Do Affiliate Strategic Roles Within MNEs Matter for Divestment Decisions, for Reverse Knowledge Transfer, and for Lateral Knowledge Transfer?

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Declaration

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Signature: .....

UNIVERSITY OF SUSSEX

DEGREE OF DOCTOR OF PHILOSOPHY

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SUMMARY

This PhD thesis seeks to explore the importance of affiliate strategic roles in determining affiliate survival in foreign markets, reverse knowledge transfer from the affiliate to the parent company, and lateral knowledge transfer between affiliates. I group affiliates into four different types including upstream, horizontal, downstream and unrelated affiliates based on their activities within multinational enterprises' global value chains. Affiliates that are either upstream or downstream in the value chains are regarded as vertical affiliates. Robust to a number of different specifications and drawing on large MNE parent-affiliate linkage data in the period from 2004 to 2016, I find that the likelihood to divest poorly-performing affiliates and the effect of intra-MNE knowledge transfer are contingent on affiliate strategic roles. More specifically, the likelihood to divest poorly-performing affiliates is higher when the overseas affiliates are vertical rather than horizontal FDI, and when they are downstream, rather than upstream, in the MNE value chains. Besides, I find that the performance benefits from intra-MNE knowledge transfer are greater when the overseas affiliates are horizontal rather than vertical FDI, and when they undertake upstream, rather than downstream, activities. This thesis contributes to the international business literature by emphasizing the importance of affiliate strategic roles.

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was presented at the 2018 AIB-UKI Doctoral Colloquium and at the 2018 BAM Doctoral Symposium, and I find that presenting my thesis chapters in conferences, doctoral colloquium and symposium is extremely useful.

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List of Abbreviations

BvD: Bureau van Dijk

CEPII: Centre d'Etudes Prospectives et d'Informations Internationales

FDI: Foreign Direct Investment

FSA: Firm-specific Advantages

GDP: Gross Domestic Product

GMM: Generalised Method of Moments

GVC: Global Value Chain

IAS: International Accounting Standards

IATA: Intangible Assets to Total Assets ratio

IB: International Business

IV: Instrumental Variable

KBV: Knowledge-based View

LKT: Lateral Knowledge Transfer

MNE: Multinational Enterprise

NACE REV 2: Statistical classification of economic activities in the European Community

OECD: Organisation for Economic Cooperation and Development

OLS: Ordinary Least Squares

ONS: Office for National Statistics

PPP: Purchasing Power Parity

PSM: Propensity Score Matching

RBV: Resource-based View

RKT: Reverse Knowledge Transfer

ROS: Return on Sales

UNCTAD: United Nations Conference on Trade and Development

WDI: World Development Indicators

WGI: Worldwide Governance Indicators

WIR: World Investment Report

Chapter 1

Introduction

1.1 Introduction

Historically, foreign affiliates and their strategic roles have been gaining importance in the international management literature (White & Poynter, 1984; Harrigan, 1985; Bartlett & Ghoshal, 1986; Birkinshaw & Morrison, 1995; Ambos, Ambos & Schlegelmilch, 2006; Mudambi, 2008; Rugman, Verbeke & Yuan, 2011; Mudambi & Puck, 2016; Verbeke, Kano & Yuan, 2016). In this PhD thesis, the focus of all three empirical chapters is on the strategic roles played by the affiliates within their multinational enterprises (MNEs). The importance of these affiliate roles is then examined in the context of three issues including foreign affiliate divestments in Chapter two, as well as reverse knowledge transfer from the foreign affiliates to parent companies in Chapter three, and lateral knowledge transfer between foreign affiliates in Chapter four. More specifically, I categorize overseas affiliates according to their strategic roles to one of four types: (1) horizontal; (2) upstream GVC-integrated; (3) downstream GVC-integrated; and (4) unrelated.

Each affiliate in the data reports its shareholders' information, such as equity control, names and locations. I can therefore build unique parent-affiliate linkages worldwide. I recognise a parent-affiliate linkage when the parent owns at least 25% of the equity shares of the affiliate, and I use the word "affiliate" rather than "subsidiary" in the empirical analyses. My data samples include 1,762 minority-owned affiliates whose parents own less than half but at least 25% of their equity shares, and 27,909 majority-owned affiliates whose parents control at least half of their shares. I argue that minority-owned affiliates, although accounting for a small portion of the total samples, have important strategic roles within their parent company value chains, and that 25% equity is a significant share which entitles the parent non-negligible power and influence over the affiliate. In fact,

some very recent studies including for example Contractor, Yang & Gaur (2016) also include affiliates who have a minimum of 25% ownership controlled by their parent companies when exploring the effects of parent company firm-specific assets on affiliate profitability. In addition, I re-ran the analyses by only using majority-owned affiliates in all three empirical chapters, and the results are largely unchanged, indicating that the results are not distorted by including minority-owned affiliates.

1.2 Affiliate strategic roles

Inspired by the exponential growth of global foreign direct investment and the pivotal role of the affiliates in sustaining MNE competitiveness in fierce global competition, increasing scholarly attention has been paid to the affiliates of MNEs as a unit of analysis in strategic management and international management research since the early 1980s. The study of White & Poynter (1984) was one of the earliest to distinguish affiliates into different types, and other later works published in refereed outlets include Bartlett & Ghoshal (1986), Jarillo & Martínez (1990), Gupta & Govindarajan (1991, 1994), Birkinshaw & Morrison (1995) and Taggart (1997a, 1997b, 1998), among others.

Among these early works, the most influential is the one by Bartlett & Ghoshal (1986) which is a cornerstone in affiliate typology research. In their work, affiliates are distinguished into different types based on a framework matrix consisting of the importance of affiliate competence and host country locational advantages. Another influential work in this stream of affiliate typology research is Gupta & Govindarajan (1991) who distinguish affiliates into local innovators, implementors, integrated players and global innovators in their intra-MNE knowledge flow framework.

There are some patterns that I can discern in the literature on affiliate role types. Different researchers have attempted to adopt different sets of dimensions when proposing affiliate role frameworks, and in many earlier studies, they often adopt a set of two dimensions (e.g., affiliate competence and the strategic importance of host country locations in Bartlett & Ghoshal (1986)) to capture different affiliate roles. Despite the different affiliate roles proposed by various researchers, a role proposed in one study is sometimes similar or even identical to one proposed in another study. Recently, some studies have gone beyond simply providing a typology, and they have empirically tested how affiliates with different roles have different outcomes. Besides, in the recent international management literature, there emerges an emphasis on the role of affiliates within MNE value chains. These patterns are illustrated in more detail below.

First, one striking tendency presented in most affiliate role studies is the use of dimensions when categorizing affiliates into differentiated roles. Many affiliate roles are proposed in the literature, which is because of the different dimensions used in previous studies when categorizing affiliate roles. Table 1.1 presents a list of studies on affiliate role types including the affiliate role classifications in each study. These strategic dimensions include product, value added and market scope (White & Poynter, 1984); affiliate competence and the importance of the local environment (Bartlett & Ghoshal, 1986); integration and local responsiveness (Jarillo & Martínez, 1990; Taggart, 1997a, 1998); intra-MNE knowledge inflows and outflows (Gupta & Govindarajan, 1991, 1994); procedural justice and autonomy (Taggart, 1997b); competence and the scope of activities (Benito, Grøgaard & Narula, 2003); competence creating and exploiting (Cantwell & Mudambi, 2005); capability creation and utilization, product and geographic scope (Enright & Subramanian, 2007); affiliate resource development (Cavanagh & Freeman,

Table 1.1: Affiliate typologies and value chain

Studies	Classifications
White & Poynter (1984)	Miniature replica; Marketing satellite; Rationalized manufacturer; Product specialist; Strategic independent
Bartlett & Ghoshal (1986)	Strategic leader; Contributor; Implementer; Black hole
Jarillo & Martínez (1990)	Receptive subsidiary; Active subsidiary; Autonomous subsidiary
Gupta & Govindarajan (1991)	Global innovator; Integrated player; Implementor; Local innovator
Birkinshaw & Morrison (1995)	World mandate; Specialized contributor; Local implementer
Taggart (1997a)	Receptive subsidiary; Constrained independent; Autonomous subsidiary; Quiescent subsidiary
Taggart (1997b)	Partner; Collaborator; Militant; Vassal subsidiaries
Taggart (1998)	Receptive subsidiary; Active subsidiary; Autonomous subsidiary; Quiescent subsidiary
Benito, Grøgaard & Narula (2003)	Highly specialized unit; Strategic center; Miniature replica; Single-activity unit; Multi-activity unit
Cantwell & Mudambi (2005)	Competence-creating; Competence-exploiting
Ambos, Ambos & Schlegelmilch (2006)	Global innovator; Integrated player; Implementer; Local innovator
Enright & Subramanian (2007)	Leader; Innovator; Implementer; Observer
Cavanagh & Freeman (2012)	Implementer; Local innovator; Specialised contributor; Centre of excellence
Affiliate activities in value chain	
Harrigan (1985)	Upstream units; Downstream units
Porter (1985)	Inbound logistics; Operations; Outbound logistics; Marketing and sales; Service and four supporting activities
Porter (1986)	Upstream value activities; Downstream value activities
Benito (1997)	Horizontal; Non-horizontal; Related; Unrelated
Anand & Delios (1997)	Downstream assets (wholesale and retail industries)
Mudambi (2008)	Upstream activities; Downstream activities; Middle activities
Rugman, Verbeke & Yuan (2011)	Innovation; Production; Sales; Administrative support
Mudambi & Puck (2016)	Upstream activities; Downstream activities
Verbeke & Asmussen (2016)	Upstream activities; Downstream activities
Verbeke, Kano & Yuan (2016)	Upstream activities; Downstream activities
Driffield, Love & Yang (2016)	Upstream FDI; Downstream FDI; Vertical FDI; Horizontal FDI
Hernández & Pedersen (2017)	Upstream activities; Downstream activities; Middle-end activities

2012) and global value chains (Porter, 1985; Anand & Delios, 1997; Mudambi, 2008; Rugman, Verbeke & Yuan, 2011, among others).

Second, notwithstanding the fact that researchers have their own preferred dimensions when classifying affiliates into different role types, there exists a certain degree of commonality in the affiliate types proposed in different studies; that is to say, an affiliate type proposed in one work can be identical to one proposed in another. For instance, a foreign affiliate can be specialised in a small range of production, or have distinctive knowledge in advertising, or in selling activities, and this specialised role was classified as the contributor in Bartlett & Ghoshal (1986). This contributor role is similar to the role of the rationalised manufacturer or product specialist depending on the extent of the product range, or the role of marketing satellite in the study by White & Poynter (1984). The contributor is also similar to a single-activity unit or a highly specialised unit, as proposed by Benito, Grøgaard & Narula (2003), or acts as the specialised contributor (Birkinshaw & Morrison, 1995). In a similar vein, the world mandate role in Birkinshaw & Morrison (1995) is analogous to the strategic leader role proposed by Bartlett & Ghoshal (1986), the active role in Jarillo & Martínez (1990), or the integrated player role in Gupta & Govindarajan (1991).

Third, some recent international management literature is more inclined to differentiate affiliates based on their activities within the value chain. In fact, the use of upstream and downstream units can be traced back to 1980s, and some influential work, including for example Porter (1985) who decomposes value chains into a range of primary and supporting activities which have been rooted in a number of recent studies on affiliate roles, and Harrigan (1985) who proposes that vertical integration includes upstream and

downstream units. Anand & Delios (1997) is one of the earliest studies in the international business (IB) literature focusing on downstream affiliates, e.g., retail and wholesale. Likewise, the distinction between different affiliates in terms of their activities in the MNE value chains is also employed in Rugman, Verbeke & Yuan (2011) who classify affiliates into innovation, production, sales and administration based on their unique, idiosyncratic resource bundling, both internally and externally. This is also echoed in Mudambi (2008), who uses Apple company's fragmentation of value chain activities worldwide as an example, and categorizes the strategic positions of affiliates according to their value-adding activities to parent companies into upstream activities (e.g., design, R&D and component production), as well as middle-end/horizontal activities (e.g., manufacturing) and downstream ones (e.g., brand management, marketing, sales and after-sales services). This classification of upstream, middle-end/horizontal, and downstream activities is also employed in Mudambi & Puck (2016) and Verbeke & Asmussen (2016), who focus on the value adding activities of different affiliates from global and regional aspects, respectively. Such classification has also been addressed in other recent work such as Verbeke, Kano & Yuan (2016) who propose that the regional effect on affiliate capabilities may vary according to their positions within MNE value chains, and Hernández & Pedersen (2017) who review the activities in MNE global value chains.

Fourth, the affiliate roles in many of the earlier studies are largely built upon the observed or idealised strategies of the national affiliates of MNEs (e.g., White & Poynter, 1984; Bartlett & Ghoshal, 1986; Gupta & Govindarajan, 1991; Enright & Subramanian, 2007; Cavanagh & Freeman, 2012). White & Poynter (1984), for example, using Canadian-based affiliates develop a framework consisting of differentiated affiliate types. A similar

approach is employed in Bartlett & Ghoshal (1986) who propose four differentiated affiliate roles according to the observed strategies of the national affiliates. Increasingly, scholarly attempts have been devoted to exploring the impact of affiliate roles, and more specifically, to empirically examining how affiliates with different roles have different outcomes. Building upon their earlier work on affiliate role classifications, Gupta & Govindarajan (1994), for example, empirically examine the extent to which affiliates with different roles differ at the level of their lateral interdependence and the need for autonomous initiative. In a similar vein, some existing literature have explored the extent to which affiliate role types affect the barriers to exiting the market (Harrigan, 1985), the lateral linkages between the affiliate and its corporate affiliates and performance outcomes (Birkinshaw & Morrison, 1995), entry mode and subsequent performance outcomes (Anand & Delios, 1997), and intra-firm knowledge transfer (Ambos, Ambos & Schlegelmilch, 2006).

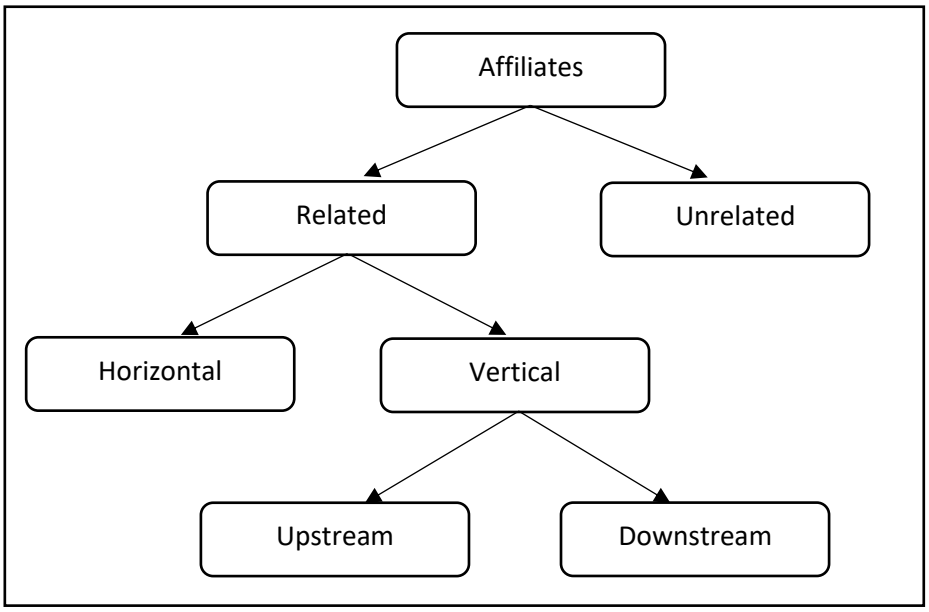
In line with these studies, I categorize affiliates into different types according to their activities within MNE value chains. The reasons for adopting this approach are twofold. First, one tendency in the more recent IB literature is to explore the value chain positioning of affiliates and to evaluate the outcome (see, for example, Rugman, Verbeke & Yuan, 2011 and Verbeke & Asmussen, 2016). In the past few decades, we have witnessed fast-growing attention to the global value chain and its implications for multinational enterprises, in terms of not only performance outcomes but also internal and external governance structures (Strange & Humphrey, 2018). Decomposing value chain activities across geographical boundaries has been generally regarded as one important option for firms to gain benefits from scattered locational advantages. This growing trend towards fine-sliced value chain activities has, for example, triggered very

recent calls for special issues on the theme of the global value chain and its implications for international business including the *Global Strategy Journal*, the *Journal of World Business*, and the *Journal of International Business Policy*. I follow this trend of value chain research to classify affiliates based on their value adding activities to MNEs. Second, the dataset employed in this research includes information on the industry classification of the core and primary activities of each affiliate, as well as its parent company, which allows me to identify the strategic position of an affiliate within the MNE value chains. For instance, when the main activities of an affiliate are engaged in providing a significant amount of intermediate inputs for the industry of its parent company according to the industry input-output (I-O) table matrix made available at the Office for National Statistics (ONS) in the UK, I then regard the affiliate as an upstream FDI from its parent company. Other countries do not have exactly the same I-O industry structure as the UK, but I believe the UK I-O table provides a reasonable approximation. The analysis draws on foreign affiliates operating in 85 host countries and it is impossible to gather data of the intermediate inputs of each industry for most countries. The analysis focuses on the value chain of manufacturing industries.

To be more specific, I divide affiliates into four different role types including upstream, horizontal, downstream and unrelated affiliates based on their activities in MNE global value chains. The first three affiliate types are flagged as related affiliates, as shown in Figure 1.1. Upstream and downstream affiliates are grouped into the vertically-integrated type of foreign direct investment. Upstream affiliates mainly engage in research and development, component production, the intermediate inputs, which are in contrast to the downstream affiliates whose focuses are on marketing and selling. Horizontal affiliates

are those who share the same three-digit industry code as their parent companies, meaning that horizontal affiliates undertake fairly similar activities as their parent companies.

Figure 1.1: Affiliate strategic roles



1.3 An overview of each empirical chapter

Apart from this introductory chapter, the thesis includes three empirical chapters which focus on the impact of affiliate roles, and a concluding chapter which summarizes the main findings, highlights the main contributions and managerial implications, and discusses the limitations and future research agenda.

Given that return on sales (ROS) is one of the most common variables for measuring the performance of MNEs during internationalisation (Contractor, Kundu & Hsu, 2003; Kafouros & Aliyev, 2016a), the thesis uses ROS to measure the performance of the parent company and its foreign affiliates. The MNE parent- and affiliate- level data used in this thesis are from the Orbis and Zephyr datasets that are compiled by Bureau van Dijk (BvD).

In addition, some country-level variables are included as control variables in data analysis, and these data are from the World Bank World Development Indicators (WDI), Worldwide Governance Indicators (WGI), CEPII and UNCTAD FDI inflows and outflows.

Chapter two examines *the extent to which the strategic roles of affiliates influence MNE divestment decisions*. The literature on the divestment of foreign affiliates has mainly addressed how their characteristics, as well as parent company characteristics and host country characteristics determine MNE divestment decisions, yet in the rich and burgeoning literature there is one issue which remains underexplored. This is the extent to which the strategic role of a foreign affiliate in the MNE value chain affects its survival in the foreign market when it is performing poorly. I regard this as an important oversight, particularly considering that recently growing attention has been paid in the international management literature to affiliate value chain positioning, as well as that the likelihood of divesting a poorly performing affiliate can be determined by the extent of the similarities and interdependences between the affiliate and its parent company. Berry (2013), for example, substantiated that the likelihood of divestment is attenuated when an overseas affiliate manufactures the same, rather than different, products as its parent company, but the interdependence between them when, for example, an affiliate engages in upstream activities in parent company value chain has yet to be considered. Chapter two of the thesis therefore seeks to contribute to the divestment literature by exploring how different types of affiliate roles determine MNE divestment decisions.

In **Chapter three,** *I examine the impact of an affiliate's intangible assets on its parent company's profitability and explore how affiliate strategic roles moderate the effect of*

reverse knowledge transfer. The work of Gupta & Govindarajan (2000) has made a seminal contribution to the literature on two-way knowledge flows within an MNE, consisting of conventional knowledge transfer from the MNE parent company to its affiliates, as well as reverse knowledge transfer from an affiliate to the parent company. There is fast-growing attention to reverse knowledge transfer within MNEs, and much of the focus in this literature addresses the types of transferred knowledge, the competences of affiliates, and the knowledge transfer channels and mechanisms in reverse knowledge transfer. Yet the question of whether such transferred knowledge can be successfully utilised in operations and commercialised by firms, leading to an increase in firm profitability, is under-explored. Idiosyncratic features of knowledge, such as its tacitness (Bresman, Birkinshaw & Nobel, 1999), complexity (Simonin, 1999), path-dependence (Song, Almeida & Wu, 2003) and causal ambiguities (Szulanski, Ringov & Jensen, 2016) are often regarded as impediments for the parent company to effectively utilise this knowledge in operation. Chapter three of the thesis focuses on a "reduced form" model to examine the impact of the intangible assets of an affiliate on its parent company's financial performance. Moreover, in this chapter I also explore whether the impact of affiliate intangible assets on parent performance is influenced by the strategic role of the affiliate in the MNE value chains.

A different but related research topic that has received relatively limited attention is the lateral knowledge flows to an affiliate from its sibling affiliates. Andersson, Buckley & Dellestrand (2015), for example, explore how formal hierarchical governance tools and transmission channels determine the effectiveness of knowledge flows between affiliates. Gupta & Govindarajan (2000) is one of the very few studies that have considered how an affiliate's interaction with other affiliates influences the lateral knowledge flows, yet it

does not uncover the performance benefits from the lateral knowledge transfer. Building upon these existing studies, in **Chapter four** I build a "reduced form" model to test *the performance benefits of lateral knowledge transfer by directly linking an affiliate's performance and its siblings' intangible assets*, and I also explore *how affiliate roles determine the lateral knowledge transfer effect.*

There are two reasons to explain why I focus on the divestment of foreign affiliates in the first empirical chapter and the performance benefit of intra-firm knowledge transfer in the subsequent chapters. First, the link of all three empirical chapters is the strategic roles of the affiliates within MNE global value chain. Previous literature largely proposes and addresses the affiliate role typology based upon the observed or idealised strategies of the national affiliates of MNEs. Our focus in this thesis is to empirically examine how affiliates with different roles have different outcomes. The thesis contributes to the affiliate role literature by emphasizing the importance of affiliate roles through examining how affiliate roles influence three key issues in the international business field. Chapter 2 explores how the likelihood of divesting an affiliate with declining performance depends upon the affiliate's strategic role, and chapters 3 and 4 examine how the performance benefits of reverse and lateral knowledge transfer are moderated by the affiliate roles.

Second, the strategic management of cross-border FDIs involves a thoughtful effort in planning and evaluation. Managers who are in charge of global businesses should not only understand whether and when to divest some foreign affiliates, but also assess whether foreign affiliates, especially those with a high level of firm-specific assets, can

contribute to the rest of MNEs. This thesis empirically examines how affiliate roles affect the divestment decision and the performance benefits of knowledge transfer.

1.4 Main contributions

This thesis seeks to make several important theoretical and empirical contributions to the international business and international management literature which I outline below.

First, from the theoretical perspective, this thesis reveals and articulates that there is a need to incorporate affiliate roles into the theories of MNE divestments. Supported by the behavioral theory of the firm, the MNEs will engage in the problemistic search when their foreign affiliates do not attain financial performance at the aspiration level and the divestment can be an approach to solving the problem. This thesis extends and complements this line of research by integrating the affiliate's strategic roles with the MNE divestment decision and providing a framework to explain how the likelihood of divesting an affiliate with declining performance is significantly influenced by the role of affiliate within the MNE global value chain.

In a similar vein, I also build the framework to show to what extent the performance benefits of intra-MNE knowledge transfer is influenced by affiliate roles. Supported by the resource-based theory, the affiliate's intangible assets can be the source of knowledge to be transferred internally within the firm yielding superior financial performance for the MNE. This thesis has complemented and extended the literature by addressing the strategic role of affiliate as a crucial factor which can constrain or augment the performance benefit of intra-firm knowledge transfer.

Second, there is a large and growing emphasis addressing the relatedness between the parent company and affiliate as an important factor influencing the MNE's divestment decision. This line of research however has its primary focus on the shared resources and capabilities between the parent company and affiliate, with limited attention to the interdependency between them. In Chapter two, I have considered not only the relatedness but also interdependency between the parent company and affiliate, and I explained to what extent the interdependency matters for the MNE divestment decision. Downstream affiliates, for example, are more likely to be divested than upstream and horizontal affiliates when they fail to attain financial objective at the aspiration level.

Next, the extant literature on intra-firm knowledge has its large focus on the determinants, as well as the extent and the process of knowledge transfer. Gradually, there is an escalating attention on the performance benefit from utilizing the transferred knowledge for commercial use and economic returns at the receiving units (Ambos, Ambos & Schlegelmilch, 2006; Minbaeva et al., 2003, 2014). We contribute to this growing literature by taking a reduced form approach addressing to what extent the intangible assets of foreign affiliates have an impact on the MNE performance.

Fourth, IB research has addressed the role of intangible assets in a substantive way, in terms of not merely exploring how to develop greater intangible assets but also addressing the importance of intangible assets during the firm's internationalisation process (Wang et al., 2012; Denicolai, Zucchella & Strange, 2014; Kafouros & Aliyev, 2016b). In this thesis, I seek to contribute to the literature by addressing the impact of foreign affiliates' intangible assets on the performance of MNEs.

Fifth, despite a large literature on intra-firm knowledge transfer, much of attention lies in conventional and reverse knowledge transfer, with relatively limited, yet growing, attention exploring the performance benefit from knowledge transferred between affiliates. Chapter four specifically contributes to this growing literature by examining the impact of the affiliate's intangible assets on its siblings, and by exploring to what extent the performance benefit is affected by affiliate roles.

Sixth, drawing on a large number of multinational enterprises and their foreign affiliates, this thesis has made important empirical contributions to the extant literature. Unlike most studies in the extant literature which focus on one country or a group of small countries due to the availability of data, this thesis provides new empirical evidence on MNE divestment decisions and the performance benefit of intra-firm knowledge transfer from a global view.

The methodology used in the data analysis of each empirical chapter follows the most common approach used in the literature. In addition, the falsification exercise has been used as a robustness test to consider the possible common shock that influences both MNE performance and affiliate intangible assets, and the results from falsification exercises assure the accuracy of our interpretation of the performance benefits of intra-firm knowledge transfer. Using panel data, I am able to more precisely estimate the determinants of divestment decisions and the effects of affiliate intangible assets than using cross-sectional data.

Chapter 2

MNE divestments of foreign affiliates:

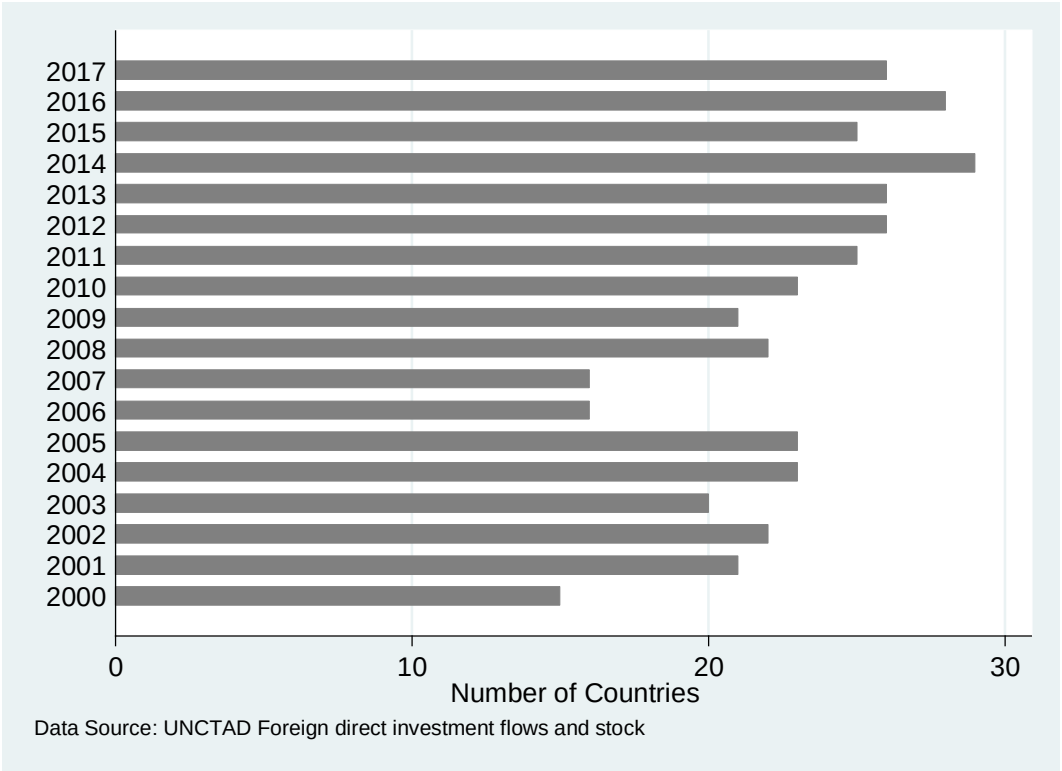
does the strategic role of the affiliate have an impact?

2.1 Introduction

In the past five decades of international business research, there has been much research on the determinants of FDI by MNEs and the subsequent outcomes of international diversification (Buckley & Casson, 1976; Dunning, 1981; Morck & Yeung, 1991; Contractor, 2007; Majocchi & Strange, 2012; Shirodkar & Konara, 2016; Kafouros & Aliyev, 2016a; Berry, 2017), but relatively little work on the determinants of why MNEs divest their overseas affiliates (Boddewyn, 1979, 1983; Li & Guisinger, 1991; Belderbos & Zou, 2009; Berry, 2013; Blake & Moschieri, 2016; Mohr, Batsakis & Stone, 2018). Despite the increasing growth of global FDI, which benefits from reduced trade barriers and the cross-border mobility of capital, internationally diversified firms often recognise divestment as a viable strategy to restructure their business portfolios which subsequently changes their global competitiveness.

The FDI data are financial flows and may be negative if divestments outweigh investments, and the number of countries recording negative FDI outflows reached 29 in the year of 2014 that is the highest since 2000, as shown in Figure 2.1, which is based on UNCTAD FDI data. Despite a trend of rapid growth in global FDI, the number of countries reporting annual negative FDI outflows has gradually increased, from an average of 20 annually over the period 2000-2009, to 26 in 2010-2017, representing an increase of about 31%. Following divestments, the composition of top companies has changed dramatically in the past five years (WIR 2018). Divestments have had a tremendous impact on FDI in a number of countries including, for example, the US where the divestment is recognised as a significant factor in the 40% decline in FDI, and in the Netherlands, which recorded the largest FDI outflows in Europe in 2016, but had a net divestment of -$5.2 billion in 2017, as reported in WIR (2018).

Figure 2.1: The number of countries with negative FDI outflows



Notes: The above figure presents the number of countries reporting a negative value in FDI outflows each year from 2000 to 2017. A negative value in FDI outflows occurs when divestments outweigh investments.

It is strategically important for MNEs to decide which affiliates to be held active and which ones to be disposed of, and the determinants of MNE divestment decision include affiliate characteristics (Duhaime & Baird, 1987; Brauer, 2006; Berry, 2013), parent company characteristics (Hoskisson, Johnson & Moesel, 1994; Shimizu, 2007; Kolev, 2016) and host country market conditions (Benito, 1997; Belderbos & Zou, 2009; Blake & Moschieri, 2016). Among these determinants, parent and affiliate performance are the most important factors which trigger divestment decisions which is unanimously supported by many studies including, for example, Duhaime & Grant (1984), Zuckerman (2000) and Berry (2013). In the literature on the relationship between affiliate performance and divestment, there is a growing emphasis on the extent of relatedness in terms of shared resources and capabilities between a foreign affiliate and the rest of the

MNE which impacts the likelihood of divestment (Bergh, 1998; Zuckerman, 2000; Berry, 2013). The shared resources and capabilities addressed in the literature include not only physical facilities, capital structure and human resource profiles (Harrigan, 1981; Chang, 1996; Wan, Chen & Yiu, 2015) but also technological capabilities and marketing intensity (Chang & Singh, 1999; Capron, Mitchell & Swaminathan, 2001). This literature, however, places very limited attention to the different roles of affiliates within the value chain of the parent company, which I regard as an important oversight which will be explored in this chapter.

Building upon the strategic management literature on affiliate roles (Bartlett & Ghoshal, 1986; Birkinshaw & Morrison, 1995) as well as the literature on global value chains (Porter, 1985), recent IB research has highlighted the different strategic roles that affiliates may fulfil within MNEs (Mudambi, 2008; Rugman, Verbeke & Yuan, 2011; Mudambi & Puck, 2016; Verbeke & Asmussen, 2016; Hernández & Pedersen, 2017). Rugman, Verbeke & Yuan (2011), for example, distinguish between affiliate roles based on an affiliate's position in its parent company's value chain. In a similar vein, Mudambi (2008) distinguishes between affiliate roles based on an affiliate's activities in its parent company's value chain. In this chapter, I build upon this insight by categorising overseas affiliates according to their strategic roles to one of four types: (1) horizontal; (2) upstream GVC-integrated; (3) downstream GVC-integrated; and (4) unrelated, as shown in Figure 1.1. A horizontal affiliate undertakes the same activities and shares the same knowledge as its parent company. An upstream GVC-integrated affiliate is primarily involved in sourcing raw materials, producing intermediate inputs and engaging in research and development, which is in contrast to a downstream GVC-integrated affiliate that is exclusively engaged in selling and marketing activities. The unrelated affiliates are

those whose activities have no relationship to their parent company's value chain. The first three affiliate types are grouped into related affiliates because their value activities are related to the parent company's global value chain (GVC). The affiliates engaged in upstream or downstream activities are classified as vertical GVC-integrated affiliates.

Drawing on unbalanced panel data including 449 parent companies from 42 countries and 7,254 of their foreign affiliates in 79 host countries over the period 2004-2016, I substantiate that the poorer the performance of a foreign affiliate, the more likely it will be divested by its MNE parent. I contribute to the literature by arguing that the likelihood of divesting a poorly performing affiliate is lower when the foreign affiliate is in horizontal rather than vertically-integrated FDI, and when it is engaged in upstream, rather than downstream, GVC-integrated activities. In addition, I find that the parent company, when facing financial adversity, will divest its overseas affiliates, but is more likely to divest its unrelated ones.

The remainder of this chapter is organized as follows. The following section reviews the relevant literature and develops the hypotheses. Section three describes the data and variables used in this chapter, followed by the empirical specifications used in the analysis. Section four presents the empirical results. The final section is the conclusion.

2.2 Literature review and hypothesis development

There are four main types of reasons to explain why MNEs divest their operations in foreign markets. The first is that divestment is historically deemed as an effective corporate strategy to decrease the degree of diversification to an optimal level in order to lower the costs associated with over-diversification (Markides, 1992a, 1995; Hoskisson,

Johnson & Moesel, 1994; Haynes, Thompson & Wright, 2003). Second, restructuring the portfolio of businesses improves firm efficiency and efficacy (Bergh, 1997, 1998; Brauer, 2006; Belderbos & Zou, 2009). Third, completely or partly selling or disposing of some unattractive overseas assets allows a better use of the resources for other opportunities elsewhere (Hamilton & Chow, 1993; Capron, Mitchell & Swaminathan, 2001; Berry, 2010). Fourth, divestment is a strategy for responding to the changing market conditions and challenges that reduces threats and brings new opportunities for firms (Bergh & Lawless, 1998; Belderbos & Zou, 2009; Berry, 2013; Blake & Moschieri, 2016).

What factors determine when and why to divest a foreign affiliate has been an important research question, and much of the literature has mainly focused on three groups of factors. The first group of factors to influence divestment decisions lies in the characteristics of an affiliate likely to be divested, and the paramount factor is its declining performance which triggers MNE divestment decisions. Other affiliate characteristics which determine their survival in the foreign market include size as well as financial liability and operational experience in the host country (Shaver, Mitchell & Yeung, 1997; Berry, 2013; Hamilton & Chow, 1993). The second set of factors relates to the parent company level, with its financial profitability remaining a significantly important factor. Other parent company characteristics include its financial liability as well as knowledge intensity (Benito, 1997) and the extent of diversification (Hoskisson, Johnson & Moesel, 1994). The third set of factors relates to host country market conditions in terms of market size, economic growth, institutional stability and the distance, both geographical and cultural, between the host and home countries (Chatterjee, Harrison & Bergh, 2003; Berry, 2010; 2013; Damaraju, Barney & Makhija, 2015). Interestingly, the effects of the three groups of factors have been found to intertwine with each other, such that an impact of a country-

level factor on the likelihood of divesting a foreign affiliate is contingent upon an affiliate-level or a parent-level factor. Berry (2013), for example, considers both the role of affiliate-level characteristics and of host country uncertainties in determining the divestment of an affiliate, and finds that an affiliate when performing poorly but operating in a volatile and uncertain market will potentially offer option value. Therefore, the wait-to-see logic, i.e., non-divestment, is prudent, particularly when the initial investment/sunk cost is high and irreversible.

Crucially, a salient, fast-growing topic that is becoming the centre of scholarly interest in the divestment literature is to explore how the relatedness between a foreign affiliate and its parent company determines the likelihood of its survival (Boddewyn, 1979; Bergh, 1995; Zuckerman, 2000; Berry, 2013; Damaraju, Barney & Makhija, 2015). Table 2.1 shows detailed measurements of relatedness in the literature on divestments. There is however relatively limited research that seeks to recognise the interdependence between the affiliate and its parent company from the value chain perspective, so in this chapter, I seek to contribute to the literature by exploring how the strategic roles of foreign affiliates within the MNE value chain influence the relationship between divestment decisions and performance in particular. The relationship between financial performance and MNE divestment decisions and to what extent the relationship is influenced by the relatedness are the core questions in several existing studies. I follow this line of research and propose that the relationship among financial performance, divestment decisions and relatedness in hypotheses one to four based on the review of extant literature. More importantly, hypotheses five and six are novel focusing on a comparison among upstream, horizontal and downstream affiliates.

Table 2.1: Studies of measurements of relatedness

Studies	Interdependence between divested affiliates and other parts of the firm
Boddewyn (1979)	Core or peripheral businesses
Harrigan (1981)	Shared facilities between businesses
Boddewyn (1983)	Interrelatedness between the units of the firm
Duhaime & Grant (1984)	Shared technology, facilities and customers between affiliates; Interfirm sales and purchases
Harrigan (1985)	Upstream and downstream units
Woo, Willard & Daellenbach (1992)	Upstream and downstream affiliates
Bergh (1995)	Shared two-digit SIC code
Chang (1996)	Similarities in the human resource profile
Benito (1997)	Horizonal and non-horizonal subsidiaries
Zaheer & Mosakowski (1997)	Relatedness between local units and parents
Bergh (1998)	Relatedness using the entropy measure
Chang & Singh (1999)	Strategic fit in R&D, advertising and capital intensity; similarities in human resources profile
Zuckerman (2000)	Intersegment relatedness
Capron, Mitchell & Swaminathan (2001)	Similarities in products, customers, technologies, geographical markets and direct competitors
Shimizu (2007)	Relatedness using SIC two-digit code
Belderbos & Zou (2009)	Relatedness between affiliates in terms of host-country redundancy and MNE portfolio redundancy
Lee & Madhavan (2010)	A meta paper analysing the strategic fit and shared industry codes
Berry (2013)	Shared three-digit SIC code
Song (2014)	Intra-firm purchases
Damaraju, Barney & Makhija (2015)	Sales-weighted measure of the interrelationship between divisions
Wan, Chen & Yiu (2015)	Foreign operations send personnel to the parent as a member of top management team

2.2.1 Theoretical background

The notion that poor performance is regarded as one of the most influential factors triggering the divestment decision has been firmly rooted in the behavioral theory of the firm (Cyert & March, 1963; Chang, 1996; Shimizu, 2007; Kolev, 2016) which is the main theory this chapter builds upon. The behavioral theory of the firm assumes that each firm should set a profit goal, and subsequently should aspire to attain the goal. Predominately, the profit goal is set by the use of financial performance indicators such as profitability ratios.

Maintaining profitability at the aspiration level is required to meet the demand for accumulating firm resources, and to meet the demand of shareholders and top management teams. The accumulated firm resources can be used for various purposes including, for example, an increase in the budget or other resource allocations to its subunits (Cyert & March, 1992). Managers have stark different levels of pressure in search and selection when the firm fails to attain its profit goal, relative to when it accomplishes its goal. When the firm attains its profit target; in other words, the profitability ratio is at the aspiration level, the managers face less pressure in adjusting its previous strategies, and therefore are more likely to maintain managerial persistence. In contrast, when the profitability is declining and does not reach the aspiration level, the managers are under pressure in searching for problems and information and finding solutions to improving the firm profitability (Chang, 1996; Shimizu, 2007; Kolev, 2016).

The problemistic search has been one of the major concepts in the behavioral theory of the firm stating that the search is problem-oriented. Under the circumstance that the goal is not attained, a problem is identified which triggers the firm to search for information

and to choose an approach to solving the problem by either revising the goal or finding an acceptable alternative (Cyert & March, 1992). As illuminated in the behavioral theory of the firm, in the stage of problemistic search, there are four general directions of problem searching including lowering the expenditure, improving financial profitability, increasing revenues, maintaining a subgroup's position within the firm (Cyert & March, 1992).

When a subunit fails to attain a desired profitability, the firm often searches for some alternatives such as allocating more resources or assigning more attention to help the subunit fix the problem (Cyert & March, 1992; Shimizu, 2007). In the process of search and selection activities, the firm typically builds upon its existing knowledge base, and a subunit who is far from the core competence of the firm is less likely to benefit from this process (Chang, 1996), which is in line with the literature emphasising the role of relatedness between an affiliate and its parent company on the divestment likelihood (Bergh, 1998; Zuckerman, 2000; Berry, 2013).

According to the behavioral theory of the firm, the firm is a coalition of diverse individual and groups, and in the response to the pressure, there involves a process of bargaining among the members of coalition which has several implications on the firm including, for example, the arrangement of transfer payment, the allocation of wage payment and so on. Constrained by the limited availability of resources, the firm often cannot attend all problems at the same time; thus, the amount of attention to a problem of a member in the coalition is influenced by the bargaining position of the member (Cyert & March, 1992). This is echoed in the literature of intra-organisation power (Lawrence & Lorsch, 1967; Hickson et al., 1971) and the later development of affiliate power (Mudambi & Navarra,

2004) which offer reasoning that the affiliate's role within the multinational enterprise plays a non-negligible influence on the extent of attention paid to it by its parent company.

