Essays on Foreign Investment in
Developing and Emerging Economies

Name: Gordon Sirr

Award: Doctor of Philosophy

Supervisors: Dr. John Garvey
            Prof. Liam A. Gallagher

Submitted to the University of Limerick, September 2015
THIS PAGE IS LEFT BLANK INTENTIONALLY
Abstract

Essays on Foreign Investment in Developing and Emerging Economies

Gordon Sirr

This thesis consists of four individual essays which are framed by an introductory and a concluding chapter. While independent from each other, the essays all focus on the topic of foreign investment in developing and emerging economies. The first essay applies an innovative quantitative finance technique to measure investor perceptions of nationalisation risk in an emerging economy. Investment promotion agencies (IPAs) from developing and emerging economies conduct a range of promotional activities with the aim of attracting foreign direct investment (FDI) and their choice of activity is often based on investor perceptions of their location. However, to assess investor perceptions, they often use qualitative methods that provide only a measurement of risk perceptions at a point-in-time and are limited as to the information they provide about specific companies’ concerns about risk. The novel approach used in this essay provides IPAs with a method to speedily determine the risk perceptions of target companies and conduct the most appropriate promotional activities. The effect of bilateral investment treaties (BITs) on the vertical and horizontal FDI activities of multinational enterprises (MNEs) in developing and emerging countries is investigated in the second essay. BITs are legal instruments used to provide investor protections and, by extension, promote higher levels of inward FDI. While the impact of these treaties on FDI has been studied extensively, little is known about their effects on different forms of investment. BITs are shown to be more positively associated with vertical than horizontal FDI and they also tend to act as stronger substitutes for better institutional conditions in the case of vertical investments. The third essay examines the relationship between FDI from developing and emerging (Southern) countries and economic growth in recipient Southern economies. Theoretical and empirical evidence shows that Southern FDI has a lower technological content than FDI from developed (Northern) countries and, thus, may generate growth differently than Northern FDI. In this essay, Southern FDI is found to contribute to growth in economies with strong law and order, whereas Northern FDI is shown to raise growth in countries with highly skilled labour and strong property rights protection. In the final essay, the extent of foreign exchange risk associated with equity
portfolio investments in emerging countries is examined. While foreign exchange risk is a prominent feature of emerging market investments, there has been no empirical work examining the extent of this risk in an equity portfolio context. Indeed, an important consideration from a portfolio perspective is that the correlation between a portfolio's equity and foreign exchange components can play a role in reducing foreign exchange exposure. Using a Value-at-Risk (VaR) technique that captures this correlation, it is shown that significant variation exists in equity portfolio foreign exchange risk across emerging markets. These essays address a number of important gaps in the existing literature on foreign investment in developing and emerging countries. Specific practical and policy implications can be drawn from the essays which, taken together, support a more positive economic effect from foreign investment in the world’s less-advanced economies.
Declaration

The work in this thesis has not been submitted to any other university or higher education institution, or for any other academic award. Any contribution made by others with whom I have worked, is explicitly acknowledged in the thesis.

Signed: ________________________________

Date: ________________________________
Table of Contents

Abstract ................................................................................................................ i
Declaration ........................................................................................................... iii
Acknowledgements .......................................................................................... viii
List of Tables ...................................................................................................... x
List of Figures .................................................................................................. xiii
List of Abbreviations ........................................................................................ xv

Chapter 1 – Introduction ................................................................................. 1

1. Introduction ........................................................................................... 2
2. Thesis Background ................................................................................ 2
   2.1. Foreign Investment Flows to Developing and Emerging Economies .......... 2
   2.2. FDI and Economic Development ...................................................... 9
   2.3. FPI and Economic Development .................................................... 17
3. Outline of Essays ................................................................................. 20
   3.1. Essay One ................................................................................ 20
   3.2. Essay Two ............................................................................... 23
   3.3. Essay Three ............................................................................. 26
   3.4. Essay Four ............................................................................... 30
References ............................................................................................... 32

Chapter 2 (Essay One) – A Quantitative Approach to Guiding the Promotional Efforts of IPAs in Emerging Markets ......................... 40

Abstract ................................................................................................... 41
1. Introduction ........................................................................................... 41
2. Literature Review ................................................................................ 45
   2.1. Attracting FDI Through IPA Activities ........................................ 45
4.1. Portfolio Composition and Data Requirements .................... 179
4.2. Exponential Weighting .......................................................... 180
4.3. Risk Attribution Using Risk Factor Mapping ...................... 183
4.4. Marginal VaR ........................................................................ 184
4.5. Estimation of Risk Factor Sensitivities ................................. 186
4.6. Advantages and Disadvantages of Risk Factor Mapping ...... 187
5. Empirical Analysis ................................................................. 188
  5.1. Preliminary Data Analysis .................................................... 188
  5.2. Decomposition of VaR for Argentinian Portfolio .......... 199
  5.3. Decomposition of VaR for Brazilian Portfolio ............ 202
  5.4. Decomposition of VaR for Chinese Portfolio ............... 204
  5.5. Decomposition of VaR for Indian Portfolio ................. 206
  5.6. Decomposition of VaR for Mexican Portfolio .......... 208
  5.7. Decomposition of VaR for Russian Portfolio ............. 211
  5.8. Decomposition of VaR for US Portfolio .................. 213
  5.9. VaR Backtesting ............................................................. 215
6. Conclusion ............................................................................ 221
References ................................................................................. 222

Chapter 6 – Conclusion .......................................................... 226

Conclusion ................................................................................. 227
Acknowledgements

I wish to express my sincere thanks to my supervisors, Dr. John Garvey and Prof. Liam A. Gallagher, for their guidance, encouragement and support over the last number of years. I was privileged to receive the supervision of two such knowledgeable and helpful mentors whose continuous direction and advice made this thesis possible. I am deeply indebted to you both for the time and effort you have invested in me and I look forward to working with you both in the future.

I am grateful to my external examiners, Prof. Holger Görg and Dr. Niall O’Sullivan, for making my viva voce a challenging and enjoyable experience and providing insightful comments on my work.

I would like to thank the Department of Accounting and Finance at the University of Limerick, for granting me a scholarship to undertake this thesis. Many thanks also to my friends and colleagues in the Kemmy Business School, for their many kind words of advice and encouragement.

To Catriona, Frances, Geraldine, Valerie, Anthony, Gerald, Sharon and Sinead, thank you for all the chats, coffees, and moments we’ve shared over the years. I hope our paths continue to cross and we get to share time together in the future.
Lastly, I would like to pay special thanks to my parents, Padraic and Maureen, and my sister, Elaine, who have provided me with help in so many ways. I would not be where I am today without your continuous support and the sacrifices you’ve made on my behalf. I will be forever grateful.
List of Tables

Chapter 2 (Essay One)

Table 1. Timeline of Events in Study .......................................................... 63
Table 2. Fundamental Company Information ............................................. 64
Table 3. BG Group Plc. – Average Realised Volatility Around the Events that Occurred Prior to Nationalisation ..................................................... 73
Table 4. BP Plc. – Average Realised Volatility Around the Events that Occurred Prior to Nationalisation ..................................................... 73

Chapter 3 (Essay Two)

Table 1. Descriptive Statistics ................................................................. 109
Table 2. FGLS Regression Estimates of the Impact of BITs on Vertical FDI, Horizontal FDI, and Their Ratio ............................................. 110
Table 3. FGLS Regression Estimates of the Interactive Effects of BITs and Expropriation Risk on Vertical FDI, Horizontal FDI, and Their Ratio ........................................................................................................... 112
Table 4. FGLS Regression Estimates of the Interactive Effects of BITs and Law and Order on Vertical FDI, Horizontal FDI, and Their Ratio ........................................................................................................... 114
Table 5. FGLS Regression Estimates of the Interactive Effects of BITs and Government Stability on Vertical FDI, Horizontal FDI, and Their Ratio ........................................................................................................... 116

Chapter 4 (Essay Three)

Table 1. Descriptive Statistics ................................................................. 150
Table 2. System GMM Estimation of the Impact of Northern FDI and Southern FDI on Growth in Recipient Southern Countries .............. 151
Table 3. System GMM Estimation of the Impact of Northern FDI and Southern FDI on Growth in Recipient Southern Countries: Interaction with Human Capital, Property Rights Protection, and Law and Order .......................................................... 153

Table 4. System GMM Estimation of the Impact of Northern FDI and Southern FDI on Growth in Recipient Southern Countries: Above and Below the Median Values of Human Capital, Property Rights Protection, and Law and Order ................................................................................ 155

Chapter 5 (Essay Four)

Table 1. Data Requirements for Each Portfolio............................................... 181
Table 2. Descriptive Statistics, Augmented Dickey-Fuller Test and Jarque-Bera Test for Exchange Rate Log Returns ........................................ 190
Table 3. Descriptive Statistics, Augmented Dickey-Fuller Test and Jarque-Bera Test for Stock Index Log Returns ............................................. 191
Table 4. Descriptive Statistics of Exchange Rate Volatilities ...................... 195
Table 5. Descriptive Statistics of Correlations Between Index Returns and Exchange Rate Returns ........................................................................ 198
Table 6. Descriptive Statistics of Marginal Foreign Exchange VaR for Argentinian Portfolio .............................................................................. 202
Table 7. Descriptive Statistics of Marginal Foreign Exchange VaR for Brazilian Portfolio ................................................................................ 204
Table 8. Descriptive Statistics of Marginal Foreign Exchange VaR for Chinese Portfolio ............................................................................... 206
Table 9. Descriptive Statistics of Marginal Foreign Exchange VaR for Indian Portfolio ............................................................................... 209
Table 10. Descriptive Statistics of Marginal Foreign Exchange VaR for Mexican Portfolio .......................................................................... 211
Table 11. Descriptive Statistics of Marginal Foreign Exchange VaR for Russian Portfolio .............................................................................. 213
Table 12. Descriptive Statistics of Marginal Foreign Exchange VaR for US Portfolio

