficial to the fulfilment of firms' FDI motives, or are more attractive for inward/outward FDI. This chapter thus has an empirical application of interest to MNEs/EMNEs and to policy makers, who need to understand strategic-asset seeking FDI motives over time. In this way we seek to extend the debate from why such firms do this, or how their development is somehow different from western MNEs, to how firms use foreign-based technology to engage in technology sourcing, and in turn how this impacts on their location decisions. The chapter paper is structured as follows. Sections 2 and 3 organise and synthesise previous studies on FDI in emerging economies and developed economies, particularly in the context of FDI from South Korea to the US. Section 4 reviews the methodology. We test whether different technological factors have different effects under the different motivations using a dataset of inward investment into the US. Section 5 discusses the results and Section 6 concludes.

2. Korean outward FDI to the US

We start with a discussion of the history of Korean outward FDI. It is fair to say that from 1970s the outflow of FDI from Korea has increased (Kumar and Kim, 1984). However, from the mid-1980s, Korean firms embraced internationalisation in earnest, due to the world's liberalisation and globalisation. Korean FDI policies were gradually liberalised as the Korean government started to perceive FDI as a way of reducing the technological gap between Korea and the developed countries (Kim and Seo, 2003). Thus, in the 1980s, the predominantly export-based Korean industrial development strategy was to encourage light manufacturing industries to target the export market. However, despite these liberalisation efforts by the Korean government, the role of outward FDI in the South Korean economy remained small. After the Asian economic crisis of 1997, the Korean government opened its doors to both inward and outward FDI by MNEs as a means of dealing with its large amounts of foreign debt and the weakness of the Korean currency (Ismail, 2002). Overall conditions for investing in foreign markets have changed since the Asian economic crisis of 1997 significantly, and Korea has also seen an increase in labour costs particularly in the technology sectors (Kim et al., 2018).

Kim et al. (2018) show that Korean FDI in developed countries was initially dominated by strategic asset-seeking motives most notably a desire to acquire technological information. In the

context of investment development cycle (Dunning, 1981), when net outward investment (NOI) is positive, Korean firms changed their investment decisions to expand internationalisation into the developed countries for motives other than the mere acquisition of technology. Kim et al.(2018) highlight how the stages of South Korean economic development and economic structures are interrelated to South Korea's outward FDI with the location advantages of Korean MNEs reflecting the progress before/after the country's net outward investor position in 2001. South Korean outward FDI, like that of many other East Asian countries, has been geared toward accessing important proprietary technology (Dunning, 2006). However, there is as yet no research on EMNEs full-scale technology-seeking FDI patterns with location preferences as its economy develops. This is due to the majority of research interest being location choices for certain regional factors.⁴

Thus, Korean FDI case can be a good example the evolution of outward FDI from emerging country to advanced country. MNEs from emerging countries may be prompted to invest in more advanced countries, in order to gain intangible strategic assets, rather than to exploit the MNE's ownership advantages. In line with this thinking, we posit that South Korean outward FDI for strategic asset-seeking motives would gravitate toward developed countries' economies, which typically possess significant levels of human and intellectual capital, so that the South Korean firms could strengthen their own competitiveness (Dunning, 2006).

Figure 1 shows South Korea's FDI flow in the US, which has the most popular destination for South Korean firms seeking economic partners abroad. South Korean firms have invested more than 77,997 million US dollars there in the period of 1980 to 2016, and the number of affiliated companies in the US is 13,596. These figures account for more than 20% of South Korea's worldwide outward FDI.

(Insert Figure 1)

The selection of host countries by Korean firms reflects their international expansion strategy and their upgrading, which enables them to undertake higher value-adding activities. Thereafter, once Korean MNEs internationalise in advanced countries such as the US or EU countries, and acquire a greater ability to deploy and upgrade capabilities through linkage and learning through that outward FDI, they further consolidate their advantages by exploiting the market of the host country; thus, FDI becomes a "platform" to export to the surrounding area. One of the reasons for this upward trend of FDI from South Korea may be Korea's government policy. From 1986, Korean outward FDI was encouraged by the Korean government, which relaxed FDI regulations, including the investment ceiling for venture

⁴ In Dunning's investment development cycle (1981), he categorises 4 stages of investment development stages. However, due to availability of data, we analyse from 3rd stage (increasing outward FDI) and 4th stage (more outward FDI than inward FDI (Net Outward FDI is positive)).

capitalism. In addition, the South Korean government provides four major types of outward FDI measures: financial support, favourable taxation, overseas investment services, and institutional services such as administration and information (Kim & Rhee, 2009).

(Insert Figure 2)

(Insert Table 1)

A significant volume of literature has been developed that seeks to provide an explanation of these attractive location factors, and to analyse a particular host location through the lens of the motive for FDI. Shaver (1998) for example, maps location choice onto the market-seeking, resource-seeking, efficiency-seeking and strategic asset-seeking motives. However, the relationship between FDI motive and location advantage has generated much debate and empirical research because a country's location advantage may broaden as the country develops. This relationship, between country level development and firm level internationalisation is under explored, especially in the context of motives for FDI. Hitherto research has sought to capture such effects using country level data. We seek to extend this using both firm level data on motive and FDI location, linked to location specific characteristics.

Figure 2 and Table 1 show the proportion of and different motives for investing in the US from 1980-2016. This paper exploits a unique dataset to uncover a change in FDI strategy, both in terms of motive and location, something that has received little attention in the IB literature⁵. The major advantage of these data is that firms were required to state their motivation for FDI ex ante. This allows us to extend the existing literature that rather assumes motivation based on differences between home and host country. The dataset includes details such as location information, total amount, industrial sector and so on. In other words, this dataset can link the FDI location and the FDI motivation. It would be interesting to investigate how different FDI motivations can shape Korean firm's investment in each country. For example, one could collect a dataset on FDI motivation (Dunning 1993); such as market-seeking, efficiency-seeking, strategic asset-seeking, and natural resource-seeking, and host country (195 countries) by industrial sectors.

The EXIM dataset records not merely the investment location decisions of Korean firms, but also their motives. These are presented in 8 categories, which map onto, the taxonomy of Dunning's

⁵In South Korea, if a company wants to engage in foreign direct investment, they must satisfy Korean foreign exchange law by submitting documents to the South Korean Banks that include information as to the proposed exact location, the total amount of FDI, their motivations for investing, the firm size, industrial area, and so on. Korea's Export and Import Bank (EXIM) handles this comprehensive data. Specifically, the dataset captures specific motives of Korean FDI in host countries by Korean unique foreign exchange law; submitting documents to the Korean Banks that include details of the exact location and investment motive of their subsidiaries.

(1993) classification: resource-seeking FDI; efficiency-seeking FDI; market-seeking FDI; and strategic-asset seeking FDI. Historically the dominant motive for Korean firms investing in the US has been market seeking FDI (58%) while strategic asset seeking (advanced technology introduction) ranked second at around 16% of total Korean FDI from 1980s to present. However, over time, as Figure 2 illustrates, technology-seeking FDI has become more important Korean firms, prompted by Korea's rapid industrial development, expanded their operations overseas in order to consolidate their position in technological development (Kim et al., 2018)

Theoretical Framework

Our over-arching framework here is taken from the CSA/FSA matrix of Rugman (1981) and its application to EMNEs, and their ability to overcome liability of foreignness. We start off by exploring how EMNEs overcome the liability of foreignness, and how this influences their location decisions, given their motivation for internationalisation. As Bhaumik et al. (2016) demonstrate the continued development of EMNEs has presented something as a conundrum for international business theorists. While the existing literature is possibly sufficient to explain how emerging market firms can internationalise through overseas investment without having any pronounced technological advantage (e.g., Mathews, 2002, 2006; Luo and Tung, 2007; Kedia, Gaffney and Clampit, 2012; Ramamurti, 2012; Gaffney, Kedia and Clampit, 2013), it is less able to offer any evidence on how such firms develop over time, or to generalise beyond a few well known cases.