2.2.2 The relationship between parent performance and divestments

Deciding which affiliates to keep and which to divest from the portfolios of multinational corporations has been long recognised as an important corporate strategy. As suggested by the behavioral theory of the firm, it has been proposed that when experiencing financial constraints parent companies are very likely to engage in problemistic search and find a solution to fixing the problem (Cyert & March, 1963). A hypothesis predicting a negative impact from parent profitability on the likelihood of divesting its affiliates has been proposed and substantiated in various studies including, for example, Duhaime & Grant (1984), Markides (1992a), Zuckerman (2000) and Haynes, Thompson & Wright (2003). The expected negative impact has also been found in studies that include parent performance as a control factor in predicting divestment decisions (Johnson, Hoskisson & Hitt, 1993; Damaraju, Barney & Makhija, 2015; Blake & Moschieri, 2016), while a few studies do not obtain the expected results in their empirical analyses (see Table 2.2 for a list of studies on the relationship between parent company performance and foreign affiliate divestment, and a recent survey by Kolev (2016)).

To the extent that profitability is firmly linked to the returns to the shareholders, it stands to reason that a firm in an adverse financial position will face great pressures from its stockholders and creditors (Duhaime & Grant, 1984). A firm suffering deteriorating performance will be inclined to restructure its business portfolio in order to improve its performance by searching for new markets to enter and selecting some of its existing businesses to divest (Chang, 1996). Haynes, Thompson & Wright (2003) found that the

Table 2.2: Studies of the relationship between parent performance and divestments

Studies	Hypothesized /Control variable	Moderating factors	Data sources	Samples	Time periods	Methodologies
Boddewyn (1979)	Hypothesis (-)	None	Previous studies	NA	1973, 1975, 1976	Literature review
Duhaime & Grant (1984)	Hypothesis (-)	None	Interviews, questionnaires	40 large US firms with 59 divestments	1975-1980	Chi-square test; Kolmogorov-Smirnov test
Duhaim & Baird (1987)	Hypothesis (-)	Unit size	Interviews, questionnaires	40 large US firms with 59 divestments	1972-1980	Chi-square test
Montgomery & Thomas (1988)	Hypothesis (-)	None	Secondary data	68 voluntary divestments from Fortune 500 firms	1976-1979	T-test
Markides (1992a)	Hypothesis (-)	None	Secondary data	201 firms from Fortune 500 list	1981-1985	Logit model
Hamilton & Chow (1993)	Hypothesis (-)	None	Questionnaires	36 large New Zealand companies with 208 divestments	1985-1990	Spearman rank correlation
Johnson, Hoskisson & Hitt (1993)	Control (-)	None	Secondary data, questionnaires	92 firms	1985-1990	Linear regression
Hoskisson, Johnson & Moesel (1994)	Hypothesis (none)	None	Secondary data	203 firms	1985-1990	Structural equation modelling
Chang (1996)	Hypothesis (-)	None	Secondary data	2775 exit events and 3059 retained events from 772 firms in the US	1981-1989	Cox proportional hazards model
Bergh & Lawless (1998)	Control (+)	None	Secondary data	164 firms from Fortune 500 list	1985-1993	Regression
Bergh (1998)	Control (-)	Relatedness	Secondary data	168 firms from Fortune 500 list	1985-1991	Regression; ANOVA
Zuckerman (2000)	Hypothesis (-)	None	Secondary data	All US operating firms in Compustat	1984-1994	Discrete-time logit analysis
Sanders (2001)	Hypothesis (-)	CEO stock option pay	Secondary data	250 firms from Standard & Poor's 500	1991-1995	Negative binomial regression; FE; RE

Notes: (+)/(-) means a positive/negative relationship. (mix) means that the results are mixed. 'Hypothesis'/'Control' denotes that the parent performance is included as a hypothesized/control variable. 'Hypothesis (none)' or 'Control (none)' refers to the insignificant result. 'FE' refers to fixed effects. 'RE' refers to random effects.

Table 2.2: Studies of the relationship between parent performance and divestments (cont'd)

Studies	Hypothesized /Control variable	Moderating factors	Data sources	Samples	Time periods	Methodologies
Haynes, Thompson & Wright (2003)	Hypothesis (-)	Corporate governance	Secondary data	144 UK companies with 1483 divestments	1985-1991	OLS; FE; RE; Poisson; negative binomial; negative binomial random-effects
Chatterjee, Harrison & Bergh (2003)	Control (none)	None	Secondary data	76 firms	1981-1991	Logistic regression
Chen & Guo (2005)	Hypothesis (mix)	None	Secondary data	Industrial firms with 2674 divestment transactions	1985-1998	Multinomial logit analysis; ordered logit analysis
Shimizu & Hitt (2005)	Control (-)	None	Secondary data	70 acquiring US firms	1988-1998	Cox proportional hazards model
Shimizu (2007)	Control (-)	None	Secondary data	68 units of 68 US firms	1988-1998	Cox proportional hazards model
Berry (2013)	Control (none)	None	Secondary data	12,430 subsidiaries from 759 US manufacturing parents	1989-2004	Cox proportional hazards model
Soule, Swaminathan & Tihanyi (2014)	Control (none)	None	Secondary data	449 firms from 32 countries that have investments in Burma.	1996–2002	Additive form of the heterogeneous diffusion model
Damaraju, Barney & Makhija (2015)	Control (-)	None	Secondary data	230 sell-offs, 153 spin-offs and equity carve-outs, 734 non-divestments	1980-2003	Multinomial logistic regression
Kolev (2016)	Hypothesis (none)	None	35 previous studies	35 studies in the literature	1986-2015	Meta-analysis
Blake & Moschieri (2016)	Control (-)	None	Secondary data	211 firms from 37 countries and their 5721 cross-border divestments	1995-2012	Logit model

Notes: (+)/(-) means a positive/negative relationship. (mix) means that the results are mixed. 'Hypothesis'/'Control' denotes that the parent performance is included as a hypothesized/control variable. 'Hypothesis (none)' or 'Control (none)' refers to the insignificant result. 'FE' refers to fixed effects. 'RE' refers to random effects.

extent of divestment activities of a firm increases as its performance decreases. A firm's declining profitability often precedes divestment of its foreign affiliates (Zuckerman, 2000), but when a firm is in a strong financial position, its foreign affiliates have a diametrically opposite outcome, so the firm is likely to deem its previous investment decisions as good strategies and to maintain its portfolio without divesting foreign affiliates in order to maximize the returns from internationalisation (Sanders, 2001). A recent study by Damaraju, Barney & Makhija (2015) found that an increase in the likelihood of divesting an affiliate was preceded by poorly corporate performance, which is also supported by Blake & Moschieri (2016). Managers seek to maximize firm profitability and they are under pressure to adjust their portfolios by divesting some foreign affiliates in order to improve firm performance. I therefore propose that

Hypothesis 1: **The higher the financial performance of an MNE parent, the lower the likelihood of divesting its foreign affiliates.**

The extent of relatedness of an affiliate likely to be divested to the parent company has been at the centre of scholarly interest in the divestment literature (Boddewyn, 1979; Bergh, 1995; Zuckerman, 2000; Shimizu, 2007; Berry, 2013; Damaraju, Barney & Makhija, 2015). Table 2.1 provides detailed measurements of the relatedness in the existing literature.

As summarized in Table 2.1, the divestment literature places emphasis on the shared strategic resources and capabilities between the affiliate and the parent company. The inherent, shared resources and capabilities addressed in the existing studies range from physical facilities, capital structure and human resource profiles (see Harrigan, 1981; Chang, 1996; Wan, Chen & Yiu, 2015 for example) to technological capabilities and

marketing intensity (see Duhaime & Grant, 1984; Chang & Singh, 1999; Capron, Mitchell & Swaminathan, 2001 for example). On the other hand, MNEs can set up unrelated affiliates which allow them to diversify their businesses, as well as to enlarge firm size, and benefit from network effects (Bergh, 1995, 1997). The likelihood of divesting these unrelated affiliates can rest on MNE strategy and resources.

Despite the argument that an MNE can diversify its businesses into unrelated industries, these unrelated affiliates, compared to related affiliates, often find it difficult to understand the causal ambiguity of incoming best practice from the parent company (Szulanski, 1996; Szulanski, Ringov & Jensen, 2016), which is largely due to their unfamiliarity with parent company knowledge, as it is often too complicated to understand, and is tacit and path-dependent (Cohen & Levinthal, 1990; Bresman, Birkinshaw & Nobel, 1999). When experiencing a decline in performance, MNEs have pressure in searching for problem and finding a solution (Cyert & March, 1963), and it is conceivable that MNE parents may choose to divest unrelated affiliates because the parent companies are less familiar with those affiliates. In addition, the unrelated affiliates are less important in terms of adding value to their parent company production and sales, compared to related affiliates. Moreover, these unrelated affiliates often do not solely target adding value to their parent company value chain or increasing financial returns.

When MNE parent companies experience financial difficulty, they are likely to be under pressure from stockholders and creditors to restructure their portfolios by focusing attention on their core businesses (Hamilton & Chow, 1993; Zuckerman, 2000; Haynes, Thompson & Wright, 2003; Chen & Guo, 2005), to convert certain unattractive or unrelated assets into better opportunities (Hamilton & Chow, 1993; Berry, 2010; 2013),

or to find sources of financing to fund their on-going capital investment and operations (Chen & Guo, 2005). Therefore, they might be more willing to divest foreign affiliates which add relatively little value to their value chains. Taking all these together, I propose that

Hypothesis 2: **When the performance of MNE parents decreases, they are more likely to divest unrelated affiliates as compared to related affiliates**.

2.2.3 The relationship between affiliate performance and divestments

In the burgeoning literature on MNE divestments, the financial performance of the affiliate has been hitherto recognised as a dominant factor determining the likelihood of its divestment (see Table 2.3 for a list of studies on the relationship between affiliate performance and divestment, together with their study characteristics). A hypothesis predicting a negative relationship between affiliate performance and divestment outcome was proposed and substantiated in several studies including Harrigan (1981), Duhaime & Grant (1984) and Zuckerman (2000), among others. Affiliate performance has also been included as a control factor in a number of studies when modelling MNE divestment decisions, and almost all of these studies, apart from Bergh (1997) and Damaraju, Barney & Makhija (2015), have found an expected negative effect of affiliate performance on the likelihood of divestment. Most of these findings, in particular those published in recent years, are based upon secondary data sources and on divestments of US and a small set of developed country firms.

Prolonged weak financial performance in an affiliate raises a concern that the parent company may not be willing to afford any further losses (Boddewyn, 1979). As predicted by the behavioral theory of the firm and evidenced in several studies, the affiliate

Table 2.3: Studies of the relationship between affiliate performance and divestments

Studies	Hypothesized /Control variable	Moderating factors	Data sources	Samples	Time periods	Methodology
Boddewyn (1979)	Hypothesis (-)	None	Previous studies	NA	1973, 1975, 1976	Literature review
Harrigan (1981)	Hypothesis (-)	Economic exit barriers, product differentiations and the strategic importance	Secondary data, interviews	61 firms	1965-1978	OLS
Duhaime & Grant (1984)	Hypothesis (-)	None	Interviews, questionnaires	40 large US firms with 59 divestments	1975-1980	Chi-square test; Kolmogorov-Smirnov test
Hamilton & Chow (1993)	Hypothesis (-)	None	Questionnaires	36 large New Zealand companies with 208 divestments	1985-1990	Spearman rank correlation
Bergh (1997)	Control (none)	None	Secondary data	135 acquisitions in 1997; 140 acquisitions in 1987	1997, 1987	Logistic, linear discriminant analysis
Bergh (1998)	Control (-)	Relatedness	Secondary data	168 firms from Fortune 500	1985-1991	Regression
Zuckerman (2000)	Hypothesis (-)	NA	Secondary data	All US operating firms in Compustat	1984-1994	Discrete-time logit analysis
Shimizu & Hitt (2005)	Hypothesis (-)	Acquirer size, age and experience, unit performance change, CEO and directors	Secondary data	70 acquiring US firms	1988-1998	Cox proportional hazards model
Shimizu (2007)	Hypothesis (-)	Ambiguity, failure to improve performance, resources and size	Secondary data	68 units of 68 US firms	1988-1998	Cox proportional hazards model
Berry (2013)	Hypothesis (-)	Relatedness, country growth, policy stability, exchange rate volatility	Secondary data	12,430 foreign subsidiaries of 759 US firms	1989-2004	Cox proportional hazards model
Song (2014)	Control (-)	None	Secondary data	1560 subsidiaries of 101 Korean MNEs in 31 foreign countries	1990-2008	Cox proportional hazards model
Damaraju, Barney & Makhija (2015)	Control (+)	None	Secondary data	230 sell-offs, 153 spin-offs and equity carve-outs, 734 non-divestments	1980-2003	Multinomial logistic regression
Kolev (2016)	Hypothesis (-)	None	35 previous studies	35 studies in the literature	1986-2015	Meta-analysis

with declining performance faces greater pressure for search and selection, and is more likely to be divested when it displays poor performance, compared to other companies in the same sector as the foreign affiliate (Cyert & March, 1963; Chang, 1996; Shimizu, 2007; Kolev, 2016). Affiliates that are in declining performance have financial constraints in sustaining a minimal investment requirement, which gives a negative signal to their parent company to divest its unattractive overseas assets (Hoskisson & Turk, 1990). Shimizu & Hitt (2005) and Shimizu (2007) conclude that the continuously declining profitability of an affiliate often precedes the divestment of the affiliate, which is also supported by Berry (2013).

Hypothesis 3: **The higher the financial performance of a foreign affiliate, the lower the likelihood of being divested by its MNE parent.**

MNEs typically have superior firm-specific advantages in terms of advanced technological capability and know-how, and parent companies can internalise their knowledge and resources within the firms to help foreign affiliates to overcome barriers and difficulties particularly when intermediary markets are missing (Buckley & Casson, 1976; Tallman & Li, 1996). Because of this internalisation effect, affiliates can gain competitive advantages that are necessary when competing with indigenous companies in the host country. When an affiliate cannot attain financial goal at the aspiration level, its parent company may pay more attention to the affiliate in the initial phases and search for tactics to improve performance (Cyert & March, 1963; Kolev, 2016), and if the performance deteriorates, the divestment decision will be made (Shimizu, 2007).

With regard to parent companies, it is likely to be difficult for them to find an effective remedial solution to improve the performance of unrelated affiliates, as they have fewer

similarities, not only related to physical facilities, capital structures and human resource profiles (Harrigan, 1981; Chang, 1996; Wan, Chen & Yiu, 2015) but also to technological capabilities and marketing intensity (Duhaime & Grant, 1984; Chang & Singh, 1999; Capron, Mitchell & Swaminathan, 2001). Unrelated affiliates are less likely to benefit from parent company ownership advantages, as they do not share similar characteristics with their parent companies, hence the level of capacity to absorb, assimilate and utilise parent company knowledge will be rather limited (Bresman, Birkinshaw & Nobel, 1999; Song, Almeida & Wu, 2003). I suggest that when unrelated affiliates' performance is declining, they are more likely to be divested than related ones.

Hypothesis 4: **Unrelated affiliates are more likely to be divested when the performance declines, as compared to related affiliates.**

Horizontal versus vertical affiliates

Firms diversify their operations by assigning specific roles to their foreign affiliates in order to maximize the benefits of global integration and locational advantages, and these dispersed foreign affiliates have differentiated, rather than homogenous, roles when operating in the foreign market. This builds upon the work of Rumelt (1974) on firms' diversification strategy, which was then subsequently developed by Williamson (1971), Porter (1976), Dundas & Richardson (1982), Harrigan (1985) and Woo, Willard & Daellenbach (1992), among others who address that the interdependence of units matters in managing firms. There is an increasing emphasis, both theoretical and empirical, on the strategic position of affiliates in the MNE value chains. Each affiliate has its own strategic task or role assigned by its parent company (Gupta & Govindarajan, 1991, 1994; Birkinshaw, 1997; Rugman, Verbeke & Yuan, 2011), and because of these different strategic tasks, there exist enormous differences in affiliate operations, as well as in the

relationship between the parent company and affiliate, and the relationship between affiliate networks.

The MNE divestment literature, despite with relatively limited attention, seeks to recognise the interdependence of the affiliate and its parent company from the value chain perspective (see Table 2.1 for a list of these studies). The underlying view of these studies builds upon the concept of the global value chain, which consists of different but interrelated activities. Proponents of this view include for example Harrigan (1985), Woo, Willard & Daellenbach (1992), Song (2014) and Damaraju, Barney & Makhija, (2015), who assert that the strategic importance of an affiliate increases when it has a large proportion of intra-firm sales or purchases, or when it participates in the value chains of other affiliates or the rest of corporation, which in turn prolongs its survival; in other words, it reduces the likelihood of divestment. Building upon this interdependence literature, as well as on the recent IB literature on affiliate roles in the global value chain of the firm (Rugman, Verbeke & Yuan, 2011), I seek to explore how the strategic roles of foreign affiliates in relation to their positions in the MNE value chains influence the relationship between divestment decisions and affiliate profitability.

Although horizontal and vertical affiliates are investments by MNEs in related industries, they play different roles in the global value chains of MNEs. As emphasized and explained by Bergh (1997) who explores how the extent of relatedness determines divestment, vertical affiliates are a part of related, rather than unrelated, affiliates. These vertical affiliates are often assigned specialised roles, such as sourcing materials, producing parts or components, product design and development, marketing or selling products (Dunning & Lundan, 2008; Buckley & Strange, 2015). Because of these

specialised roles, the divestment of vertically integrated affiliates may possibly lead to disruption to the global value chain. This is unlike horizontal affiliates, the divestment of which may not cause such disruption. When a vertically integrated affiliate's performance is under the desired level, MNEs can engage in the problemistic search and give more support to help the affiliate solve the issue (Cyert & March, 1963). The parent company however has a relatively limited knowledge about the vertically integrated affiliate who often has a specialised role. The dissimilarity between the parent company and affiliate may increase the likelihood of affiliate divestment (Chang, 1996).

Horizontal affiliates, however, engage in a wide range of activities which are similar to their parent companies, and they share fairly similar skills and technologies with their parent companies, therefore, compared to vertical affiliates, they have a high level of similarity in shared resources and capabilities with their parent companies in terms of value-adding activities (Harrigan, 1981; Chang, 1996; Capron, Mitchell & Swaminathan, 2001; Wan, Chen & Yiu, 2015). This high level of similarity between the parent company and affiliate may decrease the likelihood of affiliate divestment. Chang (1996), for example, finds that the greater the similarity between the affiliate's business and its MNE core operations, the less likely that the overseas operation will be divested. Ang, de Jong & van der Poel (2014) reached a similar finding that when the CEOs of parent company are familiar with the assets of an affiliate, they are less likely to divest these familiar assets. A study by Berry (2013) finds that the likelihood of divesting a poor operation in a foreign country with a growing market and stable policy is low when the overseas affiliate has a great extent of product relatedness with the MNE parent.

Despite the distance between home and host country, the parent company has more knowledge of and is more familiar with its horizontal affiliates, and the extent of knowledge flows from the parent company to its horizontal affiliates is greater compared to vertical affiliates (Driffield, Love & Yang, 2016), which influences the likelihood of affiliate survival when its performance declines (Berry, 2013). MNE knowledge is often complicated (Song, Almeida & Wu, 2003) and tacit (Bresman, Birkinshaw & Nobel, 1999), therefore the more a foreign affiliate is familiar with its parent company's knowledge, the greater its capacity to absorb, assimilate and exploit the incoming knowledge from its parent (Gupta & Govindarajan, 2000; Cohen & Levinthal, 1990). The difficulty in understanding and transferring knowledge is largely due to a lack of understanding of incoming knowledge (Szulanski, 1996), and when an affiliate is in the vertical integration FDI type, it will benefit less from the internalisation effects of parent firm-specific assets than those affiliates who mimic parent company operations, i.e., horizontal affiliates. I therefore propose that

Hypothesis 5: **Vertically integrated affiliates are more likely to be divested when the performance decreases, as compared to horizontal affiliates.**

Upstream versus downstream affiliates

I now turn to compare the likelihood of divesting an upstream, as compared to a downstream, GVC integrated affiliate. When the affiliate's performance declines, the firm will be under pressure in the problemistic search and allocating resources to fix the problem (Chang, 1996; Shimizu, 2007). As proposed by the behavioral theory (Cyert & March, 1992), the firm is a coalition of diverse individual and groups, and the amount of attention to a problem of an affiliate is determined by the bargaining position of the

affiliate. This is in line with the literature on the importance of affiliate roles (Mudambi & Navarra, 2004; Bouquet & Birkinshaw, 2008).

A study by Bouquet and Birkinshaw (2008) highlights that the weight of the foreign affiliate within the MNE production network shapes the attention paid to it by multinational headquarters, and that the strategic role of a foreign affiliate within the network of multinational enterprises becomes a means for it to negotiate and bargain with headquarters when the affiliate faces a difficult or even isolated situation. Intra-organizational power (Lawrence & Lorsch, 1967; Hickson et al., 1971) and the later development of affiliate power (Mudambi & Navarra, 2004; Bouquet & Birkinshaw, 2008), provide the reasoning that different strategic positions of affiliates in the value chain strengthen or attenuate the bargaining power of the affiliates. Multinational enterprises allocate different attention to their foreign affiliates, and the extent of attention from corporation headquarters is fundamentally determined by the affiliates' initiatives (Ghoshal & Bartlett, 1990) and their strategic roles (Mudambi & Navarra, 2004) within the multinational enterprise network.

Upstream affiliates have the main focus of sourcing raw materials for the final production of MNEs, or engaging with the development of technological capability and know-how (Mudambi, 2008). These upstream activities are not purely driven by profit generation (Hanson, Mataloni & Slaughter, 2005; Mudambi & Swift, 2014). Upstream affiliates are less likely to achieve economies of scale and scope due to the narrow nature of their upstream activities (Hanson, Mataloni & Slaughter, 2005), and the outcome of these activities such as research development is uncertain (Mudambi & Swift, 2014). However, research show that affiliates that specialize in producing intermediate inputs and sourcing

raw materials are likely to have more bargaining power and to receive more attention from headquarters, as these affiliates are important for international production flows of multinational enterprises (Driffield, Love & Yang, 2016). Affiliates that undertake design activities in the local market play an important role in the value chain, and the necessity for a multinational corporation to develop new products and to modify process design enhances the strategic importance of these R&D affiliates in the value chain of corporations (Lawrence & Lorsch, 1967). The parent company may therefore assign more resources to these upstream affiliates who have more bargaining power, relative to downstream affiliates. Consequently, there is a reduced likelihood of divesting these upstream affiliates.

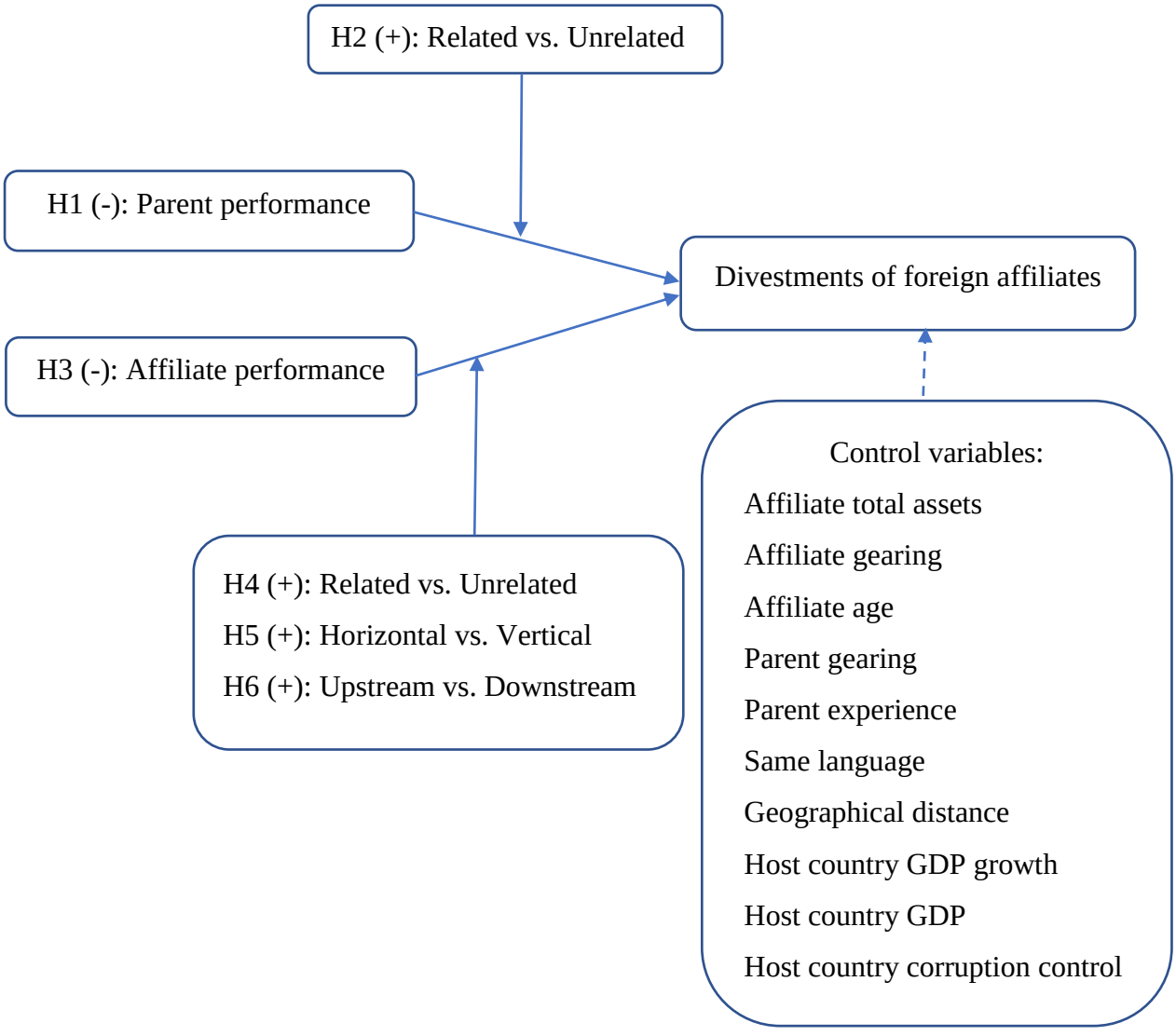
With respect to downstream affiliates, they often gather local market knowledge over time, including product-market segmentation, supplier relationships, competition analysis, customer preferences, marketing practices, and distribution channels (Shaver, Mitchell & Yeung, 1997). On the one hand, this knowledge adds value to the parent company (Dunning, 1980, 1988; Benito & Gripsrud, 1992). On the other hand, however, downstream affiliates are driven by expanding markets and exploiting parent intangibles (Meyer, Mudambi & Narula, 2011), achieving financial returns. Affiliates with limited control over firm specific-assets will have very limited power in the parent-affiliate bargaining process (Mudambi & Navarra, 2004). When the affiliate's performance declines, the parent company is under pressure in finding a solution to fix the problem, and the bargaining power of the affiliate positively influences the amount of attention received from the MNE (Cyert & March, 1963). Downstream affiliates are recipients of parent company's intangible assets and have very limited understanding (Williams, 2007) and control over these intangible assets. The initiatives of these affiliates are typically

directed toward new market opportunities. The extent of the attention and support from headquarters will decrease when downstream affiliates fail to develop good competences or achieve the expected financial returns in the local market (Bouquet & Birkinshaw, 2008). I therefore propose the following hypothesis:

Hypothesis 6: **Downstream affiliates are more likely to be divested when the performance decreases, as compared to upstream affiliates.**

Figure 2.2 gives a better overview of the research framework which describes the hypothesized relationships.

Figure 2.2: Framework of foreign affiliate divestments



2.3 Data and methodology

2.3.1 Data sample

The data are from the Orbis and Zephyr datasets, compiled by Bureau van Dijk (BvD). In earlier studies, such as Duhaime & Grant (1984) and Hamilton & Chow (1993), the use of questionnaire surveys and interviews were the most common approach to retrieving information on affiliate divestment information, as the corporate-level strategic information was generally unavailable from secondary data sources. Gradually, the secondary data that are compiled and made available by official agencies or commercial data companies are widely used – or even becomes the main data source – in divestment literature (e.g., Bergh, 1997; Zuckerman, 2000; Damaraju, Barney & Makhija, 2015 and other studies in shown Tables 2.2 and 2.3).

There are three important steps to generate panel data used in this thesis. I started with a search for a list of affiliates who have equity shares owned by at least one foreign company. A subsequent, important step is to download these affiliates' shareholder information, thus creating unique parent-affiliate linkage data that include the identification of affiliate and its parent company, the year of the linkage and equity shares owned by the parent company. After identifying the parent-affiliate linkage across years, I then downloaded financial and accounting information of these parent companies and their affiliates, such as return on sales, from Orbis data, thereby creating panel data.

The Orbis database provides detailed financial information on companies across the globe, and it provides company-level data[1]. Orbis also provides the status of each affiliate, which

[1] See for example Shirodkar, Konara & McGuire (2017) and Mohr, Batsakis & Stone (2018) using the Orbis database. The Orbis data highlight detailed information on company profile, industry codes, geographical information, establishment year, shareholder lists, profitability ratios, financial reports, competitor analysis, stock price, granted patents.

is used to identify whether it has exited from a foreign market as a result of bankruptcy. Zephyr is a comprehensive database of mergers and acquisitions, providing information on the names and identity numbers of each pair of acquirer and acquiree in each acquisition deal, and is mergeable with Orbis data as they are both collected by BvD company. Using M&A data from Zephyr, I identify which affiliates have been divested by the parent company. Drawing on Orbis and Zephyr, I can therefore group affiliates into exiting and surviving ones.

This study requires each affiliate to report information on its geographical location and the year of establishment, as well as the return on sales, gearing ratio and total assets, together with its parent company's return on sales and gearing ratio. I removed parent-affiliate linkages that have the missing value for any of those variables. I also dropped those affiliates whose parent company has an inactive status (e.g., bankruptcy or liquidation), which means that the parent company needs to have survivor status rather than having ceased to exist, a sampling criterion that is also applied by Berry (2013). In the analysis, I focus on those parent companies which have divested at least one foreign affiliate, which makes the analysis more comparable. I also only focus on manufacturing parent companies. Each parent included in the analysis reports financial statements based on consolidated accounts.

Each parent-affiliate linkage includes not only firm-level information, but also the location of each affiliate and that of its parent company. I can therefore merge parent-affiliate linkage data derived from the Orbis and Zephyr databases with the World Bank World Development Indicators (WDI), Worldwide Governance Indicators (WGI) and CEPII, which allows me to retrieve country-level variables.

After applying all these criteria, I have unbalanced panel data of 7,386 parent-affiliate linkages, covering a total of 449 parent companies from 42 home countries and 7,254 of their foreign affiliates from 79 host countries. Although there is large literature on the relationship between performance and divestment decisions, much of the existing literature, as well as its findings, largely build upon the firms in the US and a small set of developed countries, as shown in survey tables 2.2 and 2.3. With the advent of the increasingly important role of developing country firms in global FDI, as well as the increasing number of countries reporting a large volume of divestments in recent decades (as shown in Figure 2.1), I seek to contribute to the existing literature by examining why affiliates are divested using samples from a wide set of countries.

Besides, the findings in the existing literature are largely based on divestment decisions made prior to the 2010s, as shown in survey tables 2.2 and 2.3, so I seek to update the literature by using more recent divestment data. In the final parent-affiliate samples, 614 foreign affiliates completely exited overseas markets during the period 2004 to 2016. Each parent-affiliate linkage appears on average for 4.08 years corresponding to 30,121 observations, and the samples are certainly comparable with other studies in the divestment literature (see Table 2.2 for more detailed information on the study characteristics in the literature). I therefore extend the literature by using a large, worldwide sample of affiliates not only with different strategic roles, but also from different countries.

2.3.2 Affiliates with different strategic roles

As described in Figure 1.1, I categorize affiliates into four types including horizontal, upstream GVC-integrated, downstream GVC-integrated and unrelated affiliates using the following approaches.

Horizontal affiliates: I retrieve information on industry classification at the three-digit level of the parent company and its affiliates, and then group these affiliates into the horizontal type if they share the same three-digit NACE industry code as their respective parent company. Horizontal affiliates have a large extent of shared resources and capabilities with their parent company.

Upstream affiliates: Upstream GVC-integrated affiliates are primarily engaged in sourcing raw materials, as well as manufacturing parts or components for final production, and are also engaged in design and research. Drawing on industry intermediate input tables made available by the Office for National Statistics (ONS), I flag upstream FDI for those affiliates whose primary industries count for 5% (or more) of the total intermediate inputs to the industry where its parent company belongs to[2]. As a robustness check, I have also used an alternative threshold of 1%. Additionally, affiliates that only engage in scientific research and development activities (i.e., NACE industry code 72) are all classified as upstream GVC-integrated affiliates.

Downstream affiliates: An affiliate is regarded as downstream GVC-integrated if its primary activities are in retail and wholesale trade (codes 45, 46 and 47 in NACE

[2] For instance, we find that most important intermediate consumptions of the industry of motor vehicles, trailers and semi-trailers include 1) fabricated metal products, 2) rubber and plastic products, 3) other basic metals and casting, 4) basic iron and steel, 5) machinery and equipment, 6) petrochemicals, 7) computer, electronic and optical products, 8) electrical equipment, 9) glass, refractory, clay, other porcelain and ceramic, stone and abrasive products. Therefore, any affiliate which produces any of above products (e.g., rubber and plastic products, basic iron or steel) is an upstream affiliate of a company in the motor vehicle industry.

Rev.2). I also consider those affiliates in advertising and the market research sector (code 73 in NACE Rev.2) as downstream affiliates of their parent company.

Unrelated affiliates: The remaining affiliates that are not included in the above three categories are flagged as unrelated. These affiliates do not contribute to the global value chain of the parent company; in other words, they do not belong to the above three categories.

2.3.3 Empirical specifications

Following the standard literature on affiliate survival and MNE divestment decisions, I use Cox proportional hazards model (Chang, 1996; Zaheer & Mosakowski, 1997; Shimizu, 2007; Belderbos & Zou, 2009; Berry, 2013) to explore the determinants of affiliate divestment.

In order to test the first hypothesis that the likelihood to divest a foreign affiliate is influenced by its MNE parent's financial performance, I use equation 1 as follows:

$$h_i(t) = h_0(t)a_i^P \exp\left(\beta_1 ROS_{it-1}^P + \lambda X_j^A + \tau Z_h^p + \kappa C_m + \gamma_t\right) \quad (1)$$

where $h_i(t)$, the hazard rate at time *t* for an event *i* (exit decision), is a function of the underlying baseline hazard rate $h_0(t)$ of the divestment event multiplied by an exponentiated set of explanatory variables. The coefficient β_1 shows the effects of parent performance upon affiliate survival. ROS_{it-1}^P is the return on sales of the MNE parent of the affiliate *i* with a one-year lag. X_j^A embraces the affiliate debt-to-equity ratio, as well as age, and total assets. Z_h^p includes the parent company's international experience and the debt-to-equity ratio. C_m controls for country-level variables including foreign market economic size, the common language, the economic growth rate, the geographical

distance between home and host countries and the control for corruption in the host country.

The second hypothesis examines whether the likelihood of divesting a related affiliate, as compared to an unrelated one, will be affected by parent company performance by including an interaction term ($ROS^{P}_{it-1} * Related^{A}_{i}$) in equation 2. The coefficient ϕ_3 shows the moderating effect of relatedness hypothesized in H2.

$$h_i(t) = h_0(t)a_i^P \exp\left(\phi_1 ROS^{P}_{it-1} + \phi_2 Related^{A}_{i} + \phi_3 ROS^{P}_{it-1} * Related^{A}_{i} + \lambda X^{A}_{j} + \tau Z^{p}_{h} + \kappa C_m + \gamma_t\right) \quad (2)$$

I now turn to address the importance of affiliate performance on the likelihood of divestment by including ROS^{A}_{it-1} in equation 3, and to explore whether affiliate relatedness moderates the relationship between the likelihood of divestment and affiliate performance by including $ROS^{A}_{it-1} * Related^{A}_{i}$ in equation 4. The key coefficients, ϑ_1 and ψ_3 , are the effect of affiliate performance and the moderating effect of relatedness hypothesized in H3 and H4, respectively. All other variables have the same interpretations as those in equation 1.

$$h_i(t) = h_0(t)a_i^P \exp\left(\vartheta_1 ROS^{A}_{it-1} + \lambda X^{A}_{j} + \tau Z^{p}_{h} + \kappa C_m + \gamma_t\right) \quad (3)$$

$$h_i(t) = h_0(t)a_i^P \exp\left(\psi_1 ROS^{A}_{it-1} + \psi_2 Related^{A}_{i} + \psi_3 ROS^{A}_{it-1} * Related^{A}_{i} + \lambda X^{A}_{j} + \tau Z^{p}_{h} + \kappa C_m + \gamma_t\right) \quad (4)$$

Following a similar structure to equation 4, I test hypotheses five and six on whether being a horizontal or vertical (using equation 5), or being an upstream or downstream affiliate (using equation 6) will influence the likelihood of divesting the affiliate with declining performance. $Horz^{A}_{i}$ is a dummy variable taking the value of one for any affiliate which has the same three-digit industry code as its parent company, while Up^{A}_{i}

is a dummy variable equal to one for an upstream affiliate, or zero otherwise. The key coefficients, δ_3 and φ_3, are the moderating effects hypothesized in H5 and H6, respectively. All other control variables have the same interpretation as in equation 1.

$$h_i(t) = h_0(t)a_i^P \exp\left(\delta_1 ROS_{it-1}^A + \delta_2 Horz_i^A + \delta_3 ROS_{it-1}^A * Horz_i^A + \lambda X_j^A + \tau Z_h^p + \kappa C_m + \gamma_t\right) \quad (5)$$

$$h_i(t) = h_0(t)a_i^P \exp\left(\varphi_1 ROS_{it-1}^A + \varphi_2 Up_i^A + \varphi_3 ROS_{it-1}^A * Up_i^A + \lambda X_j^A + \tau Z_h^p + \kappa C_m + \gamma_t\right) \quad (6)$$

2.3.4 Dependent, independent and control variables

Table 2.4 provides a detailed list of all the variables used in the Cox proportional hazards model, along with their definitions. I also describe them as follows.

Dependent variable: The divested affiliates included in this chapter are in liquidation or bankruptcy or exited in the form of sell-off; in other words, divestments are those full exiting affiliates rather than decrease in equity shares owned by the parent company. Following Cox proportional hazards model method adopted in divestment studies such as those of Shimizu (2007) and Berry (2013), the dependent variable reflects both the status of a given foreign affiliate (divested or non-divested) and time duration, which is measured by calculating the length of time from when the foreign affiliate was surveyed until it was divested, and for non-divested affiliates, until the year of 2016.

Independent variables: ROS_{it-1}^A is the one-year lagged return on sales for affiliate *i*. ROS_{it-1}^P is the return on sales of the MNE parent of the affiliate *i* with a one-year lag. Return on sales is defined as net profit before tax divided by sales, which is widely used to measure company financial profitability (Contractor, Kundu & Hsu, 2003; Zschoche,

Table 2.4: Variable definition and descriptive statistics

Variable name	Variable	Definition	Mean	Std. Dev.
Dependent variable				
Time period	*_t*	The length of time since the foreign affiliate was surveyed until it has been divested, and for the non-divested affiliate, until year 2016	3.23	1.92
Divest event	*_d*	Takes a value of 1 if the affiliate is divested by its parent company in year *t*, takes zero if the affiliate is survival.	0.02	0.14
Independent variables				
Parent ROS (%)	ROS^{P}_{t-1}	Lagged parent company return on sales which is (parent profit before tax / sales) * 100	8.00	8.64
Affiliate ROS (%)	ROS^{A}_{t-1}	Lagged affiliate return on sales which is (affiliate profit before tax / sales) * 100	5.69	11.82
Upstream	Up^{A}	Dummy variable equal to one for upstream FDI, otherwise zero	0.18	0.38
Downstream	$Down^{A}$	Dummy variable equal to one for downstream FDI, otherwise zero	0.36	0.48
Horizontal	$Hori^{A}$	Dummy variable equal to one if the affiliate shares the same 3-digit NACE industry classification code as its parent company, otherwise zero	0.20	0.40
Related	$Related^{A}$	Dummy variable takes value one for related affiliate, i.e., upstream, downstream or horizontal FDI, otherwise zero	0.74	0.44
Control variables				
Affiliate gearing (%)	$Gear^{A}_{t-1}$	Lagged affiliate debt-to-equity ratio = ((non-current liabilities and loans) / shareholders funds)) * 100	55.29	90.05
Affiliate total assets ($million)	$Assets^{A}_{t-1}$	Lagged affiliate total assets	302.32	1812.32
Affiliate age	Age^{A}_{t-1}	Lagged affiliate age	26.91	20.42
Parent experience	Exp^{P}	Lagged the total number of affiliates established by the parent company in the host country where the affiliate is located	8.73	19.67
Parent gearing (%)	$Gear^{P}_{t-1}$	(Lagged parent debt-to-equity ratio which is ((non-current liabilities and loans) / shareholders funds) * 100	123.58	103.4
Same language	*Lang.*	Dummy variable takes a value of 1 if the host country shares the same common language as the home country, otherwise zero	0.14	0.34
Geographical distance (km)	*Dist.*	Geographical distance from the capital of host country to the capital of home country	4040.87	3992.74
GDP growth (%)	$GDPG_{t-1}$	Lagged GDP growth rate of host country	1.43	3.33
GDP ($billion)	GDP_{t-1}	Lagged GDP of host country in USD using Purchasing Power Parity rate	2068.11	3110.43
Control of corruption	$Corrupt_{t-1}$	Lagged control of corruption score of host country, ranging from -2.5 to 2.5	0.89	0.93

Notes: Monetary variables are in US dollars. Observations are 30,121.

2016; Kafouros & Aliyev, 2016a). A recent study by Kafouros & Aliyev (2016a), for example, uses return on sales to measure performance when comparing foreign affiliates and domestic firms. It has also been used in studies in the MNE divestment literature (Markides, 1992b, 1995; Hoskisson, Johnson & Moesel, 1994; Kolev, 2016) to test performance effects on divestments. Other profitability measurements such as return on assets and return on equity are not used, as return on equity is very sensitive to the capital structure of the firm (Hitt, Hoskisson & Kim, 1997; Qian et al., 2008), and it is also recommended that there is a high level of correlation between return on assets and return on sales leading to fairly similar findings (Contractor, Kundu & Hsu, 2003; Capar & Kotabe, 2003). Market performance indicators such as Tobin's Q are not employed in the analysis due to the unavailability of data for most of the countries covered in the analysis.

Control variables: In Cox proportional hazards model, I also control for affiliate-level, parent-level and country-level heterogeneity, i.e., X_j^A, Z_h^p and C_m, and all the variables apart from geographical distance and host country language are with a one-year lag.