Table 13. Backtesting Results for Systematic VaR of Each Portfolio
List of Figures

Chapter 1

Figure 1. External Capital Flows to Developing and Emerging Economies (1980–2013) ................................................................. 4
Figure 2. Foreign Investment Flows to Developing and Emerging Economies (1980–2013) ................................................................. 8
Figure 3. BIT Participation (1990–2010) .............................................. 15

Chapter 2 (Essay One)

Figure 1. Daily Realised Volatility Estimate for BG Group Plc. – July 2004 ...................................................................................... 65
Figure 2. Daily Realised Volatility Estimate for BP Plc. – July 2004 .... 66
Figure 3. Daily Realised Volatility Estimate for BG Group Plc. – May 2005 ...................................................................................... 68
Figure 4. Daily Realised Volatility Estimate for BP Plc. – May 2005 .... 69
Figure 5. Daily Realised Volatility Estimate for BG Group Plc. – December 2005 .............................................................................. 70
Figure 6. Daily Realised Volatility Estimate for BP Plc. – December 2005 ...................................................................................... 71

Chapter 5 (Essay Four)

Figure 1. Normal Probability Plots of Exchange Rate Log Returns ..... 192
Figure 2. Normal Probability Plots of Stock Index Log Returns .......... 193
Figure 3. Exchange Rate Volatilities ................................................... 194
Figure 4. Correlations Between Index Returns and Exchange Rate Returns ...................................................................................... 197
Figure 5. Decomposition of Variance-Covariance VaR for Argentinian Portfolio (January 2004 to December 2010) ................................................. 200
Figure 6. Decomposition of Variance-Covariance VaR for Brazilian Portfolio (January 2003 to December 2010) ................................................. 203
Figure 7. Decomposition of Variance-Covariance VaR for Chinese Portfolio (January 2003 to December 2010) ................................................. 205
Figure 8. Decomposition of Variance-Covariance VaR for Indian Portfolio (January 2003 to December 2010) .................................................. 207
Figure 9. Decomposition of Variance-Covariance VaR for Mexican Portfolio (January 2003 to December 2010) .................................................. 209
Figure 10. Decomposition of Variance-Covariance VaR for Russian Portfolio (January 2006 to December 2010) .................................................. 212
Figure 11. Decomposition of Variance-Covariance VaR for US Portfolio (January 2003 to December 2010) ..................................................... 214
Figure 12. VaR and P&L for All Portfolios .................................................. 220
# List of Abbreviations

## Chapter 1

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>British Gas</td>
</tr>
<tr>
<td>BIT</td>
<td>Bilateral Investment Treaty</td>
</tr>
<tr>
<td>BP</td>
<td>British Petroleum</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FPI</td>
<td>Foreign Portfolio Investment</td>
</tr>
<tr>
<td>ICSID</td>
<td>International Centre for Settlement of Investment Disputes</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>ISDS</td>
<td>Investor-State Dispute Settlement</td>
</tr>
<tr>
<td>ISI</td>
<td>Import Substitution Industrialisation</td>
</tr>
<tr>
<td>MFC</td>
<td>Most-Favoured Country</td>
</tr>
<tr>
<td>MNE</td>
<td>Multinational Enterprise</td>
</tr>
<tr>
<td>ODA</td>
<td>Official Development Assistance</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-Operation and Development</td>
</tr>
<tr>
<td>SEZ</td>
<td>Special Economic Zone</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
</tbody>
</table>

## Chapter 2 (Essay One)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>British Gas</td>
</tr>
<tr>
<td>BP</td>
<td>British Petroleum</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FTSE</td>
<td>Financial Times Stock Exchange</td>
</tr>
<tr>
<td>GBP</td>
<td>Great British Pound</td>
</tr>
</tbody>
</table>
Chapter 3 (Essay Two)

BEA  Bureau of Economic Analysis
BIT  Bilateral Investment Treaty
FDI  Foreign Direct Investment
FGLS Feasible Generalized Least Squares
GDP  Gross Domestic Product
ICRG International Country Risk Guide
NAFTA North American Free Trade Agreement
NATO North Atlantic Treaty Organisation
OECD Organisation for Economic Co-Operation and Development
UNCTAD United Nations Conference on Trade and Development
US   United States
WTO  World Trade Organisation
Chapter 4 (Essay Three)

FDI  Foreign Direct Investment
GDP  Gross Domestic Product
GMM  Generalized Method-of-Moments
ICRG International Country Risk Guide
IPA  Investment Promotion Agency
MNC  Multinational Corporation
UNCTAD United Nations Conference on Trade and Development

Chapter 5 (Essay Four)

ADF  Augmented Dickey-Fuller
ARS  Argentine Peso
BRL  Brazilian Real
BSE  Bombay Stock Exchange
CNY  Chinese Yuan Renminbi
ETL  Expected Tail Loss
EUR  Euro
EWMA Exponentially Weighted Moving Average
GARCH Generalized Autoregressive Conditional Heteroskedasticity
GDP  Gross Domestic Product
IBG  Indice Bolsa de Galicia
IMF  International Monetary Fund
INR  Indian Rupee
IPC  Indice de Precios y Cotizaciones
LR  Likelihood-Ratio
MXN  Mexican Peso
PPP  Purchasing Power Parity
RTS   Russia Trading System
RUB   Russian Rouble
SSE   Shanghai Stock Exchange
US    United States
USD   US Dollar
VaR   Value-at-Risk

Chapter 6

BEA   Bureau of Economic Analysis
BG    British Gas
BIT   Bilateral Investment Treaty
BP    British Petroleum
FDI   Foreign Direct Investment
GMM   Generalized Method-of-Moments
MNE   Multinational Enterprise
US    United States
Chapter 1

Introduction


Chapter 1

1. Introduction

This chapter sets the scene for the research undertaken in this thesis. It starts by providing a background to the research topic, describing the overall context in which the research takes place. An outline of the essays which constitute the main part of the thesis is then provided. In this section, the contributions that the essays make to existing literature and knowledge, as well as their practical and policy implications, are briefly discussed.

2. Thesis Background

2.1. Foreign Investment Flows to Developing and Emerging Economies

In recent decades, foreign investment flows to developing and emerging countries have received considerable attention in both academic and policy-making circles. A key reason for this interest has been the spectacular rise in the volume of these investment flows together with their increased economic role in less developed economies. Albeit a long-standing feature of the international economy, these capital flows have increased dramatically since the late-1980s, rising from US$ 22 billion in 1987 to stand at US$ 886 billion in 2013.¹ Not only has their volume increased but their importance relative to

¹ These figures come from the World Bank’s World Development Indicators and include foreign direct investment (FDI) as well as foreign portfolio investment (FPI) in equities and bonds. Developing and emerging economies are those classified by the World Bank as low and
other forms of external capital for developing and emerging countries has also risen. Up until the early 1990s, official development assistance (ODA) was the main source of external capital for these economies, but since then, foreign investment has become the largest component of these capital flows. In 1991, for instance, external capital flows to developing and emerging economies were composed of 42 percent ODA and only 32 percent foreign investment, whereas in 2013, foreign investment constituted 60 percent of these capital movements. FDI has constituted the bulk of these investment flows, climbing from US$ 8 billion to US$ 739 billion over the period 1980–2013, while since the early 2000s, FPI in the form of equities and bonds have also increased, rising from US$ 6 billion to US$ 65 billion, and US$ 13 billion to US$ 172 billion, respectively, between 2002 and 2013. Figure 1 illustrates the rise of foreign investment relative to other forms of external capital flowing to developing and emerging economies over recent decades.

A critical factor behind the rapid expansion of foreign investment flows to developing and emerging countries over the last number of decades has been the widespread liberalisation of trade and investment regimes in these economies. Up until the mid-1980s, many governments in lower-income countries viewed multinational enterprises (MNEs) with suspicion and tended to forbid or curtail their activities through various measures, including ‘outright prohibitions, limitations on the industries in which they were allowed to

middle income countries. The World Bank defines low-income countries as those with a gross national income (GNI) per capita in 2013 of $1,045 or less, while middle-income countries are defined as those with a 2013 GNI per capita of more than $1,045 but less than $12,746. The same data source and country classifications apply to the data and statistics presented in the remainder of this paragraph.
Much of the concern surrounding MNEs was due to fears that they could exploit their host economies and exert a negative influence on economic and political affairs (Asian Development Bank, 2004). In the early 1990s, however, there was a marked reversal in the attitudes of developing and emerging countries towards FDI. For example, between 1992 and 2001, 95 percent of FDI policy changes in less-developed economies aimed to create more

Notes: This figure is based on data from the World Bank’s World Development Indicators. Developing and emerging economies are those classified by the World Bank as low and middle income countries.
favourable environments for FDI (Kobrin, 2005). Moreover, many developing and emerging countries which had restrictions on portfolio investment inflows in the 1970s, also initiated reforms of their domestic capital markets in the late 1980s and 1990s, easing or removing restrictions on non-resident participation in their local markets (Stepanyan, 2011).