Rugman (1981) states that FDI ultimately depends upon the linkages between a firm's unique, idiosyncratic capabilities (firm-specific advantages) and its home country assets (country-specific advantages). It is well known that the competitive advantages of multinational enterprises (MNEs) are determined by the interaction of two sets of factors. First, the internal factors of the firm, which lead to the development of unique capabilities, known as firm specific advantages (FSAs). Second, the factors that are external to the firm and which offer complementary resources for the exploration and/or exploitation of FSAs in foreign markets, referred to as country specific advantages (CSAs). The nature of FSAs, CSAs, and their interaction have been developed by Rugman (1981) into a basic FSA/CSA framework for the analysis of the activities and performance of MNEs.

Rugman's FSA/CSA matrix shows the linkages between the FSAs of MNEs and their home CSAs. The FSA is the internalisation of a firm's own assets (such as the capability to venture abroad and engage in foreign investment) while home CSAs include quality of labour, institutions, scale of economy, and endowments of natural resources. The firm's strategy is then developed with this combination of both firm- and country- specific advantages. It can be seen that both the FSA and CSA matter and represent the firms' ownership advantages being strengthened through the CSAs of home countries. The firms combining CSA with FSA tend to be the successful ones (Rugman, 1996).

In the context of EMNEs, the existing literature focuses almost entirely on how these firms can access technological capabilities by investing in developed host countries. This is a challenging question

since EMNEs' firm specific advantages may be different compared to those of their Western counterparts (Meyer & Xia 2012; Bhaumik et al., 2010; Guillen & Garcia-Canal 2009; Narula 2012; Peng et al. 2008). Notable studies such as Peng et al. (2008) describe experiences of EMNEs that spur them into going abroad, whilst Guillen and Garcia-Canal (2009) offer generalisations as to how EMNEs differ from MNEs that originate from developed countries. EMNEs first internationalise through country specific assets (CSAs) such as economies of scale, thereby increasing their competitive advantages and overcoming their inherent liability of “foreignness” (LOF) (Bhaumik et al. 2010; Bhaumik & Driffield 2011). EMNEs are also expected to be motivated by potential for technology sourcing and subsequent technological upgrading in developed host markets (Bhaumik et al. 2016; Driffield & Love 2003). Yet, extant literature on EMNEs gives little attention to how their patterns of investment and motivations for the foreign direct investment (FDI) evolve over time and even fewer studies focus on how the development of new investment positions affects EMNEs' subsequent location choices.

We therefore seek to develop a framework which encapsulates the development of Korean FDI, and captures the changes in motives over time. Building on the standard IDC / IDP approaches, and on Bhaumik et al (2016), we outline a process illustrated by Figure 3. The dominant paradigms explaining FDI from countries such as Korea have been to assume a two-pronged process. Firstly that FDI to developing countries from Korea maps conveniently onto the standard OLI paradigm, driven typically either by market seeking facilitated by ownership advantages over local firms, or alternatively efficiency-seeking FDI. In contrast, market-seeking FDI to developed countries is facilitated through efficiency or through other CSAs at home. However, we suggest a more multi-faceted approach, incorporating technology sourcing, which in itself facilitates more FDI, building on Bhaumik et al (2016). Indeed, as we discuss above, we have seen a shift towards technology-seeking FDI, as firms seek to bolster their stock of firm-specific advantage. Thus, the frameworks developed by in the traditional EMNE literature need updating, and we illustrate this with Figure 3.

(Insert Figure 3)

As the country moves along the investment development path (Dunning, 1986), and firms develop core competencies and FSAs, CSAs fuel FDI, which in turn funds technology-sourcing FDI, augmenting the set of FSAs the firm possesses, and facilitating further market seeking FDI in more lucrative markets. The traditional literature, as discussed for example by Bhaumik et al (2016), recognises the existence of FSAs within EMNEs, but that they may not be of the same form of FSA as one encounters in western firms. The mechanisms by which such firms internationalise, and acquire and enhance their stock of firm-specific assets is, we argue, important in terms of their location decisions regarding technology-sourcing FDI. Technology-sourcing FDI is therefore seen by the firm as a way building on its existing capacity, forming collaborations and accessing frontier technology. As

we see with the leading Korean firms such as LG or Samsung, they now compete with world-leading firms. Thus, firms engaging in technology-sourcing FDI from Korea to the US need initially to overcome a specific form of liability of foreignness. This concerns not merely their unfamiliarity with customers, but also with potential collaborators. Secondly, they need to be aware of US domestic policy, which seeks to attract inward investment not on the basis of technological collaboration, but of employment. For instance, Mubambi and Mudambi (2005) show that inward investment incentives emphasise employment creation, often short term, rather than for example longer term benefits around knowledge creation or technological development. As Blomstrom et al (2005) note, this is consistent with US industrial policy to attract jobs to disadvantaged areas. We argue that this has influenced for example how technology-sourcing FDI by emerging market firms has been able to enter frontier economies by offering local job creation.

3. Literature Review and Hypotheses Development

3.1 Knowledge-seeking FDI from emerging countries

The conventional IB literature largely focuses on the activities of firms from developed countries. Firms from emerging economies are considered to be latecomers to global business with regard to their home-country specific factors of production (Buckley, et al., 2007; Child and Rodrigues, 2005). With respect to firms from the emerging economies, scholars have highlighted the relevance of knowledge-seeking outward FDI in highly developed economies (Child and Rodrigues, 2005; Mathews, 2006). This is reflected in the empirical literature in its support of the notion of knowledge-seeking FDI being used to acquire knowledge or to enhance already acquired skills (Cantwell and Jane, 1999; Chung and Alcácer, 2002) Driffield and Love (2007) propose an FDI taxonomy and combine two different sets of issues: technology and factor cost differences through the measurement of R&D intensity differentials and units of labour. In their taxonomy, FDI motivations can be considered via two broad categories of asset exploitation and asset-seeking. In other words, they come up with a method of disentangling knowledge-seeking FDI motivations (Driffield and Love, 2007) and the technological levels of host and home countries (Driffield and Love, 2005).

The importance of the acquisition of knowledge or technology to the internationalisation strategy of the EMNE has found empirical support in that the EMNE may have a competitive advantage related to specific factors such as cheap labour or natural resources (Gaffney, et al., 2013). Ramamurti (2008; 2012) points out that these advantages are related to the characteristics of countries that have different economic structures and environments. In the same vein, Porter's diamond terminology (1990) states that multinational firms in a particular country derive a home based advantage in global trade competition. Despite their technological weakness, firms from emerging countries are now upgrading their competitiveness through value-added activities (Mudambi, 2008). In addition, Bhaumik and Driffield (2011) suggest that firm characteristics that reflect firm-specific capabilities of emerging countries explain outward FDI from emerging countries. Fosturi and Motta (1999) question the reliance

on firm-specific advantages as a formal model of the FDI motivation to access technology and transfer it from host country to home country.

MNEs from emerging economies arrive with the liability of foreignness (LOF) and are faced with a technological lag that is as important to them as economies of scale to the emerging markets (Bhaumik et al., 2016). However, the existence of that same LOF makes acquiring technological knowledge problematic for them. EMNEs, for example, face the perception that their brands are not well known, and that their technology lags behind host country frontier firms (Kedia et al., 2012). In terms of being able to enter into technology sharing, or joint development agreements with host country firms, property right theory would say that this places them at a disadvantage (Driffield et al., 2016). As is highlighted by the wider literature on EMNEs (e.g. Bhaumik et al., 2016), firms' location decisions for tech sourcing FDI are driven by the types of organisations with whom they can develop links. In this context, the functions of the technological capacity of EMNEs and the technology gap between the host and home countries should be borne in mind when initiating knowledge-seeking FDI from emerging economies.

Building on the previous literature, empirical work has been done that seeks to explain variations in outward FDI from emerging countries. It focuses on the cause of the disparity between the home and host countries, identifies links between economic and geography, the most notable being industrial agglomeration and development (Puga and Venables, 1996). It is clear then that the host country's infrastructure (including local R&D) is of paramount importance. There is a growing literature that seeks to link industrial agglomeration and development to MNE's location within their host countries, and which considers the links between the location's R&D and the benefits conferred on the organisation by its decision to settle in a particular region within an advanced country, thus linking infrastructure to FDI.