X_j^A embraces the affiliate debt-to-equity ratio, as well as age, and total assets (Duhaime & Baird, 1987; Shimizu & Hitt, 2005; Berry, 2013; Contractor, Kundu & Hsu, 2003).

The debt-to-equity ratio represents a company's potential resources and a source of financing through borrowing but also indicates the level of risk and liabilities that the company needs to bear (Shimizu, 2007; Kafouros & Aliyev, 2016a). Hoskisson, Johnson & Moesel (1994) for example find that a high level of leverage is likely to increase the intensity of a firm's divestment.

Affiliates who have more experience in the host country are likely to raise exit barriers (Berry, 2013), so I therefore also control for affiliate age, which is measured by calculating the number of years the affiliate has been established in the foreign market.

Affiliate size is often regarded as a very meaningful factor for managers to consider when they decide whether to divest an affiliate or not. Divesting a large size affiliate is a complicated process and has a bigger impact upon the parent company, compared to the divestment of a small affiliate (Duhaime & Baird, 1987; Chang, 1996; Berry, 2013).

Z_h^p includes the firm's international experience and the debt-to-equity ratio (Contractor, Kundu & Hsu, 2003; Pantzalis, 2001; Berry, 2013).

Parent company's experience in the host country in which the affiliate is located is likely to be advantageous for the affiliate; therefore, I measure this by calculating how many affiliates a parent company has established in the host country where the affiliate likely to be divested is located.

Parents with a high level of debts are likely to have a greater financial burden which restrains investment, even this is necessary, in its affiliates, which will also increase the likelihood of divestments of overseas assets (Hoskisson, Johnson & Moesel, 1994; Haynes, Thompson & Wright, 2003).

The host country GDP growth rate and GDP using the purchasing power parity rate are included in C_m to control for foreign market economic size and the economic growth rate (Song, 2014; Blake & Moschieri, 2016). C_m also includes a common language variable taking the value of one when the same official language is used in the home and host countries (Berry, 2013), the geographical distance between home and host countries

(Berry, 2013), and the control for corruption index in the host country (Cuervo-Cazurra, 2006; Konara & Shirodkar, 2018).

Differences in the economic development of the host country will systematically influence affiliate performance and the demand for affiliate products (Berry, 2013). Affiliates with declining performance are perhaps more likely to survive when there are increasing consumer demand and market growth in the local market. Therefore, in the model, I control for both the market size and economic growth of host countries.

Affiliates may have the liability of foreignness (Zaheer & Mosakowski, 1997) in the host countries, and a greater geographical distance between the parent and affiliate increases coordination costs (Berry, Guillén & Zhou, 2010; Lu & Beamish, 2004), upgrades the level of information asymmetry, and attenuates the internalization effects from parent ownership advantages on affiliate performance. Thus, the geographical distance between home and host countries is included as a control variable.

One might also need to consider cultural differences between home and host countries which increase the complexity of communication and coordination between the parent company and its affiliates. Different languages used in parent and host countries also increase barriers and difficulties in effectively transferring knowledge within the multinational enterprise' network (Harzing & Feely, 2008; Berry, 2013), so I control for a common language dummy equal to one when home and host countries share the same official language.

Institutions of the host country imply the rules and regulations that companies need to comply with, which can have an impact on affiliate operations and practices (North, 1990), so I include the level of corruption control in the host country which is one of the most common measures of institutional conditions (Cuervo-Cazurra, 2006; Shirodkar & Konara, 2016).

Firm-specific frailty and year effects: One may argue that some divested affiliates may share the same parent company, and therefore there may exist some uncaptured or unobservable firm effects that lead a parent company to make more than one divestment, meaning that some divestment events are not independent. Affiliates having the same parent may be correlated because they share the same unobservable frailty, and in line with the existing divestment studies such as that of Berry (2013), I cast some light on this by controlling for the firm-specific frailty term a^p in the most detailed specification. The Cox proportional hazards frailty model is used to address the potential concern when two or more divestment events are made by the same parent company; in other words, the shared-frailty model is used to model within-group correlation, and the log frailty is analogous to random effects in standard linear regression models (Berry, 2013; Gutierrez, 2002; STATA, 2017). I also include business cycle effects γ_t in the model. In line with the previous literature such as Haynes, Thompson & Wright (2003), Berry (2013) and Blake & Moschieri (2016) all the explanatory variables are with a one-year lag apart from the same language and geographical distance variables.

2.3.5 Descriptive statistics

Table 2.4 also presents descriptive statistics for all the key variables used in the analysis including 30,121 observations in the data sample. 614 divestments of foreign affiliates were made by MNEs. On average, parent firms have a higher level of return on sales than their foreign affiliates (8.00% vs. 5.69%) and have a much higher debt-to-equity ratio than the affiliates (123.58% vs. 55.29%). The total assets of the foreign affiliates on average is 302.32 million US dollars, and they have an average of almost 27 years' experience since being established in the host country. Each MNE parent company

included in the analysis has on average nine affiliates in the host country entered, suggesting that most MNEs in the analysis have a moderate or high level of geographical diversification.

Moving to the variables that measure the different strategic roles of foreign affiliates, I find that out of the 30,121 affiliate-year observations, 18% are upstream FDI and 36% are downstream affiliates. Around 20% of the observations are horizontal affiliates sharing the same three-digit industry code as their parent companies. Taking all these together, there are in total 74% affiliate-year observations denoting related GVC-integration activities.

When looking at the country-level control variables, they show that 14% of host and home countries share the same official language, and that the geographical distance between the capital of the host country and that of the home country is around 4,040 kilometres on average. Host countries have an average GDP growth rate of 1.43% with a standard deviation of 3.33%. On average, host country GDP at the purchasing power parity rate is around 2,068 billion US dollars. Host country control of corruption index is around 0.89, with a dispersion of 0.93.

Table 2.5 presents the composition of the sample of foreign affiliates in terms of their strategic roles, as well as the divestment rates in each affiliate role type. In total, there are 7,386 foreign affiliates, out of which 5,307 (approximately 72%) are related FDI. 3,880 of these related FDI are vertically integrated affiliates, of which 1,353 are upstream and 2,527 are downstream. 1,427 affiliates (around 19% of the total sample) have the same three-digit industry code as their parent companies, i.e., the horizontal type. Column two

shows the divestment rate of each affiliate role type, with an average divestment rate of 8.31% ranging from 6.41% for downstream affiliates to 10.63% for unrelated affiliates. On average, horizontal affiliates have a much higher divestment rate (9.25% vs. 6.73%) than vertical ones.

Table 2.5: Composition of the sample of affiliates, by affiliate roles and status

Affiliate roles	Number of affiliates	
	All	Divestment rate
Related	5,307	393 (7.41%)
Vertical	3,880	261 (6.73%)
Upstream	1,353	99 (7.32%)
Downstream	2,527	162 (6.41%)
Horizontal	1,427	132 (9.25%)
Unrelated	2,079	221 (10.63%)
All	7,386	614 (8.31%)

Notes: The ratios in parentheses are the divestment rates for each affiliate role type.

Table 2.6 presents the average profitability of both affiliates and parent companies across the different affiliate role types. On average, affiliates tend to have lower profitability than their parent company. Furthermore, there is a clear pattern showing that divested affiliates have significantly lower profitability (2.69 vs. 5.84) than non-divested affiliates, and parent companies have lower profitability (5.1 vs. 8.18) if they have divested affiliates, compared to other parents without divested affiliates. These profitability differences can be recognised across all the different affiliate role types. Horizontal affiliates tend to have a higher level of profitability on average than vertically integrated affiliates, regardless of whether they are divested or non-divested.

Table 2.6: Profitability of the sample of affiliates, by affiliate roles and status

Affiliate roles	Average affiliate ROS			Average parent ROS		
	Divested	Non-divested	t-test	Divested	Non-divested	t-test
Related	3.20	5.84	-4.85	5.25	8.38	-7.04
Vertical	2.11	5.30	-5.08	5.49	8.18	-5.02
Upstream	2.16	5.86	-2.98	5.42	6.68	-1.57
Downstream	2.08	5.03	-4.23	5.53	8.92	-4.86
Horizontal	5.34	7.30	-1.83	4.79	8.92	-5.18
Unrelated	1.78	5.84	-4.16	4.81	7.57	-5.03
All	2.69	5.84	-6.60	5.10	8.18	-8.83

Notes: The t-test shows the statistical difference between divested and non-divested affiliates in their profitability in the left panel, and in their parent company profitability in the right panel.

In Table 2.7, I present a correlation matrix of key variables included in the analysis. The correlation coefficients between affiliate characteristics X_j^A , parent company characteristics Z_h^p and country variables C_m range between -0.27 and 0.27, suggesting that there is no issue of multicollinearity.

Table 2.8 presents a list of the 25 countries where most foreign affiliates are located, along with the average of some of the key variables used in the analysis. The data cover 42 home countries and 79 host countries. Unsurprisingly, most parent firms are concentrated in advanced economies, with a significant number in the United States, Germany, the United Kingdom, Italy, Finland, France, Japan, Sweden, Switzerland, Belgium and the Netherlands, which account for 77.5 per cent of all multinational parents. Most foreign affiliates are located in France, the United Kingdom, China, Spain, Germany, Italy, Poland, Belgium, Czech Republic, Sweden, Russia, the Netherlands, India, Malaysia, Thailand, South Korea, Norway and Hungary, which account for 78.1% of total foreign affiliates.

Table 2.7: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Affiliate ROS	1.00															
2	Affiliate gearing	-0.16†	1.00														
3	Affiliate total assets	0.06†	0.16†	1.00													
4	Affiliate age	0.04†	0.03†	0.23†	1.00												
5	Parent experience	-0.05†	0.03†	-0.05†	0.02†	1.00											
6	Parent ROS	0.17†	-0.02†	0.05†	0.06†	-0.02†	1.00										
7	Parent gearing	-0.08†	0.05†	0.07†	-0.03†	0.10†	-0.27†	1.00									
8	Same language	0.00	0.08†	0.06†	0.11†	0.01*	0.04†	0.00	1.00								
9	Geographical distance	0.08†	-0.05†	0.12†	-0.03†	-0.17†	0.14†	0.04†	-0.13†	1.00							
10	GDP growth	0.10†	-0.06†	0.09†	-0.09†	-0.01	0.06†	-0.02†	-0.02†	0.25†	1.00						
11	GDP	0.01	0.08†	0.19†	-0.00	0.18†	-0.01*	0.03†	0.02†	0.20†	0.26†	1.00					
12	Control of corruption	-0.01*	0.09†	0.03†	0.22†	0.09†	0.00	-0.01	0.27†	-0.18†	-0.26†	-0.14†	1.00				
13	Upstream	0.00	-0.01*	0.08†	0.01*	0.00	-0.07†	-0.00	0.06†	0.02†	0.05†	0.07†	-0.02†	1.00			
14	Downstream	-0.05†	-0.03†	-0.21†	-0.02†	0.06†	0.06†	-0.00	-0.08†	-0.05†	-0.12†	-0.17†	0.07†	-0.35†	1.00		
15	Horizontal	0.05†	-0.00	0.23†	0.10†	-0.06†	0.03†	-0.00	-0.04†	0.03†	0.08†	0.06†	-0.11†	-0.24†	-0.38†	1.00	
16	Related	-0.00	-0.04†	0.05†	0.08†	0.01	0.04†	-0.01	-0.07†	-0.00	-0.01	-0.07†	-0.04†	0.28†	0.44†	0.30†	1.00

Notes: *: $p< 0.10$; †: $p<0.01$. Table 2.4 provides detailed explanations for each variable.

Table 2.8: List of countries and the average of some key variables (top 25 host countries)

Country	Parent			Affiliates			Value chains		
	No.	Assets	ROS	No.	Assets	ROS	Up.	Down.	Horizon.
Australia	5	8865.74	2.30	123	452.09	6.23	29	35	17
Austria	9	2988.59	8.37	146	115.10	5.49	17	63	18
Belgium	16	13690.95	5.35	321	509.47	5.49	45	130	55
China	0			529	405.45	8.05	160	40	173
Colombia	0			95	170.05	7.62	13	51	19
Czech Republic	6	132.98	5.94	253	141.88	7.02	59	78	59
Finland	26	5902.84	2.69	123	101.94	6.27	16	68	15
France	26	19807.02	4.42	730	215.21	4.46	104	328	109
Germany	44	36379.24	5.89	391	320.66	6.34	78	102	89
Hungary	1	1861.89	-1.14	152	298.55	4.35	20	62	32
India	5	19468.60	4.91	180	444.21	7.62	36	14	62
Italy	28	3805.83	3.53	387	291.43	3.93	71	123	77
Malaysia	3	174.75	12.09	170	94.73	8.17	43	42	36
Netherlands	14	21966.12	5.81	187	1119.12	6.00	32	66	24
Norway	5	2233.69	5.77	155	106.81	6.93	18	83	19
Poland	3	493.66	-2.99	339	140.40	5.53	60	122	78
Portugal	2	1624.87	-6.55	142	73.97	5.31	20	91	15
Russia	4	4376.11	7.60	221	275.62	8.16	35	84	32
Singapore	3	477.60	1.32	87	494.04	7.26	7	41	11
Slovak Republic	0			117	92.02	3.84	18	45	21
South Korea	5	16304.27	4.62	157	179.78	7.20	27	71	27
Spain	9	1258.41	1.06	415	223.93	2.80	69	145	83
Sweden	21	7727.22	5.09	239	343.70	6.75	42	87	44
Thailand	2	7149.77	6.91	166	178.37	7.80	41	52	38
United Kingdom	32	11573.88	10.69	672	584.60	6.50	172	136	90

Notes: This table includes a list of countries where most foreign affiliates are located. Table 2.4 provides the detailed explanations for each variable. 'Up.' refers to upstream. 'Down.' refers to downstream. 'Horizon.' refers to horizontal.

2.4 Empirical results

Table 2.9 reports the regression results with respect to the factors influencing MNE divestment of foreign affiliates. In column 1, I test how parent company performance influences the likelihood of divesting affiliates from foreign markets, while in column 2 I test whether the effect of parent company performance on affiliate divestment is moderated by relatedness between the parent companies and affiliates. In the more

detailed specifications columns 3 and 4, I specify the Cox proportional hazards model with shared frailty of the same parent firms, which is a similar approach to the random effects model in the regression approach (Berry, 2013; STATA, 2017).

Table 2.9: Parent performance, relatedness and divestments (H1 and H2)

	(1)	(2)	(3)	(4)
	All	Related/Unrelated	All	Related/Unrelated
Parent ROS * Related		**0.029*** **		**0.025*** **
		(0.009)		**(0.010)**
Related		-0.498***		-0.517***
		(0.105)		(0.111)
Parent ROS	**-0.032*** **	**-0.055*** **	**-0.034*** **	**-0.052*** **
	(0.006)	**(0.008)**	**(0.005)**	**(0.008)**
Parent experience	-0.043***	-0.045***	-0.032***	-0.035***
	(0.014)	(0.014)	(0.008)	(0.009)
Parent gearing	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Affiliate total assets	-0.209***	-0.203***	-0.251***	-0.242***
	(0.025)	(0.025)	(0.025)	(0.026)
Affiliate age	-0.006**	-0.005**	-0.005**	-0.005*
	(0.002)	(0.002)	(0.003)	(0.003)
Affiliate gearing	0.001**	0.001**	0.001**	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
Same language	0.449***	0.449***	0.433***	0.417***
	(0.103)	(0.106)	(0.127)	(0.127)
Geographical distance	0.036	0.039	0.008	0.010
	(0.042)	(0.042)	(0.046)	(0.046)
GDP growth	-0.014	-0.014	-0.015	-0.015
	(0.017)	(0.017)	(0.018)	(0.018)
GDP	0.118***	0.106***	0.121***	0.109**
	(0.040)	(0.039)	(0.042)	(0.042)
Control of corruption	0.088	0.071	0.047	0.035
	(0.054)	(0.055)	(0.055)	(0.055)
Year dummies	Yes	Yes	Yes	Yes
Shared-frailty			Yes	Yes
No. observations	30121	30121	30121	30121
No. linkages	7386	7386	7386	7386
No. exits	614.000	614.000	614.000	614.000
Log likelihood	-4360.612	-4348.293	-4333.577	-4323.147
Theta			0.409	0.399
LR test of theta			54.070	50.292
Prob >= chibar2			0.000	0.000

Notes: Columns 3 and 4 control for shared frailty of the parent company. All independent variables are with a one-year lag apart from "Same language" and "Geographical distance". Robust standard errors clustering at the parent level are in parentheses. Table 2.4 provides detailed explanations for each variable. *: p< 0.10; **: p<0.05; ***: p<0.01.

The positive coefficient means that an increase in a given explanatory variable will increase the likelihood of divestment, and vice-versa. In column 1, the regression coefficient of parent company ROS is -0.032 and is at the significance level of 1%, suggesting that a parent company with declining performance is more likely to completely divest its affiliates from overseas markets. In the qualitative term, a one percentage point decrease in parent company profitability is likely to lead to a 0.032 increase in the likelihood of divestment. I find that parent company performance is negatively correlated with the likelihood of divestment. This negative divestment effect from parent company performance is consistent across all columns from different specifications including adding an interaction term or adding intra-group frailty at parent company level (columns 2-4), and the sign of the coefficients and the significance level are largely unchanged, which show a very robust and consistent result and hypothesis H1 is supported. This result is consistent with several studies including for example Duhaime & Grant (1984), Hamilton & Chow (1993), Zuckerman (2000), Haynes, Thompson & Wright (2003) and Damaraju, Barney & Makhija (2015).

In column two, I include an interaction term between parent company profitability and the relatedness between parent and affiliate companies, and find a positive value of 0.029, meaning that a one percentage point decrease in profitability reduces the likelihood of affiliate divestment by 0.029 for related affiliates, compared to unrelated affiliates. I therefore find that when MNE parents with declining performance, they are more likely to divest unrelated affiliates than related ones, which supports hypothesis H2. In columns three and four, I control for shared frailty of the same parent firms, and virtually all results are largely unchanged, which shows the robustness of the estimates. The likelihood ratio

test of Theta is at the significance level, showing that the frailty model used is appropriate for controlling heterogeneity and random effects (Gutierrez, 2002; Berry, 2013).

When looking at control variables, I find that a few control variables have significant impacts on affiliate divestments. As expected, affiliate size measured by total assets has a negative correlation with the probability of MNE divestment of a foreign affiliate, and affiliate age also reduces the likelihood of divestment, which are in line with the literature (Duhaime & Baird, 1987; Chang, 1996; Song, 2014; Berry, 2013). As expected, affiliates who have high debt-to-equity ratios are more likely to be divested (Hoskisson, Johnson & Moesel, 1994; Shimizu, 2007). The parent company's experience in the host country reduces the likelihood of affiliate divestment, perhaps because it is easier for managers to find comparative information with respect to the affiliate, and therefore be more familiar with the affiliate, which makes managers more reluctant to divest these familiar assets (Ang, de Jong & van der Poel, 2014). In addition, the likelihood of divesting an affiliate is high when the host country market size is large, which is also found in a recent study by Blake & Moschieri (2016), and this is perhaps because MNEs may find it relatively easier to find a buyer, particularly when the foreign market is well established. I also find a positive effect of using the same language on divestment decision, which may be because it is easier for the MNEs to process affiliate information and find possible buyers when host country has the same language as the home country.

I now turn to examine whether the divestment decision is determined by affiliate performance. Table 2.10 reports the results without parent company specific frailty in columns 1-2, and with frailty in columns 3-4. In column 1, I examine how a foreign affiliate's profitability influences the likelihood of it being divested by its parent company.

Table 2.10: Affiliate performance, relatedness and divestments (H3 and H4)

	(1)	(2)	(3)	(4)
	All	Related/Unrelated	All	Related/Unrelated
Affiliate ROS * Related		**-0.004**		**-0.002**
		(0.005)		**(0.006)**
Related		-0.324***		-0.362***
		(0.092)		(0.100)
Affiliate ROS	**-0.012*** **	**-0.010*** **	**-0.012*** **	**-0.010** **
	(0.003)	**(0.004)**	**(0.003)**	**(0.004)**
Parent ROS	-0.030***	-0.031***	-0.031***	-0.032***
	(0.006)	(0.006)	(0.005)	(0.005)
Parent experience	-0.044***	-0.046***	-0.032***	-0.035***
	(0.014)	(0.014)	(0.009)	(0.009)
Parent gearing	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Affiliate assets	-0.208***	-0.202***	-0.248***	-0.239***
	(0.024)	(0.024)	(0.026)	(0.026)
Affiliate age	-0.005**	-0.004*	-0.005**	-0.004*
	(0.002)	(0.002)	(0.003)	(0.003)
Affiliate gearing	0.001	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Same language	0.460***	0.443***	0.442***	0.416***
	(0.104)	(0.105)	(0.127)	(0.127)
Geographical distance	0.037	0.033	0.008	0.004
	(0.041)	(0.042)	(0.047)	(0.047)
GDP growth	-0.012	-0.009	-0.013	-0.012
	(0.016)	(0.016)	(0.018)	(0.018)
GDP	0.125***	0.114***	0.126***	0.116***
	(0.040)	(0.040)	(0.043)	(0.043)
Control of corruption	0.087	0.071	0.048	0.035
	(0.054)	(0.055)	(0.055)	(0.055)
Year dummies	Yes	Yes	Yes	Yes
Shared-frailty			Yes	Yes
No. observations	30121	30121	30121	30121
No. linkages	7386	7386	7386	7386
No. exits	614.000	614.000	614.000	614.000
Log likelihood	-4352.435	-4345.112	-4326.215	-4319.325
Theta			0.413	0.413
LR test of theta			52.440	51.575
Prob >= chibar2			0.000	0.000

Notes: Columns 3 and 4 control for shared frailty of the parent company. All independent variables are with a one-year lag apart from "Same language" and "Geographical distance". Robust standard errors clustering at the parent level are in parentheses. Table 2.4 provides detailed explanations for each variable. *: p< 0.10; **: p<0.05; ***: p<0.01.

The effect of affiliate ROS on the likelihood of divestment is -0.012 at the significance level of 1%, which confirms the results of previous studies and shows that affiliate performance has a significantly negative relationship with affiliate divestment. More specifically, a one percentage point decrease in affiliate performance is likely to lead to a 0.012 increase in the probability of being divested by the parent firm. This negative divestment effect of affiliate performance and its significance level are largely unchanged across all other columns, and therefore hypothesis three is supported. This result is consistent with several studies in the divestment literature such as that of Harrigan (1981), Zuckerman (2000) and Kolev (2016). In column two, I report the moderating effect of relatedness between the affiliate and its parent company on the likelihood of divesting affiliates with declining performance. The interaction term however is insignificant, and it remains insignificant in column four after controlling for parent company specific frailty, so hypothesis four is not supported.

I now turn to look at the results in Table 2.11, where I divided the related affiliates into three different role types. All control variables display similar effects on affiliate survival as evidenced in Tables 2.9 and 2.10. In column one, I test the moderating role of a horizontal as opposed to a vertical affiliate on the likelihood of divesting the affiliate with declining performance. I find that the likelihood of divestment is 0.021 lower for horizontal affiliates, relative to vertical ones, when they have one percentage point decrease in profitability. Hypothesis five is supported.

The second column compares upstream with downstream affiliates. While the individual effect of affiliate performance remains negative, the interaction term between an upstream affiliate and affiliate performance is positive. Taken at face value, it shows that when

Table 2.11: Affiliate divestments, by different strategic roles (H5 and H6)

	(1)	(2)	(3)	(4)	(5)	(6)
	Horizontal vs Vertical	Upstream vs. Downstream	Three Roles	Horizontal vs Vertical	Upstream vs. Downstream	Three Roles
Affiliate ROS	-0.024***	-0.032***	-0.032***	-0.023***	-0.033***	-0.032***
	(0.005)	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)
Affiliate ROS * Horizontal	**0.021*** **		**0.029*** **	**0.021** **		**0.029*** **
	(0.007)		**(0.009)**	**(0.008)**		**(0.009)**
Horizontal	0.382***		0.529***	0.347***		0.502***
	(0.114)		(0.129)	(0.130)		(0.144)
Affiliate ROS * Upstream		**0.019** **	**0.018***		**0.020** **	**0.019***
		(0.009)	**(0.010)**		**(0.010)**	**(0.010)**
Upstream		0.323**	0.391***		0.352**	0.404***
		(0.138)	(0.139)		(0.151)	(0.147)
Affiliate gearing	0.001	0.001*	0.001	0.001	0.001*	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Affiliate total assets	-0.221***	-0.225***	-0.242***	-0.239***	-0.255***	-0.261***
	(0.029)	(0.035)	(0.029)	(0.031)	(0.038)	(0.031)
Affiliate age	-0.006**	-0.004	-0.006**	-0.006**	-0.004	-0.006**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
Parent experience	-0.044***	-0.036**	-0.048***	-0.038***	-0.031**	-0.042***
	(0.013)	(0.014)	(0.013)	(0.012)	(0.013)	(0.012)
Parent ROS	-0.025***	-0.021**	-0.024***	-0.026***	-0.022***	-0.024***
	(0.007)	(0.009)	(0.007)	(0.006)	(0.008)	(0.006)
Parent gearing	-0.000	-0.001	-0.000	-0.000	-0.001	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Same language	0.509***	0.412**	0.422***	0.513***	0.442**	0.437***
	(0.129)	(0.165)	(0.138)	(0.156)	(0.191)	(0.159)
Geographical distance	0.036	0.089	0.036	0.014	0.081	0.019
	(0.047)	(0.059)	(0.047)	(0.053)	(0.065)	(0.053)
GDP growth	-0.013	-0.026	-0.018	-0.015	-0.031	-0.021
	(0.021)	(0.027)	(0.021)	(0.022)	(0.029)	(0.022)
GDP	0.099**	0.143**	0.092**	0.102**	0.143**	0.094*
	(0.045)	(0.063)	(0.045)	(0.050)	(0.065)	(0.050)
Control of corruption	0.086	0.045	0.091	0.056	0.008	0.066
	(0.061)	(0.074)	(0.061)	(0.068)	(0.084)	(0.068)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Shared-frailty				Yes	Yes	Yes
No. observations	22326	16207	22326	22326	16207	22326
No. linkages	5307	3880	5307	5307	3880	5307
No. exits	393	261	393	393	261	393
Log likelihood	-2656.108	-1673.881	-2649.845	-2653.321	-1671.64	-2647.152
Theta				0.218	0.248	0.220
LR test of theta				5.575	4.481	5.386
Prob >= chibar2				0.009	0.017	0.010

Notes: Columns 4, 5 and 6 control for shared frailty of the parent company. All independent variables are at with a one-year lag apart from "Same language" and "Geographical distance". Robust standard errors clustering at the parent level are in parentheses. Table 2.4 provides detailed explanations for each variable. *: p< 0.10; **: p<0.05; ***: p<0.01.

affiliate profitability decreases by one percentage point, a downstream affiliate is likely to have a 0.019 increase in the likelihood of divestment, as compared to an upstream affiliate. Hypothesis six is therefore corroborated.

I have implemented some robustness exercises to verify the results. In column three, I add the interaction term between affiliate performance and being a horizontal affiliate, as well as the interaction term between affiliate performance and being an upstream affiliate. I find that, compared to the baseline group i.e., the downstream affiliates, the likelihood of divesting the affiliate with declining performance is significantly reduced for horizontal and upstream affiliates, and the horizontal type has the lowest likelihood. In columns four to six, I replicate the analyses of columns one to three by controlling for frailty at the parent level. I again find all results are robust, and the size and sign of the coefficients on the interaction terms are largely unchanged.

As a robustness check, I also define upstream FDI for affiliates whose primary industries count for 1% (or more) of the total intermediate inputs to the industry where its parent company belongs to. The findings[3] remain the same. Unrelated affiliates are more likely to be divested when parent companies' performance is declining. The likelihood to divest affiliates with declining performance is higher when the overseas affiliates are vertical rather than horizontal FDI, and when they are downstream, rather than upstream, in the MNE value chains. I presented these results in Appendices 2.1 and 2.2.

[3] The use of 1% as an alternative threshold for defining upstream FDI does not change the whole observation samples; therefore, the estimates for hypotheses one and three are unchanged and we therefore do not include them in Appendices 2.1 and 2.2.

2.5 Conclusions

With the rapid pace of globalisation and the growing prevalence of outsourcing and offshoring activities (Strange & Humphrey, 2018), multinational enterprises are disintegrating their value adding activities through giving specialized roles to each affiliate, and they are locating affiliates in countries which offer significant locational advantages (Dunning, 1988; Kedia & Mukherjee, 2009; Buckley & Strange, 2015). According to the strategic roles of the affiliates in the MNE value chains, foreign affiliates are categorized into four types, namely upstream, downstream, horizontal and unrelated affiliates. Each type of affiliate has different initiatives and plays a unique strategic role in the MNE value chains (Bouquet & Birkinshaw, 2008).

I find a robust finding that an affiliate is likely to be divested when it or its parent company has a poor financial performance, which is consistent with a number of studies (such as Hamilton & Chow (1993), Zuckerman (2000) and Berry (2013)). Furthermore, the results also show that the likelihood of divesting the affiliate with declining performance is higher for downstream affiliate than upstream ones. I also find robust evidence that horizontal affiliates are less likely to be divested when they do not perform well, which could be partly due to the high extent of product relatedness between the parent company and its horizontal affiliates (Chang & Singh, 1999; Capron, Mitchell & Swaminathan, 2001; Wan, Chen & Yiu, 2015). I find that the likelihood of divesting an unrelated affiliate is significantly determined by its parent company's financial performance. When the parent company has financial constraints, it is more likely to convert the assets of unrelated affiliates into other opportunities. I however find that when an affiliate's performance declines, the likelihood of divesting a related affiliate is not different from that of an unrelated affiliate. On the one hand, the parent company may divest its unrelated

affiliates with declining performance as they make limited contributions to the parent company value chain (Bergh, 1997). On the other hand, however, divesting a related affiliate with declining performance may be an option because there often involves a high level of coordination and shared resources, and therefore divesting a related affiliate significantly reduces monitoring costs and the firm can benefit more from resource allocation efficiencies (Hill & Hoskisson, 1987; Bergh, 1995). Therefore, the likelihood of divesting an unrelated affiliate with declining performance is not significantly different from that of a related affiliate.

This chapter extends the affiliate divestment literature by emphasizing the importance of affiliates' strategic roles in the MNE value chains (Mudambi, 2008; Rugman, Verbeke & Yuan, 2011; Hernández & Pedersen, 2017). While much evidence in the affiliate divestment literature demonstrates that affiliates with declining performance are likely to be divested, there is a relatively little emphasis on the strategic role of each affiliate in divestment, and I fill in this research gap. This chapter has three main contributions to the foreign affiliate divestment literature. First, I extend the divestment literature by considering the strategic roles of affiliates in their parent company value chains. To the best of my knowledge, this is the first paper to link the affiliate production activity with affiliate divestment. There has been increasing emphasis on the importance of the disintegration of the value chain in the foreign direct investment and location choice literature, so it is necessary to understand how the strategic positions and different roles of affiliates influence divestment decisions. Second, I contribute to the international business and global strategy literature by emphasizing the importance of embeddedness of an affiliate within the parent company value chain structure (Meyer, Mudambi & Narula, 2011) in divestment decisions. Third, I also make a significant contribution to the

empirical literature on divestment decision. Most empirical literature on foreign affiliate divestment is focused on US firms and a small number of developed country firms. I extend the literature by analysing the survival of affiliates by including a wider set of countries. I include both developed and developing country affiliates in the analysis, which builds a global view of foreign affiliate divestment and its determinants.

This study has some limitations, which point to an agenda for future research. First, in this chapter, I have used a rudimentary but novel category based on an affiliate's value-adding activities in the MNE value chains. Future work could consider more fine-sliced classifications of affiliate roles. Despite the large database covering thousands of foreign affiliates in different countries, there are a few countries with very few affiliate samples due to the unavailability of required information for the analysis. However, this does not influence the majority of the countries covered in the analyses. In this chapter, I have not explored how affiliate or parent profitability is likely to influence the selection of modes to divest an affiliate including sell-off, carve-out and spin-off, and I have not explored the subsequent performance outcomes for parent companies after they have restructured their portfolios, which I leave for future research.

The managerial implications of my findings are intriguing. From the foreign affiliate perspective, maintaining a good financial performance is imperative for their survival in overseas markets. Foreign affiliates could engage more in research and development activities to augment their own competence creation and bargaining power (Mudambi & Navarra, 2004; Bouquet & Birkinshaw, 2008). The corporate decision-makers of the MNE parent company need to be aware that the strategic roles of affiliates influence divestment decisions.

Appendices

Appendix 2.1: Performance, relatedness and divestments (H2 and H4) (using one percent as the threshold for upstream affiliates)

	(1)	(2)	(3)	(4)
	H2: parent performance		H4: affiliate performance	
	Related/Unrelated		Related/Unrelated	
Parent ROS * Related	0.031***	0.027***		
	(0.009)	(0.010)		
Affiliate ROS * Related			-0.004	-0.002
			(0.005)	(0.006)
Affiliate ROS			-0.009***	-0.010**
			(0.004)	(0.004)
Parent ROS	-0.056***	-0.054***	-0.032***	-0.032***
	(0.007)	(0.008)	(0.006)	(0.005)
Related	-0.583***	-0.595***	-0.396***	-0.428***
	(0.103)	(0.111)	(0.091)	(0.101)
Parent experience	-0.046***	-0.036***	-0.046***	-0.035***
	(0.014)	(0.009)	(0.014)	(0.009)
Parent gearing	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Affiliate total assets	-0.201***	-0.239***	-0.200***	-0.236***
	(0.025)	(0.026)	(0.024)	(0.026)
Affiliate age	-0.005**	-0.005*	-0.004*	-0.004*
	(0.002)	(0.003)	(0.002)	(0.003)
Affiliate gearing	0.001**	0.001*	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Same language	0.445***	0.411***	0.439***	0.408***
	(0.106)	(0.127)	(0.105)	(0.127)
Geographical distance	0.036	0.008	0.031	0.002
	(0.042)	(0.046)	(0.042)	(0.047)
GDP growth	-0.015	-0.015	-0.011	-0.013
	(0.016)	(0.018)	(0.016)	(0.018)
GDP	0.104***	0.108**	0.112***	0.115***
	(0.039)	(0.042)	(0.039)	(0.043)
Control of corruption	0.060	0.032	0.061	0.031
	(0.054)	(0.055)	(0.055)	(0.055)
Year dummies	Yes	Yes	Yes	Yes
Shared-frailty		Yes		Yes
No. observations	30121	30121	30121	30121
No. linkages	7386	7386	7386	7386
No. exits	614	614	614	614
Log likelihood	-4344.258	-4319.836	-4341.933	-4316.686
Theta		0.393		0.408
LR test of theta		48.844		50.494
Prob >= chibar2		0.000		0.000

Notes: Columns 2 and 4 control for shared frailty of the parent company. All independent variables are with a one-year lag apart from "Same language" and "Geographical distance". Robust standard errors clustering at the parent level are in parentheses. Table 2.4 provides detailed explanations for each variable. *: p< 0.10; **: p<0.05; ***: p<0.01.

Appendix 2.2: Affiliate divestments, by different strategic roles (H5 and H6) (using one percent as the threshold for upstream affiliates)

	(1)	(2)	(3)	(4)	(5)	(6)
	Horizontal vs Vertical	Upstream vs. Downstream	Three Roles	Horizontal vs Vertical	Upstream vs. Downstream	Three Roles
Affiliate ROS	-0.024***	-0.032***	-0.032***	-0.023***	-0.033***	-0.032***
	(0.005)	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)
Affiliate ROS * Horizontal	0.021***		0.029***	0.021**		0.029***
	(0.007)		(0.009)	(0.008)		(0.009)
Horizontal	0.406***		0.528***	0.379***		0.505***
	(0.113)		(0.128)	(0.129)		(0.143)
Affiliate ROS * Upstream		0.018*	0.017*		0.019*	0.018*
		(0.009)	(0.010)		(0.010)	(0.010)
Upstream		0.236*	0.304**		0.258*	0.315**
		(0.136)	(0.137)		(0.146)	(0.144)
Affiliate gearing	0.001	0.001*	0.001*	0.001	0.001*	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Affiliate total assets	-0.224***	-0.227***	-0.242***	-0.240***	-0.251***	-0.259***
	(0.029)	(0.035)	(0.029)	(0.031)	(0.038)	(0.031)
Affiliate age	-0.006**	-0.004	-0.006**	-0.006**	-0.004	-0.006**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
Parent experience	-0.044***	-0.034**	-0.046***	-0.038***	-0.030**	-0.041***
	(0.012)	(0.014)	(0.013)	(0.011)	(0.012)	(0.012)
Parent ROS	-0.024***	-0.020**	-0.023***	-0.025***	-0.021***	-0.024***
	(0.007)	(0.009)	(0.007)	(0.006)	(0.008)	(0.006)
Parent gearing	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Same language	0.507***	0.433***	0.438***	0.508***	0.458**	0.449***
	(0.129)	(0.163)	(0.136)	(0.155)	(0.189)	(0.158)
Geographical distance	0.051	0.111*	0.054	0.031	0.101	0.036
	(0.046)	(0.056)	(0.046)	(0.052)	(0.064)	(0.053)
GDP growth	-0.013	-0.019	-0.014	-0.014	-0.022	-0.016
	(0.019)	(0.025)	(0.019)	(0.022)	(0.027)	(0.022)
GDP	0.094**	0.138**	0.087**	0.096*	0.137**	0.089*
	(0.044)	(0.062)	(0.044)	(0.050)	(0.064)	(0.050)
Control of corruption	0.104*	0.078	0.114*	0.078	0.044	0.088
	(0.059)	(0.074)	(0.061)	(0.066)	(0.082)	(0.067)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Shared-frailty				Yes	Yes	Yes
No. observations	22946	16827	22946	22946	16827	22946
No. linkages	5450	4023	5450	5450	4023	5450
No. exits	398	266	398	398	266	398
Log likelihood	-2697.241	-1713.324	-2692.656	-2694.824	-1711.613	-2690.286
Theta				0.202	0.224	0.209
LR test of theta				4.833	3.422	4.740
Prob >= chibar2				0.014	0.032	0.015

Notes: Columns 4, 5 and 6 control for shared frailty of the parent company. All independent variables are at with a one-year lag apart from "Same language" and "Geographical distance". Robust standard errors clustering at the parent level are in parentheses. Table 2.4 provides detailed explanations for each variable. *: p< 0.10; **: p<0.05; ***: p<0.01.

Chapter 3

The impact of MNE affiliate intangible assets on parent performance: the moderating effect of affiliate strategic role

3.1 Introduction

Since the 2000s, there has been escalating interest in intra-MNE reverse knowledge transfer, i.e., knowledge transferred from a foreign affiliate to its parent company (Gupta & Govindarajan, 2000; Minbaeva et al., 2003; Mudambi & Navarra, 2004; Rabbiosi & Santangelo, 2013; Nair et al., 2017). Much focus of this literature is on measuring the extent to which affiliate knowledge is transferred to or used by the parent company (see for example Ambos, Ambos & Schlegelmilch, 2006; Rabbiosi, 2011; Jeong, Chae & Park, 2017), but none of these studies has focused on affiliates' intangible assets as the source of the reverse knowledge transfer to the parent. Intangible assets have been deemed as paramount sources of proprietary know-how and superior technological advancement for MNEs to gain competitive advantages (Morck & Yeung, 1991; Delios & Beamish, 2001; Denicolai, Zucchella & Strange, 2014; Mohr & Batsakis, 2014; Kafouros & Aliyev, 2016b). It is therefore important to address how affiliates' intangible assets exert an influence on the parent company's performance. In addition to that, while some studies have explored the extent to which the relevance of or similarity between the parent and affiliate can increase knowledge flow between them (Yang, Mudambi & Meyer, 2008; Nair, Demirbag & Mellahi, 2016; Jeong, Chae & Park, 2017), there has been limited research on exploring how an affiliate's role in relation to the parent company's value chain can moderate the impact of affiliate intangibles on parent performance.

The seminal contribution by Bartlett & Ghoshal (1986) distinguishes affiliate roles into four categories including the strategic leader, the contributor, the implementer and the black hole, and as articulated in Birkinshaw & Morrison (1995), an MNE can assign a specific mandate and charter to its foreign affiliate. Increasingly, recent IB research has highlighted the different strategic roles that affiliates may fulfil within MNEs (Mudambi,

2008; Rugman, Verbeke & Yuan, 2011; Verbeke & Asmussen, 2016; Hernández & Pedersen, 2017). Rugman, Verbeke & Yuan (2011), for example, have put forward the rationale for augmenting the literature on affiliate roles (e.g., Bartlett & Ghoshal, 1986) by emphasising the position of an affiliate in the MNE value chains. Building upon this literature and from a regional perspective, Verbeke & Asmussen (2016) illustrate the differences between the upstream and downstream activities of multinational enterprises. This chapter builds upon these insights by categorising overseas affiliates according to their strategic roles to one of four types: (1) horizontal (2) upstream GVC-integrated; (3) downstream GVC-integrated; and (4) unrelated affiliates, as shown in Figure 1.1. I use the same classifications of affiliate roles as those presented in Chapter two.

In this chapter, I specifically look at the causal relationship between the intangible assets of affiliates and the performance benefits gained by parent companies. I argue that the greater the level of intangible assets, the greater the level of knowledge transfer. The high level of intangible assets will expect to an improvement in performance (Chang, Chung & Moon, 2013a; Filatotchev & Piesse, 2009; Kafouros & Aliyev, 2016b). I am not tracking the micro-processes by identifying the instances of knowledge transfer which has been studied a lot in previous literature (see Nair, Demirbag & Mellahi, 2015; Peltokorpi, 2015, among others). In the knowledge transfer literature, this process of transferring knowledge is termed as reverse knowledge transfer (Gupta & Govindarajan, 2000). I build a "reduced form" of the reverse knowledge transfer model by directly investigating the causal impact of the affiliate's intangible assets on its parent company performance, and assume that it is an effect of the reverse transfer of knowledge. Contractor, Yang and Gaur (2016) use a similar approach by examining the impact of

parent company intangible assets on affiliate performance as the effect of knowledge transfer from the parent company to its foreign affiliates.

In this chapter, I include more than 5,000 multinational parents from 52 countries and their over 15,000 foreign affiliates located in 74 countries in order to analyse the causal impact of affiliate intangibles on MNE performance. As a whole, I find a positive and significant affiliate intangible effect, and this positive effect remains when I use the instrumental variable estimator to control for the possible endogenous issue, and the results are also very robust when I use a falsification test which is a new approach in parent-affiliate analysis. In this chapter, I also demonstrate that the affiliate role at the different stages in the value chain influence the affiliate intangibles effects on MNE performance, and more specifically, I find that the impact of affiliate intangible assets on the parent company's performance is higher for related, rather than unrelated, affiliates. Moreover, the impact is greater for horizontal affiliates than vertical ones, and is higher for upstream affiliates as compared to downstream ones.