An important factor in the shift towards market liberalisation and the accompanying rise of foreign investment in lower-income countries was the failure of import substitution industrialisation (ISI). Prior to the 1980s, ISI was the dominant strategy pursued by less-developed economies as a means to achieve economic development. A prominent feature of ISI was the adoption of protectionist measures such as high tariffs, import licencing, and foreign exchange rationing, in order to shield domestic firms from foreign competition. While successful in raising output levels in basic consumer-goods industries, this strategy proved to be largely ineffective in delivering economic prosperity. A critical shortcoming was that it reduced export competitiveness through impositions on exporters to purchase expensive intermediate and capital goods from domestic producers. The advanced skills and technologies required to produce sophisticated goods, together with insufficient domestic demand to achieve economies of scale in their production, also reduced profit potential of local firms (Baldwin, 2004). The large budget and balance-of-payments deficits linked to ISI led to its decline by the 1990s, to be replaced by development strategies that focused on greater integration with the world economy.
Fundamental to the expansion of foreign investment flows to developing and emerging countries was an increased recognition of the economic importance of these investments. Before most lower-income countries started to liberalise their investment regimes, some economies in South-East Asia had opened up to foreign investment and had achieved high rates of economic growth (Te Velde, 2006). The success of these Asian economies served to demonstrate the potential economic gains associated with foreign investment. Moreover, a reduction in commercial bank lending and ODA on account of the international debt crisis in the 1980s made policymakers more aware of the potentially positive role of foreign investment in sustained economic development. As traditional sources of capital began to disappear, many governments sought to attract a greater volume of private foreign capital (Neumayer and Spess, 2005; Asian Development Bank, 2004).

Although foreign investment flows to developing and emerging countries have increased dramatically over recent decades, the volume of these investments has been much lower than expected under standard neoclassical theory (Alfaro et al., 2008). A basic prediction arising from this theory is that foreign capital should flow from rich countries with high levels of physical capital per worker and, hence, where returns to capital are low, to poorer economies with lower capital levels and, hence, more profitable investment opportunities. Consequently, the poorer countries in the world, which are characterised by higher marginal returns to capital, should be the main recipients of foreign capital. In practice, however, this has not been the case as developed
countries have tended to receive the bulk of global foreign investment; a phenomenon referred to as the ‘Lucas Paradox’ (Lucas, 1990). For example, over the period 1980–2013, developed countries received 72 percent of global FDI flows, with the remaining 28 percent going to developing and emerging economies. Additionally, developed countries captured 91 percent of global equity portfolio investments over this period, while developing and emerging economies absorbed the remaining 9 percent. Figure 2 illustrates the patterns of these foreign investment flows to developed as well as developing and emerging economies over recent decades.

In an effort to explain the flow of capital to lower-income economies, an extensive literature has been amassed; much of which distinguishes between ‘push’ factors, which are external to countries receiving capital and encourage investment in search of higher potential returns in foreign countries, and ‘pull’ factors, which are host-country determinants of capital inflows. The push factors comprise of economic conditions in capital-exporting countries and reflect the opportunity cost associated with investment in these economies. Some of these factors include a lack of profitable investment opportunities in developed countries (Kinda, 2007), low international interest rates, and low growth rates in the developed world (Calvo et al., 1996). In contrast, pull factors encompass host-country conditions that can affect capital productivity.

---

2 These statistics are based on data sourced from the World Bank’s World Development Indicators. Developed economies refer to those classified by the World Bank as high-income economies. These are economies in which 2013 GNI per capita was $12,746 or more. Developing and emerging economies refer to those classified by the World Bank as low or middle income economies. The same data source and country classifications apply to the statistics presented in the remainder of this paragraph.
Chapter 1

Figure 2. Foreign Investment Flows to Developing and Emerging Economies (1980–2013)

Notes: This figure is based on data from the World Bank’s World Development Indicators. Developed economies include those classified by the World Bank as high-income economies. Developing and emerging economies include those classified by the World Bank as low or middle income economies.

or expected investment returns. Many of these are linked to economic or structural fundamentals, such as human capital (Lucas, 1990), technological capabilities (Eichengreen, 2003), institutional conditions (Alfaro et al., 2008), and financial sector development (Delechat et al, 2009), while others are related to capital market imperfections and include information asymmetry (Portes and Rey, 2005) and sovereign risk (Reinhart and Rogoff, 2004).
2.2. FDI and Economic Development

FDI is defined as a ‘an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate)’ (UNCTAD, 2013b, p.3). Generally, it is assumed to occur when a foreign investor acquires an equity stake of 10 percent or more of the ordinary shares or voting power of a foreign enterprise. Furthermore, it encompasses both the initial investment as well as all subsequent investments made by a foreign investor, provided that the 10 percent ownership criterion is met. It can occur in three forms: equity investments, reinvested earnings and intra-company loans. Equity investments refer to a foreign investor’s purchase of shares in a foreign enterprise; reinvested earnings refer to a foreign investor’s earnings from a foreign enterprise that are not remitted but instead are retained in the enterprise for investment purposes; while intra-company loans refer to the lending of funds by a foreign investor to a foreign enterprise (UNCTAD, 2013b). While various entities can engage in FDI, such as MNEs, governments, institutional investors, and private individuals, MNEs are by far the most important source of these investments, with the world’s largest three to four hundred MNEs accounting for close to 90 percent of the global stock of FDI (Aharoni and Ramamurti, 2011).
FDI can contribute to economic development in host countries in a number of ways. It can create employment, generate exports, increase tax revenue, as well as add to capital formation, while it can also produce positive spillover effects for domestic firms (World Bank, 2014). While some of these benefits can materialise through domestic investment, they are often not realised due to insufficient capital levels in lower-income countries. As a result, FDI can be an important source of capital for stimulating economic activity. The standout feature of FDI, however, is that MNEs engaging in these investments bring ownership advantages such as superior technologies, processes, and managerial skills, which can spill over to local firms, thereby increasing domestic productivity. These spillovers from FDI can occur when domestic firms imitate the technologies or processes used by MNEs, or when they employ workers who previously worked for MNEs and know how to implement their business practices. They can also occur when MNEs share technology and knowledge with local partner firms, or when increased competition from MNEs induces domestic firms to make more efficient use of their existing resources or adopt new technologies (Crespo and Fontoura, 2007; Görg and Greenaway, 2004).

Due to the positive economic effects associated with FDI, developing and emerging countries have in recent decades engaged in intense competition to attract these investments, through measures such as investment incentives, investment promotion, and bilateral agreements (Busse et al., 2010). FDI incentives are defined as ‘any measurable advantage accorded to specific
enterprises or categories of enterprises by (or at the direction of) a Government’ and they include instruments designed to either ‘increase the rate of return of a particular FDI undertaking, or to reduce (or redistribute) its costs or risks’ (UNCTAD, 2000, p.11). These incentives include fiscal benefits such as ‘full or partial holidays from tax; reductions in the standard rate of tax; tax reductions conditional on reinvestment of profits; investment allowances and investment tax credits; accelerated depreciation of assets; preferential treatment of profit on exports; tax deductions based on specific types of expenditure (e.g. R&D); and exemptions from import duties on capital goods or other inputs’, while they also include financial benefits such as ‘cash grants related to the value of assets invested or numbers employed or training costs; provision of subsidized facilities such as factories or sites; provision of infrastructure related to new facilities, such as roads and links to utilities; and direct subsidies’ (Cass, 2007, p.80). Often, the incentives used by governments to encourage FDI are targeted toward foreign investors who locate within special economic zones (SEZs) designed to foster the contribution of FDI to economic development.

Offering incentives for FDI is often justified on the basis of correcting a market failure related to the spillovers from FDI. Many governments seek FDI in the hope that its technologies, processes, and managerial skills, will spill over to domestic firms and, thus, increase productivity in their economies. However, MNEs may not always invest at levels high enough for significant spillovers to occur. Incentives encourage increased investment by MNEs, thereby increasing spillovers to the local economy (Blomstrom, 2002). Another
rationale for offering incentives is that they can mitigate the market failure caused by information asymmetry. Foreign investors often lack complete information about business climates in foreign countries and incentives can be used to indicate that a country is a good location for investment (Javorcik, 2008).

Investment promotion agencies (IPAs) conduct a range of activities that involve ‘providing information to potential investors, creating an attractive image of the country as place to invest, and providing services to prospective investors’ (Wells and Wint, 2000, p.1), and which include ‘advertising, investment seminars and missions, participation in trade shows and exhibitions, distribution of literature, one-to-one direct marketing efforts, facilitating visits of prospective investors, matching prospective investors with local partners, help with obtaining permits and approvals, preparing project proposals, conducting feasibility studies and servicing investors whose projects have already become operational’ (Harding and Javorcik, 2011, p.1450). These activities are generally grouped into four categories; image building, investment generation, investor facilitation and servicing, and policy advocacy. Image building aims to build a perception of a location as an attractive site for FDI, while the aim of investment generation is to connect with potential investors and encourage them to invest. Investor facilitation and servicing aims to help investors analyse business opportunities and manage their business, while the aim of policy advocacy is to improve the investment environment in order to meet the needs of foreign firms (MIGA, 2004; Wells and Wint, 2001).
One of the main rationales for IPAs is to mitigate the market failure that ‘may arise if potential investors are unaware of a location’s advantages or have an incorrect impression of its business environment’ (Morisset and Andrews-Johnson, 2004, p.10). In general, when MNEs decide to undertake FDI they draw up a long list of potential investment locations which belong to one of three groups: popular sites for FDI, geographically close countries, and emerging FDI destinations. It is the inclusion of this latter group of locations in an investor’s decision-making process that presents an opportunity to IPAs to attract FDI through promotional activities (Harding and Javorcik, 2011). Moreover, IPAs also work to ‘reduce transaction costs facing foreign investors by providing information (on business opportunities, prevailing laws and regulations as well as factor cost in a host country) and helping foreign investors to deal with bureaucratic procedures’ (Harding and Javorcik, 2011, p.1450–1451). In these cases, investors may be aware of an IPA’s location but fail to give it due consideration due to unfamiliarity or search costs. Indeed, they may even have committed to an investment project but encounter regulatory obstacles. IPAs can help to mitigate these issues by providing information to investors and helping them overcome bureaucratic hurdles.