Cantwell (1989) notes that technology differs across global locations because the technology level depends on specific factors, such as established innovations, the educational level of the workforce, and the link between educational institutions and firms in each region. Consequently, firms may access new knowledge by expanding their international activities, improving their existing technologies or connecting with new technology (Cantwell, 1989). In terms of accessing localised knowledge, firms require a degree of physical closeness in a subsidiary's location choice to enable frequent interaction (Kogut and Zander, 1992). Building on this, Almeida (1996) shows that foreign firms make greater use of local knowledge in comparison to their local counterparts in the semiconductor industry. Most of this evidence concerns advanced industrial development in specific countries, and the importance of highly technological industries such as biotechnology/drugs, electronics, chemical/materials, and automotive (Kuemmerle, 1999; Florida, 1997; Serapio and Dalton, 1999). The literature emphasises that physical proximity is required for foreign firms to access localised high-tech knowledge.

In order to capture a new market and exploit the knowledge already in their possession, emerging-economy firms learn new and advanced technology and management skills in specific

locations. Researchers have examined the knowledge-related characteristics of host countries that are important for foreign firms when they are deciding on their FDI locations, considering location activities such as the availability of highly skilled labour and the number of research endowments (Chung and Alcácer, 2002). Using this analysis, it appears that MNEs from emerging markets choose their internationalisation location on the basis of factors such as market size, technical activities and labour abilities. However, the capabilities of the home country's assets may also motivate firms' decisions as to the countries in which they initially invest, in that specific countries have particular location advantages related to their differing economic structures and environments through value-added activities (Mudambi, 2008).

However, we argue that in the context of EMNEs, it is necessary, even when exploring technology sourcing FDI, to consider the type of collaborations that such firms will be able to generate. Building on our framework outlined above, we suggest that firms from EMNEs, even those in possession of certain FSAs, still encounter liability of foreignness, and will find only limited opportunities for collaboration in the US. However, with significant CSAs, as well as efficiency and economies of scale, this may still facilitate technology sourcing. For example, there is a growing literature linking knowledge-seeking FDI and university research. Abramowsky, et al. (2007) seek to link business R&D location to the UK's higher education funding councils for science. They show that the presence of R&D facilities of foreign firms strongly correlates with the location of top university departments. De Silva and McComb (2009) perform a similar analysis and show that both the size and proximity of university research facilities contribute to higher instances of business start-ups at a local level. The authors point out that the presence of universities, with their ready availability of skilled university graduates, attracts new firms to those areas.

This literature suggests that an ability to fund research, rather than to offer world leading technology is important in firms seeking collaboration with Universities, where brands and reputation matter less when partnering with higher education. As such, at least in the first stage of technology sourcing, partnering with a university offers a way of augmenting existing assets, as well as potentially facilitating further links into the private sector. This leads to our first hypothesis:

Hypothesis 1: Technology sourcing FDI by EMNEs seeks colocation with Higher Education (HE) institutions in the West.

3. 2 Emerging market multinationals and private sector R&D

The above discussion generally focuses on one of two different aspects of internationalisation. The first is related to the local activities that firms can explore, or the knowledge that they can exploit. The second concerns the gap of technological development level between the home and host country, so firms from the developed or developing countries seek to justify how their FDI is determined by the link of location advantage and internationalisation purpose. Bhaumiket al (2015, 2016) highlight that

the choice of location in the host country will be influenced by the firm specific advantages (FSAs) of EMNEs, and go on to point out that this finding poses a problem for the hitherto wide generalisation about the access-to-technology based motivation for the internationalisation of EMNEs. Knowledge-seeking firms from emerging countries will seek a location that is close to the sources of knowledge. However, firms have numerous reasons for wishing to establish operations abroad, Chung and Alcácer (2002) examine how localised knowledge affects knowledge-seeking FDI, and argue that firms that are seeking knowledge will be attracted to locations where they are able to access such local market and technical activity.

The theoretical explanation for knowledge-seeking FDI points to two reasons for locating R&D abroad. The first is asset-exploiting foreign R&D (Dunning and Narula, 1995). In this case, firms seek to exploit existing technologies to local circumstances and similar motive such as marketing or production may exist for undertaking FDI in their host location. As this type of R&D is specifically targeted to the foreign locale, a firm's activity for knowledge seeking FDI will under many circumstances be most efficient to undertake it in the host region or country. Thus, FDI for exploiting existing technology has the advantage of close interaction with local production factors. In terms of essential points about foreign R&D, this type of foreign R&D can be a substitute to the firm's domestic R&D. In addition, this type of R&D has no inclination toward locating in specific foreign region on the basis on the technological infrastructure that attract foreign demand in this region.

As high cash flow makes EMNEs more attractive to higher education R&D (Abramovsky, et al., 2007), the potential for universities to confidently contribute to outward FDI from the emerging economies has recently received more attention. EMNEs cooperate with external institutes for technological development. The availability of research collaboration projects and information contracts (Antonelli, 2008; Bekkers and Freitas, 2008) implies that as universities become more entrepreneurial and engaged with business, they undergo a move toward 'Academic Capitalism' (Slaughter and Leslie, 1997). Empirical research provides sustenance for the many reasons universities are attracted to EMNEs. In general this research finds that the benefits of physical closeness to universities are various. Focusing on local universities and university concentration, Huggins et al. (2009) argue that a geographical relationship between businesses and local universities in relevant knowledge sources can provide competitive advantages. In the context of research on the characteristics of the FDI by EMNEs that engage with universities for the purpose of innovation, Hewitt-Dundas (2013) finds that the probability of business-university cooperation increases where the business is experiencing a lack of information on technology, and that absorptive capacity increases with proximity between the universities and the private sector. This also links to the study what other facilities are required to attract technological expertise, and suggests reasons for the strong correlation between the relationships (Woodward et al., 2006).

There is a growing literature linking knowledge-seeking FDI location and agglomeration economies. In the classic 'ownership' advantage, technological superiority may be preconditioned; thus,

where a company has a competitive advantage over its rivals, this company will set up its subsidiaries in a foreign country through FDI. Some specific advantages in the host country may exist, meaning that expansion through FDI is preferred over expansion through exporting (Buckley and Casson, 1976; Dunning, 1979; 1988; 1993). In this sense, MNEs create and integrate knowledge as they seek to source and combine knowledge/technology and competences from their network of geographically spread subsidiaries. At the outset, foreign subsidiaries mainly adapt their own centrally-developed technology to local conditions (Dunning, 1998; Dunning & Lundan, 2008; Pearce, 1999a, b). These subsidiaries depend on their parent firm's specific assets such as R&D, product and process technology, and brand and management capabilities; and the role of the subsidiaries is to exploit these specific assets in the markets that their parent firms are trying to break into (Cantwell & Mudambi, 2005). Any local R&D is used to support the subsidiary's immediate competitiveness through the adaptation of products and processes to suit local characteristics (Hood & Young, 1982; Pearce, 1999a, b). Over time, MNEs in foreign locations switch their emphasis to the significance of strategic asset-seeking and knowledge sourcing (Dunning, 1998; Dunning & Lundan, 2008; Cantwell & Mudambi, 2011).