The remainder of this chapter is organised as follows. Next section reviews the literature and proposes the hypotheses to be examined in this chapter. Section three describes the data and methodology. The following section presents the results which embrace the baseline results, robustness exercises and a falsification test using the matching approach. Finally, a conclusion is given.

3.2 Literature review and hypothesis development

In line with several studies exploring the role of intangible assets (Mohr & Batsakis, 2014; Wang et al., 2012; Kafouros & Aliyev, 2016b), the theory upon which this chapter builds

is the resource-based view of the firm. It has been well acknowledged that the resource-based view of the firm builds upon Edith Penrose's seminal work of *The Theory of the Growth of the Firm* (Wernerfelt, 1984; Kor & Mahoney, 2005). In her book, she proposed that a firm is an administrative framework in which the firm's various resources are bound together; therefore, the firms owe their existences and growth to the opportunities created by their resources (Penrose, 1959), and in her work she noted that the growth of firms can be best explained by the ability of firms to reap financial returns. Moreover, Penrose's work has offered theoretical underpinning for different value adding activities of multinational enterprises from the view of firm resources and capabilities.

Penrose's work has attracted a scholarly interest of strategy and management researchers who have explored the heterogeneity of firm resources and their impacts on firm growth and performance. Unlike neoclassical economics, the resource-based view of the firm, pioneered by Wernerfelt (1984) and Barney (1991), has two underlying assumptions. First, firms operating in the same industry are heterogenous with respect to their strategic resources and capabilities, the utilization of which can provide the market opportunities and neutralize the threat facing the firms, leading to some firms performing better than others (Barney, 1991, 2001). Second, some strategic resources cannot be easily mobilized, therefore can be persistent, which benefit from their history dependent, causal ambiguity and social complexity. More specifically, some resources cannot be perfectly imitated when the creation and exploitation of these resources depend upon their historical position in the firm, or when the link between these resources and the firm's sustained competitive advantages is causally ambiguous, or when resources are socially complex (Dierickx & Cool, 1989; Barney, 1991, 2001). In combining these two fundamental assumptions, the resource-based view (RBV) of the firm posits that firms can sustain competitive

advantages when the resources they exploit are valuable, rare and inimitable (Wernerfelt, 1984; Barney, 1991, 2001; Peteraf, 1993).

Intangible assets, such as patented technology, computer software, trademarks, customer and supplier relationships and marketing rights, have been often deemed as the paramount sources for achieving the sustained competitive advantages, as they often have a high level of specificity, thus making it difficult to be imitated (Dierickx & Cool, 1989; Wang et al., 2012). With theoretical support from the resource-based view of the firm, several studies have addressed the role of intangible assets in the extent of overseas investments (Wang et al., 2012), the speed of overseas investments (Mohr & Batsakis, 2014), the improvement of firm performance and growth (Harris & Moffat, 2013; Kafouros & Aliyev, 2016b).

Historically, the resource-based view of the firm has a significant influence on the literature addressing knowledge transfer within the firm (Gupta & Govindarajan, 2000; Håkanson & Nobel, 2000; Nair et al., 2016; Jeong et al., 2017, among others) and performance benefits of these transferred knowledge (Ambos, Ambos & Schlegelmilch, 2006; Holm & Sharma, 2006; Rabbiosi & Santangelo, 2013, among others). A recent study by Contactor, Yang & Gaur (2016), for example, explores knowledge transfer from the parent company to its foreign affiliates by investigating the effect of the parent company's intangible assets on affiliate performance, and they found a positive effect which is in line with the resource-based theory in their theoretical discussion. In this chapter, I focus on the impact of affiliate intangible assets on parent company performance. In the following section I will discuss the literature on reverse knowledge transfer including the study characteristics, the main findings and the main limitations.

The characteristics of the studies on reverse knowledge transfer are presented in Table 3.1. Sample size across the different studies varies dramatically, ranging from two case examples (Buckley, Clegg & Tan, 2003) to a few thousand parent-affiliate linkages (Driffield, Love & Yang, 2016). The three most common methods of data collection are questionnaire surveys (Gupta & Govindarajan, 2000; Jeong, Chae & Park, 2017), interviews (Buckley, Clegg & Tan, 2003; Ciabuschi, Kong & Su, 2017) and secondary data collection (Mudambi & Navarra, 2004; Corredoira & Rosenkopf, 2010). While there exists a large degree of heterogeneities across the different studies in terms of the study characteristics and the measurements of knowledge transfer, there are congruent findings confirming the existence of reverse knowledge transfer.

The main findings of the reverse knowledge transfer studies are that various factors facilitate or impede the knowledge transfer (see for example Gupta & Govindarajan, 2000; Håkanson & Nobel, 2000, 2001; Mudambi & Navarra, 2004; Nair et al., 2017). Useful tactics for firms to integrate knowledge between the affiliate and parent company and to increase the extent of the transferred knowledge is to establish an effective integrative mechanism through the exchange of personnel (Håkanson & Nobel, 2000, 2001), expatriation (Sanchez-Vidal, Sanz-Valle & Barba-Aragon, 2018), joint teamwork (Najafi-Tavani, Giroud & Sinkovics, 2012), formal meetings (Jeong, Chae & Park, 2017), staff visits (Rabbiosi & Santangelo, 2013) and personnel discussions (Schotter & Bontis, 2009). Allied to these, successful reverse knowledge transfer is contingent on the extent of the relevance in terms of their knowledge, cultures, shared values and company visions

Table 3.1: Studies of reverse knowledge transfer

Studies	RKT measurements and focus	Data collection	Country coverage and samples
Gupta & Govindarajan (2000)	Scale the extent of transferred knowledge to the parent	Questionnaire; secondary data	374 foreign subsidiaries of 75 US, Japanese and European MNEs
Håkanson & Nobel (2000, 2001)	Count the number of technological know-how transfers in 5 years	Questionnaire	17 Swedish MNEs
Buckley, Clegg & Tan (2003)	Transfer technology-related resources, output and experience to parent	Interviews	Foreign direct investments of one US and one Belgian firms in China
Mudambi & Navarra (2004)	Citations to subsidiary patents	Secondary data (patent)	275 foreign subsidiaries in the UK
Frost & Zhou (2005)	Citations to subsidiary patents	Secondary data (patent)	104 MNEs from 14 countries
Ambos, Ambos & Schlegelmilch (2006)	Scale the benefits of subsidiary knowledge transferred to the parent	Questionnaire	66 foreign subsidiaries in 24 countries from 33 European MNEs
Yang, Mudambi & Meyer (2008)	Scale the extent of subsidiary knowledge used by the parent	Questionnaire	105 foreign subsidiaries in Hungary, Poland and Lithuania
Schotter & Bontis (2009)	Transfer subsidiary-originated capabilities	Interviews	6 foreign subsidiaries of 1 German firm
Corredoira & Rosenkopf (2010)	Citations to patents	Secondary data (patent)	154 MNEs in 12 economies
Driffield, Love & Menghinello (2010)	Transfer scientific and technological know-how to the parent company	Secondary data	921 foreign affiliates in Italy
Rabbiosi (2011)	Scale the extent of knowledge used by the parent	Questionnaire	290 dyads of the parents and foreign subsidiaries from 84 Italian MNEs
Najafi-Tavani, Giroud & Sinkovics (2012)	Scale the extent of transferred knowledge to the parent	Questionnaire	178 foreign subsidiaries in the UK from MNEs worldwide
McGuinness, Demirbag & Bandara (2013)	Scale the extent of transferred knowledge to the parent	Questionnaire	Three foreign Subsidiaries of a UK based MNE
Rabbiosi & Santangelo (2013)	Scale the benefits of foreign subsidiary knowledge transferred to the parent	Questionnaire; Interviews	84 foreign subsidiaries of 41 Italian MNEs
Mudambi, Piscitello & Rabbiosi (2014)	Scale the extent of foreign subsidiary knowledge used by the parent	Questionnaire; Interview	84 Italian MNEs

Table 3.1: Studies of reverse knowledge transfer (cont'd)

Studies	RKT measurements and focus	Data collection	Country coverage and samples
Nair, Demirbag & Mellahi (2015, 2016)	Scale the extent of subsidiary knowledge transferred to the parent	Questionnaire	329 Indian MNEs
Nair et al. (2017)	Scale the benefit of subsidiary knowledge transferred to the parent	Questionnaire	329 Indian MNEs
Najafi-Tavani et al. (2015)	Scale the extent of knowledge transferred to the parent in the past three years	Questionnaire	183 foreign subsidiaries in the UK from MNEs worldwide
Peltokorpi (2015)	Scale the extent of knowledge transferred by employees to the parent	Questionnaire	467 foreign subsidiaries in Japan
Driffield, Love & Yang (2016)	Subsidiary productivity upgrades the efficiency of the parent company	Secondary data	Parent-affiliate linkages in 46 nations
Park & Vertinsky (2016)	Parents gain knowledge from the subsidiary	Questionnaire	199 international joint ventures in South Korea
Ciabuschi, Kong & Su (2017)	Subsidiary knowledge transferred to the parent company	Secondary data; Interviews	Four Chinese subsidiaries in Germany and the Netherlands
Jeong, Chae & Park (2017)	Scale the benefit of market knowledge transferred to the parent	Questionnaire	145 foreign subsidiaries in Korea from 108 MNEs
Oh & Anchor (2017)	Subsidiary transfers local market knowledge to the parent company	Questionnaire	432 foreign subsidiaries in South Korea
Peltokorpi & Yamao (2017)	Scale the extent of knowledge transferred by employees to the parent	Questionnaire	425 foreign subsidiaries in Japan from MNEs in 14 countries
Peng et al. (2017)	Scale the extent of knowledge received at the parent company	Questionnaire; Interviews	30 Chinese subsidiaries in the US
Sanchez-Vidal, Sanz-Valle & Barba-Aragon (2018)	Scale the benefits of repatriates' knowledge to the parent	Questionnaire	115 Spanish MNEs

(Najafi-Tavani, Giroud & Sinkovics, 2012; McGuinness, Demirbag & Bandara, 2013; Park & Vertinsky, 2016; Oh & Anchor, 2017; Peltokorpi & Yamao, 2017). Yang, Mudambi & Meyer (2008) for example corroborate that the extent of knowledge transfer is influenced by the level of the overlapping and similarity of the knowledge between the affiliate and parent company. A similar finding is reached in Jeong, Chae & Park (2017) and Nair, Demirbag & Mellahi (2016) who emphasize that some form of connectedness between the transferred knowledge from the affiliate and the knowledge residing in the parent company is conducive to the transfer and subsequent economic benefits. In this chapter, I follow this line of research and consider the relatedness between an affiliate and its parent company in terms of their value-adding activities. More specifically, I consider a broad classification of value activities of foreign affiliates in relation to their parent company, as shown in Figure 1.1.

Crucially, as shown in Table 3.1, I can discern that there exists a significant variation with respect to how to measure the effect of reverse knowledge transfer. One group of studies (see for example Mudambi & Navarra, 2004 and Frost & Zhou, 2005) count the number of citations to an affiliate's patent by its parent's patent as a measurement of reverse knowledge transfer. This measurement however suffers from the possible omission bias, as it does not capture certain affiliate-originated knowledge such as local market experience or technological capability which are not granted patents. The second group follows the most common measurement used in Gupta & Govindarajan (2000), who surveyed managers' perceptions to scale the extent of the knowledge and skills transferred from a foreign affiliate to its parent company (Najafi-Tavani, Giroud & Sinkovics, 2012; Nair, Demirbag & Mellahi, 2015, 2016; Oh & Anchor, 2017). The third group of studies including, for example Rabbiosi (2011), Mudambi, Piscitello & Rabbiosi (2014) and

Jeong, Chae & Park (2017), specifically assesses whether a foreign affiliate's knowledge is used by the parent company to aid its existing operations, or whether there are benefits from using such knowledge for the parent company (Ambos, Ambos & Schlegelmilch, 2006; Sanchez-Vidal, Sanz-Valle & Barba-Aragon, 2018). However, it is important to note that much of the knowledge transfer evidence is based on discrete and observed cases of knowledge transfer from a foreign affiliate to its parent company using questionnaire surveys or interviews.

I argue that intra-MNE knowledge transfer occurs continually, and that some knowledge flows are officially counted or registered while others are not. In fact, as pointed out by Minbaeva et al. (2003) and also emphasized in their retrospective study (Minbaeva et al., 2014) on knowledge flow literature, it is important not only to capture the underlying technological capabilities and local market information transferred from an affiliate to its parent company, but also to explore how the parent company uses this transferred knowledge in its operations and maximizes the economic benefits by using it. In order to cast light on this, I build a "reduced form" of the reverse knowledge transfer model by directly examining the impact of intangible assets of an affiliate on its parent company's financial performance, rather than only addressing reverse knowledge transfer activities.

3.2.1 Affiliates' intangible assets and parent profitability

Despite the fact that an affiliate can exploit parent company competence, growing literature on reverse knowledge transfer posits that the transfer of technological capability and know-how is not only, or even largely from, multinational headquarters to its affiliates. More and more affiliates engage in both competence creation and competence exploitation during their operations in the foreign market, and they often search for a

desirable balance between the two (Cantwell & Mudambi, 2005). In the contemporary global economy, more and more affiliates are extensively engaging in a high level of innovative initiatives, either locally, internally or globally, or through a combination of internal and global approaches (Birkinshaw, 1997). Some affiliates have a high level of capability building in order to adapt their products or services to the local market, or to exploit host country locational advantages, with the latter involving a more efficient use of host country factor endowments or a better level of learning originating from the sophisticated and advanced technological capability in the host country. These capability building initiatives often lead to a rapid accumulation of subsidiary-specific advantages (Rugman & Verbeke, 2001; Cantwell & Mudambi, 2005). Affiliate specific advantages are often tacit, proprietary, intangible and path-dependent, and because of these superior attributes, a foreign affiliate is often willing to embark on a series of strategic capability building activities in order to enhance its sustainable competitive advantages (Barney, 1991, 2001; Barney, Ketchen & Wright, 2011). An affiliate who builds its competitive advantages upon intangible assets which are (i) valuable for not only its customers but also for the rest of the MNE, (ii) rare and absolutely unique compared to those of its rivals, (iii) difficult for its rivals, both within national and global settings, to imitate, and (iv) path-dependent on, embedded in and supported by MNEs, will be more competitive than those who primarily depend on their tangible assets or parent company knowledge.

Not only do capability building initiatives have relevance to affiliates' competence creation, they also signal the importance of the affiliate to the MNE, thus influencing the distribution of firm resources and support (Rugman & Verbeke, 2001), and increasing the voice and weight of the affiliate within the firm (Bouquet & Birkinshaw, 2008). This was emphasised for example in Mudambi & Navarra (2004) who found that the higher the

level of specific assets upon which an affiliate builds its competence, the greater the bargaining power it can exert on MNE headquarters. An affiliate who builds its competence on proprietary, intangible assets may use its strong bargaining power to appropriate a big portion of rents for its own purposes (Mudambi & Navarra, 2004).

Despite this bargaining power to appropriate the rents, an affiliate with strong capability building initiatives is likely to become the centre of excellence in the MNE intranet, and as illustrated in Frost, Birkinshaw & Ensign (2002), the foreign affiliate embodying a bundle of unique capabilities provides a high level of value creation to the MNE. Intangible assets are the pivotal source of technological capabilities and know-how for MNEs (Morck & Yeung, 1991; Denicolai, Zucchella & Strange, 2014; Kafouros & Aliyev, 2016b). Greater intangible assets increase the extent of internationalisation (Wang et al., 2012; Denicolai, Zucchella & Strange, 2014; Jones, Temouri & Cobham, 2018), expedite the process of overseas expansions (Mohr & Batsakis, 2014) and play a direct or indirect (moderating) role in improving firm performance (Delios & Beamish, 2001; Harris & Moffat, 2013; Mishra & Gobeli, 1998; Marrocu, Paci & Pontis, 2011; Chang, Chung & Moon, 2013a) and increasing firm growth rates (Filatotchev & Piesse, 2009; Kafouros & Aliyev, 2016b). Some studies, such as Wei & Liu (2006), have found the effect of knowledge spillovers using intangible assets to measure knowledge.

In the growing literature on reverse knowledge transfer within firms (Gupta & Govindarajan, 1991; Cantwell, 1995; Grant, 1996; Frost, 2001; Narula, 2002; Mudambi & Swift, 2014), an MNE is regarded as a repository for collecting knowledge from its dispersed affiliates across different countries, and knowledge reversely transferred from an affiliate to its parent company can boost productivity growth in the rest of the MNE

(Ambos, Ambos & Schlegelmilch, 2006; Driffield, Love & Yang, 2016). For an internationally diversified firm, the intangible assets of its foreign affiliates are vital for the firm to sustain its competitiveness, leading to improved economic returns. I therefore propose that:

Hypothesis 1: **The greater the level of affiliate intangible assets, the better the performance of the MNE parent.**

3.2.2 Affiliate strategic roles within MNEs

Supported by the existing literature on relatedness (such as Duhaime & Grant, 1984 and Berry, 2013), related affiliates that are in the parent's value chain are more likely to be familiar with the MNE parent's knowledge, and the extent of knowledge flows, either from MNE parents or from affiliates, will be greater than that of unrelated affiliates. As compared to unrelated affiliates, related affiliates are within the MNE value chain and there involves more frequent interactions between the parent company and affiliate, which leads to the reverse knowledge transfer. In spite of the importance of related affiliates in MNE structures, MNEs may establish unrelated foreign affiliates in order to expand the firm size, or to benefit from the conglomeration. An unrelated affiliate has a lower level of relatedness and fewer shared values with its parent company, and therefore it is conceivable that it has a low "weight" or "voice" in the MNE network, and that the capabilities and know-how the unrelated affiliate builds upon are different from the rest of the MNE. The parent company also finds it difficult to understand or assimilate this knowledge as it is often tacit and path-dependent (Barney, 1991, 2001). This therefore leads to causal ambiguity, mainly due to a lack of understanding about the idiosyncratic characteristics of knowledge created by the unrelated affiliate, and a lack of effective communication mechanisms (Szulanski, 1996; Szulanski, Ringov & Jensen, 2016), and

these lead to little or no benefit for MNEs from the intangible assets of unrelated affiliates. I therefore propose that

Hypothesis 2: **The impact of affiliate intangible assets on MNE parent performance is larger for related than for unrelated affiliates.**

In the category of related affiliates, it includes horizontal affiliates and vertically-integrated affiliates (Bergh, 1997). Establishing horizontal affiliates in the foreign market can benefit from locational advantages of the host country and effectively engage in product adaptions in response to the local need. Intangible assets accumulated at these horizontal affiliates in the foreign market are important sources of technological capabilities and superior know-how for multinational enterprises (Barney, 1991; Cantwell & Mudambi, 2005). MNEs therefore will transfer affiliate knowledge back to the parent company, and it is important for the parent company to have the absorptive capability to recognise, understand and assimilate these knowledge (Cohen & Levinthal, 1990; Gupta & Govindarajan, 2000). As discussed in Cohen & Levinthal (1990), the absorptive capability is largely a function of the receiving unit's prior related knowledge. The importance of similarity or relevance between the sending and receiving units in the intra-firm knowledge transfer has been addressed in a few studies, including Ambos, Ambos & Schlegelmilch (2006), Jeong, Park & Chae (2017), among others. A horizontal affiliate engages in a series of the same activities as its parent company, producing the same products and sharing the same knowledge and skills as its MNEs; thus, the parent company is familiar with the transferred knowledge from the affiliate. It is therefore relatively easy for the parent company to evaluate the value of transferred knowledge and apply it for commercial uses (Cohen & Levinthal, 1990), leading to a higher performance benefit from the reverse knowledge transfer.

As proposed and corroborated by Nohria & Ghoshal (1994), the shared values between an affiliate and its parent company are an important factor in managing the nexus of parent-affiliate relations within a firm (Duhaime & Grant, 1984; Berry, 2013). Eventually, these shared values can lead to better MNE performance, which is also evidenced in Driffield, Love & Yang (2016) who found that the extent of reverse knowledge transfer is augmented when the parent and affiliate have a high level of shared values.

In contrast to the horizontal type of FDI, affiliates engaging in vertical integration often have a narrow range of activities based on the parent company's assigned tasks, thus having less similarity with the parent company in terms of production activities and knowledge. In order to better evaluate the value of the transferred knowledge, it is important for the receiving unit has some prior related knowledge (Cohen & Levinthal, 1990). The parent company may therefore find it less efficient to evaluate the value of the transferred knowledge from the vertically-integrated affiliate because they have a different set of technological capabilities and know-how, thereby leading to a limited scope of the effective knowledge transfer. It is not inconceivable that because a horizontal affiliate has a high level of relatedness with its parent company in terms of shared norms, knowledge and skills, its intangibles have the largest impact on MNE performance.

Hypothesis 3: **The impact of affiliate intangible assets on MNE parent performance is larger for horizontal affiliates than for vertical affiliates.**

I now turn to specifically consider those affiliates with specialised knowledge, i.e., upstream or downstream types of FDI. Multinational enterprises can disintegrate their value chain activities by assigning specialised roles to each affiliate and locate these

affiliates in countries which have significant locational advantages. (Dunning, 1988; Kedia & Mukherjee, 2009; Buckley & Strange, 2015). Some affiliates undertake upstream activities, such as design, R&D and component production, and some affiliates engage in downstream activities, such as selling and marketing, and the parent company resides in the middle of network. The specific activities that the affiliate engages in can have a great influence on the extent of, and the type of, underlying capabilities which they attempt to build during their operations in the local market (Birkinshaw, 1997). On the one hand, the amount of specialised knowledge developed at the affiliates varies across different types of affiliates. Upstream affiliates engaging in R&D and manufacturing are likely to have a higher level of knowledge creation and specialisation, as compared to downstream affiliates mainly engaging in selling and marketing (Birkinshaw & Morrison, 1995). Given that knowledge is a paramount resource for the firm (Barney, 1991), intangible assets accumulated at the foreign affiliate are important for multinational enterprises (Cantwell & Mudambi, 2005), which promotes the reverse knowledge transfer. Driffield, Love & Yang (2016) concur with this, finding that the extent of knowledge flow between an affiliate engaging in a high level of research and development capability and its parent company is significant.

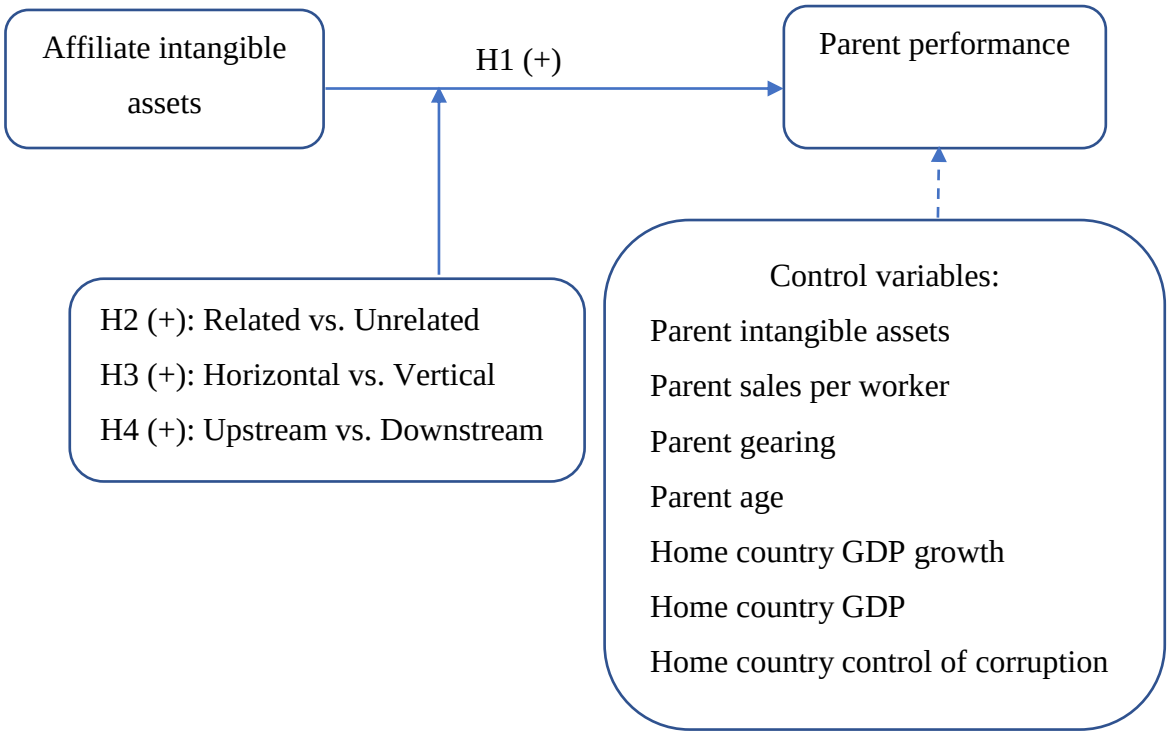
Not only are the extent of capabilities different, but the type of knowledge also differs between the two types of FDI: downstream affiliates mainly engage in selling and marketing services, which are very different from the manufacturing activities undertaken in the rest of the MNE. Downstream affiliates are in contrast to upstream affiliates which often embark on product-related innovation. Some of the downstream affiliates build their competence upon relevant know-how and learning during their operations in the local markets, but this local market knowledge, or at least some of it, cannot be adapted to other

markets in which MNEs operate, partly because the knowledge stemming from local market information may be too idiosyncratic (Gupta & Govindarajan, 1991) to be exploited outside of the market or regional block where the downstream affiliates are located. In the international production flow (Gupta & Govindarajan, 1991), a high level of technological capabilities and superior know-how of upstream affiliates can be embedded in the intermediate inputs to be provided to the parent company, which is likely to improve the quality and innovativeness of products and services offered by the multinational enterprises, thereby sustaining competitive advantages and yielding high returns. Taking all these together, I therefore propose the following hypothesis

Hypothesis 4: **The impact of affiliate intangible assets on MNE parent performance is larger for upstream affiliates than for downstream affiliates.**

For a better overview of the research framework that describes the hypothesized relationships, please see Figure 3.1.

Figure 3.1: Framework of reverse knowledge transfer



3.3 Data and methodology

3.3.1 Data sample

The analysis draws on the Orbis from Bureau van Dijk (BvD)[4]. The database provides detailed financial data for each parent company and its affiliates. At the affiliate level, I require information on their intangible and total assets. For the MNE parent companies, I require information on their return on sales (before tax), intangible assets, total assets, gearing ratio, sales per worker and year of establishment. I removed parent-affiliate linkages which had the missing value for any of these variables. I also dropped those affiliates whose parent company had an inactive status (e.g., bankruptcy or liquidation), which means that the parent company needs to have an active status rather than having ceased to exist, and this is the same sampling criterion applied in other studies, such as that of Berry (2013). For the ease to identify value-adding activities of affiliates in relation to their parent company value chains, I focus on manufacturing parent companies in the analysis. I require that the parent company reports unconsolidated accounts, which means that the parent company's profitability does not integrate the performance of its controlled affiliates.

After applying all the above criteria, I am able to create unbalanced panel data of 15,784 parent-affiliate dyadic linkages, covering 5,023 parent companies from 52 home countries and 15,784 of their foreign affiliates in 74 host countries in the period from 2008 to 2016. Each parent-affiliate linkage appears on average for 4.21 years, with a standard deviation of 1.96, which allows for longitudinal analysis of the knowledge transfer effects. On average, each parent company has 3.14 overseas affiliates. As shown in Table 3.1 which

[4] Orbis data are used in Shirodkar, Konara & McGuire (2017) and Mohr, Batsakis & Stone (2018).

lists studies on reverse knowledge transfer, the country coverage of each study is often limited to one or just a few countries, and the sample size is often limited to 500 affiliates. In this analysis, I have included a large number of parent-affiliate linkages in a wide set of home and host countries, which allows me to do a more sophisticated analysis by exploring how different types of affiliates influence the effects of reverse knowledge transfer.

3.3.2 Dependent, independent and control variables

***Dependent variable*:** there are various measures of firm performance including for example market-based indicators (such as Tobin's Q), financial-based indicators (such as return on sales) and innovation-based performance (such as the number of patents or new product development). Return on sales is one of the most common measures of firm performance in IB research (Capar & Kotabe, 2003; Hult et al., 2008; Markides, 1992b, 1995; Hoskisson, Johnson & Moesel, 1994; Kafouros & Alivey, 2016a). I do not use market-based or innovation-based performance indicators, as they are unavailable for most companies in the database.

***Independent variables*:** the key independent variable of my interest is intangible assets of the affiliates. Notwithstanding the crucial role that intangible assets have played in knowledge-based, high-velocity and innovation-driven economies, the measurement of intangible assets has been a crux in the literature (Harris & Moffat, 2013). In earlier literature, intangible assets are often measured by a firm's spending on innovation and branding activities. Largely building upon internalisation theory, Morck & Yeung (1991), for example, emphasize the importance of the possession of intangible assets for an MNE, and find that the benefits from increasing its geographical diversification can only be

realised when it makes a high level of expenditure on research and development or advertising. A similar finding is reached in Mishra & Gobeli (1998) who advocate that increasing geographical diversification alone does not sufficiently lead to greater firm value, and that firms with a high degree of such diversification, coupled with intangible assets measured by the amount of research and development spending, are likely to show superior MNE performance. In a similar vein but with a focus on foreign affiliate performance, Delios & Beamish (2001) corroborate that intangible assets are the pivotal source of MNE ownership advantages and can help foreign affiliates compete with the local rivals, thus improving their profitability and survival in the local markets.

Most recent work - perhaps due to the recent availability of data – has retrieved intangible asset data from companies' accounting and financial disclosures (see Denicolai, Zucchella & Strange, 2014 and Arrighetti, Landini & Lasagni, 2014, for example). The most common measurement of intangible assets adopted in recent studies is the ratio of intangible assets to total assets, and this construct captures not only the accumulated volume of intangible assets but also the size of the firm (see for example Denicolai, Zucchella & Strange, 2014; Mohr & Batsakis, 2014; Xu, Zhou & Phan, 2010; Zhang, Li & Li, 2014; Chang, Chung & Moon, 2013a, 2013b; Kafouros & Aliyev, 2016b; Jones, Temouri & Cobham, 2018). In this chapter, I follow the recent trend in the intangible asset literature and use the ratio of intangibles to total assets. Besides, most firms do not report expenditure on research and development and advertising in the Orbis database.

Specifically, the measurement of intangible assets in the Orbis database applies International Accounting Standard IAS38 which defines intangible assets as identifiable assets with monetary value but without physical substance, and these include, for example,

patented technology, computer software, databases and trade secrets, trademarks, customer and supplier relationships and marketing rights, which are expected to create future economic benefits (IAS 38). This IAS standard of measuring intangible assets has also been employed in other studies including, for example, Denicolai, Zucchella & Strange (2014) and Kafouros & Aliyev (2016b).

***Control variables*:** firms are heterogeneous in terms of their characteristics which can affect their financial performance, so I therefore control for a few firm-level characteristics.

Parent company knowledge: it has been proposed that MNEs have the sophisticated technological capabilities, advanced design capabilities and superior know-how, and that these specific assets are imperative for them to sustain competitive advantages and reap a higher level of financial profitability in nowadays innovation-based, high-velocity environment (Buckley & Casson, 1976; Tallman & Li, 1996; Denicolai, Zucchella & Strange, 2014). I therefore include the parent company's intangible assets to total assets ratio in the model.

Debt to equity ratio: it is well acknowledged that the extent of financial constraints that a firm encounters determines its financial performance. A parent company with a high level of debt is likely to suffer from a high level of interest charges and financial constraints, which affects its performance. I measure the leverage of the firm by using the debt-to-equity ratio (Stiebale, 2011; Kafouros & Alivey, 2016a)

Firm age: experience is accumulated over the years after the establishment of a firm. The older the MNEs are, the more experienced they are in terms of identifying market opportunities as well as neutralising threats in the market, which in turn will affect its

returns to shareholders. I therefore control for parent company age which is measured in natural logarithm in the analysis (Yamin & Otto, 2004; Nair, Demirbag & Mellahi, 2015).

Labour productivity: employees' capability to discern market trends and identify opportunities is often regarded as an impetus for firm performance, so I control for sales per worker as a proxy for labour productivity (Huselid, 1995).

Firm performance is not only influenced by the heterogeneous characteristics of firms, but is also affected by factors that are related to the country where they are located. Apart from controlling for the fixed effects, I also control for some home country characteristics, as follows.

Market size: large markets not only provide greater opportunities, but also exhibit a high level of competition for firms, which possibly affects their productivity and financial performance. I therefore use gross domestic product (GDP) as a proxy for market size (Berry, 2013; Blake & Moschieri, 2016).

Market size growth: market size growth offers an opportunity for firm growth, and on average a company is more likely to have more sales in countries with a high level of market growth, compared to sales in the low-growth country. I measure market size growth by the growth rate of GDP of the home country (Blake & Moschieri, 2016).

The Institutional conditions of the country imply rules and regulations that the companies need to comply with, and they possibly have a significant impact on the operation of the companies, thereby possibly affecting performance (North, 1990). Control of corruption has been used as one of the most common measures of the institutional environment of a country (see for example Cuervo-Cazurra, 2006 and Shirodkar & Konara, 2016), so I use this as a control variable.

3.3.3 Empirical specifications

I examine the effect of affiliates' intangible assets on parent company performance using the following equation:

$$ROS_{it}^{P} = \beta_0 + \beta_1 IATA_{it}^{A} + \beta_2 IATA_{it}^{P} + \beta_3 Sales\_p_{it}^{P} + \beta_4 Gear_{it}^{P} + \beta_5 Age_{it}^{P} + \beta_6 GDPG + \beta_7 GDP + \beta_8 Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (1)$$

where ROS_{it}^{P}, the dependent variable, is the return on sales of parent company in year *t*. The other key variable – $IATA_{it}^{A}$ - is the ratio of intangible assets to total assets of the affiliate company in year *t*. Year effects (γ_t) are included to control for business cycle effects. I also include parent firm fixed effects α_i to control for firm heterogeneity. The key parameter β_1 indicates the impact of affiliates' intangible assets on the parent's financial performance.

3.3.4 Instrumental variable estimator

One may argue that the extent of technological development and competence creation in the affiliate company is to an extent a strategic decision made by the MNE parent company, which raises the issue of endogeneity for the affiliate intangible assets variable in equation 1. Better performing parent companies are perhaps more likely to invest more in their affiliates' competence creation initiatives. In order to solve the possible endogeneity issue, I have considered the most detailed specification by using the instrumental variable estimator. Instrumental variables can be used to deal with potentially endogenous right-hand side variables (Bettis et al., 2014).

More specifically, I use the generalized method of moments - instrumental variables approach for ruling out possible endogenous concerns (Greene, 2000; Wooldridge, 2016; Baum, 2006). I use two instrumental variables: the average of the affiliate intangibles ratio at the industry level which is calculated using Orbis data, and the average host country technological capability measured by high-tech exports which is retrieved from the World Development Indicators. The validity of the instruments is important to ensure the validity of the instrumental variable estimates. If the instruments are not significantly correlated with the endogenous variable, or if they are correlated with the dependent variable in the IV estimator, the GMM-IV estimates will be biased and inconsistent (Carneiro & Heckman, 2002; Heckman & Li, 2004). In order to ensure the validity of the estimates, I have implemented over-, weak- and under-identification tests. Over-identification is to test whether the used instruments are correlated with the error terms in the model, and weak- (under-) identifications are to test whether the used instrumental variables are significantly correlated with the endogenous variable (i.e., affiliate intangible assets) (STATA 14). Once all these identification tests have been passed, the way to interpret the estimates is similar to that in the fixed effect estimator.

3.3.5 Falsification test – analysis based on the matched samples using PSM

Although the GMM-IV estimator as a stringent test to rule out the endogeneity issue has been adopted in the analysis, one may argue that both the parent company and affiliate company may be exposed to some unobservable external shocks, which can cause biased estimates and distort the results. For instance, a disruptive innovation or technology might enhance affiliates' know-how and also affect parent company performance. In order to shed light on this, I employ a falsification test by using the matching samples, and the test involves two steps. The first step is to find a matched (or fake) parent for each parent

company. The subsequent step is to re-run equation 1 but use the performance of the matched parent company as the dependent variable. The idea is to explore whether an affiliate's intangible assets have a positive impact on a fake parent company. For instance, I explore whether HP's foreign affiliate intangible assets have a similar impact upon the Dell company, as compared to the impact on the HP parent company itself.

In terms of the matching process, I conduct Propensity Score Matching (PSM) to find pairs of matched parent firms. The idea is to find a matched (fake) parent company for each true parent, and I require them to have similar total assets, intangible assets, sales, sales per worker, number of employees, age and debt-to-equity ratio. In order to find a more precise match, I also include the different transformations of these affiliate characteristics by including the squared and interaction terms of these variables. I also include a stringent condition that each matched pair is in the same country and has the same two-digit industry code. After finding a fake parent, I re-run the analysis using the fake parent information in equation 2, rather than using the true parent information in equation 1.

$$ROS_{it}^{fake\_P} = \beta_0 + \beta_1 IATA_{it}^{A} + \beta_2 IATA_{it}^{fake\_P} + \beta_3 Sales\_p_{it}^{fake\_P} + \beta_4 Gear_{it}^{fake\_P} + \beta_5 Age_{it}^{fake\_P} + \beta_6 GDPG + \beta_7 GDP + \beta_8 Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (2)$$

3.3.6 Affiliate strategic roles

As shown in Figure 1.1, I group affiliates into four main categories including horizontal, upstream, downstream and unrelated affiliates, as explained below:

Horizontal affiliates: I retrieved information on NACE industry classification at the three-digit level of the parent company and its affiliates, and grouped affiliates as horizontal when they share the same three-digit NACE industry code with their respective parent company, so the parent company and its affiliates are engaged in similar activities and share similar knowledge.

Upstream affiliates: upstream activities in global value chains include sourcing raw materials, producing intermediate input and unfinished products, and research and design activities. In order to identify the important raw materials and intermediate inputs for a given parent company, I retrieved industry input-output official data from the Office for National Statistics (ONS). For a given industry, I am able to identify which industries provide significant intermediate inputs. Taking the pharmaceutical industry as an example, the input-output data provides a list of industries (such as petrochemical products, rubber and so forth) that provide the required intermediate inputs for the pharmaceutical industry, and also provide information on the amount of the required intermediate inputs for the pharmaceutical industry. Using the industry input-output table, I flag an affiliate as upstream if the industry that the affiliate belongs to provides a significant (i.e., 5%) amount of intermediate inputs for its parent company's industry. In addition, I also deem those affiliates, whose primary activities are scientific research and development based on their industry classification codes (i.e., NACE 72), as the upstream affiliate.

Downstream affiliates: as expected, downstream affiliates engage in selling and marketing and after-sales services which are often major tasks for the selling affiliates. I

therefore group these affiliates as downstream if their core industry codes are 45, 46 47 or 73 which are wholesale and retail trade, and advertising and marketing.

Unrelated affiliates: the remaining affiliates not mentioned above are categorized as unrelated affiliates. In sharp contrast to the classified-related affiliate types described above which undertake a certain level of activities in the MNE parent company's value chain, unrelated affiliates do not contribute to the parent company's value chain.

3.3.7 Descriptive statistics

Table 3.2 provides detailed definitions and descriptive statistics of all key variables used in the regression analysis of 5,023 parent companies and 15,784 of their foreign affiliates, corresponding to 66,417 affiliate-parent-year observations in the data sample over the period 2008 to 2016. On average, the parent companies have 7.5% return on sales and their labour productivity is around 430 thousand US dollars, and the gearing ratio is around 0.98, and the average of firm age is 64. As expected, the intangible asset ratio of the parent company is almost four times (0.17 vs. 0.04) that of their affiliates, suggesting that the former is more knowledge-intensive. Moving to the next set of variables which measure the activities of affiliates in the MNE value chain, I found that out of the 66,417 parent-affiliate-year observations, 14.5% are upstream and 45% are downstream affiliates. Around 24.5% are horizontal FDI and the rest are unrelated affiliates. When I consider country-level variables, home countries have an average GDP growth of 0.896%, with a standard deviation of 2.577%. On average, home country GDP at the purchasing power parity rate is around $4344.56 billion. The index of control of corruption in the home countries is 1.447 on average, with a standard deviation of 0.638.

Table 3.2: Variable definition and description statistics

Variable name	Variable	Definition	Mean	Std. Dev.
Parent-level variables				
Parent ROS	ROS^p	Parent company profits before tax divided by sales	0.075	0.089
Parent IATA	$IATA^p$	Parent company intangible assets divided by total assets	0.167	0.179
Parent Sales Per Worker ($ 000)	$Sales\_p^p$	parent company sales divided by the number of employees	429.547	931.831
Parent Gearing	$Gear^p$	The sum of parent company non-current liabilities and loans divided by shareholders funds	0.976	0.837
Parent Age	Age^p	Parent company age	64.466	46.625
Affiliate-level variables				
Affiliate IATA	$IATA^A$	Affiliate intangible assets divided by total assets	0.041	0.094
Affiliates on parent value chain				
Upstream		Dummy variable equals to one for upstream FDI, otherwise zero	0.145	0.353
Downstream		Dummy variable equals to one for downstream FDI, otherwise zero	0.450	0.498
Horizontal		Dummy variable equals to one if the affiliate shares the same 3-digit NACE industry classification code as its parent firm, otherwise zero	0.245	0.430
Related		Dummy variable equals to one for the related affiliate, i.e., upstream, downstream or horizontal FDI, otherwise zero	0.841	0.366
Country-level variables				
Home GDP Growth (%)	$GDPG$	GDP growth rate of home country	0.896	2.577
Home GDP ($ 000 000 000)	GDP	GDP of home country in USD using Purchasing Power Parity rate	4344.561	5226.286
Home Control of Corruption	$Corrupt$	Control of corruption index of home country ranging from -2.5 to 2.5	1.447	0.638

Notes: Monetary variables are in US dollars. Observations are 66,417.

Table 3.3 presents the composition of the sample of foreign affiliates, together with the averaged parent performance and affiliate and parent intangible assets ratio by different affiliate role types. In total, the data sample includes 15,784 foreign affiliates, out of which 13,079 (approximately 82.9%) are related FDI. There are 9,299 vertically integrated affiliates consisting of 2,327 upstream and 6,972 downstream affiliates, and there are 3,780 affiliates which have the same three-digit industry code as their parent companies, i.e., the horizontal type. On average, parent return on sales is around 7.5%. As expected, parent companies tend to have a much bigger (0.167 vs. 0.041) intangible assets ratio than their foreign affiliates.