Another prominent strategy pursued by developing and emerging countries seeking to attract FDI has been the adoption of international investment agreements (IIAs), of which bilateral investment treaties (BITs) are the most common type. BITs contain provisions that grant investors with a broad set of investor rights and allow them to take legal action in cases where
those rights are violated. The standard provisions in BITs include guarantees of a minimum standard of treatment, fair treatment relative to national and most-favoured country (MFC) investors, non-discrimination, and adequate and prompt compensation for expropriated property, while a dispute settlement procedure is also included to ensure compliance with these conditions (Neumayer and Spess, 2005). In essence, the treaties provide protection against a variety of investment risks and, most notably, against expropriation risk which is commonly considered a key obstacle to FDI. An important provision is the dispute settlement procedure which enables investors to challenge any hostile government action before a binding arbitral tribunal. This provision transfers responsibility for dispute settlement away from national legal systems and, in doing so, helps ensure that foreign investors are treated fairly in dispute settlement proceedings (Neumayer and Spess, 2005). In most cases, investor claims of treaty violations are brought before the Investor-State Dispute Settlement (ISDS) system which is governed by the International Centre for Settlement of Investment Disputes (ICSID) (UNCTAD, 2013a). Figure 3 shows the pattern of BIT participation over recent decades.

The use of BITs is intended to mitigate the time-inconsistency problem facing developing and emerging countries seeking to attract FDI. Prior to investments, host governments have an incentive to assure investor protection, as they are motivated by the desire to secure the capital needed to start new businesses. However, once these set up costs are met, their incentive often
changes to seizing a greater benefit from investments (Neumayer and Spess, 2005). BITs attend to this time-inconsistency issue through binding host-government commitments to protect and treat favourably the investments from partner countries. Another rationale for the treaties is to mitigate the effect of information asymmetry on investor decisions. In this regard, BITs can send a signal to unprotected investors that a country is serious about the protection of FDI and, in doing so, alleviate concerns that investors may have about weak investor protections (Kerner, 2009).

While developing and emerging countries devote much time and resources to attracting FDI, it is not simply the case that higher levels of FDI
automatically lead to proportional increases in economic development. Rather, the contribution of FDI to economic development is dependent on a country’s absorptive capacity. In terms of the effect of FDI on economic growth, host-country conditions such as human capital (Borensztein et al., 1998), financial development (Alfaro et al., 2010), trade openness (Balasubramanyam et al., 1996), and institutional conditions (Saini et al., 2010), are all important for capturing the spillovers from FDI and, thus, raising domestic productivity. For example, human capital formation matters for the application and absorption of the technologies brought by FDI, with highly skilled workers better able to assimilate and adopt new technologies (Borensztein et al., 1998). A well-developed financial system helps by enabling domestic entrepreneurs to obtain the capital needed to start new businesses or expand existing ones (Alfaro et al., 2010). Trade openness contributes to increased benefits from FDI by promoting a more efficient allocation of investment on the basis of comparative advantage in trade (Balasubramanyam et al., 1996). Strong institutional conditions in the form of property rights protection can help to encourage foreign firms to expand their operations, while better regulations can facilitate spillovers by improving both labour mobility and market competition (Saini et al., 2010).

FDI characteristics also play a role in determining its contribution to economic development. For example, vertical FDI, which is undertaken to exploit the availability of lower production costs in foreign countries, is associated with positive economic effects in terms of employment creation
chapter 1

(Beugelsdijk et al., 2008) and export generation (Zhang, 2009). Conversely, horizontal FDI, which is carried out to provide goods or services to the local market, is expected to produce positive spillovers for domestic firms (Beugelsdijk et al., 2008). Indeed, the occurrence of spillovers from FDI is not only dependent on local conditions but also on the technologies brought by FDI. A country’s absorptive capacity is defined as its domestic firms’ ability to ‘internalize knowledge created by others’ and to modify it to ‘fit their own specific application, processes and routines’ (Narula and Marin, 2005, p.22). In this regard, the appropriateness of FDI with respect to its complexity relative to local production can be an important factor that influences its spillovers to domestic firms (Kokko et al., 1996; Li and Lu, 2005; Havranek and Irsova, 2011).

2.3. FPI and Economic Development

FPI is defined as ‘cross-border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets’ (IMF, 2009, p.110). It is considered a passive investment whereby a foreign investor acquires equity or debt securities but does not exercise any control over their management. In general, equity FPI is assumed to occur when a foreign investor acquires equity securities that account for less than 10 percent of the ordinary shares or voting power of a foreign enterprise. These investments comprises of all securities that represent claims to the residual
values of incorporated enterprises once all creditor claims have been settled (IMF, 2009). Examples of these securities include ordinary shares as well as preference shares, stocks, and depository receipts. In contrast, the debt securities included in FPI include financial instruments such as bonds and money market instruments. An key feature of the securities included in FPI is that they are negotiable and can be traded on organised exchanges or ‘over the counter’ (IMF, 2009). As a consequence, a variety of entities including MNEs, institutional investors, private individuals, and governments, can all enter transactions in these securities and, thus, engage in FPI.

As outlined by OECD (2002), FPI can contribute to economic development in recipient countries in a number of ways. First, by increasing liquidity in domestic capital markets, it can improve both the supply and allocation of capital for local investment. More liquid markets increase the volume of capital available for local entrepreneurs to start new business ventures, while they also help existing firms to raise the finance needed for business expansions. Moreover, they facilitate long-term investments by allowing savers to manage their investment portfolios and quickly sell their securities when they need to access their funds. Indeed, more liquid markets are also characterised by equity prices that better reflect the underlying values of firms, further facilitating efficient capital allocation.

FPI can also help to promote knowledge and discipline in domestic capital markets. By improving market liquidity, it can encourage investors to put more time and effort into looking for new investment opportunities. As
domestic firms compete for capital, it can also encourage increased disclosure of higher quality information in order to secure new finance. Indeed, foreign investors often lack complete information about investment opportunities in foreign countries and, for this reason, often demand more transparent and regulated information from local firms. They may also have knowledge on how to utilise this information to make better investment decisions, which may also spill over to other investors looking to invest locally.

In addition, foreign portfolio investors can improve the risk management function in domestic capital markets, by bringing new knowledge about financial instruments that can be used to manage investment portfolios. In this regard, they often have experience and expertise using hedging instruments, such as futures and options, to manage portfolio risks; and their knowledge on how use these instruments for risk management purposes can spill over to local investors. Indeed, a higher demand for hedging instruments can also serve to highlight the risk management opportunities available to local investors.

On the whole, FPI can ‘strengthen domestic capital markets and improve their functioning’ and result in ‘a better allocation of capital and resources in the domestic economy, and thus a healthier economy’ (OECD, 2002, p.2). For this reason, these investments are generally welcomed by developing and emerging countries as a means to achieve economic prosperity. However, they are not generally sought after to the same extent as FDI. Whereas FDI is a long-term investment that is relatively stable and driven by
long-term fundamentals such as ‘country size, financial market development, degree of openness, and the like’, FPI is characterised as a short-term investment that is easy to withdraw and that is driven by cyclical factors such as ‘interest rate differentials, business cycle conditions, market sentiment and herd behaviour’ (Hattari and Rajan, 2011, p.505). As a consequence, FPI tends to be much more volatile than FDI and can quickly leave an economy in response to factors that increase investor risks or reduce their expected returns. This volatility associated with FPI can have destabilising effects on domestic financial markets and an overall economy in general (Chaudhuri and Mukhopadhyay, 2014).

3. Outline of Essays

3.1. Essay One

A Quantitative Approach to Guiding the Promotional Efforts of IPAs in Emerging Markets

IPAs engage in a range of promotional activities with the aim of attracting FDI. However, at any one time, they tend to focus their efforts on either image building or investment generation. Image building activities are conducted prior to investment generation activities, and their aim is to build a perception of a location as an attractive site for investment. Once investors perceive a
location in this way, IPAs tend to shift their efforts to investment generation which involves connecting with potential investors and encouraging them to invest (Wells and Wint, 2000). Thus, an IPA’s choice between image building and investment generation depends on investor perceptions of their location.

For IPAs in emerging countries, determining investor perceptions is a challenging task, partly due to the presence of political risks, and also because investor perceptions of these risks can change over time due to changes in the political environment. In their attempts to measure investor perceptions, IPAs tend to use qualitative methods such as examining reports on their location and investment climate (MIGA, 2010). A problem with these methods, however, is that they only provide a measurement of perceptions at a point-in-time and, thus, they become outdated with changes in the political environment. Furthermore, they are limited as to the information they provide about specific investors’ perceptions of risk.

In this essay, an innovative quantitative finance approach is used to measure investor perceptions of the risk of nationalisation. This approach uses financial market data to measure the volatility of companies’ stock prices around events that may be expected to cause a rise in risk perceptions. In the essay, the approach is applied to investigate whether large MNE resource companies operating in Bolivia were concerned about nationalisation risk around events that preceded and paved the way for the nationalisation of the country’s oil and gas resources in May 2006. These events which occurred prior to this nationalisation were as follows: In July 2004, a national
referendum revealed that 92 percent of Bolivians were in favour of nationalising all of the country’s hydrocarbons (Kaup, 2008); in May 2005, the Law of Hydrocarbons increased state control of the production of hydrocarbons, introduced a new 32 percent tax on oil and gas production, and required private companies to renegotiate contracts with the government (Ribeiro, 2009); and in December 2005, Evo Morales, a candidate who supported nationalisation, was elected as president (Keen and Haynes, 2009).