As noted above, in a consideration of access to advanced technology, South Korean MNEs, operating in a home country where the technological base in their sector is relatively weak, choose to invest in locations of R&D superiority in the US through the development of collaborations. Although we can, through a review of the literature, begin to develop an understanding of heterogeneous FDI motives, we still know little about its relative importance across the sub-industrial manufacturing levels. The key issue is whether knowledge-seeking FDI is present in all firms, or only in certain industries or locations. In addition, when engaging in technology sourcing, some technology intensive industries or knowledge intensive services are easier to access than others. Almeida (1996) concludes that Korean MNEs invest in US subsidiaries for 'knowledge sourcing', particularly to upgrade their technological ability in areas in which they are relatively weak. Serrapio and Dalton (1999) concludes that the nature of such investment changes with a firm's relative strength in the biotechnology and electronics industries; thus inward FDI to the US demonstrates more emphasis on gaining direct access to technology and expertise. Penner-Hahn and Shaver (2005) highlight that conducting R&D in a host country, and investing in R&D in the home country, is complementary rather than substitutional. From this perspective, the greatest benefit of local R&D in advanced countries is that it becomes a virtuous circle whereby the knowledge base or technology base of an industry or firm in an emerging country can foster greater benefits from technology-seeking FDI (Penner-Hahn and Shaver, 2005). In this context, we seek to capture the attractiveness of US state level R&D localities by measuring R&D spending at regional level. This leads to our second hypothesis:

Hypothesis 2: Proximity to higher education is more important than proximity to private sector research for technology sourcing FDI by EMNEs.

3.3 The relationship between technology sourcing FDI and market seeking FDI

In developing our third hypothesis, we seek to extend the arguments developed above, linked to the nature of development of EMNEs as expressed in the IDP, but also considering the policy initiatives employed in the west to use inward investment to foster economic development. Thus far, we have focused on technology seeking FDI, but now turn attention to market seeking FDI, and the scope for entry into the US by EMNEs. In Korea's case, the industrial sectors of Korea are associated with an export-intensive structure and Korea has changed the core of its industrial structure from labour intensive to knowledge intensive industries. The explanations of Korean industrial development are almost all directly or indirectly related to shifts in the industrial structure of the Korean economy, and the evolution of the world economy. Korean industries have transformed from labour-intensive industries (based on textiles and other light industries) through to heavy/chemical industries, and then to knowledge-intensive industries. The upgrading process reflects a more export-oriented industrial structure and emphasises value adding manufacturing. In addition, Korea's tendency towards technological development can be seen as a core motive for the initial engagement of Korean firms with foreign investment as their economy developed and market environments changed over time. The CSA/FSA matrix (Rugman, 1981) shows that as the technological or internationalisation behaviour gaps between two countries reflect different CSAs, the MNEs internalise in order to upgrade their FSAs. This can be clearly seen in the case of Korea where, as a result of the industrial changes from the 1980s to the present day (leading to an upgrade in status from emerging to advanced country), Korean firms have moved away from labour- and resource-intensive assets to capital- and knowledge-intensive ones. A possible motive for technology-seeking firms from emerging countries to invest in an advanced country is to access and obtain technological knowledge, rather than seeking to exploit their own proprietary technology at home.

We argue, that the way governments source technology, with systems of low bidders, offer opportunities for efficient EMNEs to enter western markets, overcoming LOF, and ensuring that their brands becoming better known as such, while this may be considered market seeking FDI, there is also an element of strategic asset seeking, strengthening brands for example. We therefore argue that such activity may be considered an extension of the arguments of Bhaumik et al (2016) that working with host country governments both enhances the development of FSAs by EMNEs, through further development of their technological capacity, but also acts as a signaling device in the internationalisation process. We therefore seek to extend this analysis, but exploring a further way in which emerging market firms can lever their home country advantages into internationalisation, and that is by exploiting how western governments source technology. There is a relatively well-developed literature on the nature of collaboration between governments and the private sector to foster innovation and also the nature of the relationship between the firm and the state in emerging market firms being supported through internationalisation. However, it has, to the best of our knowledge not been explored

formally as to the extent to which the interaction of these factors offers scope for market entry by EMNEs. There have been a number of high profile examples recently of emerging market firms internationalising through supplying western governments. Examples include Chinese and Korean investments in nuclear power and Indian investment in steel industry in the UK.

On the world stage, Korea is an ingénue, the newly industrialised country which is eager to catch up and converge with the developed world. According to Dunning's IDC, certain motives for location choice can be affected not only by the home country's investment position, but also by the development stage of host countries. Since host countries have different processes in terms of economic development, Korean MNEs take into account location incentives for setting up or acquiring foreign value-adding activities. Assuming that Korean firms find it easier to access developed countries' potential markets than those of the developing countries, we expect that Korean firms are more likely to invest in the US for market-seeking purposes. Therefore, we hold the position that South Korean outward FDI pursues both asset exploitation and asset exploration. In this sense, technology seeking FDI from emerging countries and R&D incentives through providing western governments can assist host regions to improve specialised clusters and integrate more profitably in global value chains (Carlsson, 2006; Cantwell and Piscitello, 2000). This has encouraged a growing interest in attracting the R&D activities of international business among regions and countries worldwide (Zanatta and Queiroz, 2007). R&D-intensive FDI can be realised mainly as an evolutionary progression whereby the manufacturing or marketing units already located in the locations are engaged in R&D after some time. The main aim of host location policy would be to expedite this evolution.

This can be encouraged through various policies supplying the better conditions for inward investors. Thus, it is critical to develop policy initiatives directed towards providing incentives for creating jobs and getting value for money from their spending, with the aim of transforming the original brain drain into brain circulation with benefits for local economic development and innovation system (Guimón, 2009). Equally important are the policies aimed at improving the country's research infrastructure, including public research hubs and government-driven technology parks and scientific platforms in key technology areas. In particular, technology parks are more attractive locations for EMNEs to be provided the necessary infrastructure and administrative support by local governments. They offer a pleasant suitable environment for EMNEs and local employees. This kind of services and incentives from the government increase the implementing an R&D centre and reduce costs and bureaucracy, all of which are important issues in the FDI location choice (Guimón, 2009). This therefore leads to our third hypothesis:

Hypothesis 3. Market seeking FDI by EMNEs is attracted to locations with high levels of government spending on innovation.

4. Empirical Analysis

To test our hypotheses, we analyse at the state level, Korean investment into the US, and relate this to state level characteristics. Our initial aim is to explore the relative importance of certain location factors, related to FDI motive.

4.1 Model specification

Location modelling has its roots in the work of authors, such as McFadden (1974) and Carlton (1979, 1983). The nature of the dependent variable (the number of Korean firms in each US state) lends itself to several options of nonlinear models, the most commonly used of which is the Poisson (count data) model. There are however, two issues with this type of model. First, it assumes that conditional variance is equal to an expected count. The consequence of applying the Poisson estimator in this case is that there are too many zero observations in the sample and so standard errors will be under-estimated and statistical significance will be higher. Second, the Poisson model assumes that Korean firms have a positive probability of being present in each state. However, in reality, in some US states, Korean firms have never been present. Therefore, a Zero Inflated Negative Binomial (ZINB) model is considered to be a better alternative to the Poisson model.

We set up variables in line with the research of Carlton (1983), Coughlin, et al. (1991), Devereux and Griffith (1998) Guimarães, et al. (2004), and Driffield, et al. (2010). R&D investment is a key factor in determining a high-tech industrial region. Therefore, this paper takes the ratio of in-state R&D expenditure to GDP as an indicator. A higher R&D/GDP ratio is an important sign of innovation capacity and reflects the R&D investment attending on high-tech products.

4.2. Explanatory variables

Building on the above hypotheses, the empirical literature that seeks to explain the variations in Korean technology-seeking FDI in the United States focused on the following factors: market size; labour force ability; and R&D locality.

Market Size

Many MNEs from emerging countries have the capacity to internationalise, and they seek to access areas with a high availability of capital resource. Thus we might expect a positive relationship between state size and FDI. Our research in this regards builds on empirical evidence from previous studies such as Stone and Jeon (1999), Grosse and Trevino (1996), Tallman (1988), Kyrkilis and Pantelidis (2003) and Thomas and Grosse (2001). The market size variable may simply serve as a proxy for potential consumption in each US state. Indeed, these studies suggest that the impact of market size on FDI is significant. In our study, we focus on the state as our unit of measurement, which suggests that state GDP and GDP per capita are the appropriate metrics here.