Table 3.3: Composition of the sample of affiliates, by affiliate roles

Affiliate roles	Number of affiliates	Parent ROS	Affiliate IATA	Parent IATA
Related	13,079	0.076	0.039	0.163
Vertical	9,299	0.078	0.040	0.166
Upstream	2,327	0.072	0.040	0.194
Downstream	6,972	0.080	0.040	0.158
Horizontal	3,780	0.070	0.038	0.153
Unrelated	2,705	0.069	0.053	0.192
All	15,784	0.075	0.041	0.167

Notes: The values of parent ROS, affiliate IATA and parent IATA are averages weighted by the number of affiliates.

In Table 3.4, I present a correlation matrix of the key variables included in the analysis. The correlation coefficients among the independent variables range from -0.0048 to 0.1970, suggesting that there is no issue of multicollinearity.

Table 3.4: Correlation matrix

	1	2	3	4	5	6	7	8	9
Parent ROS	1								
Affiliate IATA	0.038**	1							
	(0.000)								
Parent IATA	0.183***	0.157***	1						
	(0.000)	(0.000)							
Parent Sales per Worker	0.061***	-0.011***	-0.052***	1					
	(0.000)	(0.006)	(0.000)						
Parent Gearing	-0.235***	-0.005	0.080***	0.074***	1				
	(0.000)	(0.215)	(0.000)	(0.000)					
Parent Age	0.051***	-0.032***	0.053***	-0.051***	-0.001	1			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.887)				
Home GDP Growth	0.126***	0.002	0.095***	-0.022***	-0.031***	0.036***	1		
	(0.000)	(0.572)	(0.000)	(0.000)	(0.000)	(0.000)			
Home GDP	0.087***	0.021***	0.183***	0.014***	0.106***	0.054***	0.098***	1	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Home Control of Corruption	0.072***	-0.035***	0.106***	0.047***	-0.037***	0.197***	0.108***	-0.213***	1
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Notes: The dependent variable in the regression analysis is parent ROS. IATA is the ratio of intangible assets divided by total assets. Table 3.2 provides detailed explanations for the variables. P-values are in parentheses. ***: $p<0.01$.

Table 3.5 presents a list of countries where most of the parent companies or foreign affiliates are located, along with the average of some of the key variables used in the analysis. The data cover 52 home countries and 74 host countries in total. Unsurprisingly, most parent firms are in advanced economies, with a significant number in Italy, Germany, Japan, the United States, France, the United Kingdom, Spain, Sweden, Belgium, Austria, Finland and the Netherlands, which account for 87.4% of total parent firms. Most foreign affiliates are located in France, Germany, Italy, Spain, Poland, the United Kingdom, the Czech Republic, Belgium, Austria, the Netherlands, Thailand, Norway, China and South Korea, which account for 81.3% of total foreign affiliates.

3.4 Empirical results

3.4.1 The effect of reverse knowledge transfer

Table 3.6 reports the first set of results testing hypothesis one which estimates the effect of affiliate intangible assets on parent financial performance using the GMM-IV estimation approach. Column one is the baseline testing of hypothesis one using the entire sample, and I find the impact of an affiliate's intangible assets on the profitability of the parent company is 0.064, showing that a ten percentage-point increase in the intensity of affiliate intangibles will improve parent company performance by 0.0064. Considering that on average parent company profitability is 0.075 (see summary statistics Table 3.2), this suggests 8.5% increase in parent company performance, indicating a significant economic return. The two included instrumental variables are the average of the affiliate intangibles ratio at industry level that is compiled using Orbis data, and the average host country technological capability measured by high-tech exports that is retrieved from the World Development Indicators. The identification of the instruments has been a major concern when using the GMM-IV approach (Carneiro & Heckman, 2002; Heckman & Li,

Table 3.5: List of countries and the average of some key variables

Country	Affiliate		Parent					
	No.	IATA	No.	ROS	IATA	Sales Per Worker	Age	Gearing
Australia	164	0.09	10	0.09	0.26	489.4	71.89	0.8
Austria	503	0.02	157	0.09	0.02	618.52	42.5	0.91
Belgium	566	0.04	220	0.05	0.04	891.84	46.36	0.94
China	379	0.03	79	0.07	0.08	232.34	19.81	0.84
Croatia	139	0.02	20	0.06	0.04	165.97	42.64	0.87
Czech Republic	588	0.01	67	0.08	0.02	246.37	18.3	0.49
Denmark	149	0.07	31	0.07	0.17	306.2	64.07	0.67
Finland	235	0.05	135	0.05	0.11	396.4	37.87	0.8
France	2110	0.07	411	0.06	0.11	503.41	48.16	0.72
Germany	2040	0.03	622	0.06	0.06	465.63	63.32	1.02
Greece	179	0.02	30	0.02	0.07	372.59	41.2	1.43
Hungary	293	0.01	15	0.03	0.04	323.79	43.7	0.56
India	228	0.02	30	0.11	0.1	464.52	50.38	1.1
Ireland	60	0.17	26	0.06	0.31	361.73	32.75	1.04
Israel	1	0.27	27	0.04	0.16	357.35	39.59	0.75
Italy	1395	0.04	761	0.04	0.07	460.5	35.65	1.1
Japan	85	0.01	566	0.06	0.03	423.57	69.9	0.75
Luxembourg	50	0.03	26	0.06	0.11	350.93	33.25	0.55
Netherlands	472	0.07	112	0.05	0.13	689.55	54.89	0.69
Norway	431	0.06	17	0.04	0.22	382.15	63.39	0.91
Poland	887	0.01	37	0.04	0.06	433.33	38.91	0.76
Portugal	296	0.03	54	0.04	0.03	264.27	39.87	1.14
Russia	174	0.01	11	0.08	0.02	1120.77	18.98	0.79
Slovak Republic	270	0.02	21	0.05	0.00	313.67	18.54	0.75
Slovenia	131	0.02	36	0.02	0.03	201.36	34.75	1.02
South Korea	336	0.02	7	0.06	0.01	485.31	17.88	0.58
Spain	1176	0.04	296	0.05	0.06	467.12	41.46	0.76
Sweden	299	0.05	238	0.07	0.1	452.35	54.24	0.72
Switzerland	2	0.13	77	0.08	0.15	326.49	89.92	0.57
Thailand	444	0.01	0					
United Kingdom	716	0.11	321	0.08	0.15	359.39	48.61	0.77
United States	7	0.39	463	0.09	0.26	416.86	41.19	0.89

Notes: Table 3.2 provides detailed explanations for each variable. Sales per worker are in thousands of US dollars. This table includes a list of countries where most parent companies or foreign affiliates are located.

Table 3.6: Affiliate IATA and MNE parent performance (GMM-IV estimation)

	(1)	(2)	(3)	(4)	(5)	(6)
Affiliate IATA	0.064*	0.073**	0.108**	0.146**	0.067*	0.064*
	(0.033)	(0.034)	(0.042)	(0.063)	(0.035)	(0.034)
Parent IATA	0.103***	0.105***	0.108***	0.088***	0.108***	0.094***
	(0.021)	(0.022)	(0.024)	(0.016)	(0.021)	(0.022)
Parent Sales Per Worker	0.041***	0.040***	0.043***	0.053***	0.040***	0.043***
	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)
Parent Gearing	-0.031***	-0.030***	-0.030***	-0.029***	-0.031***	-0.030***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Parent Age	0.003	0.004	0.010	-0.018*	0.003	-0.002
	(0.010)	(0.011)	(0.011)	(0.009)	(0.011)	(0.011)
Home GDP Growth	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Home GDP	-0.025	-0.027	-0.049**	-0.022	-0.024	-0.032
	(0.022)	(0.022)	(0.024)	(0.020)	(0.022)	(0.022)
Home Control of	0.021***	0.022***	0.025***	0.017**	0.020**	0.024***
Corruption	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Under-identification	115.233	111.666	84.945	79.015	118.867	106.375
P-value	0.000	0.000	0.000	0.000	0.000	0.000
Weak-identification	1265.205	1285.05	1033.097	1305.718	1119.83	1189.343
Over-identification	0.067	0.033	0.357	0.116	0.731	0.030
P-value	0.796	0.856	0.550	0.733	0.393	0.862
F statistics	39.897	38.813	36.209	46.705	38.881	37.778
No. Observations	66417	66417	50946	66417	63349	61790

Notes: Dependent variable: parent ROS. The independent variable is affiliate IATA, the ratio of affiliate intangible assets divided by total assets. Robust standard errors are in parentheses. Column 1 does not include any weighting. Columns 2 and 3 are weighted by the total assets and the number of employees of the affiliate, respectively. Column 4 is weighted by the inverse of the number of affiliates per parent. Columns 5 and 6 are weighted by host country FDI inflows and home country FDI outflows, respectively. *: p< 0.10; **: p<0.05; ***: p<0.01.

2004), and more specifically, the used instruments should significantly correlate with the endogenous variable which is one condition, but not with the dependent variable as the other condition (Bettis et al., 2014). In column one, I find that the p-value of 0.78 reported in the over-identification test satisfies the first condition, and that the weak-identification statistics and the p-value of 0.000 in the under-identification test satisfy the second condition. In addition, the parent company's knowledge and sales per worker positively influence firm performance, and a high level of debt ratio reduces the performance. The home country's market growth and institutional conditions improve firm performance, as expected. The size and significance level of these control variables are generally unchanged across different columns.

3.4.2 Robustness tests using different weightings

I have done a few additional exercises by using different weightings to test the robustness of results. First, one may argue that the affiliate's size may to an extent influence the effect of knowledge transfer. The extent and effectiveness of knowledge transferred from a large affiliate to its parent company may not be analogous to knowledge from a small affiliate. I therefore assign more weight proportional to affiliate size, which gives more weighting to those affiliates with large total assets (column two in Table 3.6) or a big number of employees (column three in Table 3.6) in the analysis.

Second, one may consider that some parents may have only one or few affiliates; thus, the weighting of these affiliates in their MNEs is high, which may be related to the reverse knowledge transfer effect. I therefore include the weight that is the inverse of the number of foreign affiliates who have the same MNE parent, and report the results in column four. The positive impact of affiliate intangibles on parent company performance remains at

the significance level, suggesting that the finding of intra-firm knowledge transfer effects is not distorted by affiliate size or the parent company's scope of international diversification.

Third, one may argue that the data used in this chapter, despite being worldwide and large, may not represent actual global FDI patterns because I only include those parents and affiliates who report necessary accounting and financial information. In order to cast some light on this, columns 5 and 6 add the weighting proportionally to host country FDI inflows and home country FDI outflows, respectively. Both columns 5 and 6 present fairly similar results in terms of not merely the size of the effects, but also the significance level as the baseline results reported in column 1. I therefore conclude that the results are not distorted by global FDI flows. I again find that the used instruments pass all identification tests in columns 2-6, showing that the results from the GMM-IV estimator are reliable and valid. Taking all these tests together, hypothesis one is supported, meaning that there is a positive impact of affiliate knowledge on parent company performance.

3.4.3 Falsification test based on the matched samples

I now conduct a falsification test to explore whether an affiliate's knowledge has a similar impact on a matched (fake) parent, compared to the impact on its true parent. If I find a similar impact, I then need to reconsider the reverse knowledge transfer results presented in Table 3.6. Matching quality is of importance for the falsification analysis. Table 3.7 reports descriptive statistics of the quality of matching in terms of the similarities between the 'true' and 'fake' parent company. For a given characteristic of true and matched parents, I divide the difference between the two means by the average of the two means.

As shown in Table 3.7, the differences in the various characteristics between true and fake parents are very small, although the standard deviations are relatively big.

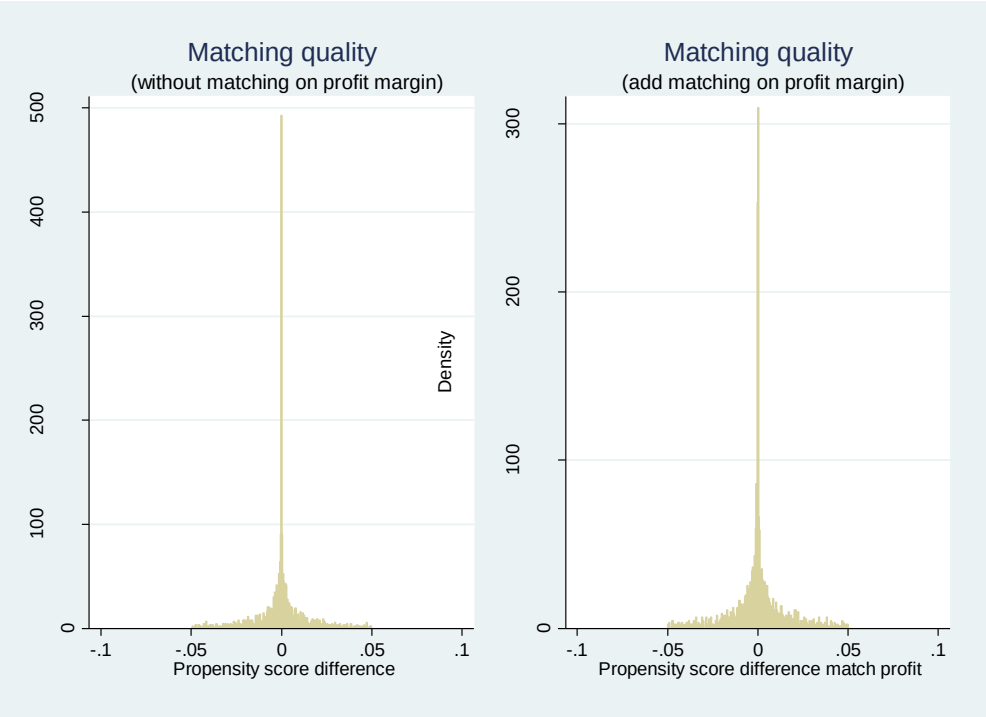
Table 3.7: Descriptive statistics – matching quality using propensity score matching

Variable	Without matching on parent ROS			With matching on parent ROS		
	Obs	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Parent Sales Per Worker difference	3,363	0.014	0.684	3,346	0.019	0.687
Parent Age difference	3,363	-0.011	0.678	3,346	-0.014	0.683
Parent ROS difference	3,363	0.013	0.985	3,346	0.007	0.987
Parent Intangible difference	3,312	-0.015	1.445	3,295	-0.005	1.445
Parent Gearing difference	3,362	-0.007	1.021	3,345	-0.003	1.020
Parent Total Assets difference	3,363	-0.011	1.062	3,346	-0.011	1.062
No. of Employees difference	3,363	-0.020	0.934	3,346	-0.025	0.939
Same Sector	3,363	1	0	3,346	1	0
Same Country	3,363	1	0	3,346	1	0
Same Year	3,363	0.419	0.493	3,346	0.419	0.493
p-score difference	3,363	-0.000	0.015	3,346	-0.000	0.014

Notes: This table presents the difference in the characteristics between true parents and fake (matched) parents. For example, 'Parent Sales Per Worker difference' is calculated by the difference in sales per worker between true and fake parents divided by the mean of the same two values. They are required to have the same two-digit industry code and to be in the same home country. The p-score is the propensity score.

Additionally, in order to present a better feeling of the quality of matching, I also portray the propensity score differences of the matched parents in Figure 3.2, and again find that the difference centres around 0. Taking all these together, I evidence that the matching is reliable, and the matched parents are very similar.

Figure 3.2: Propensity score difference



I have also considered the balancing of the variables between the true and fake (matched) parent groups and report them in Tables 3.8 and 3.9. When p-value is significant (*i.e.* less than or equal to 10%), it suggests that the difference between the two groups are significant. As shown in Tables 3.8 and 3.9, p-values of all variables and their squared terms and interaction terms are all at insignificance level, which assures that the matching quality is very high.

Table 3.8 Balancing test of the variables between true and fake parents (without matching on parent ROS)

	Mean		t-test	
Variable	True parent	Fake parent	t value	p value
Age	51.407	51.151	0.253	0.801
Profit Margin	8.677	8.562	0.454	0.650
Gearing	0.758	0.787	-1.215	0.224
Total Assets (million)	3073.174	3405.386	-0.614	0.540
Intangible Assets (million)	602.989	700.324	-0.848	0.396
No. of Employees	6635.294	7407.940	-1.086	0.278
Sales per Worker (thousand)	380.393	382.939	-0.225	0.822
Age^2	3772.379	3805.993	-0.211	0.833
$Gearing^2$	1.230	1.273	-0.528	0.598
Total $Assets^2$ (trillion)	3.49E+08	3.33E+08	0.082	0.935
Intangible $Assets^2$ (trillion)	1.42E+07	1.64E+07	-0.353	0.724
No. of $Employees^2$	5.83E+08	6.58E+08	-0.428	0.669
Sales per $Worker^2$ (million)	266426.8	314701.3	-0.915	0.360
Age*Gearing	38.561	40.028	-0.910	0.363
Age*Total Assets (million)	237181.2	264938.7	-0.480	0.631
Age*Intangible Assets (million)	44493.39	49395.91	-0.466	0.641
Age*No. of Employees	500747.8	557471.3	-0.779	0.436
Age*Sales per Worker (thousand)	19260.13	19204.38	0.072	0.942
Gearing*Total Assets (million)	4142.707	4626.494	-0.360	0.719
Gearing*Intangible Assets (million)	872.146	969.537	-0.386	0.699
Gearing*No. of Employees	7716.884	8658.294	-0.674	0.501
Gearing*Sales per Worker (thousand)	315.919	333.088	-0.679	0.497
Total Assets*Intangible Assets (trillion)	4.43E+07	5.03E+07	-0.221	0.825
Total Assets*No. of Employees (million)	3.46E+08	3.32E+08	0.102	0.919
Total Assets*Sales per Worker (billion)	1844579	2194155	-0.424	0.672
Intangible Assets*No. of Employees (million)	5.87E+07	6.84E+07	-0.431	0.667
Intangible Assets*Sales per Worker (billion)	227932.8	280646.9	-1.088	0.277
Propensity score	0.744	0.744	-0.005	0.996

Notes: when P-value is more than 10%, the difference between the true and fake (matched) parent groups for a given variable is not significant.

Table 3.9 Balancing test of the variables between true and fake parents (with matching on parent ROS)

	Mean		t-test	
Variable	True parent	Fake parent	t value	p value
Age	51.014	50.934	0.078	0.938
Profit Margin	8.762	8.667	0.377	0.706
Gearing	0.780	0.790	-0.407	0.684
Total Assets (million)	3093.574	3330.407	-0.454	0.650
Intangible Assets (million)	578.752	704.830	-1.144	0.253
No. of Employees	6759.513	7540.641	-1.103	0.270
Sales per Worker (thousand)	375.106	376.366	-0.114	0.909
Age^2	3769.431	3783.909	-0.089	0.929
$Gearing^2$	1.304	1.281	0.276	0.783
Total $Assets^2$ (trillion)	3.38E+08	3.00E+08	0.200	0.841
Intangible $Assets^2$ (trillion)	1.21E+07	1.63E+07	-0.726	0.468
No. of $Employees^2$	5.76E+08	6.68E+08	-0.541	0.589
Sales per $Worker^2$ (million)	260065.3	300852.3	-0.783	0.434
Age*Gearing	39.133	39.866	-0.454	0.650
Age*Total Assets (million)	245260.9	254334.6	-0.159	0.874
Age*Intangible Assets (million)	43175.11	49368.07	-0.602	0.548
Age*No. of Employees	510651.2	567602	-0.774	0.439
Age*Sales per Worker (thousand)	18854.11	18850.17	0.005	0.996
Gearing*Total Assets (million)	4160.527	4526.784	-0.279	0.781
Gearing*Intangible Assets (million)	856.304	970.119	-0.457	0.648
Gearing*No. of Employees	7788.869	8656.779	-0.648	0.517
Gearing*Sales per Worker (thousand)	318.219	326.101	-0.324	0.746
Total Assets*Intangible Assets (trillion)	4.10E+07	4.95E+07	-0.317	0.751
Total Assets*No. of Employees (million)	3.30E+08	3.24E+08	0.039	0.969
Total Assets*Sales per Worker (billion)	1875866	1938159	-0.080	0.937
Intangible Assets*No. of Employees (million)	5.57E+07	6.86E+07	-0.579	0.563
Intangible Assets*Sales per Worker (billion)	219529.3	274031.5	-1.161	0.246
Propensity score	0.744	0.744	-0.018	0.985

Notes: when P-value is more than 10%, the difference between the true and fake (matched) parent groups for a given variable is not significant.

I then run equation 2 using fake, rather than true, parent company information in the analysis. For example, the dependent variable is the return on sales of the fake parent company. Table 3.10 reports the results of the falsification test. In the first two columns, I present the results without matching on parent company profitability, and in column two, I give more weight to the better matches, and the weight is inversely proportional to the propensity score difference. I find that the affiliate intangible assets ratio has no impact on the performance of the matched parent company, suggesting that the results reported in Table 3.6 about the reverse knowledge transfer effect are not distorted. As expected, the control variables in Table 3.10 using the matched samples have similar results in terms of sign and significance level to the main results reported in Table 3.6 without using matching. In columns 3 and 4, I include some additional robustness checks by re-run the analysis but include parent company profitability in the matching, and assign more weight to those better matches in column four. The results again show no effect of the affiliate intangibles assets ratio on the matched parent's performance, which supports my interpretation of the reverse knowledge transfer results reported in Table 3.6.

Table 3.10: Affiliate IATA and matched parent ROS (falsification test)

	Without matching on parent ROS		With matching on parent ROS	
	(1)	(2)	(3)	(4)
Affiliate IATA	0.006	0.006	0.007	0.008
	(0.012)	(0.012)	(0.010)	(0.010)
Fake Parent IATA	0.062**	0.062**	0.069**	0.069**
	(0.030)	(0.030)	(0.033)	(0.033)
Fake Parent Sales Per Worker	0.040***	0.040***	0.039***	0.039***
	(0.009)	(0.010)	(0.013)	(0.013)
Fake Parent Gearing	-0.028***	-0.028***	-0.030***	-0.030***
	(0.003)	(0.003)	(0.004)	(0.004)
Fake Parent Age	0.020	0.020	0.034*	0.034*
	(0.015)	(0.015)	(0.018)	(0.018)
Fake Home GDP Growth	0.002**	0.002**	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Fake Home GDP	-0.084*	-0.084*	-0.117*	-0.117*
	(0.051)	(0.051)	(0.060)	(0.060)
Fake Home Control of Corruption	0.038***	0.038***	0.038***	0.038***
	(0.011)	(0.012)	(0.012)	(0.012)
No. observation	23963	23963	24653	24653
Adjusted R-squared	0.742	0.742	0.754	0.755

Notes: The dependent variable is matched parent ROS. The independent variable is affiliate IATA, the ratio of affiliate intangible assets divided by total assets. Robust standard errors are in parentheses. Year differences and fake parent fixed effects are included. *: p< 0.10; **: p<0.05; ***: p<0.01.

3.4.4 The moderating effect of affiliate roles

Having established solid evidence for the knowledge transfer effect, I now turn to exploring how the effect is influenced by affiliate roles. In order to do so, I re-run the GMM-IV estimator using equation 1 for different affiliate samples and report the results in Table 3.11. I use the same set of instruments in all columns as the ones used in Table 3.6. Unlike Chapter two which uses the affiliate role as an interaction term in the Cox proportional hazards model, Chapter three includes firm fixed effects in the empirical model to control for unobserved time-invariant factors (Allison, 2009; Woodridge, 2016). In the fixed effect estimator, the affiliate role variable is time invariant and therefore it will be removed during the fixed effect estimation (Allison, 2009). I therefore do not include the affiliate role variable in the estimation but compare the performance benefit of knowledge transfer among different subsamples, and I report the results in Table 3.11. I use Cohen's d to compare the performance benefit of knowledge transfer between different affiliate types (Cohen, 1988).

In all columns, I find that the reported p-value in the over-identification test satisfies the first condition (i.e., the used instruments are not significantly correlated with the dependent variable), and that the weak-identification statistics and p-value of 0.000 in the under-identification test satisfy the second condition, i.e., the used instruments are significantly correlated with affiliate intangible assets). This evidences that the instruments passed the tests of over-, under- and weak- identifications, showing that the instruments are valid. The sign and significance level of the control variables are largely unchanged.

Table 3.11: Affiliate IATA and MNE parent performance
- affiliate strategic roles (GMM-IV estimation)

	(1) Related	(2) Unrelated	(3) Horizontal	(4) Vertical	(5) Up	(6) Down
Affiliate IATA	0.120***	-0.004	0.149**	0.106*	0.159*	0.040
	(0.045)	(0.047)	(0.071)	(0.058)	(0.087)	(0.068)
Parent IATA	0.096***	0.134***	0.121***	0.086***	0.076**	0.091***
	(0.021)	(0.029)	(0.031)	(0.022)	(0.030)	(0.026)
Parent Sales Per Worker	0.042***	0.035***	0.047***	0.041***	0.045***	0.039***
	(0.007)	(0.011)	(0.010)	(0.007)	(0.007)	(0.008)
Parent Gearing	-0.031***	-0.030***	-0.028***	-0.032***	-0.029***	-0.033***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)
Parent Age	0.004	0.000	0.007	0.003	0.005	0.003
	(0.010)	(0.015)	(0.014)	(0.011)	(0.013)	(0.013)
Home GDP Growth	0.001***	0.002***	0.001*	0.002***	0.002***	0.002***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
Home GDP	-0.031	0.019	-0.032	-0.031	-0.072**	-0.022
	(0.022)	(0.040)	(0.038)	(0.022)	(0.032)	(0.025)
Home Control of Corruption	0.024***	0.004	0.020	0.026***	0.025**	0.026***
	(0.008)	(0.013)	(0.013)	(0.009)	(0.011)	(0.010)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Under-identification	117.669	33.771	46.694	77.549	44.169	43.403
P-value	0.000	0.000	0.000	0.000	0.000	0.000
Weak-identification	864.527	341.278	418.057	468.58	264.238	215.051
Over-identification	0.076	1.358	0.105	0.002	0.762	0.422
P-value	0.783	0.244	0.746	0.960	0.383	0.516
F statistics	37.201	19.870	16.700	35.236	20.778	28.823
No. Observations	55835	10582	16263	39572	9657	29915

Notes: Dependent variable: parent ROS. The independent variable is affiliate IATA, the ratio of affiliate intangible assets divided by total assets. Robust standard errors are in parentheses.
*: p< 0.10; **: p<0.05; ***: p<0.01.

Drawing on the related affiliates, I find that affiliate knowledge has a big and significant impact on parent company performance in column one. With recent growing emphasis on the size of the effect, as well as the statistical significance of the coefficient (see for example Ellis, 2010; Hahn & Ang, 2017; Meyer, van Witteloostuijn & Beugelsdijk, 2017),

I consider the size of the coefficients. Taken at face value, the estimated impact on parent performance is 0.12, suggesting that ten percentage-point increase in a related affiliate's intangible asset ratio leads to 0.012 increase in parent profitability – a significant economic return when considering that average parent company profitability is 0.075. In contrast, I virtually find no impact on parent performance from unrelated affiliates, as shown in column two. Cohen's d has been widely used to compare the size of the effects across different subsamples (see a recent study by Whittington, Yakis-Douglas & Ahn, 2016, for example), and it is 2.76 when comparing the reverse knowledge transfer effects between related and unrelated affiliates, suggesting that the difference is 'large' (Cohen, 1988). This shows that the reverse knowledge transfer effect is greater for related than for unrelated affiliates, and therefore hypothesis two is supported.

I then compare the reverse knowledge effect from horizontal affiliates to the effect from vertical affiliates, and report the results in columns three and four, respectively. It shows that the impact is bigger (0.149 vs.0.106) when the affiliate is a horizontal, rather than vertical, type. In addition, Cohen's d for the hypothesized variable between columns three and four is 0.69, indicating a moderate difference in effect size (Cohen, 1988). Hypothesis three is therefore supported. Further, I have a fine-sliced classification by dividing the vertically integrated affiliates into two groups, i.e., upstream and downstream activities. In column five with the inclusion of upstream affiliates only, I find a positive (0.159) and significant effect, which is in sharp contrast to the downstream affiliates in column six where there is virtually no evidence of a reverse knowledge transfer effect. Cohen's d is 1.65, which indicates a 'large' difference in the effect size for the hypothesized variable in columns five and six (Cohen, 1988). Therefore, hypothesis four is supported.

3.5 Conclusions

The literature on intra-MNE knowledge transfer prior to 2000 largely underscored the importance of knowledge transfer from home to host country, particularly when transaction costs are high due to market imperfections in the host country, and this internalisation leads to better multinational performance (Buckley & Casson, 1976; Dunning, 1981; Rugman, 1982; Morck & Yeung, 1991). Increasingly, an affiliate often engages in its own capability building for better use of its resources or opportunities, rather than primarily relying on its parent company to deploy resources and support in order to compete with rivals in the local market (Rugman & Verbeke, 2001; Mudambi & Navarra, 2004). Since the early 2000s, one emerging stream in the international knowledge transfer literature, building upon knowledge-based view theory as well as the affiliate competence creation literature, has started to place emphasis on the reverse knowledge transfer from overseas affiliates to their parent company. In this chapter, I have specifically examined the extent to which parent company performance is affected by their affiliates' intangible assets. To the best of my knowledge, the existing reverse knowledge transfer literature (see Table 3.1) has not measured affiliate knowledge by intangible assets – perhaps due to the unavailability of data at the earlier stages. There has been an increasing emphasis in the IB literature, from both theoretical and empirical perspectives, on affiliate role types in the nexus of parent-affiliate relationships within the firm (Bartlett & Ghoshal, 1986; Birkinshaw & Morrison, 1995; Rugman, Verbeke & Yuan, 2011). I extend this literature by showing the extent to which the reverse knowledge transfer effects are contingent upon an affiliate's role within the MNE value chains.

This study makes several contributions to the literature. First, I extend the reverse knowledge transfer literature by emphasizing the importance of intangible assets in both the parent company and its affiliates. I show that not only the parent company's know-how but also its affiliate's know-how are vital sources for MNEs to sustain their competitiveness in the global setting (Rabbiosi & Santangelo 2013; Mudambi & Swift, 2014; Nair, Demirbag & Mellahi, 2016). Moreover, I also corroborate that the reverse knowledge transfer effect is influenced by the affiliate's value positioning in its parent company value chain.

To the best of my understanding, this is the first paper to test whether there is an expected positive impact of affiliate intangible assets on MNE parent performance. In order to solve the endogeneity issue, I employed the instrumental variables approach to rule out the reverse causality issue, and the instruments included in the two-step approach all satisfy the over-, under- and weak-identifications, which ensures the validity of the findings. Following a recent, novel methodology employed in the analysis of the parent-affiliate linkage, I also included falsification exercises to confirm the validity of the interpretation of the findings. As shown in the survey table 3.1, the existing literature largely builds upon the surveys conducted from the early 1980s up to 2013. In terms of country coverage, the literature largely focuses on MNEs and their foreign affiliates in developed economies and a small set of developing economies. The analysis in this chapter builds upon more than 5,000 multinational parents over the period 2008 to 2016 from 52 countries and their over 15,000 foreign affiliates located in 74 countries, which I regard as an empirical contribution to the existing literature.

Robust to different specifications and estimation methods, in this chapter I have found a positive and significant impact on MNE performance from affiliate intangible assets, with the size of the effects ranging between 0.064 to 0.146 after controlling for both fixed effects and reverse causality, suggesting that a ten percentage-point increase in affiliate knowledge intensity will lead to 0.0064-0.0146 increase in MNE parent performance.

The relatedness between the affiliate and parent company augments the shared values and facilitates knowledge flows in MNE intranets (Duhaime & Grant, 1984; Berry, 2013), thus having a large impact on MNE performance. In this chapter, I have categorized affiliates into upstream, downstream, horizontal and unrelated types of FDI according to their strategic role in the MNE value chain. As expected, the impact of affiliate intangibles on the financial performance of the parent company is bigger when the affiliates are in related, rather than unrelated, industries. I also found a bigger effect of intangible assets on MNE performance from affiliates in the horizontal type of FDI, compared to vertical affiliates. In this chapter, I have developed a more fine-sliced classification by grouping the vertical affiliates into upstream and downstream types of FDI. I found a positive affiliate intangible effect from the upstream affiliates, while the effect almost vanishes when the affiliate undertakes downstream activities to its parent company. I also found that the type of specialised knowledge matters for reverse knowledge transfer. Specialised knowledge (Birkinshaw, 1997; Mudambi & Puck, 2016) accumulated in upstream activities has a positive impact on MNEs, while the intangible assets of downstream affiliates have little influence on MNE performance, partly because local market know-how could be too idiosyncratic for the parent company to exploit.

The managerial implications of my findings are intriguing. The corporate decision-makers of the MNE need to encourage knowledge flow from its dispersed and diversified foreign affiliates to the parent company (Gupta & Govindarajan, 2000; Mudambi & Navarra, 2004; Nair et al., 2017). They should be aware that the MNE parent company can utilize the knowledge not only from the parent itself but also from outside the home country (Kogut & Zander, 1992, 1993). Parent corporate managers should know from which affiliates they can expect a high level of knowledge transfer.

This chapter has some limitations. Despite a large database covering thousands of foreign affiliates in different countries, there are a few countries with very few affiliate samples due to the unavailability of required information for the analysis. However, this does not influence the majority of the countries covered in the analysis. Second, my study focuses on the analysis of knowledge measured by intangible assets which can be identifiable and codified in company accounting statements. I did not include other tacit and unidentifiable intangible knowledge, such as the reputation of the business, goodwill or managerial knowledge. Future research could explore intra-MNE knowledge transfer by considering different types of knowledge when the relevant secondary data becomes available. This chapter investigates the effect of reverse knowledge transfer, while another interesting aspect to explore would be the lateral knowledge transfer between an affiliate and its sibling affiliates which belong to the same parent. It would be interesting to know whether an affiliate's intangibles assets would have an impact on its sibling affiliates, and if so, how great the effect would be, and what factors moderate the lateral knowledge transfer. This will be explored in Chapter four.

Chapter 4

The impact of siblings' intangible assets on affiliate performance: do affiliate strategic roles matter?

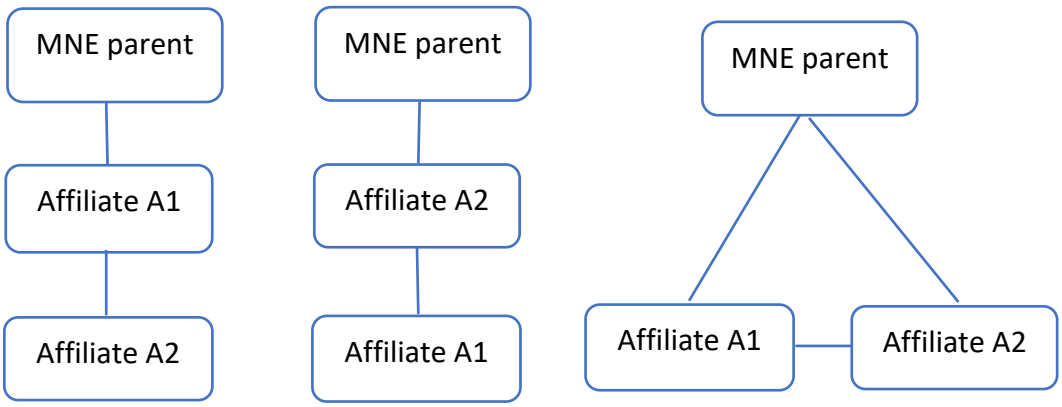
4.1 Introduction

The literature on intra-MNE knowledge transfer (Gupta & Govindarajan, 1991; Minbaeva et al., 2003) largely emphasizes knowledge transfer from the MNE parent company to its affiliates (Hymer, 1976; Buckley & Casson, 1976), knowledge transferred reversely from the affiliate to its MNE parent (Ambos, Ambos & Schlegelmilch, 2006; Mudambi & Navarra, 2004), or a combination of the two (Gupta & Govindarajan, 2000; Yang, Mudambi & Meyer, 2008). Despite the complicated intra-MNE networks (Rugman & Verbeke, 2001; Rugman, Verbeke & Yuan, 2011), there is very limited understanding about lateral knowledge transfer, that is, knowledge flow from an affiliate to its sibling affiliates which belong to the same parent company. A multinational enterprise is typically regarded as a network of differentiated, connected affiliates worldwide (Kogut & Zander, 1992; Gupta & Govindarajan, 1991; Rugman & Verbeke, 2001; Buckley & Strange, 2015), and therefore exploring the relationships between the affiliates and how these relationships impact lateral knowledge transfers is both strategically and managerially relevant for MNEs.

Building upon the literature on affiliate roles in strategic management (Bartlett & Ghoshal, 1986; Jarillo & Martínez, 1990; Birkinshaw & Morrison, 1995), as well as the global value chain literature (Porter, 1985), recent IB literature has emphasised the role of affiliates in MNE global value chains (Verbeke & Asmussen, 2016; Hernández & Pedersen, 2017). Mudambi (2008), for example, categorises affiliates into upstream, horizontal and downstream types, based on their activities in the parent company value chain. There is, however, relatively limited research exploring the strategic relationships between the affiliates.

This chapter categorizes overseas affiliates according to their strategic roles in relation to sibling affiliates within their common parent value chain. In Figure 4.1(a), affiliate A2 is a downstream sibling of affiliate A1. In this case, affiliate A2 is mainly engaged in selling and marketing activities. If affiliate A2 is an upstream sibling of affiliate A1, their relationship is shown in Figure 4.1(b). In this case, affiliate A2 is involved in sourcing raw materials, producing intermediate inputs or engaging in research design, which are important for the production of affiliate A1. Figure 4.1(c) shows that A1 and A2 are either horizontal affiliates if they carry out and operate in similar industry sectors, or unrelated affiliates if they operate in different industry sectors. See Section 4.3.2 for a more detailed description of these affiliate relationships.

Figure 4.1: Affiliate strategic roles



(a) **(b)** **(c)**

It has been long proposed that knowledge is a requisite for gaining competitiveness and achieving superior performance in foreign markets (Barney, 1991; Kogut & Zander, 1992; Grant, 1996; Gupta & Govindarajan, 2000; Frost, 2001; Mudambi & Swift, 2014). In this chapter, I aim to contribute to the intra-MNE knowledge transfer literature by specifically exploring the performance benefits of lateral knowledge transfer between affiliates, and

exploring the extent to which affiliate roles moderate the effect of lateral knowledge transfer. I have two objectives in this chapter, each of which is pertinent to the performance benefits from lateral knowledge transfer. First, drawing on a large sample of foreign affiliates, I examine the impact of siblings' intangible assets on affiliate performance. The second objective of this chapter is to examine whether, and if so how, the effect of lateral knowledge transfer is moderated by the strategic role of the affiliate in relation to its sibling affiliates within their parent company value chain.

Using more than 8,000 affiliates located in overseas markets during the period 2008 to 2016, I find a positive impact of siblings' intangible assets on affiliate performance – a result which is robust based on a number of different estimations. Furthermore, the results show that the impact of siblings' intangible assets is greater when the affiliate and its siblings are in related, rather than unrelated, industries. In addition, I also evidence that the impact is bigger when the affiliate and its siblings are horizontally-related rather than vertically-related, and that the impact is also bigger when the siblings are upstream, rather than downstream, of the affiliates.

The remainder of this chapter is organised as follows. I review the relevant literature and propose the hypotheses in the following section. In Section three, I describe the data and methodology, and provide descriptive statistics. The results are presented and discussed in Section four. Finally, Section five gives a conclusion.

4.2 Literature review and hypothesis development

The knowledge-based view (KBV) has been treated as a cornerstone in the intra-MNE knowledge transfer literature (Grant, 1996; Kogut & Zander, 1992; Gupta &

Govindarajan, 2000), and relevant aspects include the resource-based view (Barney, 1991) and the internalisation theory of the firm (Buckley & Casson, 1976).

Building upon the seminal contribution of Penrose (1959) on the growth of the firm, the resource-based view (Barney, 1991; Wernerfelt, 1984) suggests that MNEs can build the competitiveness upon resources and capabilities that are valuable, rare and inimitable. Intangible assets including for example product secrets, manufacturing routines, technological capabilities and marketing knowledge are path-dependent and proprietary, therefore costly and difficult to imitate, which are pivotal for MNEs as well as their foreign affiliates to successfully compete with other companies in the fierce global markets. Intangible assets have resided at the heart of the literature on the performance benefits of internalisation (Morck & Yeung, 1991; Delios & Beamish, 2001; Denicolai, Zucchella & Strange, 2014). Internalisation theory suggests that MNEs will internalise their intangible assets within the firm and the costs of doing so are markedly lower than acquiring them externally from the host country, particularly when intermediary markets are missing in the host country (Hymer, 1976; Buckley & Casson, 1976; Vernon, 1966; Lu & Beamish, 2004; Contractor, 2007). Building upon the resource-based view (Barney, 1991; Wernerfelt, 1984), the knowledge-based view of the firm envisages a multinational enterprise as a repository for gathering, collecting and coordinating knowledge (Kogut & Zander, 1992; 1993). Rather than merely relying on its own knowledge (Kafouros & Aliyev, 2016b), a foreign affiliate can sustain its competitiveness by building upon the knowledge transferred from its parent company (Nair et al., 2017), as well as the knowledge internally transferred from its sibling affiliates (Andersson, Buckley & Dellestrand, 2015). In essence, the KBV emphasizes the pivotal role of knowledge as a

source of global competitiveness, and treats MNEs as repositories of valuable knowledge and competencies.

Since 2000 there has a growing number of empirical studies examining lateral knowledge transfer between affiliates sharing the same parent companies (i.e., lateral knowledge flows), and the majority of these studies draw upon the affiliates of MNEs in North America and a small set of developed countries (Gupta & Govindarajan, 2000; Lord & Ranft, 2000; Schulz, 2001; Persson, 2006; Ciabuschi, Dellestrand & Kappen, 2011; Yamin, Tsai & Holm, 2011; Crespo, Griffith & Lages, 2014; Tseng, 2015; Andersson, Buckley & Dellestrand, 2015). Below I will discuss the literature on lateral knowledge transfer.

First, the characteristics of the studies on lateral knowledge transfer are presented in Table 4.1. The sample size in this literature is relatively small, with an average around 130 affiliates, ranging from 63 affiliates surveyed in Andersson, Buckley & Dellestrand (2015) to 374 affiliates used in Gupta & Govindarajan (2000). Although there is a high level of variation in the study characteristics in Table 4.1, the literature has congruent findings which corroborate the existence of lateral knowledge transfer between affiliates.