The findings of the essay indicate that, around each of the events that occurred prior to the nationalisation of Bolivia’s oil and gas resources, neither BG Group Plc. nor BP Plc. were concerned about nationalisation risk. These findings have implications for guiding the promotional efforts of IPAs. In countries where nationalisation is a risk, IPAs can seek to attract FDI to the natural resource sector by focusing on investment generation activities and targeting large MNE resource companies that do appear to be concerned about nationalisation risk. Moreover, in countries where changes in the political environment have reduced the risk of nationalisation, IPAs can also conduct investment generation activities to seek investments from these companies. In the past, IPAs may have engaged in image building activities to inform these companies of the improved environment for FDI. However, as the findings of this essays show that large MNE resource companies do not appear to be concerned about nationalisation risk, the use of image building activities to attract investment from these companies is likely to be unnecessary and wasteful of resources.
Chapter 1

For IPAs, the main advantages of this essay’s approach to measuring risk perceptions are that it enables the timely identification of risk perceptions upon market events and allows them to assess the risk perceptions of target companies. Accordingly, it can help IPAs to speedily determine whether to conduct image building or investment generation activities.

3.2. Essay Two

Bilateral Investment Treaties and Foreign Direct Investment: Evidence of Asymmetric Effects on Vertical and Horizontal Investments

BITs are legal instruments used by developing and emerging countries to provide investor protections and, by extension, promote higher levels of FDI. While their effect on FDI has been studied extensively, practically all existing studies have focused on their impact on aggregate FDI, and have produced mixed findings. Some studies find that BITs have a direct positive impact on FDI (Kerner and Lawrence, 2014; Busse et al., 2010; Kerner, 2009; Neumayer and Spess, 2005), others find no evidence of this link (Tobin and Rose-Ackerman, 2011; Hallward-Driemeier, 2003), while some show a positive connection that is dependent on institutional conditions in host countries (Tobin and Rose-Ackerman, 2011; Neumayer and Spess, 2005). An important issue that is not fully addressed in the literature is the potentially heterogeneous impact of the treaties across different forms of FDI.
Chapter 1

This essay distinguishes between vertical and horizontal FDI and examines the effect of BITs on each form of investment. Vertical FDI is undertaken by interlinked affiliates of MNEs that divide the production process internationally, with the purpose to exploit cheaper factor prices available in foreign countries. In contrast, horizontal FDI is carried out by standalone affiliates that perform all business activities needed to serve the local market, with the purpose to reduce costs by selling through local subsidiaries rather than trade. MNEs involved in vertical FDI are more vulnerable to host-country risks compared to those engaged in horizontal FDI, with the reason being that their entire global operations are vulnerable to production risks in the locations of their vertical enterprises. In contrast, for MNEs involved in horizontal FDI, the impact of host-country risks is limited to their local operations (Slangen and Beugelsdijk, 2010; Desbordes, 2007). Moreover, MNEs involved in vertical FDI tend to be less tolerant of host-country risks compared to those engaged in horizontal FDI, with the reason being that they often have location choices for their vertical operations, whereas those engaged in horizontal FDI are constrained by the need to access foreign markets (Woodward and Rolfe, 1993). Based on these differences in the sensitivity of vertical and horizontal FDI to host-country risks, this essay hypothesises that BITs are more positively related to vertical than to horizontal FDI. Moreover, to the extent that BITs compensate for weak institutional environments in developing and emerging countries, the essay posits they have a stronger positive effect on vertical than on horizontal FDI in countries with weaker institutional conditions.
The findings of the essay show that BITs have a positive impact on both vertical and horizontal FDI but that they are more positively related to vertical investments. Moreover, they demonstrate that BITs have a more positive effect on vertical FDI in countries with higher expropriation risk, poorer law and order, and lower government stability, whereas that their impact on horizontal FDI is more positive in economies with poorer law and order. Additionally, they show that the treaties are more positively associated with vertical than horizontal FDI in countries with higher expropriation risk and lower government stability. The main policy implication of these findings is that developing and emerging countries seeking to attract vertical FDI should consider BITs as a means to encourage these investment. Moreover, economies with development priorities that can be satisfied through vertical FDI, for example employment creation (Beugelsdijk et al., 2008) or export generation (Zhang, 2009), should also consider BITs as a means to achieve their objectives. Indeed, these policy inferences are most relevant for countries with weak institutional conditions in terms of expropriation risk, law and order and government stability. Another policy implication is that developing and emerging countries seeking to attract horizontal FDI, as well as those with development priorities that can be satisfied through horizontal investments, for instance technological upgrading (Beugelsdijk et al., 2008), should also consider BITs as a means to achieve their objectives. These policy inferences are most relevant for countries with weak law and order.
Chapter 1

The essay contributes to the existing literature on BITs and FDI by showing that the treaties tend to be more effective in promoting the sorts of investments that are more sensitive to host-country risks. Accordingly, its findings suggest that the weak existing evidence of a positive effect of BITs on FDI may be somewhat attributable to the heterogeneous effect of the treaties on different forms of FDI. Moreover, in its analysis, it employs a recent sample period in which a proliferation of BIT claims had raised awareness of the obligations and costs associated with the treaties for signatory economies. With this in mind, the findings point to the possibility that the weak evidence in relation to the effectiveness of BITs may also be partly attributable to the use of long historical sample periods in which there may have been a lower awareness of the potency of the treaties.

3.3. Essay Three

Local Conditions and Economic Growth from South-South FDI

The existing empirical literature examining the link between FDI and growth has shown that FDI does not raise growth automatically. Rather, the positive contribution of FDI to growth is shown to be dependent of a country’s capacity to absorb the spillovers from FDI. A prominent finding in this regard is that host-country conditions such as human capital (Borensztein et al., 1998), institutional environments (Saini et al., 2010), financial development (Alfaro et
al., 2010), infrastructural quality (Li and Liu, 2005), and trade openness (Balasubramanyam et al., 1996), matter to capture spillovers from FDI. Another factor shown to influence a country’s capacity to internalise spillovers is the technology gap between foreign and domestic firms. In this context, a low technology gap is found to increase the capacity of domestic firms to assimilate and adopt the technologies brought by FDI (Havranek and Irsova, 2011; Li and Liu, 2005; Kokko et al., 1996). Moreover, there is evidence of a link between the technological content of FDI and certain host-country conditions in determining the contribution of FDI to growth, with spillovers from high- and low-technology FDI shown to be sensitive to different local conditions (Amendolagine et al., 2013; Branstetter et al., 2011; Fortanier, 2007).

In the macro-empirical literature, studies examining the impact of FDI on growth have focused mainly on FDI from developed (Northern) countries and have shown that its growth effect is dependent of host-country conditions necessary for the absorption of its spillovers. (Alfaro et al., 2010; Saini et al., 2010; Li and Liu, 2005; Borensztein et al., 1998). To date, however, there has been no macro-empirical work examining whether FDI from developing and transition (Southern) countries contributes to growth in recipient Southern economies or whether its potential growth effect is conditional on host-country conditions.

This essay examines the effects of Southern FDI and Northern FDI on economic growth in Southern host countries. In doing so, it explores the role
of various host-country conditions in achieving growth through Southern FDI and Northern FDI, respectively. Theoretically, there is reason to believe that Southern FDI can generate growth in Southern host countries, in a way distinct from Northern FDI. Whereas Northern MNEs tend to use sophisticated technologies that are difficult to absorb in Southern economies, Southern ones tend to employ less complex technologies that are more in line with Southern technological capabilities (Aykut and Goldstein, 2007; UNCTAD, 2006). From a technology gap perspective, Southern FDI may have the potential to contribute to growth in recipient Southern countries by bringing new technologies that domestic firms have the capacity to absorb. In addition, the low-technological content of Southern FDI suggests that its impact on growth in Southern economies may be dependent of host-country conditions conducive to the absorption of low-technology spillovers, and not on conditions that matter primarily to capture spillovers from high-technology Northern FDI.

The findings of the essay show that Southern FDI contributes to growth in Southern economies with strong law and order, whereas Northern FDI raises growth in Southern countries with high skilled labour and strong property rights protection. For Southern countries aiming to achieve growth through Southern FDI, these findings have important policy implications. For example, host-country governments frequently offer incentives to MNEs to encourage FDI. These incentives are often viewed as a cost that is justified on the basis of economic growth arising from increased inward FDI (Blomstrom et al., 2003). In directing costs towards the attraction of Southern FDI, governments in
Chapter 1

Southern economies should consider those local conditions that matter for its impact on growth. In this regard, the findings show that strong legal systems in Southern countries are critically important for realising growth from inward Southern FDI.

The main contribution of this essay to the existing literature on FDI and economic growth is that it distinguishes between FDI originating from Northern and Southern countries and identifies distinct host-country conditions conducive to the growth effects from these investments in recipient Southern countries. It also provides support to literature pointing to the importance of effective legal institutions in capturing spillovers from MNEs that have similar technological capabilities to domestic firms (Amendolagine et al., 2013). In addition, it adds to the traditional literature on Northern FDI, acknowledging that the growth effects from high-technology investments are dependent of a highly skilled local population as well as strong protection of property rights (Fortanier, 2007; Branstetter et al., 2011).
Emerging Markets and Portfolio Foreign Exchange Risk: 

An Empirical Investigation Using a 
Value-at-Risk Decomposition Technique

Foreign exchange risk is regarded as a key obstacle to foreign investment in emerging countries. One reason for this risk is that emerging economies are characterised by periods of high inflation which can result in depreciations in the values of their currencies. Another reason is that political risks in emerging countries can cause investors to lose confidence in the strength of an economy and dispose of assets denominated in a country’s currency. This phenomenon is known as capital flight and it reduces the demand for the currency of the affected country.

While emerging market investments are characterised by a high degree of foreign exchange risk, there has been no study examining the extent of this risk in an equity portfolio context. This essay makes a unique contribution to existing literature on foreign exchange risk in emerging markets by measuring the extent of this risk in the context of equity portfolio investments and providing a comparative analysis among a number of emerging market economies. To this end, a Value-at-Risk (VaR) risk factor mapping technique, under the variance-covariance VaR approach, is used to decompose equity portfolio risk into its equity and foreign exchange components. This process
involves mapping a portfolio to its risk factors and calculating the corresponding VaRs. An important advantage of this approach is that it takes into accounts the correlation between a portfolio’s equity and foreign exchange components, which can play a role in reducing foreign exchange exposure (Hau and Rey, 2005). In this regard, a negative correlation between exchange rate returns and foreign equity returns reduces the return volatility on a portfolio and thus reduces the effect of currency risk.