Labour force availability

The conventional response is that wage level is a key issue for those MNEs that engage in labour-intensive industries. However, a higher wage does not necessarily deter FDI into all industries because a higher wage can reflect a higher productivity level in specific cases. Rather than using labour costs or differentials, we use labour force based measures for measuring different proportions in terms of investment in high-tech industries and knowledge intensive service. By measuring the different proportions of labour in each state across categories such as unemployment, youth unemployment, proportion of high-tech industrial/knowledge intensive service employment (as an indicator of labour availability), we can assess their relative importance in FDI at state level.

Importance of R&D

The present analysis is consistent with these interpretations; Driffield and Love (2007) regard any FDI by a foreign investor as technology sourcing if it involves investment in a host sector which is more R&D intensive than the source sector, regardless of the absolute levels of R&D intensity in each. As Driffield, et al. (2010) argue, interactions flow between inward investors and their host locality, as does, more explicitly, knowledge and technology. In this context, we seek to capture the attractiveness of a region in terms of its stock of knowledge. Research and development effort captures the dynamism of a region by looking at the resources it allocates to innovation activities. R&D is widely considered as a means of fostering economic growth. A general overview on R&D spending at a regional level (as % of GDP) draws a baseline picture of the relative intensity of R&D effort at the regional level. The data included in the following table refers to the intramural R&D spending by the main three actors involved in R&D investments: firms, government and universities (higher education).

(Insert Table 2)

4.3 Data

This empirical study focuses on the distribution of Korean firms' presence in the US. For this, the study combines two main sources of data: the overseas investment statistics of The Export-Import Bank of Korea ("EXIM Bank") and OCED statistics.

The statistics data of EXIM bank shows the categorised Korean firms' numbers by year, the US states in which they are located, their industrial areas, the type of subsidiary, and the ratio invested across all industries. In addition, EXIM Bank has data on Korean firms' investing motives, namely: advance to local market; advanced technology introduction; exploitation of resources; export promotion; going to third country; taking advantage of host country's low wage structure; overcoming protective trade regulations; securing raw material; and others.

OECD statistics have data on regional demography, economic indicators, and innovation indicators such as patents applications in regions, R&D expenditure by sector, skilled labour by sector,

and so on. The OECD data show state proportions of R&D, numbers of patents, and availability of skilled labour in each state.

South Korean FDI location choice extends to the firms' specific motives for choosing a particular US state. It is of paramount importance for Korean enterprises entering the US market to be aware of the distribution of FDI locations by motive. Our research focuses upon the pattern of FDI location choice in the manufacturing sector from South Korea. This is especially interesting given the relationship between R&D development at state level and the location determinants of FDI by Korean firms. Our research period is from 1995 to 2008. This period was chosen not because of restrictions in FDI data generally, but because of the more limited data available on state R&D, this being our independent variable. The total number of manufacturing firms undertaking FDI in the United States during the 13-year period was 1,620. California was the leading recipient of South Korean FDI with 836 (table 3).

(Insert Table 3)

5. Results

(Insert Table 4)

In these estimation results, we can see several characteristics of South Korean firms' location choice in each state. Table 4 shows that the logarithm of GDP, PCT patent applications per million populations, and proportion R&D Higher-education sector/Total R&D are significant and positive. In terms of the different motives for FDI, the trend of technology-seeking is significant and negative, while the trend of market-seeking is significant and positive. Compared with other FDI motives, the proportion of knowledge intensive services compared to total services is significant and positive in market-seeking FDI from South Korea into the US. However, the proportion of R&D of higher-education sector/total R&D, technology-seeking is significant and positive while market-seeking is insignificant and negative. In other words, taken overall, South Korean manufacturing firms' location choice shows different location preferences according to their FDI motives.

The results clearly show that we have support for our hypotheses. The results are indicative of an adjustment process in the location choice of South Korean firms in the US states, depending on their FDI motive. Tables 4 shows that the firm's motive for undertaking FDI and the local R&D situation all have different influences over South Korean FDI location choices. We now discuss the implications of our results for each hypothesis in turn.

We have support for Hypothesis 1 (*Technology sourcing FDI by EMNEs seeks colocation with Higher Education (HE) institutions in the West*) in the results in Table 4. The results suggest that the presence of Higher Education (HE) institutions in the United States influences the location choice of

the South Korean manufacturing industry overall.

The results reported in Table 4 suggest that different R&D intensities in each state are attractive to Korean total manufacturing firms by motive. For firms with a market-seeking motive, access to higher education R&D is not significant. However, for firms with a tech-seeking motive, higher education R&D is significant and positive. In terms of firms with a technology-seeking motive, South Korean overall manufacturing firms' location choice is strongly related to the presence of a higher education institution in the US.

In other words, while Hypothesis 2 (*Proximity to higher education is more important than proximity to private sector research for technology sourcing FDI by EMNEs*) is fully supported by our empirical results, the results do provide empirical validity of the changing nature of South Korean outward FDI by different motives based on our Korean FDI model (Figure 3). This means that we can recognise the requirements of FSAs as an emerging country develops, and they may not be of the same form of FSA as a way of accessing the R&D type.

Finally, the results reported in Table 4 suggest that the existence of high levels of government R&D spending in the United States influences the location choice of the Korean market-seeking FDI location. (Hypothesis 3. *Market seeking FDI by EMNEs is attracted to locations with high levels of government spending on innovation*). This result supports our argument that certain FSAs within EMNEs may be more associated with efficiency-seeking motive than technological advantage. In particular, government R&D spending such as technology park is more attractive locations for EMNEs to be provided the necessary infrastructure and administrative support so that they can employ the incentives and reduce costs and bureaucracy.

6. Conclusions

The US is a key location for those Korean firms that wish to obtain a high-technology advantage and so internationalise for knowledge-seeking reasons. By linking Korean FDI data from the EXIM Bank with OECD statistics data sets, we have been able to extend the existing literature on this newly industrialised country by examining the various motives of firms within the high-tech industrial sectors.

South Korean outward FDI in the US has changed over time. Our findings extend the existing literature on South Korean by examining the drivers of high-tech industrial regions with various motives for investing there over time. In addition, the findings show that the motives partially explain the FDI location choice's distribution within the US separated according to the different motives for internationalisation. South Korean FDI for technology had been strongly focused on R&D activities particularly in the context of higher education R&D in the US over the period 1995-2008. However, local market seeking FDI by South Korean firms is located in regions that have different R&D activities to those sought by firms that do FDI for technology-seeking reasons. In addition, our results suggest that while the South Korean firms overall expanded to gain access to different R&D intensities in the US states, their location preferences differ by industry and FDI motive.

Our findings provide explicit evidence to facilitate the discussion about the relationship between the sources of R&D and the outward FDI location of EMNEs. There are a number of possible explanations for this, which suggest future avenues of research. For manufacturing firms with a market-seeking motive, access to higher education has less influence than other motives. This means that South Korean firms generally internationalise in order to find new markets. These implications add more nuances to the interpretation of MNEs' FDI motives, reflecting both their international expansion strategy and the upgrading effort for specific technology in economically advanced countries.

In addition, our results show that separating out the different motives for FDI partially explain the location choice distribution's different coefficients and significances. We investigated the different coefficients of FDI on the relationship between firms' tech-seeking and market-seeking motives. The technological improvement of South Korea's high-tech industries and knowledge intensive services may affect their motives for investing in the US. The United States has historically been the location for Korean firms for the motive of technology in terms of knowledge-seeking FDI. However, over time, firms started to invest in the US for the reason of market-seeking. The results suggest that despite their initial technological weakness, South Korean firms have changed their motives for undertaking FDI. This can be explained by developments in the internationalisation strategy of Korea.

Looking at the impact of Korea's internationalisation strategy on Korean firms' investments, we can see how the various location preferences are as a result of the specific advantages of the diverse locations. South Korean FDI for technology-seeking is strongly focused on locations with marked R&D activities, especially R&D tied to higher education institutions. Korean firms' investment for local market seeking is focused on markets with services and incentives from the local government. In other words, the different motives for FDI drive Korean firms to locations which have different R&D intensities in each US state. Our research suggests that while South Korean firms generically expanded to gain access to different R&D intensities in the US states, their location preferences are influenced by their industry sector and their motives for undertaking FDI. Taken together, these findings represent an important contribution to the existing literature on technology seeking EMNEs. Our results suggest that EMNEs in advanced countries, irrespective of their initial motive for FDI, see enhancement to their competitiveness, which particularly reflects the dynamic relationship between R&D type and FDI motive over time.