Second, recent emphasis in the intra-MNE knowledge transfer literature, as elucidated in Minbaeva et al. (2003), is not simply to identify whether there is knowledge transfer (e.g., Gupta & Govindarajan, 2000; Lord & Ranft, 2000; Schulz, 2001; Persson, 2006), but also to address the extent to which an affiliate is likely to benefit from this knowledge. For example, Ciabuschi, Dellestrand & Kappen (2011), Yamin, Tsai & Holm (2011) and Andersson, Buckley & Dellestrand (2015) specifically emphasize the efficiency of lateral

Table 4.1: Studies of lateral knowledge transfer

Studies	Data collection	Samples	Knowledge transfer measurements	Time period	Methodology	Factors that influence knowledge transfer
Gupta & Govindarajan (2000)	Questionnaires, secondary data	374 foreign subsidiaries of 75 US, Japanese and European MNEs	The extent of knowledge transfer	1991	Multivariate OLS	Entry mode acquisition (+), sub size (+), formal integrative mechanisms (+), informal socialization mechanisms (+), downstream activities (+), advertising intensity (+)
Lord & Ranft (2000)	Survey, interviews, secondary data	104 divisions in China, India and Russia from 7 US parents	The extent of local market knowledge transfer	1994-1995	Multiple regression	Tacitness (-), corporate HQ office (+), corporate centralization (+), linkage of incentives (+), parent experience (+)
Schulz (2001)	Questionnaires, interviews	97 foreign subsidiaries in Denmark and the US	The extent of knowledge transfer	1996	Regression	Level of codification of knowledge (+), horizontal inflows (+), vertical inflows (-); sub autonomy (+), distance (-), informal horizontal relation (+), knowledge content (+), knowledge prevalence (+)
Buckley, Clegg & Tan (2003)	Interviews	Foreign direct investments of one US and one Belgian firms in China	The extent of knowledge transfer	2000	Case study	Expatriate and employee training (+)
Persson (2006)	Questionnaires, interviews	74 subsidiaries organised in 17 divisions in Sweden from 12 MNEs	The extent of knowledge transfer	2002	OLS	Product flows (internal sales/sales) (+), liaison mechanisms (+), permanent team structures (-), temporary team structures (+), incentives (+), socialization (+), context specificity (+)

Notes: (+)/(-) denotes a positive/negative impact on knowledge transfer. ‘Sub’ refers to subsidiary.

Table 4.1: Studies of lateral knowledge transfer (cont'd)

Studies	Data collection	Samples	Knowledge transfer measurements	Time period	Methodology	Factors that influence knowledge transfer
Ciabuschi, Dellestrand & Kappen (2011)	Questionnaires, interviews	169 knowledge transfer projects in 63 subsidiaries of 23 MNEs. Subsidiaries are in 14 economies	Efficiency and effectiveness of knowledge transfer	2002-2005	OLS	Centralization (-), IT (+), size (-), patent (-), sender GDP (+), previous cooperation (+ for effectiveness) explicitness (+ for efficiency)
Yamin, Tsai & Holm (2011)	Questionnaires, interviews	129 lateral innovation transfer cases in 19 European- and US-based MNEs	Efficiency and effectiveness of knowledge transfer	2003-2006	Multiple regression	Innovation explicitness (+), HQ incentives (+), dyadic willingness (+), Innovation complexity (- for effectiveness), dyadic collaboration (+ for effectiveness), subsidiary autonomy (+ for efficiency), HQ involvement (– for efficiency)
Crespo, Griffith & Lages (2014)	Questionnaires, secondary data, Interviews	202 Portuguese subsidiaries of MNEs headquartered in Japan, Europe and North America	The extent of knowledge transfer and the profitability outcome	2010	Structural equation modelling	Knowledge explicitness (+ for knowledge transfer), communication (+ for knowledge transfer); cultural distance (- for knowledge transfer), formalization (+ for knowledge transfer), specialised resources (+ for performance outcome)
Tseng (2015)	Questionnaires, interviews	100 Taiwanese foreign subsidiaries	The extent of knowledge transfer	NA	Regression	Motivation of an MNE to acquire internalization advantages (+), sub importance*motivation (+), sub local experience (-)
Andersson, Buckley & Dellestrand (2015)	Questionnaires, interviews	63 subsidiaries of 23 MNEs from the US and Europe	The effectiveness of knowledge transfer	2002-2005	OLS	Headquarter formal hierarchical governance tools (-), sub expatriates (-), established relationship (+), sub similarity (+), patented (-)

Notes: Transfer efficiency is measured by the cost and speed of lateral knowledge transfer. Transfer effectiveness is measured by the extent of knowledge implemented and used by the receiving affiliate, and how satisfactory the performance outcome of the knowledge transfer is. (+)/(-) denotes a positive/negative impact on knowledge transfer. 'Sub' refers to subsidiary.

knowledge transfer, in terms of the speed and costs of the transfer, and its effectiveness, in terms of adopting new knowledge in operations and achieving satisfactory outcomes for the receiving affiliates. Such inter-affiliate knowledge transfer will subsequently improve the performance of the multinational corporations, as substantiated in Crespo, Griffith & Lages (2014). In this chapter, I follow this recent literature by building a "reduced form" of the lateral knowledge transfer model directly examining the impact of siblings' intangible assets on affiliate performance.

Third, virtually every study in this literature does not merely test the existence of knowledge flows between affiliates. Studies on lateral knowledge transfer have also found various factors that augment or attenuate the extent and effectiveness of lateral knowledge flows. These stimuli or impediments can be summarized in detail as follows:

(a) the idiosyncratic features of the knowledge, including the level of tacitness (Lord & Ranft, 2000), codification (Schulz, 2001) and explicitness (Crespo, Griffith & Lages, 2014) of the transferred knowledge;

(b) the relationship building between the receiving and sending affiliates, such as their prior cooperation experience (Ciabuschi, Dellestrand & Kappen, 2011), the adoption of liaison mechanisms (Persson, 2006), socialisation mechanisms (Gupta & Govindarajan, 2000) and the frequency of communications (Crespo, Griffith & Lages, 2014);

(c) corporate management of intra-MNE knowledge flows, in terms of headquarters' involvement and mentoring roles (Yamin, Tsai & Holm, 2011), centralisation (Lord & Ranft, 2000), and hierarchy governance tools (Andersson, Buckley & Dellestrand, 2015) during the knowledge transfer;

(d) the similarities or relatedness between the receiving and sending affiliates (Andersson, Buckley & Dellestrand, 2015) during lateral knowledge transfer;

(e) other factors including, for example, cultural distance (Crespo, Griffith & Lages, 2014), affiliate experience (Tseng, 2015), and rewards or incentives for effective knowledge transfer (Lord & Ranft, 2000).

4.2.1 Affiliate financial performance and siblings' intangible assets

Gradually, the structure of MNEs has been moving away from a pure hierarchy in which knowledge is initially created by the parent and then transferred to affiliates, i.e., knowledge-exploitation (Hymer, 1976; Vernon, 1966). Despite the importance of knowledge exploitation, more and more foreign affiliates are engaging in product or process research and design as well as market development, as pathways for developing their competencies upon which they can build their competitiveness in the foreign market (Cantwell & Mudambi, 2005). Some MNE affiliates, as analysed in Frost, Birkinshaw & Ensign (2002), are becoming 'centres of excellence', characterized as embodiment of a set of core competencies, which are important sources of value creation for the entire MNE. The subsidiary-specific advantages, proposed in Rugman & Verbeke (2001), are as a result of the MNE structure of differentiated, dispersed operations worldwide, and can be identified in various types of MNE-affiliate relationship.

From the perspective of the resource-based view, strategic resources that are valuable and difficult to imitate are regarded as a requisite for a firm (Barney, 1991). Knowledge such as sophisticated technological capabilities and know-how is deemed to be an important engine for firm growth and competitiveness (Denicolai, Zucchella & Strange, 2014), and thus an MNE is regarded as a repository for collecting, absorbing and assimilating

knowledge through its scattered, but connected, worldwide affiliates, that is, the knowledge-based approach of the firm (Kogut & Zander, 1992). It has been widely accepted that firm knowledge can be transferred within intra-MNE networks from MNE parents to their affiliates (Buckley & Casson, 1976), from the affiliates to their parent companies (Ambos, Ambos & Schlegelmilch, 2006; Nair et al., 2017), or from foreign affiliates to their sibling affiliates. The focus of this chapter is the latter pattern of intra-MNE knowledge flows, i.e., knowledge flows between affiliates. Affiliate-specific advantages, *inter alia*, product and process research and know-how, could be important sources for the value creation of other affiliates, leading to a superior economic outcome. I therefore propose that

Hypothesis 1: **There will be a positive impact of siblings' intangible assets on affiliate performance.**

4.2.2 Affiliate strategic roles

An important corporate strategy of multinational enterprises is to decide how broadly they want to diversify. The extent of relatedness between the sending and receiving MNE units magnifies knowledge transfer and its subsequent performance benefits, which has been supported by several studies. With an emphasis on the relevance of the knowledge between the receiving and sending units, Yang, Mudambi & Meyer (2008), for example, argue that the effect of reverse knowledge flow is largely contingent on whether the incoming knowledge is pertinent and relevant to the existing knowledge of the receiving units. Although each affiliate contributes to the parent company global value chain, some affiliates are unrelated to each other in terms of the products and services they are engaged in. The knowledge of the affiliate is often complicated, due to its idiosyncratic features such as tacitness and path-dependence (Bresman, Birkinshaw & Nobel, 1999; Song,

Almeida & Wu, 2003; Szulanski, Ringov & Jensen, 2016). It is therefore difficult for one affiliate to understand another's knowledge when they are operating in unrelated businesses.

In fact, there is increasing attention to the extent to which the lateral knowledge transfer is affected by the level of product similarities between the affiliates (Yamin, Tsai & Holm, 2011; Andersson, Buckley & Dellestrand, 2015). Drawing on the affiliates of the US and European firms, Andersson, Buckley & Dellestrand (2015) postulate and substantiate that the level of the similarity between the receiving and sending affiliates can enhance the effectiveness of knowledge transfer. Unrelated affiliates add little value and are less relevant to the main activities of their sibling affiliates. Compared to unrelated affiliates, related affiliates are likely to have a better understanding of the know-how of their sibling affiliates which can lead to better performance. I therefore propose that:

Hypothesis 2: **The positive impact of siblings' intangible assets on affiliate performance will be greater when the affiliate and its siblings are in related industries compared to when they are in unrelated industries.**

An affiliate can engage in fairly similar, or even the same, activities as its sibling affiliates, and in which they often have a high level of similarities in terms of not only physical resources, human resource profiles and technological capabilities (Harrigan, 1981; Chang & Singh, 1999; Wan, Chen & Yiu, 2015), but also the market environments such as customer needs and competitions in which they operate (Capron, Mitchell & Swaminathan, 2001). A high degree of similarity in tangible and intangible assets reduces the costs associated with knowledge transfer and improves the effectiveness of knowledge transfer (Andersson, Buckley & Dellestrand, 2015). Therefore, despite the

complicated nature of knowledge, it is less difficult to understand and assimilate it when the affiliate's activity is similar to (i.e., a horizontal relationship) that of its sibling. In contrast, an affiliate's activities could be in a vertical relationship with its sibling affiliate; in other words, the affiliate's activities are concerned with either the inputs or the outputs of its sibling. A vertical affiliate therefore will have some specialised knowledge in, for example, design and market information, which can be valuable sources of knowledge (Mudambi, 2008).

Intangible assets of horizontal affiliates and vertical affiliates are both regarded as valuable sources of knowledge. The key to benefit from this knowledge is the absorptive capability of the receiving unit (Gupta & Govindarajan, 2000) which is the ability to evaluate the value of transferred knowledge and apply it to commercial uses (Cohen & Levinthal, 1990), and to what extent absorptive capabilities influence the intra-firm knowledge transfer has been explored in some studies. As discussed in the study by Cohen & Levinthal (1990), the absorptive capability is largely a function of the receiving unit's prior related knowledge. Several studies have addressed that knowledge relevance between the sending and receiving units will improve the capacity and willingness of the receiving unit to understand knowledge and lead to the success of intra-firm knowledge transfer. As proposed by Yang, Mudambi & Meyer (2008), a high overlap of knowledge between the receiving and sending units will attract the receiving unit interest and attention in the transferred knowledge, and these receiving units are likely to understand the benefit of knowledge – a finding which is also supported by Jeong, Park & Chae (2017). Moreover, Ambos, Ambos & Schlegelmilch (2006) proposes that a high level of similarity makes the managers in the receiving unit find it easier to understand and apply the transferred knowledge, and they demonstrated that the similarity will lead to a higher

benefit from knowledge transfer. I therefore postulate that the lateral knowledge transfer effect will be greater when the affiliate and its sibling affiliate are in the horizontal type relationship, as the receiving affiliates are more willing to understand the transferred knowledge and apply it in commercial uses.

In contrast, despite being interdependent (Harrigan,1985; Woo, Willard & Daellenbach, 1992), the affiliates in a vertical relationship have a certain degree of heterogeneity in knowledge, compared to those in a horizontal relationship (Shimizu, 2007; Berry, 2013). The affiliate will be less familiar with the transferred knowledge stemming from its sibling affiliates; therefore, the receiving affiliate would be less efficient in evaluating the value of knowledge and applying it in the commercial uses (Cohen & Levinthal, 1990). I therefore argue that when the affiliate and its sibling's value activities are of the horizontal type, they will benefit most from lateral knowledge transfer, compared to affiliates in a vertical relationship. I therefore propose that

Hypothesis 3: **The positive impact of siblings' intangible assets on affiliate performance will be greater when the affiliate and its siblings are horizontally-related compared to when they are vertically-related.**

I now turn to compare the lateral knowledge transfer when the sources of knowledge are concerned with the inputs into the affiliate's production, relative to when such knowledge sources are concerned with the outputs of the affiliate. Knowledge is regarded as a paramount resource for the firm (Barney, 1991; Cantwell & Mudambi, 2005). Affiliates who engage in producing intermediate inputs, and in design and research development, have advantages in specification and efficiency, and they often undertake research and development themselves which are important sources of knowledge that could be

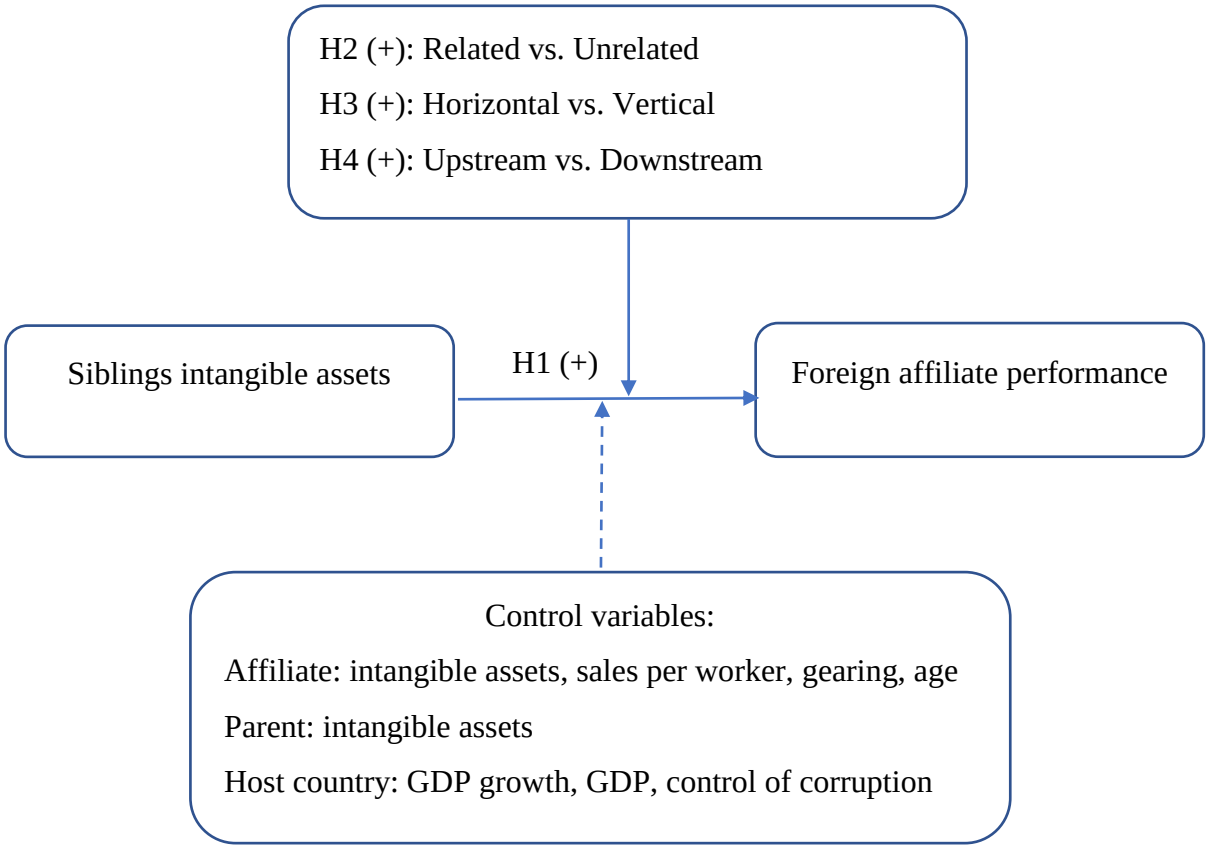
transferred to the rest of the multinational enterprise (Mudambi, 2008; Mudambi & Puck, 2016). I therefore expect significant performance benefits from receiving and assimilating such knowledge.

In contrast, downstream affiliates mainly engaged in selling and marketing are often recipients of know-how and benefit from competence exploitation. The location of the downstream activities is often tied to the country where the buyers are located, and the competences of a downstream affiliate grow out of its marketing, sales and service activities in that country, and these competencies are often country-specific (Porter, 1986). This is echoed in the work of Rugman, Verbeke & Yuan (2011), who propose that competence building on selling activities are often location-bound and may be less deployable across geographical scopes than those competencies based on production. Some downstream affiliates may develop effective marketing capabilities and local market knowledge (Anand & Delios, 1997), and much of this know-how could be location-bound and be less applicable to their sibling affiliates, in particular when considering that many countries vary significantly in terms of governance, customer preferences and marketing tactics (Berry, Guillén & Zhou, 2010; Crespo, Griffith & Lages, 2014). Taking these together, I propose that

Hypothesis 4: **The positive impact of siblings' intangible assets on affiliate performance will be greater when the siblings are upstream of the affiliates compared to when they are downstream of the affiliates.**

To give a better overview of my research framework which describes the hypothesized relationships, please refer to Figure 4.2.

Figure 4.2: Framework of lateral knowledge transfer



4.3 Data and methodology

4.3.1 Data sample

The data sample is derived from the Orbis database collected by Bureau van Dijk (BvD) which provides detailed financial data on both MNE parent companies and their affiliates. There are three steps in generating panel data to be used in this chapter. The first step is to identify parent-affiliate linkages over the period 2008-2016. For each affiliate, Orbis provides information on company's shareholder name and location in each year, which allows me to establish parent-affiliate linkages over the period 2008-2016. For each affiliate in a given year (e.g., 2010), we can identify its sibling affiliate if they have the

same parent in the same year; therefore, I am able to identify affiliate and its sibling affiliate at yearly basis. For example, if two affiliates have the same parent company in years 2010-2012, I then identify they are siblings in these three years. The second and important step is to retrieve the required accounting and financial information (such as intangible assets and total assets) for each parent and affiliate company. These required accounting and financial information are necessary for analysing the performance benefit of lateral knowledge transfer. The third step is that for each affiliate *i* at year t, I calculated the averaged intangible assets ratio of sibling affiliates who have the same parent as affiliate *i* at year t; therefore, intangible asset ratio is time variant. I used the same approach to calculate the averaged intangible assets ratios of different types of siblings according to their roles on value chains.

I require that all affiliates and their parent companies have an active status, and dropped those inactive companies that have ceased to exist (e.g., bankruptcy or liquidation), a similar criterion that is applied in Berry (2013). I also require that each affiliate reports the necessary information on its intangible assets, total assets, return on sales, gearing ratio, sales per worker and establishment year. Affiliates without information on any of these are removed from the data sample. I also control for parent company firm-specific assets, so those companies without information on intangible assets or total assets are excluded from the analysis. After applying all the above sampling criteria, I am able to find 2,739 parent companies from 57 home countries and 8,255 of their foreign affiliates in 68 host countries over the period 2008 to 2016. For each given affiliate, I then calculate the average intangible asset intensity of its sibling affiliates that share the same parent company as the given affiliate, and the final samples include 8,255 foreign affiliates, corresponding to 26,775 affiliate-year observations.

Each affiliate appears on average for 3.24 years, with a standard deviation of 2.11, which allows for longitudinal analysis of the lateral knowledge transfer effects. On average, each parent company has 3.01 overseas affiliates. In the survey Table 4.1, it summarizes the studies on lateral knowledge transfer, the country coverage of the existing literature is often limited to one or just a few countries, and the sample size is often limited to 500 affiliates. With increasing emphasis on globally dispersed affiliates, I seek to contribute to the lateral knowledge transfer literature by using samples from a wider set of countries.

4.3.2 Affiliate strategic roles

As shown in Figure 4.1, I group sibling affiliates into horizontal, upstream, downstream and unrelated types.

Downstream siblings: when the siblings mainly engage in selling, marketing and after-sales services, I then categorize them as downstream siblings. I therefore group those sibling affiliates to the downstream type if their core industry codes are 45, 46, 47 or 73 being wholesale and retail trade, as well as advertising and marketing. If affiliate A2 is a downstream sibling of affiliate A1, their relationship is depicted in Figure 4.1(a).

Upstream siblings: for a given affiliate, upstream siblings are involved in sourcing raw materials, producing intermediate inputs or unfinished products, or engaging in research design which are important for the affiliate. If affiliate A2 is an upstream sibling of affiliate A1, their relationship is shown in Figure 4.1(b). In order to identify the important raw materials and intermediate inputs for a given affiliate, I use industry input-output official data published by the Office for National Statistics (ONS). For a given industry, I am able to identify which industries provide a significant amount of intermediate inputs. Taking motor vehicles, trailers and semi-trailers as an example, their

most important intermediate inputs include 1) fabricated metal products, 2) rubber and plastic products, 3) other basic metals and casting, 4) basic iron and steel, 5) machinery and equipment, 6) petrochemicals, 7) computer, electronic and optical products, 8) electrical equipment and 9) glass, refractory, clay, other porcelain and ceramic, stone and abrasive products. Using the industry input-output table, I flag a sibling affiliate as an upstream type if the industry that the sibling belongs to provides a significant (i.e., 5%) amount of intermediate inputs for a respective affiliate's industry. In addition, I also deem those siblings, whose primary activities are scientific research and development based on their industry classification codes (i.e., NACE 72), as the upstream type.

Vertical siblings: vertical siblings include both upstream and downstream siblings, as described above.

Figure 4.1(c) depicts A1 and A2 are either horizontal affiliates if they operate in the similar industry sectors, or unrelated affiliates if they operate in different industry sectors.

Horizontal siblings: I retrieved information on NACE industry classification at the three-digit level of an affiliate and its sibling affiliates, and group the siblings into the horizontal type when the affiliate and siblings share the same three-digit NACE industry codes. The affiliate is therefore engaged in the same activities as its sibling.

Unrelated siblings: the remaining siblings that are not included in the above categories are unrelated siblings. An affiliate and its unrelated siblings have no relationship in terms of products or services.

4.3.3 Dependent, independent and control variables

Dependent variable: foreign affiliate performance has been one of the main topics in international business, and there are various performance measurements including

market-based indicators (such as Tobin's Q, risk-adjustment), financial-based indicators (such as return on sales or sales growth) and innovation-based performance (such as the number of patents or new product development). Return on sales is often used as one of the most common measures of performance in the IB literature (for example, Capar & Kotabe, 2003; Hult et al., 2008; Kafouros & Aliyev, 2016a; Zschoche, 2016). Kafouros & Aliyev (2016a), for example, use return on sales as a performance measurement when comparing foreign affiliates and domestic firms. Return on sales is the ratio of net profit before tax divided by sales.

Independent variables: intangible assets have been widely adopted to measure the knowledge of foreign affiliates in the international business literature (Villalonga, 2004; Denicolai, Zucchella & Strange, 2014, among others). In this chapter, the measurement of intangible assets applies International Accounting Standard IAS 38 which defines intangible assets as an identifiable asset with monetary value but without physical substance, and these include, for example, patented technology, computer software, databases and trade secrets, which are expected to create future economic benefits (IAS 38). This IAS standard for measuring intangible assets has also been employed in other studies including, for example, Denicolai, Zucchella & Strange (2014) and Kafouros & Aliyev (2016b).

Following various recent studies, I calculate the ratio of intangible assets to total assets – a measurement adopted in several recent studies including, for example, Zhang, Li & Li (2014), Mohr & Batsakis (2014), Kafouros & Aliyev (2016b) and Mohr, Batsakis & Stone (2018). This construct captures not only the accumulated volume of intangible assets but also the size of the company (Denicolai, Zucchella & Strange, 2014; Mohr & Batsakis,

2014; Xu, Zhou & Phan, 2010; Chang, Chung & Moon, 2013a, 2013b; Kafouros & Aliyev, 2016b). Considering that an affiliate may have more than one sibling, I calculate the average of the intangible asset ratio of the siblings for each given affiliate.

Control variables: affiliate performance is expected to be influenced by a number of factors, and therefore I include various control variables suggested by the relevant literature.

Affiliate intangible asset ratio: not only its sibling affiliates' intangible assets, but also its own intangible assets are expected to influence affiliate performance, as predicted by studies including, for example, Kafouros & Aliyev (2016b) who find a positive role of an affiliate's intangible assets on its performance. We therefore include the affiliate intangible asset ratio in the analysis.

Affiliate debt to equity ratio: the extent of financial constraints that the affiliate encounters influences its performance. Affiliates with a high level of debt are likely to have the liability of paying a high level of interest which potentially affects its performance. I measure the leverage of the affiliates by using the debt-to-equity ratio (Stiebale, 2011), which is a measure of the inverse of potential slack of resource (Kafouros & Aliyev, 2016a).

Affiliate age: the experience of the affiliate in local markets is accumulated over the years. The older the affiliate is, the more experience it will have, in the sense of identifying market opportunities as well as neutralising market threats which could affect its profitability. I therefore control for affiliate age that is measured in natural logarithm in the analysis (Yamin & Otto, 2004; Nair, Demirbag & Mellahi, 2015; Wang et al., 2012).

Affiliate labour productivity: employees' capability to discern trends in the market and to identify opportunities is often important for affiliates established in foreign markets, and

I employ sales per worker that is measured in natural logarithm as a proxy for labour productivity (Huselid, 1995; Martins & Yang, 2015).

Parent company intangible asset ratio: MNE parent companies often have the sophisticated technological capabilities, advanced design capabilities and superior know-how. Knowledge could be transferred from the parent company to its foreign affiliates, and building upon this superior knowledge the foreign affiliates can compete with local rivals and reap economic returns (Buckley & Casson, 1976; Tallman & Li, 1996; Denicolai, Zucchella & Strange, 2014). I therefore include the parent company's intangible assets to total assets ratio in the analysis.

Other controls: affiliate performance is not only affected by the affiliate company's characteristics but also by the environment of the host country in which the foreign affiliate is based. I have included fixed effects in the analysis which control for time-invariant factors. Moreover, I also control the following three country-level variables.

Market size: a large market can offer greater opportunities as well as competitions for firms, thus possibly influencing their financial returns. In order to shed light on this, I control for market size by using gross domestic product (GDP) (Berry, 2013; Blake & Moschieri, 2016).

Market size growth: in addition to market size, its growth rate is also an important indicator of market potential. A company located in a country with increasing market growth is likely to have more demand for its products and will subsequently sell more. I therefore control the growth rate of the GDP of the host country (Blake & Moschieri, 2016).

The institutional conditions of the country imply the rules and regulations which shape companies' operations, thus possibly influencing their performance (North, 1990). Control of corruption is one of the most common measures of the institutional

environment of the country (see, for example, Cuervo-Cazurra, 2006 and Shirodkar & Konara, 2016), and I control for this in the analysis.

4.3.4 Empirical specifications

In order to estimate the impact of siblings' intangible assets on affiliate performance, I use the following empirical model.

$$ROS_{it}^{A} = \beta_0 + \beta_1 IATA_{it}^{S} + \beta_2 IATA_{it}^{A} + \beta_3 IATA_{it}^{P} + \beta_4 Sales\_p_{it}^{A} + \beta_5 Gear_{it}^{A} + \beta_6 Age_{it}^{A} + \beta_7 GDPG + \beta_8 GDP + \beta_9 Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (1)$$

where ROS_{it}^{A} is the return on sales of affiliate *i* in year *t*, and $IATA_{it}^{S}$ is the average of its siblings' intangible asset ratios at the same year *t*. I also control for the parent company intangible asset ratio ($IATA_{it}^{P}$), as well as the affiliate intangible asset ratio ($IATA_{it}^{A}$). The model also controls for affiliate sales per worker ($Sales\_p_{it}^{A}$), the debt-to-equity ratio ($Gear_{it}^{A}$) and age (Age_{it}^{A}), as well as host country market size (*GDP)*, the growth rate of the market size ($GDPG$) and institutional conditions (*Corrupt*). Affiliate fixed effects α_i, and year effects (γ_t) are also included. The key parameter β_1 shows the effect of siblings' intangible assets on affiliate performance, i.e., the performance benefits of lateral knowledge transfer.

In order to estimate whether the positive impact of siblings' intangible assets on affiliate performance is moderated by the strategic roles of siblings, I include equations 2 to 4. For a given affiliate *i*, $IATA_{it}^{RS}$ ($IATA_{it}^{US}$) is the average of the intangible asset ratios of its related (unrelated) siblings in equation 2.

$$ROS_{it}^{A} = \delta_0 + \delta_1 IATA_{it}^{RS} + \delta_2 IATA_{it}^{US} + \delta_3 IATA_{it}^{A} + \delta_4 IATA_{it}^{P} + \delta_5 Sales\_p_{it}^{A} + \delta_6 Gear_{it}^{A} + \delta_7 Age_{it}^{A} + \delta_8 GDPG + \delta_9 GDP + \delta_{10} Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (2)$$

Similarly, for affiliate *i*, I include the average of the intangible asset ratios of its horizontal siblings ($IATA_{it}^{HS}$) and vertical siblings ($IATA_{it}^{VS}$) in equation 3. Likewise, I include the average of the intangible asset ratios of its upstream siblings ($IATA_{it}^{UpS}$) and downstream siblings ($IATA_{it}^{DoS}$) in equation 4.

$$ROS_{it}^{A} = \eta_0 + \eta_1 IATA_{it}^{HS} + \eta_2 IATA_{it}^{VS} + \eta_3 IATA_{it}^{A} + \eta_4 IATA_{it}^{P} + \eta_5 Sales\_p_{it}^{A} + \eta_6 Gear_{it}^{A} + \eta_7 Age_{it}^{A} + \eta_8 GDPG + \eta_9 GDP + \eta_{10} Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (3)$$

$$ROS_{it}^{A} = \psi_0 + \psi_1 IATA_{it}^{UpS} + \psi_2 IATA_{it}^{DoS} + \psi_3 IATA_{it}^{A} + \psi_4 IATA_{it}^{P} + \psi_5 Sales\_p_{it}^{A} + \psi_6 Gear_{it}^{A} + \psi_7 Age_{it}^{A} + \psi_8 GDPG + \psi_9 GDP + \psi_{10} Corrupt + \gamma_t + \alpha_i + \varepsilon_{it} \quad (4)$$

4.3.5 Falsification test – analysis based on the matched samples

Although I have considered affiliate heterogeneity by including various control variables as well as adding affiliate fixed effects, one may argue that both the affiliate and its sibling affiliates may be exposed to some unobservable external shock, which could distort the results of the lateral knowledge transfer. For instance, a disruptive innovation or technology might enhance sibling affiliates' know-how, whilst affecting affiliate performance at the same time. In order to shed light on this, I employ a falsification test by using matching samples, and the test involves two steps. The first is to find a matched (or fake) affiliate company for each given affiliate. The subsequent step is to re-run the equations, but using the performance of the matched affiliate company as the dependent variable. The underlying view of the falsification test is to explore whether there is a positive impact of sibling affiliates' intangible assets on a fake affiliate company.

During the matching process, I conduct Propensity Score Matching (PSM) to find pairs of the matched affiliates, and I require an affiliate and its matched (fake) affiliate to be fairly similar in a sense that they are similar in terms of their total assets, intangible assets, sales per worker, employee number, age, debt-to-equity ratio. Additionally, I also include the different transformations of these affiliate characteristics by including squared terms and the interaction terms of these variables. In addition, I also include a stringent requirement that each matched pair needs to be in the same host country and in the same two-digit industry. After I find the fake affiliates, I re-run the analysis by using fake affiliate information in all equations.

4.3.6 Descriptive statistics

Table 4.2 presents definitions and descriptive statistics of all key variables used in the regression analysis. There are in total 26,775 affiliate-year observations in the data sample. On average, return on sales of affiliates is around 0.05, with standard deviation 0.103, and the average gearing ratio is around 72.4%.

As expected, the ratio of affiliate intangible assets (IATA) is 3.5% which is much lower than the ratio of parent company intangibles (16.9%). For each given affiliate, the average of its siblings' intangible asset ratios is around 4.1%, and the intangible asset ratio in the same continent is higher than that in a different continent (3.8% vs. 2%). Affiliate age is about 28 years, and affiliate labour productivity is 527 thousand USD. For other control variables, it shows that average host country market size is over 2881 billion USD, with a growth rate of 1.41%. The control of corruption index in the host countries is around 0.827 on average.

Table 4.2: Variable definition and descriptive statistics

Variable name	Variable	Definition	Mean	Std. Dev.
Dependent variable				
ROS, affiliate	ROS^A	Affiliate profit before tax / sales	0.050	0.103
Independent variables				
IATA, siblings	$IATA^S$	The average of intangible to total assets ratio of the siblings	0.041	0.056
IATA, siblings (Same continent)	$IATA^{SS}$	Avg. intangible to total assets ratio of the siblings in the same continent	0.038	0.057
IATA, siblings (Different continent)	$IATA^{DS}$	Avg. intangible to total assets ratio of the siblings in different continent	0.020	0.050
IATA, related siblings	$IATA^{RS}$	The average of intangible to total assets ratio of related siblings	0.035	0.053
IATA, unrelated siblings	$IATA^{US}$	The average of intangible to total assets ratio of unrelated siblings	0.039	0.082
IATA, horizontal siblings	$IATA^{HS}$	The average of intangible to total assets ratio of horizontal siblings	0.022	0.052
IATA, vertical siblings	$IATA^{VS}$	The average of intangible to total assets ratio of vertical siblings	0.031	0.055
IATA, upstream siblings	$IATA^{UpS}$	The average of intangible to total assets ratio of upstream siblings	0.023	0.056
IATA, downstream siblings	$IATA^{DoS}$	The average of intangible to total assets ratio of downstream siblings	0.026	0.055
Control variables				
IATA, affiliate	$IATA^A$	Affiliate intangible assets / total assets	0.035	0.086
IATA, parent	$IATA^P$	Parent intangible assets / total assets	0.169	0.174
Sales per worker, affiliate ($ 000)	$Sales\_p^A$	Affiliate Sales divided by employee	527.216	1009.530
Gearing, affiliate	$Gear^A$	(non-current liabilities and loans) divided by shareholders funds	0.724	1.179
Age, affiliate	Age^A	Affiliate age in natural logarithm	28.623	24.052
GDP growth, affiliate (%)	$GDPG$	Host country GDP growth	1.410	3.385
GDP, affiliate ($ 000 000 000)	GDP	Host country GDP in USD using Purchasing Power Parity rate.	2881.202	4337.703
Control of corruption, affiliate	$Corrupt$	Host country control of corruption, ranging from -2.5 to 2.5.	0.827	0.850

Notes: Monetary variables are in US dollars. There are 26,775 observations.

Tables 4.3 presents the average of intangible assets and affiliate performance in more detail. In total, the data samples include 8,255 foreign affiliates, out of which 7,990 (96.8%) have at least one related sibling affiliate. 7,154 affiliates each have at least one vertical sibling affiliate, and 5,383 affiliates each have at least one sibling operating in the same industry, i.e., a horizontal sibling. On average, affiliates' return on sales is around 5%, and their intangible asset ratios are around 0.035.

Table 4.3: Intangible assets and affiliate performance, by roles of sibling affiliates

Roles of Siblings	Number of affiliates	Affiliate ROS	Affiliate IATA
Related	7,990	0.050	0.035
Vertical	7,154	0.051	0.036
Upstream	5,478	0.051	0.035
Downstream	5,995	0.052	0.036
Horizontal	5,383	0.051	0.034
Unrelated	5,429	0.053	0.037
All	8,255	0.050	0.035

Notes: "Number of affiliates" is the number of affiliates who have at least one sibling in a given role. For instance, there are 7,990 affiliates which each have at least one related sibling. The values of affiliate ROS and IATA are the averaged values. IATA is the intangible assets to total assets ratio.

Table 4.4 presents a correlation matrix of the key variables. The correlation coefficients between the independent variables range between -0.24 and 0.32, which suggests that there is no multicollinearity issue.

Table 4.5 provides a list of countries where most parent companies or foreign affiliates are located, along with the average of some of the key variables used in the analysis. As expected, most foreign affiliates are located in China, France, Germany, Italy, the United Kingdom, Spain, the Czech Republic, Poland, Belgium and South Korea.

Table 4.4: Correlation matrix

	1	2	3	4	5	6	7	8	9	10
ROS, affiliate	1									
IATA, siblings	0.040***	1								
	(0.000)									
IATA, affiliate	-0.036***	0.138***	1							
	(0.000)	(0.000)								
IATA, parent	0.147***	0.233***	0.144***	1						
	(0.000)	(0.000)	(0.000)							
Sales per worker, affiliate	0.087***	0.015**	0.048***	0.027***	1					
	(0.000)	(0.015)	(0.000)	(0.000)						
Gearing, affiliate	-0.230***	0.008	0.066***	-0.028***	0.045***	1				
	(0.000)	(0.167)	(0.000)	(0.000)	(0.000)					
Age, affiliate	0.079***	0.013**	-0.090***	0.086***	0.160***	-0.021***	1			
	(0.000)	(0.040)	(0.000)	(0.000)	(0.000)	(0.001)				
GDP growth, affiliate	0.110***	-0.028***	-0.025***	-0.037***	-0.117***	-0.057***	-0.152***	1		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
GDP, affiliate	0.016***	0.017***	0.046***	0.003	0.110***	0.041***	-0.003	0.320***	1	
	(0.007)	(0.006)	(0.000)	(0.594)	(0.000)	(0.000)	(0.671)	(0.000)		
Control of corruption, affiliate	0.004	0.064***	0.130***	0.123***	0.271***	0.089***	0.262***	-0.240***	-0.102***	1
	(0.544)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Notes: **: p<0.05; ***: p<0.01. IATA is the ratio of intangible assets divided by total assets. Table 4.2 provides detailed explanations for each variable.

Table 4.5: List of countries and the average of some key variables

Country	No. parent	IATA, parent	No. affiliate	ROS, affiliate	IATA, sibling	IATA, affiliate	Sales per worker, affiliate	Age, affiliate	Gearing, affiliate
Australia	6	0.21	67	0.05	0.06	0.08	826.58	36.86	0.88
Austria	93	0.01	131	0.06	0.03	0.02	481.89	36.24	0.98
Belgium	107	0.02	281	0.05	0.04	0.04	972.15	40.16	0.74
Brazil	5	0.06	78	0.03	0.04	0.04	533.26	34.29	0.76
Bulgaria	1	0.01	68	0.02	0.04	0.01	178.95	26.8	0.72
Cayman Islands	37	0.03	0						
China	47	0.04	1030	0.06	0.03	0.02	375.72	13.06	0.47
Czech Republic	8	0.01	422	0.06	0.03	0.01	289.35	15.51	0.37
Denmark	77	0.13	0						
Finland	78	0.12	130	0.06	0.04	0.04	485.04	29.85	0.65
France	259	0.14	928	0.05	0.04	0.04	511.42	31.56	0.62
Germany	311	0.09	817	0.05	0.04	0.03	658.58	36.29	1.17
Greece	12	0.05	48	0.01	0.04	0.02	449.89	39.12	0.87
Hungary	4	0.07	175	0.04	0.04	0.01	308.25	16.94	0.52
India	18	0.1	38	0.11	0.04	0.03	276.78	61.29	0.4
Ireland	19	0.35	37	0.11	0.11	0.17	1234.51	20.68	1.08
Italy	246	0.08	806	0.03	0.04	0.04	651.46	30.09	0.86
Japan	310	0.04	0						
Luxembourg	34	0.05	19	0.02	0.02	0.01	462.79	47.26	0.43
Netherlands	131	0.14	138	0.06	0.06	0.06	1261	49.43	0.59
Norway	44	0.11	66	0.06	0.05	0.07	468.79	20.99	0.91
Poland	14	0.05	414	0.05	0.03	0.01	330.95	21.38	0.59
Portugal	12	0.06	141	0.06	0.04	0.02	388.73	32.93	0.52
Russia	6	0.03	139	0.07	0.04	0.01	394.34	18.87	1.1
Singapore	18	0.09	1	0.03	0.04	0.02	159.6	4.5	2.03
Slovak Republic	7	0.00	162	0.04	0.03	0.02	361.12	12.94	0.54
Slovenia	13	0.05	61	0.05	0.03	0.03	253.76	20.22	0.65
South Korea	30	0.02	244	0.07	0.03	0.02	726.45	19.85	0.46
Spain	89	0.08	586	0.03	0.04	0.04	582.22	32.69	0.53
Sweden	90	0.18	189	0.06	0.04	0.05	543.56	44.19	0.72
Switzerland	78	0.16	4	0.07	0.06	0.13	303.98	109.28	0.64
Ukraine	0		55	0.02	0.04	0.01	171.15	26.57	0.71
United Kingdom	117	0.24	621	0.06	0.05	0.09	510.27	34.16	1.07
United States	343	0.29	13	0.08	0.06	0.31	579.88	18.94	0.56

Notes: The sales per worker variable is in thousands of US dollars. This table includes a list of countries where most parent companies or foreign affiliates are located.

4.4 Empirical results

4.4.1 The effect of lateral knowledge transfer

Table 4.6 reports the regression results to test hypothesis H1 regarding the impact of intangible assets of the siblings on affiliate performance. Column one only includes all control variables, and in the second column the siblings' intangible asset ratio is included. The size and significance level of estimates for the control variables are largely unchanged in column two, as compared to those in column one. Column two estimates the effect of the lateral knowledge transfer on affiliate performance hypothesised in H1 using equation 1. I find that the effect of sibling IATA is positive and statistically significant. With recent growing emphasis on the effect sizes as well as the statistical significance of the coefficient (see for example Ellis, 2010; Hahn & Ang, 2017; Meyer, van Witteloostuijn & Beugelsdijk, 2017), I consider the size of the coefficients. In column two, it shows that the effect of the sibling IATA effect is 0.068, indicating that a ten percentage-point increase in the sibling intangible asset ratio will improve affiliate performance by 0.0068. Considering that on average affiliate profitability is 0.050 (see descriptive statistics in Table 4.2), this suggests 13.6% increase in affiliate performance, denoting a significant economic return for the affiliate. Hypothesis one is therefore supported.