In the essay, the VaR decomposition technique is applied to measure the foreign exchange risk of portfolios constructed using equities from the following emerging markets: Argentina, Brazil, China, India, Mexico and Russia. For comparison purposes, the same technique is applied to a portfolio of US equities. The study is conducted from the perspective of a European equity investor.

The findings of the essay uniquely demonstrate that significant variation exists in equity portfolio foreign exchange risk across emerging markets. The results of the VaR decomposition show that the foreign exchange risk in Brazil and Mexico was significant in comparison to the US, while foreign exchange risk in China and Russia was less significant when compared to the US. For the majority of the study, Argentina and India exhibited levels of foreign exchange risk that were similar to that of the US. An implication of these findings is that emerging market equity portfolio investors who are concerned about the risk of foreign exchange losses should individually assess these markets in order to determine their exposure to this risk.
For equity portfolio investors in emerging markets, foreign exchange risk needs to be considered in a portfolio context as the correlation between equity returns and foreign exchange returns affects the level of this risk. The VaR methodology used in the essay provides a framework for investors to measure the foreign exchange risk element equity portfolio investments.

References


Chapter 1


Chapter 1


Chapter 1


Chapter 1


UNCTAD (2013a) *Recent Developments in Investor-State Dispute Settlement (ISDS)*, New York: UNCTAD.


THIS PAGE IS LEFT BLANK INTENTIONALLY
Chapter 2

(Essay One)

A Quantitative Approach to Guiding the Promotional Efforts of IPAs in Emerging Markets
A Quantitative Approach to Guiding the  
Promotional Efforts of IPAs in Emerging Markets* 

Abstract 

Investment promotion agencies (IPAs) engage in a range of promotional activities with the aim of improving foreign direct investment (FDI) inflows. However, at any particular time, they tend to concentrate their efforts towards image building or investment generation. The decision of where to focus promotional efforts depends on investors’ perceptions of the IPA’s location. In contrast to current methods, this paper employs an innovative quantitative finance approach that allows IPAs to speedily measure risk perceptions using real-time data. Using this approach, the paper focuses on determining whether or not the risk of nationalisation is a concern for large multinational companies in the natural resource sector. Our empirical results demonstrate that such companies are not concerned about nationalisation risk. The findings have implications for guiding the promotional efforts of IPAs, both in countries where nationalisation is a risk and in countries where changes in the political environment have reduced the risk of nationalisation. 

1. Introduction 

In emerging markets, FDI is considered an essential component of economic development. Countries around the world compete intensely to attract foreign investors and IPAs carry out various activities with the aim of improving FDI inflows. While IPAs engage in a range of promotional activities, evidence suggests they tend to focus their promotional efforts at any particular time 

towards image building or investment generation. Image building activities are conducted to build an image of a location as an attractive site for investment. Once an appropriate image of the investment climate is formed in the minds of prospective investors, IPAs tend to shift their promotional efforts towards investment generation activities (Wells and Wint, 2000). Thus, the focus of promotional efforts depends on investors’ perceptions of the IPA’s location.

For IPAs in emerging markets, determining investors’ perceptions is a challenging task due to the presence of political risks that are generally not as prominent in developed markets. Moreover, a company’s susceptibility to political risk can change over time due to changes in FDI policies of host governments (Oetzel, 2005). In this paper, we focus on changes in political risk that arise due to the intensification of populism in a host country. In such circumstances, there is a greater risk that changes in policy will adversely affect foreign investors as governments tend to give in to social and political pressures to redistribute wealth to the populace. A nationalistic ideology often underlies the populist fervour; therefore, host governments have a greater incentive to expropriate or nationalise foreign investments in order to meet the demands of the electorate. In Bolivia, such populist sentiment led to the nationalisation of the oil and gas sector. This paper uses financial market data to measure investors’ perceptions around events that heightened the risk of nationalisation.

Specifically, we are concerned about the risk of nationalisation for large multinational companies in the natural resource sector. Attracting such
companies is an important aspect of investment promotion as they are more capable of successfully entering and conducting business in foreign markets. In contrast to smaller companies, they have various competitive advantages in FDI, such as the ability to get financing more easily (Horst, 1972), more rapidly reach the limits of foreign markets (UNCTC, 1992) and make larger investments (Tan and Vertinsky, 1996). However, large companies are also more prone to attracting the attention of host country authorities (Henisz, 2000). Moreover, large natural resource companies have a greater capacity to exploit a host country and are therefore more susceptible to the risks of expropriation and nationalisation (Stosberg, 2005; Vaghefi et al., 1991). In order to guide the promotional efforts of IPAs, this paper focuses on determining whether or not the risk of nationalisation is a concern for large multinational companies in the natural resource sector. The research has implications for IPA activity, both in countries where nationalisation is a risk and in countries where changes in the political environment have reduced the risk of nationalisation.

Up to now, the relationship between political events and financial market performance has been the subject of numerous studies. Much literature in political science, such as that of Gemmill (1992), has examined stock market responses to uncertain political events by mainly focusing on market movements in relation to elections. Lin and Wang (2007) point out that further empirical research has explored the impact of a variety of political uncertainties that may be related to capital markets, such as strikes, boycotts,
terrorist acts, macroeconomic management, monetary policy, legislation, and social and political evolution. In comparison to previous literature, the distinguishable feature of this paper is that it focuses on the market’s perception of the risk of nationalisation in a populist political environment by applying an innovative quantitative finance approach for measuring the market’s reaction to specific events. High-frequency data (HFD) for companies on the London Stock Exchange (LSE) that were affected by the nationalisation of oil and gas resources in Bolivia are used to accurately measure volatility changes around events that preceded and paved the way for the nationalisation.

It is possible to exploit these financial market data for the purpose of measuring the political risk perceptions of IPA clients as equity investors have the same concerns as IPA clients in relation to risks that may adversely affect the future profitability of the company. Moreover, it is not just short-term risks that concern investors as numerous studies demonstrate that they generally undertake investments over a long-term horizon (Investment Company Institute and the Securities Industry Association, 2005; Ipsos MORI, 2002).

At present, investors’ perceptions are measured using qualitative methods and IPAs are advised to refer to publicly available reports on their location and investment climate (MIGA, 2010). Surveys of business conducted by political risk insurance (PRI) providers are also used to measure perceptions of political risks. These methods only provide a measurement of risk perceptions at a point in time; thus, they become outdated with developments in the political environment. Furthermore, they are limited as to the
information they provide about specific companies’ perceptions of risk. The innovative approach that is utilised in this paper allows for the timely identification of changing risk perceptions and has the potential to guide the promotional efforts of IPAs. It provides a means for IPAs to quantitatively measure risk perceptions and base their promotional efforts on more up-to-date and relevant information. It allows IPAs to immediately identify the extent of investor concern and enables them to speedily determine whether image building or investment generation activities should be conducted to attract FDI. Moreover, it provides IPAs with a method to assess the risk perceptions of specific companies. In this context, our approach can guide the promotional efforts of IPAs in attracting targeted investment.

2. Literature Review

2.1. Attracting FDI Through IPA Activities

Foreign investment is considered by many policymakers and international financial institutions to be an essential part of economic development, especially in developing countries. Policymakers believe that FDI can contribute to faster economic growth by increasing capital and advancing technology in such countries. Empirical evidence also suggests that FDI may lead to positive productivity spillovers to local firms. Due to these various benefits, countries around the world compete intensely for FDI.
Chapter 2 (Essay One)

For many years, developing countries have lagged behind developed countries in attracting foreign investors. For instance, UNCTAD (2007) reveals that developing countries only received 38.6 percent of total global FDI inflows in 2005. Moreover, a significant proportion of the FDI inflows to developing countries are concentrated in a few countries, whereas the majority of developing countries seemingly fail to attract FDI. According to UNCTAD (2007), China, Columbia, Egypt and Indonesia received almost 31 percent of total FDI inflows to developing countries in 2007, whereas some developing countries, such as Bolivia, faced the problem of negative FDI inflow. Taking into consideration both the benefits of FDI and the failure of developing countries in attracting foreign investors, an important issue for policymakers in developing countries is how to attract FDI (Harding and Javorcik, 2007).

In recent decades, the promotion of investment has become recognised as an essential component of attracting inward investment, especially in emerging markets. As a result, there has been a rapid growth in the number of IPAs throughout the world. Since its establishment in 1995, the World Association of Investment Promotion Agencies (WAIPA) has recorded an increasing number of members from a wide range of locations worldwide. For instance, the number of registered IPAs increased from 112 in 2002 to 191 in 2006 (Zanatta et al., 2006). These agencies strive to promote investment through ‘activities that disseminate information about, or attempt to create an image of the investment site and provide investment services for prospective investors’ (Wells and Wint, 2001, p.4).
Although there may be some differences in the activities carried out by IPAs, there is a general consensus that the activities can be divided into four categories: image building, investment generation, investor facilitation and servicing, and policy advocacy (MIGA, 2004). Image building creates a perception of a country as an attractive site for FDI while also correcting weak perceptions or misperceptions about the country that could hinder investment. Investment generation targets specific companies, sectors and markets to create leads for investment. Investor facilitation and servicing involves assisting investors in evaluating investment decisions and managing a business. Policy advocacy consists of activities through which the IPA encourages and supports policy changes that improve the quality of the investment climate (MIGA, 2004; Wells and Wint, 2001).