Three main policy implications emerge from the results. First, the determinants for R&D sectors play a different role across the knowledge intensive industries by different FDI motive as a country develops. Thus, Korean case of knowledge intensive industries for strategic asset seeking FDI could help upgrade international strategies of MNEs from emerging countries. Second, it is important for EMNEs to understand the nature of outward FDI for strategic asset seeking, and how it is impacted by their economic position or the home country's industrial restructuring process. Given the importance of specific industrial sectors in a country's long-term economic development, it is crucial for MNEs from the emerging countries to allocate more supportive resources to certain locations regarding their

internationalising strategies as EMNEs catch up with advanced technologies and move on to considering other motivations and location choices. In terms of core competence, internationalisation is part of the development process of the EMNEs, as they seek to upgrade technologically and enhance new competences in developed countries.

References

- Abramovsky, L., Harrison, R., & Simpson, H. (2007). University research and the location of business R&D. *The Economic Journal*, 117(519), C114-C141.
- Almeida, P. (1996). Knowledge sourcing by foreign multinationals: Patent citation analysis in the US semiconductor industry. *Strategic management journal*, 17(S2), 155-165.
- Antonelli, C. (2008). *Localised technological change: towards the economics of complexity*. Routledge.
- Bhaumik, S. K., & Driffield, N. (2011). Direction of outward FDI of EMNEs: Evidence from the Indian pharmaceutical sector. *Thunderbird international business review*, 53(5), 615-628.
- Bekkers, R., & Freitas, I. M. B. (2008). Analysing knowledge transfer channels between universities and industry: To what degree do sectors also matter?. *Research policy*, 37(10), 1837-1853.
- Bhaumik, S. K., Driffield, N., & Pal, S. (2010). Does ownership structure of emerging-market firms affect their outward FDI? The case of the Indian automotive and pharmaceutical sectors. *Journal of International Business Studies*, 41(3), 437-450.
- Bhaumik, S. K., Driffield, N., & Zhou, Y. (2016). Country specific advantage, firm specific advantage and multinationality—Sources of competitive advantage in emerging markets: Evidence from the electronics industry in China. *International Business Review*, 25(1), 165-176.
- Blomström, M., Kokko, A., & Mucchielli, J. L. (2003). The economics of foreign direct investment incentives. In *Foreign direct investment in the real and financial sector of industrial countries* (pp. 37-60). Springer, Berlin, Heidelberg.
- Buckley, P., & Casson, M. (1976). *The future of multinational enterprise*. London: Macmillan.
- Buckley, P.J., Clegg, L.J., Cross, A.R., Liu, X., Voss, H. and Zheng, P.(2007). The determinants of Chinese outward foreign direct investment. *Journal of international business studies*, 38(4), pp.499-518.
- Cantwell, J. (1989). *Technological innovation and multinational corporations*. Cambridge, MA: B. Blackwell.
- Cantwell, J., & Janne, O. (1999). Technological globalisation and innovative centres: the role of corporate technological leadership and locational hierarchy. *Research policy*, 28(2), 119-144.

Cantwell, J., & Mudambi, R. (2005). MNE competence-creating subsidiary mandates. *Strategic management journal*, 26(12), 1109-1128.

Cantwell, J. A., & Mudambi, R. (2011). Physical attraction and the geography of knowledge sourcing in multinational enterprises. *Global Strategy Journal*, 1(3-4), 206-232.

Cantwell, J., & Piscitello, L. (2000). Accumulating technological competence: its changing impact on corporate diversification and internationalization. *Industrial and corporate change*, 9(1), 21-51.

Carlsson, B. (2006). Internationalization of innovation systems: A survey of the literature. *Research policy*, 35(1), 56-67.

Carlton, D. W. (1979). Vertical integration in competitive markets under uncertainty. *The Journal of Industrial Economics*, 27(3), 189-209.

Carlton, D. W. (1983). The location and employment choices of new firms: an econometric model with discrete and continuous endogenous variables. *The Review of Economics and Statistics*, 26(3), 440-449.

Child, J., & Rodrigues, S. B. (2005). The internationalization of Chinese firms: a case for theoretical extension?. *Management and organization review*, 1(3), 381-410.

Chung, W., & Alcácer, J. (2002). Knowledge seeking and location choice of foreign direct investment in the United States. *Management Science*, 48(12), 1534-1554.

Chung, W., & Alcácer, J. (2002). Knowledge seeking and location choice of foreign direct investment in the United States. *Management Science*, 48(12), 1534-1554.

Coughlin, C. C., Terza, J. V., & Arromdee, V. (1991). State characteristics and the location of foreign direct investment within the United States. *The Review of Economics and Statistics*, 73(4), 675-683.

Deng, P. (2004). Outward investment by Chinese MNCs: Motivations and implications. *Business horizons*, 47(3), 8-16.

Devereux, M. P., & Griffith, R. (1998). Taxes and the Location of Production: Evidence from a Panel of US Multinationals. *Journal of public Economics*, 68(3), 335-367.

De Silva, D.G. and McComb, R.P. (2009) Research universities and regional high0tech start-ups and

exit. MPRA paper no. 13022.

Driffield, N., & Love, J. H. (2003). Foreign direct investment, technology sourcing and reverse spillovers. *The Manchester School*, 71(6), 659-672.

Driffield, N., & Love, J. H. (2005). WHO GAINS FROM WHOM? SPILLOVERS, COMPETITION AND TECHNOLOGY SOURCING IN THE FOREIGN-OWNED SECTOR OF UK MANUFACTURING. *Scottish Journal of Political Economy*, 52(5), 663-686.

Driffield, N., & Love, J. H. (2007). Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis. *Journal of international business studies*, 38(3), 460-473.

Driffield, N., Love, J. H., & Menghinello, S. (2010). The multinational enterprise as a source of international knowledge flows: Direct evidence from Italy. *Journal of International Business Studies*, 41(2), 350-359.

Driffield, N., Mickiewicz, T., & Temouri, Y. (2016). Ownership control of foreign affiliates: A property rights theory perspective. *Journal of World Business*, 51(6), 965-976.

Dunning, J. H. (1979). Explaining changing patterns of international production: in defence of the eclectic theory. *Oxford bulletin of economics and statistics*, 41(4), 269-295.

Dunning, J.H. (1981). 'Explaining the international direct investment position of countries: towards a dynamic or developmental approach', *Weltwirtschaftliches Archiv* 119 position of countries, *Journal of International Business Studies*, 11(1), 9-31.

Dunning, J. H. (1986). The investment development cycle revisited. *Weltwirtschaftliches Archiv*, 122(4), 667-676

Dunning, J. H. (1988). Explaining international production. London: Unwin Hyman.

Dunning, J.H. (1993) *Multinational Enterprises and the Global Economy*, Addison Wesley, Workingham, England.

Dunning, J. H. (1998). Location and the multinational enterprise: a neglected factor?. *Journal of international business studies*, 29(1), 45-66.

Dunning, J. H., & Lundan, S. M. (2008). *Multinational Enterprises and the Global Economy*. (2nd ed). Cheltenham, UK; Northampton, MA: Edward Elgar.