When looking at the coefficients of affiliate IATA (0.124) and parent IATA (0.095), I find that both coefficients are positive and statistically significant, which is as expected and in line with the literature (Kafouros & Aliyev, 2016b; Contractor, Yang & Gaur, 2016). The effect of intangible assets has been explored in several studies. For example, intangible assets increase the extent of internationalisation (Wang et al., 2012; Denicolai, Zucchella & Strange, 2014), expedite the process of overseas expansion (Mohr &

Batsakis, 2014) and improve firm performance (Mishra & Gobeli, 1998; Marrocu, Paci & Pontis, 2011). I find a significant impact of affiliate intangible assets on parent company performance. Rather than merely relying on its own or its parent company's intangible assets (Kafouros & Aliyev, 2016b; Ambos, Ambos & Schlegelmilch, 2006), an affiliate can make use of its siblings' intangible assets (Gupta & Govindarajan, 2000). MNEs are treated as repositories for collecting and coordinating competences and knowledge, and this accumulated knowledge can be shared within the firm (Kogut & Zander, 1992; Gupta & Govindarajan, 2000; Andersson, Buckley & Dellestrand, 2015).

Table 4.6: Affiliate performance and sibling IATA

	(1) All	(2) All
IATA, siblings		**0.068***** **(0.026)**
IATA, affiliate	0.126*** (0.034)	0.124*** (0.034)
IATA, parent	0.097*** (0.019)	0.095*** (0.019)
Sales per worker, affiliate	0.046*** (0.005)	0.046*** (0.005)
Gearing, affiliate	-0.011*** (0.001)	-0.011*** (0.001)
Age, affiliate	0.023** (0.010)	0.023** (0.010)
GDP growth, affiliate	0.001* (0.000)	0.001* (0.000)
GDP, affiliate	-0.005 (0.019)	-0.007 (0.019)
Control of corruption, affiliate	-0.014* (0.008)	-0.013* (0.008)
Firm fixed effect	Yes	Yes
Year dummy	Yes	Yes
Cluster parent	Yes	Yes
No. observation	26775	26775
F statistics	20.318	19.426
Adjusted R-squared	0.682	0.683

Notes: Dependent variable: return on sales of the affiliates. IATA is the ratio of intangible assets divided by total assets. Robust standard errors are in parentheses. *: p< 0.10; **: p<0.05; ***: p<0.01.

In terms of other controlled variables, Table 4.6 shows that affiliates' sales per worker and age positively influence affiliate performance, whereas affiliates' debt-to-equity lowers the performance. The size and significance level of these control variables are generally unchanged across different columns. R-squared is centred around 0.68, showing that the variables included on the right-hand side of the empirical models could explain the variation of affiliate performance.

4.4.2 Falsification test based on the matched samples

I now conduct a falsification test to explore whether sibling affiliates' knowledge has a positive impact on a fake affiliate company. If there is a positive estimate, I then need to reconsider the lateral knowledge transfer results presented in Table 4.6. The quality of the matching exercise is of importance for the falsification test, and Table 4.7 shows the matching quality by reporting the extent of similarities between 'true' and 'fake' affiliates in a number of affiliate characteristics. For a given characteristic of true affiliates and their matched (fake) affiliates, I divide the difference between the two means by the average of the two means. The left panel reports the matching quality without including affiliate performance during the matching, while the right panel reports the quality of matching after controlling for affiliate performance in the matching. As shown in Table 4.7, the differences in the various characteristics between the true and fake affiliates are very small, although the standard deviations are relatively big. I also require that each matched affiliate is located in the same country and the same industry as the true affiliate.

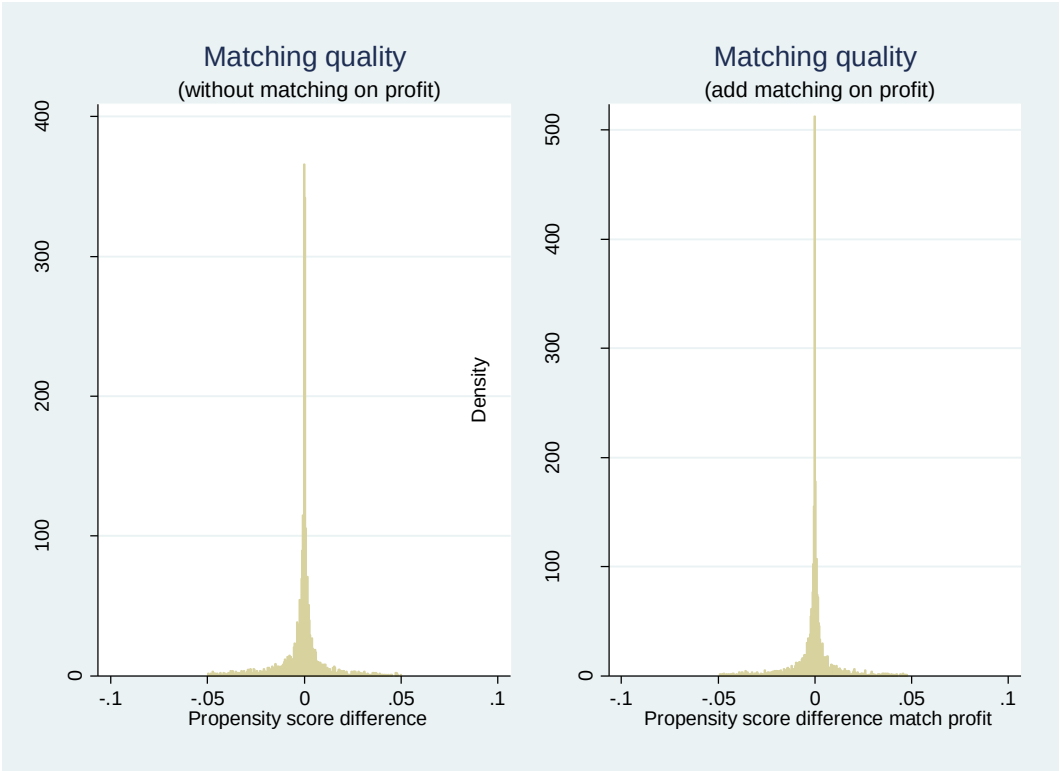
In addition, for a better feeling of matching quality, I also portray the propensity score differences of the matched affiliates in Figure 4.3, and it shows that the difference centres around 0, so the matching quality is reliable.

Table 4.7: Descriptive statistics – matching quality using propensity score matching

	Matching without ROS			Matching with ROS		
Variable	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs
Sales per worker difference	-0.0084	0.8328	3,460	-0.0011	0.8252	3,407
Age difference	0.0334	0.6564	3,460	0.0279	0.6605	3,407
ROS difference	-0.0026	1.0261	3,460	-0.0038	1.0312	3,407
Intangible difference	0.0245	1.5308	3,460	0.0317	1.5282	3,407
Gearing difference	0.0073	1.3860	3,346	0.0123	1.4150	3,303
Total assets difference	0.0088	1.2218	3,460	0.0156	1.2157	3,407
No. of employees difference	0.0084	1.0876	3,460	0.0052	1.0995	3,407
Same sector	1	0	3,460	1	0	3,407
Same country	1	0	3,460	1	0	3,407
Same year	0.5327	0.4990	3,460	0.5227	0.4996	3,407
p-score difference	-0.0011	0.0108	3,460	-0.0008	0.0106	3,407

Notes: This table presents the difference in the characteristics between the true affiliates and fake (matched) affiliates. For example, 'Sales per worker difference' is calculated by the difference in sales per worker between the true and fake affiliates, divided by the mean of the same two values. They are required to have the same two-digit industry code and to be in the same host country. The p-score is the propensity score.

Figure 4.3: Propensity score difference



Tables 4.8 and 4.9 present the balancing test between true and matched parents. Table 4.8 is to test the balancing of the matched samples without matching on parent ROS, and Table 4.9 shows the test for the matched samples with matching on parent ROS. In both tables I found that true and matched parents are similar in most characteristics, which shows that the matching quality is good and reliable.

Table 4.8 Balancing test of the variables between true and fake parents (without matching on parent ROS)

	Mean		t-test	
Variable	True parent	Fake parent	t value	p value
Age	28.546	27.653	1.738	0.082
Profit Margin	0.081	0.082	-0.143	0.886
Gearing	0.520	0.513	0.280	0.779
Total Assets (million)	222.936	209.929	0.758	0.448
Intangible Assets (million)	11.725	9.963	0.689	0.491
No. of Employees	635.359	606.725	0.811	0.417
Sales per Worker (thousand)	516.473	520.548	-0.149	0.881
Age^2	1276.435	1215.67	1.016	0.310
$Gearing^2$	1.172	1.128	0.404	0.686
Total $Assets^2$ (trillion)	579754.6	532295.6	0.309	0.757
Intangible $Assets^2$ (trillion)	12295.23	10583.07	0.187	0.852
No. of $Employees^2$	2728165	2352911	0.713	0.476
Sales per $Worker^2$ (million)	1566872	1555240	0.017	0.986
Age*Gearing	15.867	15.377	0.509	0.611
Age*Total Assets (million)	7346.013	6854.76	0.603	0.546
Age*Intangible Assets (million)	433.758	381.618	0.306	0.759
Age*No. of Employees	16911.43	15861.62	1.107	0.268
Age*Sales per Worker (thousand)	16637.35	16405.2	0.137	0.891
Gearing*Total Assets (million)	138.694	127.063	0.587	0.558
Gearing*Intangible Assets (million)	8.896	7.072	0.680	0.497
Gearing*No. of Employees	355.023	319.541	0.819	0.413
Gearing*Sales per Worker (thousand)	335.195	323.8	0.307	0.759
Total Assets*Intangible Assets (trillion)	40018.47	35170.72	0.225	0.822
Total Assets*No. of Employees (million)	727305.8	673959.4	0.299	0.765
Total Assets*Sales per Worker (billion)	351788.3	336866.5	0.080	0.936
Intangible Assets*No. of Employees (million)	39704.47	33199.71	0.526	0.599
Intangible Assets*Sales per Worker (billion)	13929.29	12351.49	0.228	0.820
Propensity score	0.911	0.912	-0.462	0.644

Notes: when P-value is more than 10%, the difference between the true and fake (matched) parent groups for a given variable is not significant.

Table 4.9 Balancing test of the variables between true and fake parents (with matching on parent ROS)

	Mean		t-test	
Variable	True parent	Fake parent	t value	p value
Age	28.519	27.725	1.560	0.119
Profit Margin	0.082	0.081	0.401	0.688
Gearing	0.519	0.509	0.460	0.646
Total Assets (million)	207.469	198.712	0.542	0.588
Intangible Assets (million)	10.295	9.395	0.376	0.707
No. of Employees	621.340	612.286	0.257	0.797
Sales per Worker (thousand)	492.007	505.115	-0.526	0.599
Age^2	1259.784	1205.394	0.969	0.333
$Gearing^2$	1.189	1.132	0.512	0.609
Total $Assets^2$ (trillion)	513128.4	457666.3	0.378	0.705
Intangible $Assets^2$ (trillion)	10053.37	9611.444	0.049	0.961
No. of $Employees^2$	2550326	2427091	0.233	0.815
Sales per $Worker^2$ (million)	1262182	1346590	-0.141	0.888
Age*Gearing	16.147	15.598	0.555	0.579
Age*Total Assets (million)	6877.251	6724.698	0.189	0.850
Age*Intangible Assets (million)	377.425	384.076	-0.040	0.968
Age*No. of Employees	16559.38	16384.16	0.176	0.860
Age*Sales per Worker (thousand)	16212.92	16144.37	0.040	0.968
Gearing*Total Assets (million)	127.904	122.230	0.286	0.775
Gearing*Intangible Assets (million)	8.342	7.060	0.469	0.639
Gearing*No. of Employees	343.128	318.745	0.560	0.576
Gearing*Sales per Worker (thousand)	303.505	315.363	-0.402	0.688
Total Assets*Intangible Assets (trillion)	33658.59	30704.63	0.140	0.889
Total Assets*No. of Employees (million)	680123.4	643424.4	0.206	0.837
Total Assets*Sales per Worker (billion)	320661.9	313702.5	0.037	0.971
Intangible Assets*No. of Employees (million)	36917.92	34115.6	0.226	0.822
Intangible Assets*Sales per Worker (billion)	9341.629	8538.804	0.199	0.843
Propensity score	0.913	0.914	-0.316	0.752

Notes: when P-value is more than 10%, the difference between the true and fake (matched) parent groups for a given variable is not significant.

I then re-run equation 1, but using fake, rather than true, affiliate company information in the analysis. In this case, the ROS of the fake affiliate is used as the dependent variable. Table 4.10 reports the results of the falsification test. The first two columns present results without matching on affiliate company profitability, and in column two I give more weight to those better matches, and the weight is inversely proportional to the propensity score difference. I find that the sibling affiliates' intangible asset ratio has no impact upon the fake affiliate performance, suggesting that the results reported in Table 4.6 about lateral knowledge transfer are not distorted. The control variables in Table 4.10 have

similar results as those reported in Table 4.6. In columns 3 to 4, I repeat the falsification exercise using the matched samples that include affiliate performance during the matching, and again find no effect of sibling affiliate knowledge on the performance of the fake affiliate; this therefore again supports the interpretation of lateral knowledge transfer results in Table 4.6.

Table 4.10: Matched affiliate performance and sibling IATA (falsification test)

	Matching without ROS		Matching with ROS	
	(1)	(2)	(3)	(4)
IATA, siblings	0.005	0.005	0.006	0.006
	(0.030)	(0.030)	(0.033)	(0.033)
IATA, fake affiliate	0.136**	0.136**	0.146***	0.145***
	(0.057)	(0.057)	(0.050)	(0.050)
IATA, fake parent	0.066*	0.065*	0.079**	0.079**
	(0.035)	(0.035)	(0.034)	(0.034)
Sales per worker, fake affiliate	0.041***	0.042***	0.038***	0.038***
	(0.008)	(0.008)	(0.007)	(0.007)
Gearing, fake affiliate	-0.009***	-0.009***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
Age, fake affiliate	0.004	0.004	0.026	0.027
	(0.017)	(0.017)	(0.018)	(0.018)
GDP growth, fake affiliate	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
GDP, fake affiliate	-0.023	-0.023	-0.013	-0.014
	(0.052)	(0.052)	(0.047)	(0.047)
Control of corruption, fake affiliate	-0.008	-0.008	-0.002	-0.002
	(0.015)	(0.015)	(0.013)	(0.013)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Cluster parent	Yes	Yes	Yes	Yes
Weighting		Yes		Yes
No. observation	7943	7943	7927	7927
Adjusted R-squared	0.675	0.676	0.674	0.675

Notes: This table includes the results of the falsification test without or with the matching on affiliate return on sales. Dependent variable: fake affiliate ROS. IATA is the ratio of intangible assets divided by total assets. Robust standard errors are in parentheses. Year differences and fake affiliate fixed effects are included. Columns 2 to 4 include a weighting that is inversely proportional to the propensity score distance between true and fake affiliates. *: p< 0.10; **: p<0.05; ***: p<0.01.

4.4.3 The moderating effect of affiliate roles

Table 4.11 presents the empirical results with consideration of siblings' strategic roles. Columns one and two compare the impact of siblings' intangible assets on affiliate performance with regard to whether they are in related industries (column one) or unrelated industries (column two). I find that the coefficient of related sibling IATA is significantly positive (0.074 in column one), suggesting that every ten percentage-point increase in related sibling intangible intensity will improve affiliate performance by 0.0074, which is a big improvement on affiliate performance compared to the average of 0.05 profitability. Unrelated sibling IATA in column two is insignificant, suggesting that there is virtually no lateral knowledge transfer effect from unrelated siblings' knowledge. When including both related and unrelated siblings' IATA together in column three, the results are largely unchanged. Hypothesis two is therefore supported.

The next set of results shown in columns 4-6 relate to Hypothesis 3. As expected, I find that the impacts of siblings' intangible assets on affiliate performance are positive when siblings are either horizontally-related or vertically-related, and that the coefficients are at the significance level of at least 5%. In terms of the size of the effects, I find the former (horizontal siblings) is much greater (0.055 vs. 0.037), suggesting that horizontal siblings' intangible assets have a higher impact on affiliate performance, compared to the impact of vertical siblings' intangible assets. I again put the two sibling types (horizontal and vertical) together in column six, and the results are largely unchanged, which supports hypothesis three. These results are echoed in a recent study by Andersson, Buckley & Dellestrand (2015) who found that a high level of similarity between the receiving and sending affiliates can augment the effectiveness of the lateral knowledge transfer.

Table 4.11: Affiliate performance and sibling IATA – Affiliate roles (a)

	(1) Related	(2) Unrelated	(3) Related vs. Unrelated	(4) Horizontal	(5) Vertical	(6) Horizonal vs. Vertical
IATA, related siblings	**0.074*** **		**0.075*** **			
	(0.021)		**(0.021)**			
IATA, unrelated siblings		**0.012**	**0.013**			
		(0.010)	**(0.011)**			
IATA, horizontal siblings				**0.055*** **		**0.055*** **
				(0.021)		**(0.021)**
IATA, vertical siblings					**0.037** **	**0.037** **
					(0.018)	**(0.018)**
IATA, affiliate	0.124***	0.126***	0.124***	0.125***	0.126***	0.125***
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
IATA, parent	0.096***	0.096***	0.095***	0.097***	0.096***	0.096***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Sales per worker, affiliate	0.046***	0.046***	0.046***	0.046***	0.046***	0.046***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Gearing, affiliate	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age, affiliate	0.023**	0.023**	0.023**	0.023**	0.023**	0.023**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
GDP growth, affiliate	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP, affiliate	-0.006	-0.006	-0.007	-0.006	-0.006	-0.006
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Control of corruption, affiliate	-0.014*	-0.013*	-0.013*	-0.014*	-0.013*	-0.014*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster parent	Yes	Yes	Yes	Yes	Yes	Yes
No. observation	26775	26775	26775	26775	26775	26775
F statistics	19.352	19.415	18.591	19.212	19.148	18.171
Adjusted R-squared	0.683	0.682	0.683	0.682	0.682	0.683

Notes: Dependent variable: affiliate ROS. Robust standard errors are in parentheses. IATA is the ratio of intangible assets divided by total assets. *: p< 0.10; **: p<0.05; ***: p<0.01.

I now turn to compare the impacts of siblings' intangible assets on affiliate performance when the siblings are upstream of the affiliates rather than downstream of the affiliates, and report the results in Table 4.12. The coefficient of upstream siblings' intangible asset ratio in column one is positive at 0.032 and statistically significant, meaning that upstream siblings' knowledge has a positive influence on affiliate performance. However, column two does not show a lateral knowledge transfer effect from downstream siblings. The competences of downstream activities, such as selling, are more likely to be location-bound and less deployable across geographical scopes (Porter, 1986; Rugman, Verbeke & Yuan, 2011). When I put the two sibling types together in column three, the results remain the same and therefore Hypothesis 4 is verified. In column four, I put all three related siblings (horizontal, upstream and downstream) together, and again find that horizontal siblings' intangible assets have a much greater impact on affiliate performance, than upstream or downstream siblings.

Table 4.12: Affiliate performance and sibling IATA – Affiliate roles (b)

	(1) Upstream	(2) Downstream	(3) Upstream vs. Downstream	(4) Value chain
IATA, upstream siblings	**0.032***		**0.032***	**0.032***
	(0.018)		**(0.018)**	**(0.018)**
IATA, downstream siblings		**0.006**	**0.006**	**0.006**
		(0.016)	**(0.016)**	**(0.016)**
IATA, horizontal siblings				**0.054*****
				(0.021)
IATA, affiliate	0.126***	0.126***	0.126***	0.125***
	(0.034)	(0.034)	(0.034)	(0.034)
IATA, parent	0.096***	0.097***	0.096***	0.096***
	(0.019)	(0.019)	(0.019)	(0.019)
Sales per worker, affiliate	0.046***	0.046***	0.046***	0.046***
	(0.005)	(0.005)	(0.005)	(0.005)
Gearing, affiliate	-0.011***	-0.011***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.001)
Age, affiliate	0.023**	0.023**	0.023**	0.023**
	(0.010)	(0.010)	(0.010)	(0.010)
GDP growth, affiliate	0.001*	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
GDP, affiliate	-0.006	-0.005	-0.006	-0.006
	(0.019)	(0.019)	(0.019)	(0.019)
Control of corruption, affiliate	-0.013*	-0.014*	-0.013*	-0.013*
	(0.008)	(0.008)	(0.008)	(0.008)
Firm Fixed Effect	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Cluster parent	Yes	Yes	Yes	Yes
No. observation	26775	26775	26775	26775
F statistics	19.321	19.264	18.384	17.462
Adjusted R-squared	0.682	0.682	0.682	0.683

Notes: Dependent variable: affiliate ROS. Robust standard errors are in parentheses. IATA is the ratio of intangible assets divided by total assets. *: p< 0.10; **: p<0.05; ***: p<0.01.

In addition, I also re-ran the analysis by using the aggregate intangible assets of the siblings, and report results in Tables 4.13 and 4.14. The estimates of control variables are largely unchanged in terms of their coefficients and significance levels. I find that the aggregate intangible assets of the siblings positively influence the affiliate's performance,

and the performance effects of intangible assets from the affiliate's related siblings are much significant compared to those from unrelated siblings, as shown in Table 4.13. As presented in Table 4.14, I again find that the positive impact of siblings' intangible assets on affiliate performance is greater when the affiliate and its siblings are horizontally-related compared to when they are vertically-related, and the impact is greater when the siblings are upstream of the affiliates compared to when they are downstream of the affiliates. This set of additional tests assures the robustness of the findings.

Table 4.13: Affiliate performance and sibling intangible assets (a)

	(1) All	(2) Related	(3) Unrelated	(4) Related vs. Unrelated
Intangible, siblings	0.0009**			
	(0.0004)			
Intangible, related siblings		0.0010***		0.0010***
		(0.0004)		(0.0004)
Intangible, unrelated siblings			0.0001	0.0000
			(0.0002)	(0.0002)
IATA, affiliate	0.1257***	0.1266***	0.1256***	0.1266***
	(0.0337)	(0.0336)	(0.0336)	(0.0336)
IATA, parent	0.0950***	0.0949***	0.0967***	0.0948***
	(0.0188)	(0.0188)	(0.0188)	(0.0188)
Sales per worker, affiliate	0.0456***	0.0455***	0.0456***	0.0455***
	(0.0046)	(0.0046)	(0.0046)	(0.0046)
Gearing, affiliate	-0.0113***	-0.0113***	-0.0113***	-0.0113***
	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Age, affiliate	0.0229**	0.0229**	0.0229**	0.0229**
	(0.0098)	(0.0098)	(0.0098)	(0.0097)
GDP growth, affiliate	0.0009*	0.0009*	0.0009*	0.0009*
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
GDP, affiliate	-0.0060	-0.0056	-0.0055	-0.0056
	(0.0192)	(0.0191)	(0.0192)	(0.0192)
Control of corruption, affiliate	-0.0134*	-0.0137*	-0.0135*	-0.0137*
	(0.0080)	(0.0080)	(0.0080)	(0.0080)
No. observation	26775	26775	26775	26775
F statistics	19.1251	19.0555	19.1217	17.9976
Adjusted R-squared	0.6824	0.6826	0.6822	0.6825

Notes: Dependent variable: affiliate ROS. Robust standard errors are in parentheses. IATA is the ratio of intangible assets divided by total assets. *: p< 0.10; **: p<0.05; ***: p<0.01.

Table 4.14: Affiliate performance and sibling intangible assets (b)

	(1) Horizonal	(2) Vertical	(3) Horizonal vs. Vertical	(4) Upstream	(5) Downstream	(6) Upstream vs. Downstream
Intangible, horizontal siblings	0.0012***		0.0011***			
	(0.0002)		(0.0002)			
Intangible, vertical siblings		0.0005**	0.0004*			
		(0.0002)	(0.0002)			
Intangible, upstream siblings				0.0006***		0.0006***
				(0.0002)		(0.0002)
Intangible, downstream siblings					0.0002	0.0001
					(0.0002)	(0.0002)
IATA, affiliate	0.1251***	0.1269***	0.1262***	0.1256***	0.1261***	0.1259***
	(0.0334)	(0.0336)	(0.0333)	(0.0336)	(0.0336)	(0.0336)
IATA, parent	0.0948***	0.0950***	0.0933***	0.0950***	0.0956***	0.0943***
	(0.0187)	(0.0188)	(0.0187)	(0.0189)	(0.0188)	(0.0189)
Sales per worker, affiliate	0.0455***	0.0456***	0.0454***	0.0456***	0.0456***	0.0456***
	(0.0046)	(0.0046)	(0.0046)	(0.0046)	(0.0046)	(0.0046)
Gearing, affiliate	-0.0112***	-0.0113***	-0.0112***	-0.0113***	-0.0113***	-0.0113***
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Age, affiliate	0.0227**	0.0231**	0.0229**	0.0231**	0.0229**	0.0231**
	(0.0097)	(0.0098)	(0.0097)	(0.0098)	(0.0098)	(0.0097)
GDP growth, affiliate	0.0009*	0.0009*	0.0009*	0.0009*	0.0009*	0.0009*
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
GDP, affiliate	-0.0054	-0.0057	-0.0056	-0.0058	-0.0054	-0.0057
	(0.0191)	(0.0192)	(0.0191)	(0.0192)	(0.0191)	(0.0192)
Control of corruption, affiliate	-0.0134*	-0.0137*	-0.0136*	-0.0135*	-0.0136*	-0.0136*
	(0.0080)	(0.0080)	(0.0080)	(0.0080)	(0.0080)	(0.0080)
No. observation	26775	26775	26775	26775	26775	26775
F statistics	20.2938	19.1011	19.2735	19.4555	19.1401	18.4889
Adjusted R-squared	0.6832	0.6824	0.6833	0.6826	0.6823	0.6826

Notes: Dependent variable: affiliate ROS. Robust standard errors are in parentheses. IATA is the ratio of intangible assets divided by total assets. *: p< 0.10; **: p<0.05; ***: p<0.01.

4.4.4 Additional analysis

Inspired by the discussions in the home-regional strategy literature (Rugman & Verbeke, 2001; Verbeke & Asmussen, 2016; Mudambi & Puck, 2016; Mohr, Batsakis & Stone, 2018), I included an additional analysis to examine whether an affiliate is more likely to

benefit from the know-how of its sibling affiliates when they are in the same, rather than, different regions.

The regional effect of intra-firm knowledge transfer is an important topic in regionalisation and knowledge transfer literature. On the one hand, with a focus on the success of the market performance of MNEs, Rugman & Verbeke (2004) advocate regional strategy as MNEs are likely to face an increase in the liability of foreignness and newness (Zaheer & Mosakowski, 1997; Mohr et al., 2014), as well as coordination costs (Lu & Beamish, 2004), and financial exposure risks (Kostova & Zaheer, 1999) when they operate outside of the home region, thereby reducing the return from international diversifications. The positive regional effect is also substantiated in Oh & Contractor (2014) who extend the literature on the horizontal 'S-curve' of performance benefits of geographical diversifications, finding that the negative effect at the first stage of the horizontal S-curve is less pronounced when a firm operates within the home region. An overview of regional insights by Verkebe & Asmussen (2016) emphasizes the necessity of regional analysis in MNE research. On the other hand, in the growing literature on the regional-home strategy, one stream of research discusses, *inter alia*, knowledge sourcing in the global setting (Cantwell, 1995). Mudambi & Puck (2016), for example, as a counter paper to Verbeke & Asmussen (2016), argue that the full pattern of MNE overseas operations cannot be fully captured in the regional strategy of MNE, with the growing witness of the globally, externally sourced knowledge of large MNEs.

I suggest that the regional effect of lateral knowledge transfer is great, and the reasons are twofold. First, compared to countries in the same region, those in different regions have a low level of geographical and cultural proximity. Geographical distance between two

countries reduces the extent of international trade (Disdier & Head, 2008), even for the trade in digital goods purchased from the internet where there are no trading costs (Blum & Goldfarb, 2006). Knowledge accumulated within a given region would benefit firms that are located in the region, either through direct transfer or knowledge spillover. Driffield, Love & Yang (2014), for example, corroborate that reverse knowledge spillover from domestic firms to foreign affiliates occurs principally when the foreign affiliates are located in the same region as their MNE parent company. An affiliate is therefore likely to be more cautious or reluctant when transferring knowledge to its sibling affiliates in a more distant location because they are less proximate. Second, knowledge is often path-dependent and tacit, and therefore when transferring it from an affiliate to its sibling, effective coordination channels or mechanisms between the receiving and sending affiliates are often required, for example through the adoption of liaison mechanisms (Ciabuschi, Dellestrand & Kappen, 2011) or the frequent communications (Crespo, Griffith & Lages, 2014). The difficulty of building an effective coordination mechanism between affiliates is heightened when they are located in different regions which leads to a high level of coordination costs. Taking all these together, I expect that the positive impact of siblings' intangible assets on affiliate performance is greater when the affiliate and its siblings are located in the same region compared to when they are located in different regions.

I report the results about the regional effect of lateral knowledge transfer in Table 4.15. It shows that the benefit of lateral knowledge transfer is greater when both affiliate and its sibling are in the same continent (0.049) in column one, rather than in different continents (0.016) in column two, and the latter is not at the significant level. The results are largely unchanged when I include them both in column three. Despite the network of

globally dispersed affiliates, the results substantiate the importance of the regional effect of knowledge transfer, in that the benefit of lateral knowledge transfer occurs mostly when affiliates are located in the same region. These results contribute to the literature on regional strategy and its benefits (Rugman & Verbeke, 2004; Mohr et al., 2014; Verbeke & Asmussen, 2016).

Table 4.15: Affiliate performance and sibling IATA - Regional effect

	(1) Same Continent	(2) Different Continents	(3) All
IATA, siblings			
IATA, siblings (Same continent)	**0.049****		**0.049****
	(0.024)		**(0.024)**
IATA, siblings (Different continent)		**0.016**	**0.016**
		(0.017)	**(0.018)**
IATA, affiliate	0.125***	0.125***	0.124***
	(0.034)	(0.034)	(0.034)
IATA, parent	0.096***	0.097***	0.096***
	(0.019)	(0.019)	(0.019)
Sales per worker, affiliate	0.046***	0.046***	0.046***
	(0.005)	(0.005)	(0.005)
Gearing, affiliate	-0.011***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)
Age, affiliate	0.023**	0.023**	0.023**
	(0.010)	(0.010)	(0.010)
GDP growth, affiliate	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)
GDP, affiliate	-0.006	-0.006	-0.007
	(0.019)	(0.019)	(0.019)
Control of corruption, affiliate	-0.013*	-0.013*	-0.013*
	(0.008)	(0.008)	(0.008)
Firm fixed effect	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
Cluster parent	Yes	Yes	Yes
No. observation	26775	26775	26775
F statistics	19.336	19.110	18.251
Adjusted R-squared	0.682	0.682	0.682

Notes: Dependent variable: return on sales of the affiliates. IATA is the ratio of intangible assets divided by total assets. Robust standard errors are in parentheses. Columns 1 and 2 base on siblings' location in the same or different continent. Column 3 shows robust results.
*: p< 0.10; **: p<0.05; ***: p<0.01.

4.5 Conclusions

Traditional MNE theories in the international business and global strategy fields emphasize knowledge flows from home country to host country, in particular when there are high transaction costs in imperfect host markets, and this internalisation effect leads to better MNE performance (Buckley & Casson, 1976; Lu & Beamish, 2004). An important stream of growing MNE knowledge management literature underscores the reverse knowledge transfer from cross-border affiliates to their MNE parent company (Ambos, Ambos & Schlegelmilch, 2006; Gupta & Govindarajan, 1994; Mudambi & Navarra, 2004; Nair et al., 2017). However, limited attention has been paid to knowledge flows between the affiliates within the MNEs (Yamin, Tsai & Holm, 2011; Andersson, Buckley & Dellestrand, 2015). In this chapter, I have tested the impact of siblings' intangible assets on affiliate performance, and explored how the strategic relationships between them moderate the lateral knowledge transfer effect.

To the best of my understanding, this is the first paper to examine the impact of siblings' intangible assets on affiliate performance, and my analysis builds on 2,739 parent companies from 57 home countries and 8,255 of their overseas affiliates in 68 host countries. I group sibling affiliates' roles into horizontal, upstream, downstream and unrelated categories according to the strategic relationship between an affiliate and its siblings. The results show that the effect of lateral knowledge transfer is greater when knowledge comes from related, rather than unrelated, siblings. The impact of siblings' intangible assets is stronger when the affiliate and its siblings are horizontally-related rather than vertically-related, and also stronger when the siblings are upstream of the affiliates rather than downstream of the affiliates. Despite a large database covering thousands of foreign affiliates in different countries, there are a few countries with very

few samples of affiliates due to the unavailability of the required information for the analysis. However, this does not influence the majority of the countries covered in the analysis. I measured affiliate knowledge using intangible assets IAS 38 which is available in firms' accounting and financial accounts (Denicolai, Zucchella & Strange, 2014). Some knowledge is declarative which can be codified and is less tacit, as compared to procedural knowledge which builds upon operational routine and experience (Kogut & Zander, 1992; Rabbiosi, 2011). In the future, research could compare the different types of knowledge transferred within the MNE, as well as its impact on performance when the relevant secondary data become available for use.

Chapter 5

Conclusions

Since the 1970s, there has been a large and burgeoning IB literature addressing why, where and when MNEs establish their foreign affiliates (Buckley & Casson, 1976; Rugman, 1982; Tallman & Li, 1996; Dunning & Lundan, 2008; Majocchi & Strange, 2012; Berry, 2017), while there has been relatively limited but growing emphasis on the strategic roles of foreign affiliates (Rugman, Verbeke & Yuan, 2011; Verbeke & Asmussen, 2016). This thesis has focused on how the strategic role of an affiliate influences its survival in the foreign market and intra-MNE knowledge transfer. This chapter summarizes the main findings of this thesis, highlights its contributions to the existing IB literature, elaborates some possible limitations, and suggests some directions for future research agendas.

5.1 Summary of the main findings

In Chapter two, I examined the extent to which the strategic roles of affiliates influence their survival in foreign markets when they encounter financial adversity. Consistent with the existing literature, I found evidence that the likelihood of divesting foreign affiliates increases when they or their parents have declining performance. Each foreign affiliate has its strategic roles assigned by its parent company, and because of these different roles, there exist enormous differences in affiliates' tasks, as well as in the relatedness between the parent company and affiliate. Building upon the insights of recent IB literature on affiliate role types, I have categorized affiliate roles into horizontal, upstream GVC-integrated, downstream GVC-integrated and unrelated types. This chapter found that the likelihood of divesting an affiliate with declining performance becomes much lower for horizontal affiliates which have a great extent of shared resources and capabilities with the parent company. Downstream GVC-integrated affiliates are engaged in seeking new market opportunities and accessing local market information, so the likelihood of

divesting these affiliates is high when their performance declines, compared to an upstream GVC-integrated affiliate. In addition, I found that unrelated affiliates are more likely to be divested when parent companies' performance declines.

In Chapter three, I investigated the impact of affiliate intangible assets on parent company profitability and explored how affiliate roles moderate the reverse knowledge transfer effect. It has been proposed that intangible assets are paramount sources of proprietary know-how and superior technological advancement, and therefore in this chapter I measured the knowledge to be internally transferred using intangible assets. As expected, I found a positive and significant impact of affiliate intangible assets upon parent company performance, which corroborates the effect of reverse knowledge transfer. I also found that the extent of relatedness between the affiliate and MNE parent enhances the reverse knowledge transfer effect, with the effect stronger from related rather than unrelated affiliates, and stronger from horizontal rather than vertically integrated affiliates. In addition, compared to the local market know-how accumulated by downstream GVC-integrated affiliates, the knowledge of upstream GVC-integrated affiliates has a much bigger impact on the parent company.

In Chapter four, I explored lateral knowledge flow, i.e., knowledge transferred between an affiliate and its sibling affiliates, and evaluated how the relationships between the affiliates affect lateral knowledge transfer. Consistent with expectations, I found a positive and significant impact of siblings' intangible assets on affiliate performance, providing the evidence for the lateral knowledge transfer effect. I also found that this lateral knowledge transfer effect occurs principally when the affiliate and its siblings are located in the same region, and that the effect is significantly moderated by the strategic

relationship between the affiliates. Specifically, I found that the lateral knowledge transfer effect is greater when the affiliate and its siblings are in related industries, compared to when they are in unrelated industries, and that the effect is greater when they are horizontally-related rather than vertically-related. In addition, I also found a greater lateral knowledge transfer effect when the siblings are upstream of the affiliates rather than downstream of the affiliates.

5.2 Contributions

I believe this PhD thesis makes a number of salient contributions to the existing literature on affiliate divestment and intra-MNE knowledge flows, and the main contributions are outlined below.

First, we suggest that the role of foreign affiliates within the MNE global value chains should be incorporated into the theories of divestment, which can advance the understanding about whether and why to divest an affiliate with declining performance. In line with the behavioral theory of the firm, the thesis shows that foreign affiliates with declining performance are likely to propel their parent companies to engage in the problemistic search and to consider the divestment as a possible solution to deal with the problem. The likelihood of divesting affiliates with declining performance however varies by different types of affiliates. The affiliate's financial performance, despite an important determinant of divestment decision, needs to be carefully interpreted with the consideration of its strategic roles within the MNE value chains.

Second, in a similar vein, we propose that the role of affiliates within the MNE value chain should be incorporated into the theories of intra-firm knowledge transfer. From the

resource-based theory perspective, foreign affiliates can be the reservoir of intangible assets as the paramount sources of resources. The accumulated knowledge at the foreign affiliate is often tacit and difficult to imitate (Dierickx & Cool, 1989), which can be internally transferred to the parent company or to their sibling affiliates, yielding superior performance. Interestingly, I suggest that the impact of affiliate intangible assets on the performance of MNE varies across different affiliate roles. This is based on the notion that the type of intangible assets accumulated at the affiliate is influenced by the affiliate roles within the MNE value chain, leading to different reverse knowledge transfer effects.

Third, in the thesis I empirically examine how affiliates with different roles have different outcomes. Affiliate roles have been addressed in several studies (Rugman, Verbeke & Yuan, 2011; Verbeke, Kano & Yuan, 2016). For instance, Harrigan (1985) explored how affiliate role types affect barriers to exiting the market. Affiliate roles also influence lateral linkages between the affiliate and its corporate affiliates and performance outcomes (Birkinshaw & Morrison, 1995), entry mode and subsequent performance outcomes (Anand & Delios, 1997), and intra-firm knowledge transfer (Ambos, Ambos & Schlegelmilch, 2006). In this thesis, I categorized overseas affiliates according to their strategic roles to one of four types: (1) horizontal; (2) upstream GVC-integrated; (3) downstream GVC-integrated; and (4) unrelated. I found solid evidence showing that the strategic role of foreign affiliates matters. Specifically, it matters for affiliates' survival in the foreign market, and matters for knowledge transfer within the MNE, either between the parent company and its affiliates or between an affiliate and its sibling affiliates.

Fourth, despite scholarly interest in the extent of relatedness between an affiliate likely to be divested and the MNE parent company (Berry, 2013; Damaraju, Barney & Makhija,

2015), the measurements of relatedness, as shown in survey Table 2.1, largely focus on the extent of shared resources and capabilities between the parent and its affiliate, with very limited attention to the interdependence between them, which I regard as an important oversight. Some affiliates may have a high degree of interdependence with their parent companies, in the sense that some affiliates are specifically concerned with the inputs of parent companies, while some affiliates would be more concerned with the outputs of parent companies. I contribute to the affiliate divestment literature by specifically considering the strategic roles of affiliates. Interestingly, the thesis shows that the likelihood of divesting an upstream GVC-integrated affiliate is lower than that of a downstream GVC-integrated affiliate.

Fifth, as shown in survey Table 3.1, there is growing emphasis not merely on discerning knowledge flows from an affiliate to its parent company, but more importantly on the performance benefits from assimilating and utilising this knowledge, leading to commercial use and economic returns (Ambos, Ambos & Schlegelmilch, 2006; Minbaeva et al., 2003, 2014). I contribute to this literature by examining the impact of affiliates' intangible assets on parent company financial performance.

Sixth, the thesis provides important insight into lateral knowledge flows between an affiliate and its sibling affiliates. Despite a large literature on conventional and reverse knowledge transfer within MNEs, there is a very limited number of empirical studies specifically examining the knowledge flows between affiliates, as shown in survey Table 4.1 which lists the studies on this topic (Ciabuschi, Dellestrand & Kappen, 2011; Yamin, Tsai & Holm, 2011, Crespo, Griffith & Lages, 2014; Tseng, 2015; Andersson, Buckley & Dellestrand, 2015, among others). I contribute to this growing literature by specifically

addressing the performance benefits of lateral knowledge transfer. In addition, I also highlight the need to consider the strategic relationship between affiliates which determines the effectiveness of lateral knowledge transfer.

Seventh, I contribute to the literature on the regional strategy of knowledge transfer. Global or regional strategy has been one of the core topics in IB research (Rugman & Verbeke, 2004; Mohr et al., 2014; 2018; Oh & Contractor, 2014; Verbeke & Asmussen, 2016; Mudambi & Puck, 2016). Although MNEs source knowledge worldwide, I found that a positive performance benefit from lateral knowledge transfer between an affiliate and its sibling affiliate occurs primarily when they are located in the same region. Different regions often display a large extent of heterogeneity in terms of institutions, cultures, economic growth and customer preferences (Rugman & Verbeke, 2004; Berry, Guillén & Zhou, 2010), and therefore the benefit of knowledge from a different region is diminished. Conversely, regional strategy is important in that knowledge stemming from the same region is easier for an affiliate to assimilate and utilise, which leads to a greater lateral knowledge transfer effect.