While IPAs engage in a range of promotional activities, evidence suggests they tend to focus their promotional efforts at any particular time towards image building or investment generation (Wells and Wint, 2000). Image building involves the use of marketing techniques to improve the perceptions of prospective investors. Activities commonly associated with image building include focused advertising, public relations (PR) campaigns, mass media campaigns, investor forums, maintaining relationships with journalists and business partners, and developing the IPA’s website (Bleyzer Foundation, 2003). Investment generation is a more focused approach to investment promotion and involves targeting specific sectors and countries in order to generate leads and create interest in the IPA’s location. Activities
include identifying potential investors, direct mailing, telephone campaigns and
organising seminars for targeted investors (Bleyzer Foundation, 2003).

Image building is generally conducted prior to investment generation,
and has the objective of building an image of a location as a site for
investment. Once an appropriate image of the investment climate is formed in
the minds of prospective investors, IPAs tend to shift their promotional efforts
towards investment generation (Wells and Wint, 2000). While other factors
such as quality of staff and financial resources are important in the transition
from image building to investment generation, MIGA (2010) explains the most
important factor that determines if IPAs are ready to shift their promotional
efforts involves their ability to sell their location as a site for FDI. In this
regard, they suggest that IPAs need to ensure the investors they intend to attract
have a favourable opinion of the investment climate. Thus, the shift in focus
between the two activities depends primarily on investors’ perceptions.

While evidence suggests that enhancing IPAs activities can improve the
attractiveness of their location as a site for FDI (Lim, 2008), it is fundamentally
essential that their activities are conducted when most effective. Furthermore,
IPAs often have limited budgets and resources which amplifies the importance
of conducting the most appropriate and effective activities. For instance,
targeting companies through investment generation is considered effective
when prospective investors do not have negative perceptions about the IPA’s
location. In this regard, Wells and Wint (1990) reveal that company focused
sector targeting is much stronger in producing investment leads, compared to
PR campaigns associated with image building. However, there is still a strong argument for PR campaigns in certain instances. Such campaigns are considered effective when the reality in a country is better than the perceptions held by investors (Loewendahl, 2001). Similarly, Morisset and Andrews-Johnson (2004) explain that image building activities in general may only be appropriate when investors’ perceptions are worse than the reality in a country. As both image building and investment generation are effective in different circumstances, MIGA (2010) notes that the key to IPA success involves getting the balance right between the two activities. In spite of this, IPAs often wrongly persist with image building when there is no need to improve investors’ perceptions. Conversely, they often rush into investment generation without ensuring that prospective investors do not have negative perceptions of their location (MIGA, 2010).

To determine the focus of their efforts, IPAs must firstly identify what potential investors think about their particular location. For IPAs in emerging markets, determining investors’ perceptions is a challenging task as there are numerous sources of risk in such markets that are generally not as prominent in developed markets and which can adversely affect investors’ perceptions. In emerging markets, political risk is a greater cause for concern and is generally regarded as one of the main obstacles to foreign investment. In a financial context, it refers to the uncertainty that political action, primarily taken by a country’s government, may reduce the value of a firm’s investment in a foreign country. WAIPA (2009) informs us that political risks have a significant
influence on the choice of investment location and that IPAs need to be aware of the impact of such risks on investment decisions of multinationals. Consequently, an awareness of political risk perceptions is fundamental in determining the focus of promotional efforts. For instance, when investors have adverse perceptions of political risk, IPAs can address such concerns through image building activities. On the other hand, when investors have favourable perceptions of political risk, IPAs can more effectively attract FDI by focusing their efforts towards investment generation.

IPAs must also understand that a company’s susceptibility to political risk can change over time, thus changing investors’ perceptions of risk and the effectiveness of their promotional efforts. Oetzel (2005) emphasises the changing nature of political risk by pointing out that companies can instantly become confronted by heightened levels of political risk once a host country changes policy in relation to FDI. Much literature on bargaining power theory provides important insights into the changing nature of firm risk. It is argued that investor bargaining power is greatest prior to investment as the government needs access to the investor’s capital and technology, and then declines once the investor commences with the project or when its technology or expertise diffuses throughout the host country (Poynter, 1985). With less bargaining power, investors face increased political risk and a greater likelihood of adverse policy changes. On the contrary, government policy and political conditions can also change over time to become more favourable to foreign investors. For instance, governments may change policies to encourage
a greater inflow of FDI. In order to guide their promotional efforts between image building and investment generation, it is important that IPAs monitor the impact of changes in a country’s policy towards FDI on investors’ perceptions.

2.2. Risk of Expropriation and Nationalisation

Since the late 1990s, political risk in many Latin American countries has escalated due to the political landscape becoming dominated by populist fervour. Against a backdrop of poor economic performance throughout the late 1990s and 2000s, the populist ideology came to the fore causing much social upheaval and a hostile response to neoliberal reforms. Frenkel (2003) points out that the condemnation of the earlier reforms led many countries to change their economic policies, under the power of populist governments in the region. As populist politics became more influential over this period, there was a heightening of political risk due to the possibility of adverse policy changes being implemented. In this regard, Lam et al. (2008) explain that the risk of policy changes exists when governments tend to give in to social and political pressures to redistribute wealth to the populace and that populist governments are therefore subject to a higher risk of policy changes. In order to guide their promotional efforts, IPAs need to be aware of the impact of populist pressure on political risk perceptions.

As a nationalistic ideology often underlies the populist fervour, there is a heightened risk of expropriation and nationalisation in such environments.
According to Joffe et al. (2009), expropriation is one of the most extreme non-commercial risks faced by investors. When this political risk occurs, the host government reneges on a prior contract with a foreign investor and seizes a greater share of an investment than was initially agreed. While international law acknowledges the sovereign right of host governments to expropriate foreign investments, such actions can only be carried out if companies are lawfully compensated (Khattab et al., 2007). The typical threats encountered by foreign investors include expropriation of assets by host states, tightening of fiscal terms or the so-called ‘creeping expropriation’, and restrictions on operations that effectively result in asset expropriation. However, in some instances, an outright nationalisation without compensation may occur (Joffe et al., 2009).

While the expropriation of foreign assets was a significant political risk in the 1960s and 1970s, it subsequently became a relatively rare event (Minor, 1994; Wells, 1998). In the early 1990s, emerging markets began to welcome foreign investors and demonstrated a commitment to economic reform. Consequently, FDI in developing countries increased from $23.7 billion in 1990 to $204 billion in 2001 (UNCTAD, 2002). Ramamurti and Doh (2004) consider the reasons behind the boom and identify that foreign investors may have believed that host governments in developing countries would not expropriate assets as they had in the past.

Examining the causes of expropriation can provide some insights into the possibility of a host government expropriating or nationalising a foreign
Chapter 2 (Essay One)

investment. Khattab et al. (2007) point out that a government may expropriate investments to prevent international projects from exploiting the country. If foreign investors begin to earn significant profits, both the host government and the local people can often become angered and feel that they are being exploited. The inequitable distribution of the economic gains from the international project leads to acts of expropriation or nationalisation in an attempt to regain a fair share of profits. Typically, high resource prices are cited as the reason for such nationalisations as resource exporting countries become endowed with increased bargaining power and attempt to profit from the economic advantages associated with nationalisation (Vivoda, 2009). While in agreement with the view that resource nationalism often occurs for financial reasons, Bremmer and Johnston (2009) identify another type that occurs in unstable political environments and is linked to political and social upheaval, referred to as revolutionary resource nationalism.

In a revolutionary political environment, political pressure can arise through a change in political ideology when the ability of governments to carry out the demands of the population is called into question. Duncan (2006, p.89) points out that in much of the political risk literature, ‘expropriatory behaviour is driven by political pressure on the domestic country government’. A survey conducted with executives of US companies in the 1970s also highlights how changes in political ideology and expropriations are intrinsically linked as the most commonly cited explanation for expropriation at the time was ‘political change involving not only a change of political leaders and government
personnel, but also, more fundamentally, a change in political and social ideology’ (Basche, 1979, p.8).

In this paper, we focus on changes in the risk of nationalisation for large multinational companies in the natural resource sector. Large companies have a greater propensity to undertake FDI (Blomstrom and Lipsey, 1991; Horst, 1972) and IPAs may be more successful in attracting investment by focusing on such companies. Tan and Vertinsky (1996) highlight that large companies are more capable of making larger foreign investments due to the high fixed costs and high risks associated with such ventures. In relation to the costs involved, Horst (1972) notes that large companies can often get financing more easily compared to their smaller counterparts. Jeon (1992) highlights how large companies are better able to invest abroad by noting that a sufficient amount of tangible and intangible assets is necessary for foreign investments. UNCTC (1992) informs us that large companies that operate in concentrated market structures often have ownership advantages that support FDI. Furthermore, large companies can fulfil the profit potential of domestic markets and involvement in foreign markets at a faster pace than smaller companies (UNCTC, 1992).

At the same time, large companies are also more susceptible to various risks that are different to those faced by small companies (Khattab et al., 2008). For instance, Henisz (2000) reveals that large companies are more prone to attracting the attention of host country authorities. In contrast, smaller companies that are less visible are less inclined to attract such attention.
Accordingly, large companies in the natural resource sector that have a greater capacity to exploit a host country are more susceptible to political risks such as expropriation and nationalisation (Stosberg, 2005; Vaghefi et al., 1991). IPAs need to be aware of large companies’ perceptions of such risks in order to guide their promotional efforts between image building and investment generation.

2.3. Measuring Perceptions of Political Risks

At present, investors’ perceptions are measured using various different qualitative methods. The FDI Promotion Centre recommends that IPAs refer to publicly available reports on their location and its investment climate (MIGA, 2010). Examples include country reports compiled for the World Investment Report (WIR), technical reports by the World Bank, and investment guides compiled by private consultancy firms such as PWC and KPMG. Other sources include country reports produced by the US Department of Commerce, and Economist Intelligence Unit’s annual publications. While such reports provide general insights into investors’ perceptions of particular markets, they often become outdated soon after publication due to risk perceptions changing in line with developments in the market.