- Dunning, J. H., & Narula, R. (1995). The R&D activities of foreign firms in the United States. *International Studies of Management & Organization*, 25(1-2), 39-74.
- Fosfuri, A., & Motta, M. (1999). Multinationals without advantages. *The Scandinavian Journal of Economics*, 101(4), 617-630.
- Florida, R. (1997). The globalization of R&D: Results of a survey of foreign-affiliated R&D laboratories in the USA. *Research policy*, 26(1), 85-103.
- Gaffney, N., Kedia, B., & Clampit, J. (2013). A resource dependence perspective of EMNE FDI strategy. *International Business Review*, 22(6), 1092-1100.
- Grosse, R., & Trevino, L. J. (1996). Foreign direct investment in the United States: An analysis by country of origin. *Journal of international business studies*, 27(1), 139-155.
- Guillén, M. F., & García-Canal, E. (2009). The American model of the multinational firm and the “new” multinationals from emerging economies. *The Academy of Management Perspectives*, 23(2), 23-35.
- Guimón, J. (2009). Government strategies to attract R&D-intensive FDI. *The Journal of Technology Transfer*, 34(4), 364-379.
- Guimaraes, P., Figueiredo, O., & Woodward, D. (2004). Industrial location modeling: extending the random utility framework. *Journal of Regional Science*, 44(1), 1-20.
- Hewitt-Dundas, N. (2013). The role of proximity in university-business cooperation for innovation. *The Journal of Technology Transfer*, 38(2), 93-115.
- Hood, N. and Young, S., 1982. US multinational R&D: corporate strategies and policy implications for the UK. *Multinational Business*, 2(1), pp.10-23.
- Huggins, R., & Johnston, A. (2009). The economic and innovation contribution of universities: a regional perspective. *Environment and Planning C: Government and Policy*, 27(6), 1088-1106.
- Kedia, B., Gaffney, N., & Clampit, J. (2012). EMNEs and Knowledge-seeking FDI. *Management International Review*, 52(2), 155-173.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication

of technology. *Organization science*, 3(3), 383-397.

Kuemmerle, W. (1999). The drivers of foreign direct investment into research and development: an empirical investigation. *Journal of international business studies*, 30(1), 1-24.

Kim, J.-Y., Driffield, N., & Love, J. (2018, in press). Outward FDI from South Korea: The relationship between national investment position and location choice. In D. Castellani et al. (Eds.), *Contemporary issues in international business. The academy of international business*. Springer Nature: Cham.

Kim, J., & Rhee, D. K. (2009). Trends and Determinants of Korean Outward FDI. *The Copenhagen Journal of Asian Studies*, 27(1), 126-154.

Kyrkilis, D. and Pantelidis, P. (2003). Macroeconomic determinants of outward foreign direct investment. *International Journal of Social Economics*, 30(7): 827-836.

Luo, Y., & Tung, R. L. (2007). International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies*, 38(4), 481-498.

McFadden, D. (1974). The measurement of urban travel demand. *Journal of public economics*, 3(4), 303-328.

Mathews, J. A. (2002). *Dragon multinationals: A new model of global growth*. New York: Oxford University Press.

Mathews, J. A. (2006). Dragon multinationals: New players in 21st century globalization. *Asia Pacific journal of management*, 23(1), 5-27.

Meyer, K., & Xia, H. (2012). British entrepreneurs, global visions. *Business Strategy Review*, 23(2), 52-57.

Mudambi, R. (2008). Location, control and innovation in knowledge-intensive industries. *Journal of economic Geography*, 8(5), 699-725.

Mudambi, R., & Mudambi, S. M. (2005). Multinational enterprise knowledge flows: The effect of government inward investment policy. *MIR: Management International Review*, 45(2), 155-178.

Narula, R. (2012). Do we need different frameworks to explain infant MNEs from developing countries?. *Global Strategy Journal*, 2(3), 188-204.

- Pearce, R. D. (1999a). Decentralised R&D and strategic competitiveness: globalised approaches to generation and use of technology in multinational enterprises (MNEs). *Research Policy*, 28(2), 157-178.
- Pearce, R. (1999b). The evolution of technology in multinational enterprises: the role of creative subsidiaries. *International Business Review*, 8(2), 125-148.
- Penner-Hahn, J., & Shaver, J. M. (2005). Does international research and development increase patent output? An analysis of Japanese pharmaceutical firms. *Strategic Management Journal*, 26(2), 121-140.
- Peng, M. W. (2001). The resource-based view and international business. *Journal of management*, 27(6), 803-829.
- Peng, M. W., Wang, D. Y. L., & Jiang, Y. (2008). An institution based view of international business strategy: A focus on emerging economies. *Journal of International Business Studies*, 39(5), 920–936.
- Porter, M.E., (1990). The competitive advantage of nations. *Harvard business review*, 68(2), pp.73-93.
- Puga, D., & Venables, A. J. (1996). The spread of industry: spatial agglomeration in economic development. *Journal of the Japanese and International Economies*, 10(4), 440-464.
- Ramamurti, R. (2008). What have we learned about EMNEs. In R. Ramamurti & J. Singh (Eds.), *Emerging multinationals from emerging markets*. Cambridge, UK: Cambridge University Press.
- Ramamurti, R. (2012). What is really different about emerging market multinationals?. *Global Strategy Journal*, 2(1), 41-47.
- Rugman, A. M. (1981). *Inside the multinationals: The economics of international markets*. New York: Columbia University Press.
- Rugman, A. M. (1996). The firm-specific advantages of Canadian multinationals. *The Theory of Multinational Enterprises: The Selected Scientific Papers of Alan M. Rugman*, 1(2), 129.
- Rugman, A. M. (2010). Reconciling internalization theory and the eclectic paradigm. *Multinational Business Review*, 18(2), 1-12.
- Serapio, M. G., & Dalton, D. H. (1999). Globalization of industrial R&D: an examination of foreign direct investments in R&D in the United States. *Research Policy*, 28(2), 303-316.

Shaver, J. M. (1998). Do foreign-owned and US-owned establishments exhibit the same location pattern in US manufacturing industries?. *Journal of international business studies*, 29(3), 469-492.

Slaughter, S., & Leslie, L. L. (1997). *Academic capitalism: Politics, policies, and the entrepreneurial university*. The Johns Hopkins University Press, 2715 North Charles Street, Baltimore, MD 21218-4319.

Stone, S. F. and Jeon, B. N. (1999). Gravity-Model specification for foreign direct investment: A case of the Asia-Pacific economies. *Journal of Business and Economic Studies*, 5(1): 33-42.

Tallman, S. B. (1988). Home country political risk and foreign direct investment in the United States. *Journal of International Business Studies*, 19(2): 219-234.

Thomas, D. E. and Grosse, R. (2001). Country-of-origin determinants of foreign direct investment in an emerging market: The case of Mexico. *Journal of International Management*, 7(1): 59-79.

Woodward, D., Figueiredo, O., & Guimaraes, P. (2006). Beyond the Silicon Valley: University R&D and high-technology location. *Journal of Urban Economics*, 60(1), 15-32.

Zanatta, M., & Queiroz, S. (2007). The role of national policies on the attraction and promotion of MNEs' R&D activities in developing countries. *International Review of Applied Economics*, 21(3), 419-435.

Table 1. South Korean FDI and motives in the US 1980-2016

Unit: million US dollar

Period	Total FDI	Market-seeking FDI		Tech-seeking FDI	
		FDI total	Proportion	FDI total	Proportion
1990s	7,569	1,165	15.4%	1,028	13.6%
2000s	21,685	8,406	38.8%	3,598	16.6%
2010-2016	48,024	23,650	49.2%	7,767	16.2%

Source: Calculated from data of Export-Import Bank of Korea

Table 2. Independent variables for estimation

Name	Description
RGDP	(Log of) GDP in US dollars PPP
RGDPPC	(Log of) GDP per capita in US dollars PPP
RUR	Total unemployment rate
RYUNR	Youth Unemployment rate
RHM	High and medium high-technology manufacturing (as % of total manufacturing)
RKIS	Knowledge intensive services (as % of total service)
RPCT	PCT patent applications per million population
RRD	Total R&D/GDP
RGRD	Total R&D Government sector/ Total R&D
RHERD	Total R&D Higher-education sector/ Total R&D
TREND	Tendency toward increase or decrease of South Korean firms

Table 3. Numbers of South Korean new entry firms in manufacturing in the US from 1995 to 2008

State	No. of new manufacturing firms	State	No. of new manufacturing firms
Alabama	48	Montana	1
Alaska	3	Nebraska	0
Arizona	18	Nevada	19
Arkansas	1	New Hampshire	0
California	836	New Jersey	74
Colorado	11	New Mexico	3
Connecticut	4	New York	79
Delaware	34	North Carolina	6
District of Columbia	2	North Dakota	2