Finally, I believe that the thesis makes significant empirical contributions to the existing literature. As shown in Tables 2.2, 2.3, 3.1 and 4.1, much of the evidence is mainly based on a few hundred companies from a small set of countries (including the US, the UK, some other developed countries and a small number of developing countries), and the relevant data and information were surveyed prior to the 2010s. This thesis contributes to the related literature by analysing foreign affiliates worldwide and finding robust evidence from a global view. The findings are based on much larger data samples from a wider set of countries based on more recent data up to 2016. The analyses include 449

parent companies and 7,254 foreign affiliates in 79 host countries in Chapter two on affiliate divestment; include 5,023 parent companies and 15,784 foreign affiliates in 74 host countries in Chapter three on reverse knowledge transfer; and include 2,739 parent companies and 8,255 foreign affiliates in 68 countries in Chapter four on lateral knowledge transfer. Large samples from different countries increase the extent of heterogeneity, but I still found consistent and expected findings as predicted by the literature. My chosen methodology in each chapter follows the most common, detailed estimators adopted in the literature, and the results are largely consistent, even in the most detailed methodological specifications, which ensures the reliability of the findings. I also used a falsification exercise as a robustness test to control for a possible common shock, e.g., a rise in technology, that can simultaneously affect affiliate competences and the performance of affiliates or of the parent company. The results remain consistent, showing that the interpretation of the knowledge transfer effects are valid.

5.3 Managerial and policy implications

This thesis offers a few insights for managers and policy makers, which I outline below. First, for the managers of foreign affiliates, this thesis reinforces the notion that maintaining financial performance at the aspiration level is good for foreign affiliates for continuing their operations in foreign markets. Managers who are in charge of global businesses should regularly review and monitor the affiliate's performance, but these managers should not pursuit a divestment action without considering the strategic roles of the affiliates or the mandates of the affiliates among the MNE network. Affiliate financial performance, despite an important determinant of divestment, should be carefully interpreted with the consideration of the affiliate's role.

This thesis provides important suggestions for the MNE's managers to respond strategically when the performance of their foreign affiliates declines. The likelihood of divestment is not the same across different types of affiliates. For foreign affiliates primarily engaging in selling and marketing activities, they are more likely to be divested when their performance decline, as compared to upstream and horizontal affiliates. In terms of those unrelated affiliates, managers should be aware of that the probability of divesting unrelated affiliates mainly depends upon the performance of parent company, rather than on the affiliate's profitability. Foreign affiliates could engage more in research and development activities to augment their own competence creation and bargaining power (Mudambi & Navarra, 2004; Bouquet & Birkinshaw, 2008).

Divestment is an important strategic decision made by the firm, and it requires thoughtful evaluation, planning and implementation. Given that the divestment often involves an intricate process, if managers have an advanced level of understanding about the affiliate's strategic role and its impact, they are likely to have more appropriate decisions and management techniques when the affiliate is underperforming.

Second, the findings of this thesis highlight that intangible assets are a crucial source of knowledge for sustaining MNEs' superior performance, and the management of these knowledge is therefore strategically important for the MNEs. The managers of multinational enterprises need to understand that knowledge does not only originate at the MNE parent company, but also at their foreign affiliates. The findings of this thesis reinforce the notion that foreign affiliates can develop competences and generate knowledge in the foreign market. Benefiting from intra-firm knowledge transfer is a very challenging phenomenon for MNEs, which requires a deliberate effort to promote

knowledge transfer and sharing within the MNE. How to effectively transfer knowledge within the firm and augment its subsequent performance benefits should be a part of cross-border knowledge creation programme.

On the one hand, MNEs should enhance the technological capabilities and know-how of foreign affiliates, thereby leading to a higher performance benefit of intra-firm knowledge transfer. On the other hand, the receiver of knowledge should seek to improve the absorptive capacity. It is imperative for corporate top managers to set up the mechanisms for sharing the knowledge of multinationals and integrate these mechanisms into corporate management. They should be aware that the MNE parent company can utilize the knowledge not only from the parent itself but also from outside the home country (Kogut & Zander, 1992, 1993).

Parent corporate managers should also know from which affiliates they can expect a high level of knowledge transfer. Intra-firm knowledge transfer also involves a complicated process so that competent managers with an advanced level of knowledge about affiliate's strategic role will be of importance for the effective knowledge transfer.

Third, this thesis also provides some important insights for FDI policies. The findings can be of relevance for host country governments who wish to assess their policy in relation to attracting inward foreign direct investment and wish to foreign affiliates stay longer in the host countries. MNEs who keep their affiliates in host countries with a focus on pre-production stages (i.e. upstream affiliates) are likely to base their divestment decisions different from MNEs who primarily focus on post-production stages (i.e. downstream affiliates). For policy makers who wish to assess the policy relating to how to maximize

the benefit of intra-firm knowledge transfer and foreign direct investment, the results of this thesis provide a crucial insight. The performance benefits from transferring knowledge generated in the foreign market are higher for upstream and horizontal types of FDIs. These results suggest that the policy makers, when targeting government fund in promoting FDI, should consider the strategic roles of affiliates.

5.4 Limitations

Due to the unavailability of data, I have not explored the actual process and administrative adjustments during the divestment and have not explored managers' behavior and techniques when they respond to the divestment. In the future more theoretical and empirical attentions should be devoted to addressing the process of divestments and the role of managers including their techniques, skills during the divestment process. while this thesis provides consistent, solid findings based on quantitative analyses on a large sample, continuing research in the form of case studies can further refine the findings.

In this thesis, I adopt a reduced form approach when examining the performance benefit of intra-firm knowledge transfer. One complementary approach is to look at micro-processes of knowledge transfer. Further work can deepen into the micro-processes particularly looking at the actual processes and discrete incidents of the intra-firm knowledge flows, and address how these facilitate the performance of the recipients of knowledge. These kinds of issues are concerned with how knowledge is generated, where it comes from, how it is transferred, and how it is absorbed by the recipients. The approach to looking at these issues is focusing on the micro-processes of knowledge transfer which involves lateral collaboration. Due to the unavailability of data, I leave this to the future work.

Despite the large database covering thousands of foreign affiliates in different countries, there are a few countries with very few samples of affiliates due to the unavailability of required information for the analysis. However, this does not influence the majority of the countries covered in the analysis. Although the strategic roles of the affiliates in MNE value chains matter, some other relationship-building approaches such as socialisation mechanisms (Gupta & Govindarajan, 2000), liaison mechanisms (Ciabuschi, Dellestrand & Kappen, 2011) and frequent communications (Crespo, Griffith & Lages, 2014) can also affect affiliate survival and intra-MNE knowledge flows. This information is unavailable in the databases, so I leave this for future research when the relevant secondary data become available.

5.5 Future research

The thesis offers a few possible avenues for future research agendas in this line of research. Although regional strategy matters, in that an affiliate benefits more from knowledge stemming from the same region, in countries within the same region there still exists a large extent of heterogeneity in terms of institutional quality, intellectual property protection, culture and economic development, among others (Ghemawat, 2001; Berry, Guillén & Zhou, 2010; Verbeke & Asmussen, 2016). For example, countries in the Asian region are more disparate than those in the North American region. Future research could explore how cross-national differences influence the extent of lateral knowledge transfer, as well as their impact on performance.

The second aspect is the rise of emerging market MNEs which have often acquired strategic assets such as brands and technological know-how as part of their going abroad

strategy in the past two decades (Luo & Tung, 2007). A comparison between developed and developing countries' foreign affiliates in terms of their survival and knowledge sharing could further advance the relevant literature.

Next, much of the existing research including this thesis focuses on manufacturing industries. Service products are different from manufacturing products in terms of their idiosyncratic features such as intangibility and perishability (Contractor, Kundu & Hsu, 2003; Capar & Kotabe, 2003; Lewis & Brown, 2012). Future research could analyze foreign affiliates from service industries, as well as the value they add to the MNE.

I measure affiliate knowledge using intangible assets IAS 38 which is available in the financial accounts of firms (Denicolai, Zucchella & Strange, 2014; Kafouros & Aliyev, 2016b). Some knowledge is declarative, can be codified and is less tacit, compared to procedural knowledge which builds upon operational routine and experience (Kogut & Zander, 1992; Rabbiosi, 2011). In the future, research could compare the different types of knowledge transferred within the MNE, as well as their impact on performance, when the relevant secondary data become available for use.

References

Allison, P. D. (2009). *Fixed effects regression models*. Los Angeles: SAGE publications.

Ambos, T. C., Ambos, B., & Schlegelmilch, B. B. (2006). Learning from foreign subsidiaries: An empirical investigation of headquarters' benefits from reverse knowledge transfers. *International Business Review*, 15(3), 294-312.

Anand, J., & Delios, A. (1997). Location specificity and the transferability of downstream assets to foreign subsidiaries. *Journal of International Business Studies*, 28(3), 579-603.

Andersson, U., Buckley, P. J., & Dellestrand, H. (2015). In the right place at the right time!: the influence of knowledge governance tools on knowledge transfer and utilization in MNEs. *Global Strategy Journal*, 5(1), 27-47.

Ang, J., de Jong, A., & van der Poel, M. (2014). Does familiarity with business segments affect CEOs' divestment decisions?. *Journal of Corporate Finance*, 29(December), 58-74.

Arrighetti, A., Landini, F., & Lasagni, A. (2014). Intangible assets and firm heterogeneity: Evidence from Italy. *Research Policy*, 43(1), 202-213.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, 27(6), 643-650.

Barney, J. B., Ketchen Jr, D. J., & Wright, M. (2011). The future of resource-based theory: revitalization or decline?. *Journal of Management*, 37(5), 1299-1315.

Bartlett, C., & Ghoshal, S. (1986). Tap your subsidiaries for global reach. *Harvard Business Review*, 64(6), 87-94.

Baum, C. F. (2006). *An introduction to modern econometrics using Stata*. Texas: Stata Press.

Belderbos, R., & Zou, J. (2009). Real options and foreign affiliate divestments: A portfolio perspective. *Journal of International Business Studies*, 40(4), 600-620.

Benito, G. R. (1997). Divestment of foreign production operations. *Applied Economics*, 29(10), 1365-1378.

Benito, G. R., & Gripsrud, G. (1992). The expansion of foreign direct investments: discrete rational location choices or a cultural learning process?. *Journal of International Business Studies*, 23(3), 461-476.

Benito, G.R., Grøgaard, B. & Narula, R. (2003). Environmental influences on MNE subsidiary roles: economic integration and the Nordic countries. *Journal of International Business Studies*, 34(5), 443-456.

Bergh, D. D. (1995). Size and relatedness of units sold: An agency theory and resource-based perspective. *Strategic Management Journal*, 16(3), 221-239.

Bergh, D. D. (1997). Predicting divestiture of unrelated acquisitions: An integrative model of ex ante conditions. *Strategic Management Journal*, 18(9), 715-731.

Bergh, D. D. (1998). Product-market uncertainty, portfolio restructuring, and performance: An information-processing and resource-based view. *Journal of Management*, 24(2), 135-155.

Bergh, D. D., & Lawless, M. W. (1998). Portfolio restructuring and limits to hierarchical governance: The effects of environmental uncertainty and diversification strategy. *Organization Science*, 9(1), 87-102.

Berry, H. (2010). Why do firms divest?. *Organization Science*, 21(2), 380-396.

Berry, H. (2013). When do firms divest foreign operations?. *Organization Science*, 24(1), 246-261.

Berry, H. (2017). Managing valuable knowledge in weak IP protection countries. *Journal of International Business Studies*, 48(7), 787-807.

Berry, H., Guillén, M. F., & Zhou, N. (2010). An institutional approach to cross-national distance. *Journal of International Business Studies*, 41(9), 1460-1480.

Bettis, R., Gambardella, A., Helfat, C., & Mitchell, W. (2014). Quantitative empirical analysis in strategic management. *Strategic Management Journal*, 35(7), 949-953.

Birkinshaw, J. (1997). Entrepreneurship in multinational corporations: The characteristics of subsidiary initiatives. *Strategic Management Journal*, 18(3), 207-229.

Birkinshaw, J.M. & Morrison, A.J. (1995). Configurations of strategy and structure in subsidiaries of multinational corporations. *Journal of International Business Studies*, 26(4), 729-753.

Blake, D. J., & Moschieri, C. (2016). Policy risk, strategic decisions and contagion effects: Firm-specific considerations. *Strategic Management Journal*, 38(3), 732-750.

Blum, B. S., & Goldfarb, A. (2006). Does the internet defy the law of gravity?. *Journal of International Economics*, 70(2), 384-405.

Boddewyn, J. J. (1979). Foreign divestment: magnitude and factors. *Journal of International Business Studies*, 10(1), 21-26.

Boddewyn, J. J. (1983). Foreign and domestic divestment and investment decisions: like or unlike?. *Journal of International Business Studies*, 14(3), 23-35.

Bouquet, C., & Birkinshaw, J. (2008). Weight versus voice: How foreign subsidiaries gain attention from corporate headquarters. *Academy of Management Journal*, 51(3), 577-601.

Brauer, M. (2006). What have we acquired and what should we acquire in divestiture research? A review and research agenda. *Journal of Management*, 32(6), 751-785.

Bresman, H., Birkinshaw, J. & Nobel, R. (1999). Knowledge transfer in international acquisitions. *Journal of International Business Studies*, 30(3), 439-462.

Buckley, P. J. & Casson, M. (1976). *The Future of the Multinational Enterprise*. New York: The McMillan Company.

Buckley, P. J., Clegg, J., & Tan, H. (2003). The art of knowledge transfer: Secondary and reverse transfer in China's telecommunications manufacturing industry. *Management and International Review*, 43(2), 67-94.

Buckley, P.J. & Strange, R. (2015). The governance of the global factory: Location and control of world economic activity. *The Academy of Management Perspectives*, 29(2), 237-249.

Cantwell, J. (1995). The globalisation of technology: what remains of the product cycle model?. *Cambridge Journal of Economics*, 19(1), 155-174.

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

Capar, N., & Kotabe, M. (2003). The relationship between international diversification and performance in service firms. *Journal of International Business Studies*, 34(4), 345-355.

Capron, L., Mitchell, W., & Swaminathan, A. (2001). Asset divestiture following horizontal acquisitions: A dynamic view. *Strategic Management Journal*, 22(9), 817-844.

Carneiro, P., & Heckman, J. J. 2002. The evidence on credit constraints in post-secondary schooling. *The Economic Journal,* 112(482), 705–734.

Cavanagh, A., & Freeman, S. (2012). The development of subsidiary roles in the motor vehicle manufacturing industry. *International Business Review*, 21(4), 602-617.

Chang, S. J. (1996). An evolutionary perspective on diversification and corporate restructuring: Entry, exit, and economic performance during 1981-89. *Strategic Management Journal*, 17(8), 587-611.

Chang, S. J., & Singh, H. (1999). The impact of modes of entry and resource fit on modes of exit by multibusiness firms. *Strategic Management Journal*, 20(11), 1019-1035.

Chang, S. J., Chung, J., & Moon, J. J. (2013a). When do foreign subsidiaries outperform local firms?. *Journal of International Business Studies*, 44(8), 853-860.

Chang, S. J., Chung, J., & Moon, J. J. (2013b). When do wholly owned subsidiaries perform better than joint ventures?. *Strategic Management Journal*, 34(3), 317-337.

Chatterjee, S., Harrison, J. S., & Bergh, D. D. (2003). Failed takeover attempts, corporate governance and refocusing. *Strategic Management Journal*, 24(1), 87-96.

Chen, H. L., & Guo, R. J. (2005). On corporate divestiture. *Review of Quantitative Finance and Accounting*, 24(4), 399-421.

Ciabuschi, F., Dellestrand, H., & Kappen, P. (2011). Exploring the effects of vertical and lateral mechanisms in international knowledge transfer projects. *Management International Review*, 51(2), 129-155.

Ciabuschi, F., Kong, L., & Su, C. (2017). Knowledge sourcing from advanced markets subsidiaries: political embeddedness and reverse knowledge transfer barriers in emerging-market multinationals. *Industrial and Corporate Change*, 26(2), 311-332.

Cohen J. (1988). *Statistical power for the behavioral sciences* (2nd edition). Hillsdale NJ: Lawrence Erlbaum.

Cohen, W.M. & Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.

Contractor, F. J. (2007). Is international business good for companies? The evolutionary or multi-stage theory of internationalization vs. the transaction cost perspective. *Management International Review*, 47(3), 453-475.

Contractor, F., Yang, Y., & Gaur, A. S. (2016). Firm-specific intangible assets and subsidiary profitability: The moderating role of distance, ownership strategy and subsidiary experience. *Journal of World Business*, 51(6), 950-964.

Contractor, F.J., Kundu, S.K. & Hsu, C.C., (2003). A three-stage theory of international expansion: The link between multinationality and performance in the service sector. *Journal of International Business Studies*, 34(1), 5-18.

Corredoira, R. A., & Rosenkopf, L. (2010). Should auld acquaintance be forgot? The reverse transfer of knowledge through mobility ties. *Strategic Management Journal*, 31(2), 159-181.

Crespo, C. F., Griffith, D. A., & Lages, L. F. (2014). The performance effects of vertical and horizontal subsidiary knowledge outflows in multinational corporations. *International Business Review*, 23(5), 993-1007.

Cuervo-Cazurra, A. (2006). Who cares about corruption?. *Journal of International Business Studies*, 37(6), 807-822.

Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.

Cyert, R. M., & March, J. G. (1992). *A behavioral theory of the firm*. 2nd edition. Cambridge, Mass., USA: Blackwell Business.

Damaraju, N.L., Barney, J.B. & Makhija, A.K. (2015). Real options in divestment alternatives. *Strategic Management Journal*, 36(5), 728-744.

Delios, A., & Beamish, P. W. (2001). Survival and profitability: The roles of experience and intangible assets in foreign subsidiary performance. *Academy of Management Journal*, 44(5), 1028-1038.

Denicolai, S., Zucchella, A., & Strange, R. (2014). Knowledge assets and firm international performance. *International Business Review*, 23(1), 55-62.

Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35(12), 1504-1511.

Disdier, A. C., & Head, K. (2008). The puzzling persistence of the distance effect on bilateral trade. *The Review of Economics and Statistics*, 90(1), 37-48.

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., Love, J. H., & Yang, Y. (2014). Technology sourcing and reverse productivity spillovers in the multinational enterprise: global or regional phenomenon?. *British Journal of Management*, 25(S1), S24-S41.

Driffield, N., Love, J. H., & Yang, Y. (2016). Reverse international knowledge transfer in the MNE: (Where) does affiliate performance boost parent performance?. *Research Policy*, 45(2), 491-506.

Duhaime, I. M., & Baird, I. S. (1987). Divestment decision-making: The role of business unit size. *Journal of Management*, 13(3), 483-498.

Duhaime, I. M., & Grant, J. H. (1984). Factors influencing divestment decision-making: Evidence from a field study. *Strategic Management Journal*, 5(4), 301-318.

Dundas, K. N., & Richardson, P. R. (1982). Implementing the unrelated product strategy. *Strategic Management Journal*, 3(4), 287-301.

Dunning, J. H. (1980). Towards an eclectic theory of international production: some empirical tests. *Journal of International Business Studies*, 11(1), 9-31.

Dunning, J. H. (1981). *International production and the multinational enterprise*. London: George Allen and Unwin.

Dunning, J. H. (1988). The theory of international production, *International Trade Journal* 3(1), 21-66.

Dunning, J. H., & Lundan, S. M. (2008). *Multinational enterprises and the global economy*. Cheltenham: Edward Elgar Publishing.

Ellis, P. D. (2010). Effect sizes and the interpretation of research results in international business. *Journal of International Business Studies,* 41(9), 1581-1588.

Enright, M. J., & Subramanian, V. (2007). An organizing framework for MNC subsidiary typologies. *Management International Review*, 47(6), 895-924.

Filatotchev, I., & Piesse, J. (2009). R&D, internationalization and growth of newly listed firms: European evidence. *Journal of International Business Studies,* 40(8), 1260-1276.

Frost, T. S. (2001). The geographic sources of foreign subsidiaries' innovations. *Strategic Management Journal*, 22(2), 101-123.

Frost, T. S., & Zhou, C. (2005). R&D co-practice and 'reverse' knowledge integration in multinational firms. *Journal of International Business Studies*, 36(6), 676-687.

Frost, T. S., Birkinshaw, J. M., & Ensign, P. C. (2002). Centers of excellence in multinational corporations. *Strategic Management Journal*, 23(11), 997-1018.

Ghemawat, P. (2001). Distance still matters. *Harvard Business Review,* 79(8), 137-147.

Ghoshal, S., & Bartlett, C. A. (1990). The multinational corporation as an interorganizational network. *Academy of Management Review*, 15(4), 603-626.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), 109-122.

Greene, W. H. (2000). *Econometric analysis* (4th edition). London: Prentice-Hall International UK.

Gupta, A.K. & Govindarajan, V. (1991). Knowledge flows and the structure of control within multinational corporations. *Academy of Management Review*, 16(4), 768-792.

Gupta, A. K., & Govindarajan, V. (1994). Organizing for knowledge flows within MNCs. *International Business Review*, 3(4), 443-457.

Gupta, A.K. & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, 21(4), 473-496.

Gutierrez, R. G. (2002). Parametric frailty and shared frailty survival models. *Stata Journal*, 2(1), 22-44.

Hahn, E. D., & Ang, S. H. (2017). From the editors: New directions in the reporting of statistical results in the Journal of World Business. *Journal of World Business*, 52(2), 125-126.

Håkanson, L., & Nobel, R. (2000). Technology characteristics and reverse technology transfer. *Management International Review*, 40(1), 29-48.

Håkanson, L., & Nobel, R. (2001). Organizational characteristics and reverse technology transfer. *Management International Review*, 41(4), 395-420.

Hamilton, R. T., & Chow, Y. K. (1993). Why managers divest—evidence from New Zealand's largest companies. *Strategic Management Journal*, 14(6), 479-484.

Hanson, G. H., Mataloni Jr, R. J., & Slaughter, M. J. (2005). Vertical production networks in multinational firms. *Review of Economics and Statistics*, 87(4), 664-678.

Harrigan, K. R. (1981). Deterrents to divestiture. *Academy of Management Journal*, 24(2), 306-323.

Harrigan, K. R. (1985). Exit barriers and vertical integration. *Academy of Management Journal*, 28(3), 686-697.

Harris, R., & Moffat, J. (2013). Intangible assets, absorbing knowledge and its impact on firm performance: theory, measurement and policy implications. *Contemporary Social Science*, 8(3), 346-361.

Harzing, A. W., & Feely, A. J. (2008). The language barrier and its implications for HQ-subsidiary relationships. *Cross Cultural Management: An International Journal*, 15(1), 49-61.

Haynes, M., Thompson, S. & Wright, M. (2003). The determinants of corporate divestment: evidence from a panel of UK firms. *Journal of Economic Behavior & Organization*, 52(1), 147-166.

Heckman, J. J., & Li, X. 2004. Selection bias, comparative advantage and heterogeneous returns to education: Evidence from China. *Pacific Economic Review*, 9(3), 155–171.

Hernández, V., & Pedersen, T. (2017). Global value chain configuration: A review and research agenda. *BRQ Business Research Quarterly*, 20(2), 137-150.

Hickson, D. J., Hinings, C. R., Lee, C. A., Schneck, R. E., & Pennings, J. M. (1971). A strategic contingencies' theory of intraorganizational power. *Administrative Science Quarterly*, 16(2), 216-229.

Hill, C. W., & Hoskisson, R. E. (1987). Strategy and structure in the multiproduct firm. *Academy of Management Review*, 12(2), 331-341.

Hitt, M. A., Hoskisson, R. E. & Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms, *The Academy of Management Journal*, 40(4), 767-798.

Holm, U., & Sharma, D. D. (2006). Subsidiary marketing knowledge and strategic development of the multinational corporation. *Journal of International Management*, 12(1), 47-66.

Hoskisson, R. E., & Turk, T. A. (1990). Corporate restructuring: Governance and control limits of the internal capital market. *Academy of Management Review*, 15(3), 459-477.

Hoskisson, R. E., Johnson, R. A., & Moesel, D. D. (1994). Corporate divestiture intensity in restructuring firms: Effects of governance, strategy, and performance. *Academy of Management Journal*, 37(5), 1207-1251.

Hult, G. T. M., Ketchen, D. J., Griffith, D. A., Chabowski, B. R., Hamman, M. K., Dykes, B. J., Pollitte, W. A. & Cavusgil, S. T. (2008). An assessment of the measurement of performance in international business research. *Journal of International Business Studies*, 39(6), 1064-1080.

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38(3), 635-672.

Hymer, S. (1976). *The international operations of national firms: A study of direct foreign investment.* Cambridge, MA: MIT press.

IAS 38 - Intangible Assets. Available at: https://www.iasplus.com/en/standards/ias/ias38

Jarillo, J.C. & Martínez, J.I. (1990). Different roles for subsidiaries: the case of multinational corporations in Spain. *Strategic Management Journal*, 11(7), 501-512.

Jeong, G. Y., Chae, M. S., & Park, B. I. (2017). Reverse knowledge transfer from subsidiaries to multinational companies: Focusing on factors affecting market knowledge transfer. *Canadian Journal of Administrative Sciences*, 34(3), 291-305.

Johnson, R. A., Hoskisson, R. E., & Hitt, M. A. (1993). Board of director involvement in restructuring: The effects of board versus managerial controls and characteristics. *Strategic Management Journal*, 14(S1), 33-50.

Jones, C., Temouri, Y., & Cobham, A. (2018). Tax haven networks and the role of the Big 4 accountancy firms. *Journal of World Business*, 53(2), 177-193.

Kafouros, M., & Aliyev, M. (2016a). Institutional development and firm profitability in transition economies. *Journal of World Business*, 51(3), 369-378.

Kafouros, M., & Aliyev, M. (2016b). Institutions and foreign subsidiary growth in transition economies: The role of intangible assets and capabilities. *Journal of Management Studies*, 53(4), 580-607.

Kedia, B. L., & Mukherjee, D. (2009). Understanding offshoring: A research framework based on disintegration, location and externalization advantages. *Journal of World Business*, 44(3), 250-261.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383-397.

Kogut, B., & Zander, U. (1993). Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies*, 24(4), 625-645.

Kolev, K. D. (2016). To divest or not to divest: A meta-analysis of the antecedents of corporate divestitures. *British Journal of Management*, 27(1), 179-196.

Konara, P., & Shirodkar, V. (2018). Regulatory institutional distance and MNCs' subsidiary performance: climbing up vs. climbing down the institutional ladder. *Journal of International Management*, 24(4), 333-347.

Kor, Y. Y., & Mahoney, J. T. (2005). How dynamics, management, and governance of resource deployments influence firm-level performance. *Strategic Management Journal*, 26(5), 489-496.

Kostova, T. & S. Zaheer (1999). Organizational legitimacy under conditions of complexity: the case of the multinational enterprises. *Academy of Management Review*, 24(1), 64-81.

Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and integration in complex organizations. *Administrative Science Quarterly*, 12(1), 1-47.

Lee, D., & Madhavan, R. (2010). Divestiture and firm performance: A meta-analysis. *Journal of Management*, 36(6), 1345-1371.

Lewis, M. A., & Brown, A. D. (2012). How different is professional service operations management?. *Journal of Operations Management*, 30(1-2), 1-11.

Li, J., & Guisinger, S. (1991). Comparative business failures of foreign-controlled firms in the United States. *Journal of International Business Studies*, 22(2), 209-224.

Lord, M. D., & Ranft, A. L. (2000). Organizational learning about new international markets: Exploring the internal transfer of local market knowledge. *Journal of International Business Studies*, 31(4), 573-589.

Lu, J. W. & Beamish, P. W. (2004). International diversification and firm performance: The S-curve hypothesis, *The Academy of Management Journal*, 47(4), 598-609.

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

Majocchi, A., & Strange, R. (2012). International diversification. *Management International Review*, 52(6), 879-900.

Markides, C. C. (1992a). The economic characteristics of de-diversifying firms. *British Journal of Management*, 3(2), 91-100.

Markides, C. C. (1992b). Consequences of corporate refocusing: Ex ante evidence. *Academy of Management Journal*, 35(2), 398-412.

Markides, C. C. (1995). Diversification, restructuring and economic performance. *Strategic Management Journal*, 16(2), 101-118.

Marrocu, E., Paci, R., & Pontis, M. (2011). Intangible capital and firms' productivity. *Industrial and Corporate Change*, 21(2), 377-402.

Martins, P. S., & Yang, Y. (2015). Globalized labour markets? International rent sharing across 47 countries. *British Journal of Industrial Relations*, 53(4), 664-691.

McGuinness, M., Demirbag, M., & Bandara, S. (2013). Towards a multi-perspective model of reverse knowledge transfer in multinational enterprises: A case study of Coats plc. *European Management Journal*, 31(2), 179-195.

Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational enterprises and local contexts: the opportunities and challenges of multiple embeddedness. *Journal of Management Studies*, 48(2), 235-252.

Meyer, K. E., van Witteloostuijn, A., & Beugelsdijk, S. (2017). What's in a p? Reassessing best practices for conducting and reporting hypothesis-testing research. *Journal of International Business*, 48(5), 535-551.

Minbaeva, D. B., Pedersen, T., Björkman, I., & Fey, C. F. (2014). A retrospective on: MNC knowledge transfer, subsidiary absorptive capacity, and HRM. *Journal of International Business Studies*, 45(1), 52-62.

Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. F., & Park, H. J. (2003). MNC knowledge transfer, subsidiary absorptive capacity and HRM. *Journal of International Business Studies*, 34(6), 586-599.

Mishra, C. S., & Gobeli, D. H. (1998). Managerial incentives, internalization, and market valuation of multinational firms. *Journal of International Business Studies*, 29(3), 583-597.

Mohr, A., & Batsakis, G. (2014). Intangible assets, international experience and the internationalisation speed of retailers. *International Marketing Review*, 31(6), 601-620.

Mohr, A., Batsakis, G., & Stone, Z. (2018). Explaining the effect of rapid internationalization on horizontal foreign divestment in the retail sector: An extended Penrosean perspective. *Journal of International Business Studies*, 49(7), 779-808.

Mohr, A., Fastoso, F., Wang, C. & Shirodkar, V. (2014). Testing the regional performance of MNEs in the retail sector: the moderating effects of timing, speed and experience. *British Journal of Management*, 25 (S1), S100-S115.

Montgomery, C. A., & Thomas, A. R. (1988). Divestment: Motives and gains. *Strategic Management Journal*, 9(1), 93-97.

Morck, R., & Yeung, B. (1991). Why investors value multinationality. *Journal of Business*, 43(2), 165-187.

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

Mudambi, R., & Navarra, P. (2004). Is knowledge power? Knowledge flows, subsidiary power and rent-seeking within MNCs. *Journal of International Business Studies*, 35(5), 385-406.

Mudambi, R., & Puck, J. (2016). A global value chain analysis of the 'regional strategy' perspective. *Journal of Management Studies*, 53(6), 1076-1093.

Mudambi, R., & Swift, T. (2014). Knowing when to leap: Transitioning between exploitative and explorative R&D. *Strategic Management Journal*, 35(1), 126-145.

Mudambi, R., Piscitello, L., & Rabbiosi, L. (2014). Reverse knowledge transfer in MNEs: Subsidiary innovativeness and entry modes. *Long Range Planning*, 47(1-2), 49-63.

Nair, S. R., Demirbag, M., & Mellahi, K. (2015). Reverse knowledge transfer from overseas acquisitions: A survey of Indian MNEs. *Management International Review*, 55(2), 277-301.

Nair, S. R., Demirbag, M., & Mellahi, K. (2016). Reverse knowledge transfer in emerging market multinationals: The Indian context. *International Business Review*, *25*(1), 152-164.

Nair, S. R., Demirbag, M., Mellahi, K., & Pillai, K. G. (2017). Do parent units benefit from reverse knowledge transfer?. *British Journal of Management*, 29(3), 428-444.

Najafi-Tavani, Z., Giroud, A., & Sinkovics, R. R. (2012). Mediating effects in reverse knowledge transfer processes. *Management International Review*, 52(3), 461-488.

Najafi-Tavani, Z., Zaefarian, G., Naudé, P., & Giroud, A. (2015). Reverse knowledge transfer and subsidiary power. *Industrial Marketing Management*, 48(July), 103-110.

Narula, R. (2002). Innovation systems and 'inertia' in R&D location: Norwegian firms and the role of systemic lock-in. *Research Policy*, 31(5), 795-816.

Nohria, N., & Ghoshal, S. (1994). Differentiated fit and shared values: Alternatives for managing headquarters-subsidiary relations. *Strategic Management Journal*, 15(6), 491-502.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge university press.

Oh, C. H., & Contractor, F. (2014). A regional perspective on multinational expansion strategies: Reconsidering the three-stage paradigm. *British Journal of Management*, *25*(S1), 42-59.

Oh, K. S., & Anchor, J. (2017). Factors affecting reverse knowledge transfer from subsidiaries to multinational companies: Focusing on the transference of local market information. *Canadian Journal of Administrative Sciences*, 34(4), 329-342.

Pantzalis, C. (2001). Does location matter? An empirical analysis of geographic scope and MNC market valuation. *Journal of International Business Studies*, 32(1), 133-155.

Park, C., & Vertinsky, I. (2016). Reverse and conventional knowledge transfers in international joint ventures. *Journal of Business Research*, 69(8), 2821-2829.

Peltokorpi, V. (2015). Corporate language proficiency and reverse knowledge transfer in multinational corporations: Interactive effects of communication media richness and commitment to headquarters. *Journal of International Management*, 21(1), 49-62.

Peltokorpi, V., & Yamao, S. (2017). Corporate language proficiency in reverse knowledge transfer: A moderated mediation model of shared vision and communication frequency. *Journal of World Business*, 52(3), 404-416.

Peng, Z., Qin, C., Chen, R. R., Cannice, M. V., & Yang, X. (2017). Towards a framework of reverse knowledge transfer by emerging economy multinationals: Evidence

from Chinese MNE subsidiaries in the United States. *Thunderbird International Business Review*, 59(3), 349-366.

Penrose, E. G (1959). *The theory of the growth of the firm*. New York: Wiley.

Persson, M. (2006). The impact of operational structure, lateral integrative mechanisms and control mechanisms on intra-MNE knowledge transfer. *International Business Review*, 15(5), 547-569.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal*, 14(3), 179-191.

Porter, M. E. (1976). Please note location of nearest exit: Exit barriers and planning. *California Management Review*, 19(2), 21-33.

Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance*. New York: Free Press.

Porter, M. E. (1986). Changing patterns of international competition. *California Management Review*, 28(2), 9-40.

Qian, G, M., Li, L., Li, J. & Qian, Z. M. (2008). Regional diversification and firm performance, *Journal of International Business Studies*, 39(2), 197-214.

Rabbiosi, L. (2011). Subsidiary roles and reverse knowledge transfer: An investigation of the effects of coordination mechanisms. *Journal of International Management*, 17(2), 97-113.

Rabbiosi, L., & Santangelo, G. D. (2013). Parent company benefits from reverse knowledge transfer: The role of the liability of newness in MNEs. *Journal of World Business*, 48(1), 160-170.

Rugman, A. (1982). *New theories of the multinational enterprise*. London: Croom Helm.

Rugman, A. M., & Verbeke, A. (2004). A perspective on regional and global strategies of multinational enterprises. *Journal of International Business Studies*, 35(1), 3-18.

Rugman, A., Verbeke, A. & Yuan, W. (2011). Re-conceptualizing Bartlett and Ghoshal's classification of national subsidiary roles in the multinational enterprise. *Journal of Management Studies*, 48(2), 253-277.

Rugman, A.M. & Verbeke, A. (2001). Subsidiary-specific advantages in multinational enterprises. *Strategic Management Journal*, 22(3), 237-250.

Rumelt, Richard P. (1974). *Strategy, structure and economic performance*. Cambridge MA: Harvard University Press.

Sanchez-Vidal, M. E., Sanz-Valle, R., & Barba-Aragon, M. I. (2018). Repatriates and reverse knowledge transfer in MNCs. *The International Journal of Human Resource Management*, 29(10), 1767-1785.

Sanders, W. G. (2001). Behavioral responses of CEOs to stock ownership and stock option pay. *Academy of Management Journal*, 44(3), 477-492.

Schotter, A., & Bontis, N. (2009). Intra-organizational knowledge exchange: An examination of reverse capability transfer in multinational corporations. *Journal of Intellectual Capital*, 10(1), 149-164.

Schulz, M. (2001). The uncertain relevance of newness: Organizational learning and knowledge flows. *Academy of Management Journal*, 44(4), 661-681.

Shaver, J. M., Mitchell, W., & Yeung, B. (1997). The effect of own-firm and other-firm experience on foreign direct investment survival in the United States, 1987–92. *Strategic Management Journal*, 18(10), 811-824.

Shimizu, K. (2007). Prospect theory, behavioral theory, and the threat-rigidity thesis: Combinative effects on organizational decisions to divest formerly acquired units. *Academy of Management Journal*, 50(6), 1495-1514.

Shimizu, K., & Hitt, M. A. (2005). What constrains or facilitates divestitures of formerly acquired firms? The effects of organizational inertia. *Journal of Management*, 31(1), 50-72.

Shirodkar, V., & Konara, P. (2016). Institutional distance and foreign subsidiary performance in emerging markets: Moderating effects of ownership strategy and host-country experience. *Management International Review*, 57(2), 179-207.

Shirodkar, V., Konara, P., & McGuire, S. (2017). Home-institutional imprinting and lobbying expenditure of foreign firms: moderating effects of experience and technological intensity. *British Journal of Management*, 28(4), 589-608.

Simonin, B. L. (1999). Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal*, 20(7), 595-623.

Song, J., Almeida, P. & Wu, G. (2003). Learning–by–hiring: When is mobility more likely to facilitate interfirm knowledge transfer?. *Management Science*, 49(4), 351-365.

Song, S. (2014). Subsidiary divestment: The role of multinational flexibility. *Management International Review*, 54(1), 47-70.

Soule, S. A., Swaminathan, A., & Tihanyi, L. (2014). The diffusion of foreign divestment from Burma. *Strategic Management Journal*, 35(7), 1032-1052.

STATA (2014). *Extended instrumental variables/2SLS, GMM and AC/HAC, LIML and k-class regression*, STATA.

STATA (2017). *stcox - Cox proportional hazards model*. Available at: http://www.stata.com/manuals13/ststcox.pdf

Stiebale, J. (2011). Do financial constraints matter for foreign market entry? A firm-level examination. *The World Economy*, 34(1), 123-153.

Strange, R., & Humphrey, J. (2018). What lies between market and hierarchy? Insights from internalization theory and global value chain theory. *Journal of International Business Studies*, forthcoming.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17(S2), 27-43.

Szulanski, G., Ringov, D. & Jensen, R.J. (2016). Overcoming stickiness: How the timing of knowledge transfer methods affects transfer difficulty. *Organization Science*, 27(2), 304-322.

Taggart, J. H. (1997a). An evaluation of the integration-responsiveness framework: MNC manufacturing subsidiaries in the UK. *Management International Review*, 37(4), 295-318.

Taggart, J. H. (1997b). Autonomy and procedural justice: a framework for evaluating subsidiary strategy. *Journal of International Business Studies*, 28(1), 51-76.

Taggart, J. (1998). Strategy Shifts in MNC Subsidiaries. *Strategic Management Journal*, 19(7), 663-681.

Tallman, S. & Li, J. (1996). Effects of international diversity and product diversity on the performance of multinational firms. *Academy of Management Journal*, 39(1), 179-196.

Tseng, C. H. (2015). Determinants of MNC's knowledge inflows to subsidiaries: a perspective on internalization advantages. *Management International Review*, 55(1), 119-150.

Verbeke, A., & Asmussen, C. G. (2016). Global, local, or regional? The locus of MNE strategies. *Journal of Management Studies*, 53(6), 1051-1075.

Verbeke, A., Kano, L., & Yuan, W. (2016). 'Inside the regional multinationals: A new value chain perspective on subsidiary capabilities', *International Business Review*, 25(3), 785-793.

Vernon, R. (1966). International investment and international trade in the product cycle. *The Quarterly Journal of Economics*, 80(2), 190-207.

Villalonga, B. (2004). Intangible resources, Tobin's q, and sustainability of performance differences. *Journal of Economic Behavior & Organization*, 54(2), 205-230.

Wan, W. P., Chen, H. S., & Yiu, D. W. (2015). Organizational image, identity, and international divestment: A theoretical examination. *Global Strategy Journal*, 5(3), 205-222.

Wang, C., Hong, J., Kafouros, M., & Wright, M. (2012). Exploring the role of government involvement in outward FDI from emerging economies. *Journal of International Business Studies*, 43(7), 655-676.

Wei, Y., & Liu, X. (2006). Productivity spillovers from R&D, exports and FDI in China's manufacturing sector. *Journal of International Business Studies*, 37(4), 544-557.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.

White, R.E. & Poynter, T.A., (1984). Strategies for foreign-owned subsidiaries in Canada. *Business Quarterly*, 49(2), 59-69.

Whittington, R., Yakis-Douglas, B., & Ahn, K. (2016). Cheap talk? Strategy presentations as a form of chief executive officer impression management. *Strategic Management Journal*, 37(12), 2413-2424.

Williams, C. (2007). Transfer in context: Replication and adaptation in knowledge transfer relationships. *Strategic Management Journal*, 28(9), 867-889.

Williamson, O. E. (1971). The vertical integration of production: market failure considerations. *The American Economic Review*, 61(2), 112-123.

WIR, (2018). *World Investment Report*. Available at: https://unctad.org/en/PublicationsLibrary/wir2018_en.pdf

Woo, C. Y., Willard, G. E., & Daellenbach, U. S. (1992). Spin-off performance: A case of overstated expectations?. *Strategic Management Journal*, 13(6), 433-447.

Wooldridge, J. M. (2016). *Introductory econometrics: A modern approach* (6th edition). Boston USA: Cengage Learning.

Xu, D., Zhou, C., & Phan, P. H. (2010). A real options perspective on sequential acquisitions in China. *Journal of International Business Studies*, 41(1), 166-174.

Yamin, M., & Otto, J. (2004). Patterns of knowledge flows and MNE innovative performance. *Journal of International Management*, 10(2), 239-258.

Yamin, M., Tsai, H. & Holm, U. (2011). The performance effects of headquarters' involvement in lateral innovation transfers in multinational corporations. *Management International Review*, 51(2), 157-177.

Yang, Q., Mudambi, R., & Meyer, K. E. (2008). Conventional and reverse knowledge flows in multinational corporations. *Journal of Management*, 34(5), 882-902.

Zaheer, S., & Mosakowski, E. (1997). The dynamics of the liability of foreignness: A global study of survival in financial services. *Strategic Management Journal*, 18(6), 439-463.

Zhang, Y. A., Li, Y., & Li, H. (2014). FDI spillovers over time in an emerging market: The roles of entry tenure and barriers to imitation. *Academy of Management Journal*, 57(3), 698-722.

Zschoche, M. (2016). Performance effects of divesting foreign production affiliates: A network perspective. *Long Range Planning*, 49(2), 196-206.

Zuckerman, E. W. (2000). Focusing the corporate product: Securities analysts and de-diversification. *Administrative Science Quarterly*, 45(3), 591-619.