Florida	26	Ohio	11
Georgia	37	Oklahoma	2
Hawaii	6	Oregon	22
Idaho	1	Pennsylvania	17
Illinois	27	Rhode Island	0
Indiana	2	South Carolina	4
Iowa	3	South Dakota	0
Kansas	3	Tennessee	7
Kentucky	3	Texas	57
Louisiana	24	Utah	10
Maine	1	Vermont	0
Maryland	13	Virginia	21
Massachusetts	14	Washington	41
Michigan	21	West Virginia	0
Minnesota	4	Wisconsin	2
Mississippi	2	Wyoming	0
Missouri	0	Total	1,620

Calculated from data of Export-Import Bank of Korea

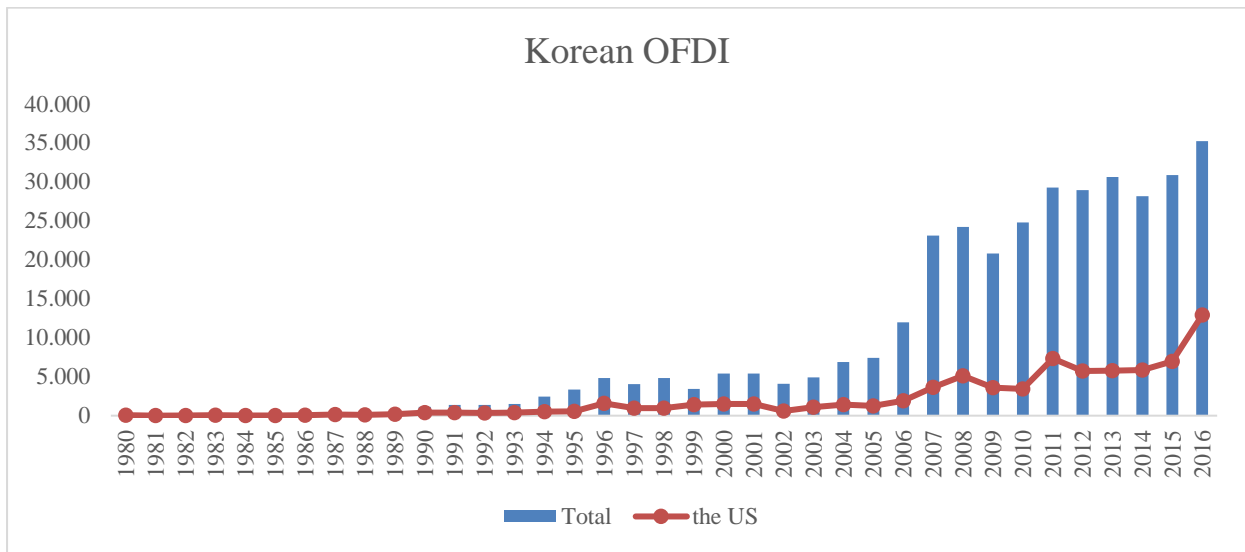
Table 4. Korean manufacturing FDI in the US

VARIABLES	(1)	(2)	(3)
	Overall	Tech-seeking	Market-seeking
RGDP	0.850***	0.780***	0.635***
RGDPPC	-0.414	-0.244	-1.334**
RUR	16.477	8.737	-22.537
RYUNR	-5.137	-7.101	8.896
RHMT	-2.284***	-2.366*	-2.652*
RKIS	0.009	-0.002	0.028***
RPCT	0.004***	0.003	0.005**
RRD	10.819	10.587	-0.8278
RGRD	0.292	0.257	2.000**
RHERD	1.897**	1.996**	-0.948
TREND	0.002	-0.064**	0.173***
Observation	663	663	663
Non-zero	256	99	85

Significance level: *** p<0.01, ** p<0.05, * p<0.1

Figure 1. South Korea OFDI flows in the US and all over the world

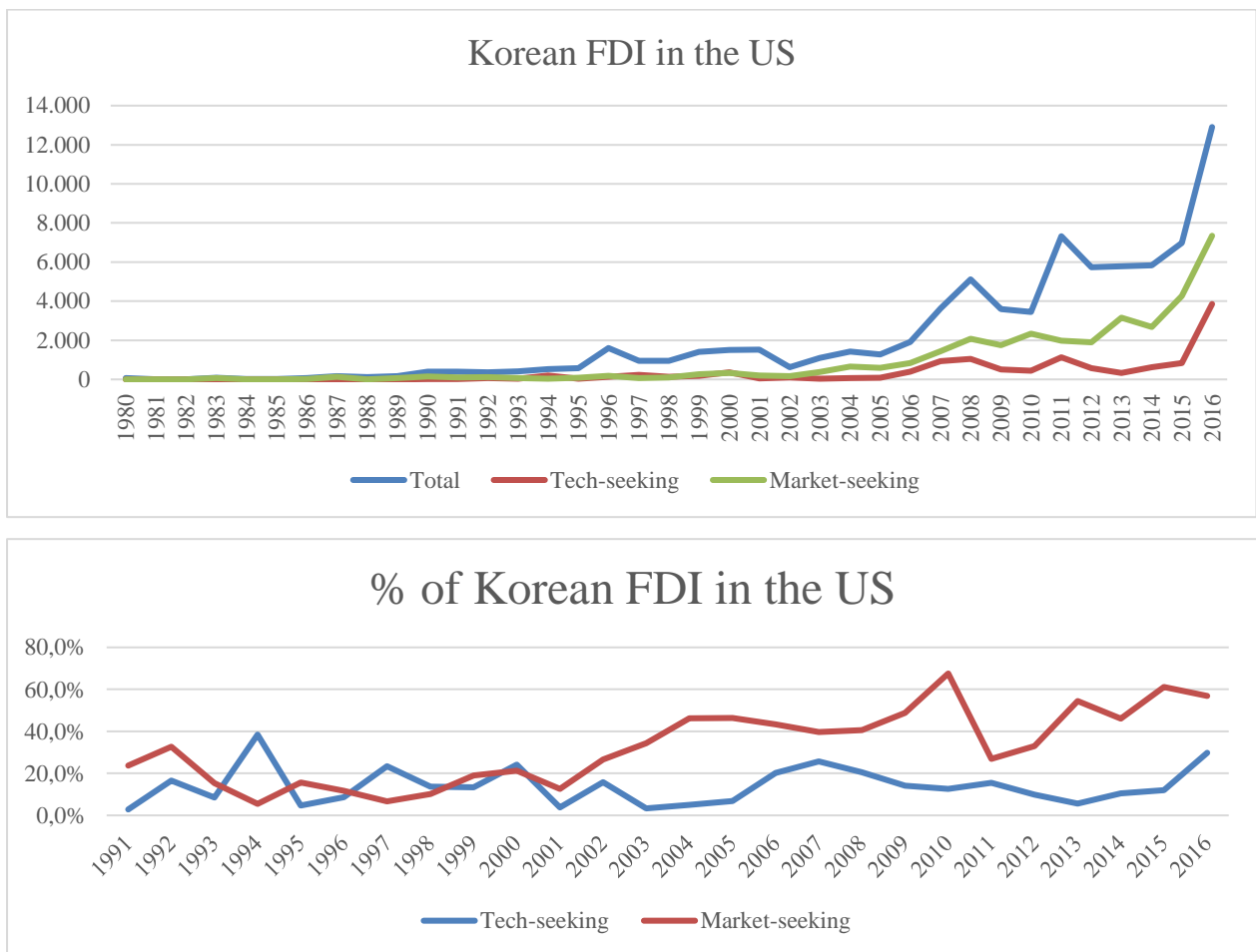
(Unit: million US dollars)



Source: Calculated from data of The Export- Import Bank of Korea

Figure 2. South Korea OFDI flows in the US by motive

(Unit: million US dollars/%)



Source: Calculated from data of Export-Import Bank of Korea

Figure 3. Korean FDI model in developed countries