Surveys of business conducted by PRI providers are frequently used to measure perceptions of political risks. For example, MIGA (2008, p.1) conducted a survey of PRI providers for the purpose of looking exclusively at
the South–South market for PRI and listed the objective of ‘gauging perceptions about the presence of political risk’. Similarly, MIGA (2009) produced a report to examine trends in political risk perceptions in the aftermath of the global financial crisis and used surveys for this purpose. However, as risk perceptions are constantly changing due to changes in the political environment, this qualitative approach is also limited as it simply provides an indication of risk perceptions at a point in time. Continually carrying out surveys is not feasible as it would require significant time and resources.

Moreover, the demand for PRI is often used as a measure of political risk perceptions in many surveys. Simply extrapolating from demand for insurance products to risk perceptions is fallacious as it overlooks issues that affect the demand, and there is evidence to suggest that this approach leads to inaccurate results. For example, MIGA (2008) explains that a lack of perceived need for coverage and a lack of awareness of insurance products are primary deterrents to purchasing PRI. These deterrents undermine the accuracy of this method as a measure of political risk perceptions. In relation to the lack of perceived need for coverage, risk perceptions that are determined from the demand for insurance will fail to take into consideration the investors who misperceive risks and do not demand coverage. In relation to the lack of awareness of insurance products, risk perceptions will fail to include investors who perceive risks but do not demand coverage. Consequently, risk perceptions will be flawed by these omissions.
Effective investment promotion has the potential to shape the perceptions of investors and attract FDI to emerging markets. However, in spite of its importance, it has been an area that has not received much attention in academic literature. Loewendahl (2001) informs us that the effective operation of an IPA is a complex task, with agencies facing competing demands to attract FDI while also having to cope with pressures from different government departments and regions to serve their particular interests. Furthermore, IPAs in most parts of the world face intensified competition for investment in a rapidly changing FDI marketplace. Due to the complexities of successful investment promotion, Loewendahl (2001) draws our attention to the need for more research in the area and emphasises the speed of response as being increasingly important to the success of IPAs. In this paper, we recognise that IPAs that conduct the most appropriate activities and that are in a position to speedily respond to changes in the business environment will be more effective in attracting investment. Our innovative methodology allows risk perceptions to be measured upon market developments so that IPAs can speedily determine whether image building or investment generation activities should be conducted to attract FDI.

3. Methodology

From a risk management perspective, Poon and Granger (2003) consider a good forecast of the volatility of an asset over a specific holding period as a
good starting point for assessing the risk of an investment. However, practitioners have encountered numerous complications in their attempts to accurately measure asset price volatility. Integrated volatility, which is recognised as the ‘true’ volatility, is not directly observable as we can only observe the discrete price movements of an asset and not the continuous dynamic that drives the movement (Garvey and Mullins, 2009). Over the years, much literature has attempted to estimate integrated volatility using approaches with varying degrees of complexity.

In the past, studies of financial market volatility generally focused on daily squared returns as a measure of integrated volatility. In recent years, it has become recognised that this approach produces a noisy estimate of integrated volatility as daily squared returns are calculated from daily closing prices and consequently omit price movements that occur during the day. While the daily squared returns approach produces an unbiased estimator of integrated volatility, its accuracy is limited due to its failure to account for intraday information. Andersen (2000) agrees that this approach is inefficient and suggests the use of higher-frequency returns for more accurate estimates of integrated volatility.

The prevalence of the use of daily squared returns had been largely due to the lack of available data at shorter frequencies. However, by virtue of technological advances both in the ability to capture HFD and in the ability of computer algorithms to deal with them in a suitable manner, tick-by-tick data can now be used to more accurately estimate integrated volatility. The use of
HFD to estimate integrated volatility is a significant improvement on the daily squared returns approach as it essentially extracts information from the data that would otherwise have been ignored by only using returns at a daily frequency. From a definitional perspective, Poon (2005) reveals that the term realised volatility has come to refer to the volatility calculated using intraday squared returns at short intervals such as 5 or 15 minutes. It has been shown that the realised volatility converges to the integrated volatility as the sampling frequency increases from daily to infinitesimal intervals. Hence, shorter sampling frequencies produce more precise estimates of integrated volatility.

While the advent of HFD has allowed for more accurate volatility estimates, there are issues associated with using financial market data at such short intervals that can lead to inaccurate results. Estimating realised volatility using HFD can lead to a bias in the volatility estimation that is attributable to a series of issues known as market microstructure effects. When prices are sampled at higher frequencies, these effects become more pronounced. In order to effectively utilise HFD, it is essential that an appropriate sampling frequency is chosen to limit the influence of these disturbances.

In quantitative finance literature, the sampling frequency is generally selected in an ad hoc manner. In relation to the choice of sampling frequency, there are two competing forces that essentially determine the amount of data that can be utilised from a dataset. On the one hand, much literature suggests that the bias induced by microstructure effects makes the most finely sampled data unusable, and many authors prefer to sample over longer time horizons to
obtain more reasonable estimates. For example, Meddahi (2002, p.1) states that ‘using data at the highest available frequency to measure volatility is not necessarily the best approach since the volatility may be contaminated by microstructure effects’. However, on the other hand, using a lower sampling frequency could lead to inaccurate estimates of the integrated volatility. As a trade-off between the accuracy of volatility estimates and limiting the influence of microstructure effects, Andersen et al. (2001) suggest the use of 5-minute return intervals to calculate daily realised volatility.

In this paper, we adopt the approach proposed by Andersen and Bollerslev (1998) for estimating realised volatility. This method involves summing up the squared returns in [0,T]:

\[ [Y, Y]^{(n,1)} = \sum \left( Y_{t_{n,i}} - Y_{t_{n,i-1}} \right)^2 \]

where \( Y \) is the observed log prices and observations occur on a grid of time points \( G_n = \{ t_{n,i}, i = 0,1,2,\ldots,n \} \). As ticks do not always exactly occur at each interval, the grid is created by interpolation between the closest recorded ticks before and after the time points on the grid. For each event, we adopt this methodology and calculate daily realised volatility for both BP Plc. and BG Group Plc. using 5-minute return intervals, starting at 8:05 all the way through to 16:30. For example, the intervals used in the study are 8:05–8:10, 8:10–8:15, . . . , 16:20–16:25, 16:25–16:30. According to Andersen and Bollerslev (1997),
the first 5-minute return of a trading day includes adjustments to overnight information, which results in a significantly higher return variability than any other 5-minute return during the day. Consequently, we remove this interval each day so that our daily realised volatility estimates are calculated from 101 intraday intervals. A preliminary filtering technique removes outliers from the data and considers transactions that take place within the London market’s trading hours (8:00–16:30). We also calculate average daily realised volatility and daily trading volume to augment our analysis.

4. Empirical Analysis

In recent years, risks related to nationalisation have become a feature of the political environment in Latin America. The politics of many countries in this region is driven by populist regimes which seek to secure greater economic benefits from their reserves of natural resources. Throughout the early to mid 2000s, the political environment in Bolivia became engulfed by the issue of resource nationalism and the political events of this period were strongly influenced by severe populist fervour, eventually culminating in the nationalisation of Bolivia’s oil and gas resources. On 1 May 2006, the Bolivian government passed a law, Supreme Decree No. 28701, announcing the nationalisation of Bolivia’s oil and gas sectors and calling for the renegotiation of contracts with hydrocarbons companies (Perreault and Valdivia, 2010). This announcement shocked the oil and gas industry as many large multinational
companies, such as Petrobras of Brazil, Repsol of Spain, BP and BG of the UK and Total of France, had operations in Bolivia. The nationalisation had a direct impact on these companies due to a consequential reduction in production and profits.

Before the announcement of nationalisation, three events occurred in Bolivia that signalled a heightening of such risk. On 18 July 2004, the then president, Carlos Mesa, held a national referendum on the role of the state in gas exploration and production. The outcome of the referendum highlighted the overwhelming anti-privatisation sentiment among the Bolivian population, as 92 percent of Bolivians were in favour of nationalising all of the country’s hydrocarbons (Kaup, 2008). As a direct consequence of the referendum, the Law of Hydrocarbons No. 3058 was passed on 17 May 2005 (Ribeiro, 2009). This new law seriously affected the environment in which oil companies operated in Bolivia as it increased state control of the production of hydrocarbons, introduced a new 32 percent tax on oil and gas production, and required private companies to renegotiate contracts with the government. Then, on 18 December 2005, the Movement Towards Socialism (MAS) candidate, Evo Morales, was elected to the presidency by 54 percent of voters (Keen and Haynes, 2009). Throughout his electoral campaign, Morales made the public aware of his disapproval of neoliberal economic policies that had been implemented in Bolivia and thus vowed to nationalise the hydrocarbon sector, alleviate poverty and empower the indigenous population. Morales promised
that nationalisation would increase government revenues and help relieve poverty. Table 1 provides a timeline of the aforementioned events.

**Table 1. Timeline of Events in Study**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/07/2004</td>
<td>National Referendum</td>
</tr>
<tr>
<td>17/05/2005</td>
<td>Law of Hydrocarbons</td>
</tr>
<tr>
<td>18/12/2005</td>
<td>Election of Morales</td>
</tr>
<tr>
<td>01/05/2006</td>
<td>Nationalisation of Oil and Gas Resources</td>
</tr>
</tbody>
</table>

In this analysis, the volatility of equity prices is used as the measure of risk perceptions. Using the daily realised volatility methodology, we calculate the volatility of equity prices around the aforementioned events for two companies on the LSE that were affected by the nationalisation of Bolivia’s oil and gas resources: BG Group Plc. and BP Plc. For each event, the sample period chosen is the month in which the event occurred and the data used are the tick data series recorded by the LSE in each month. The duration of the impact is examined for the days following the events, as the market assessed their impact on both companies. The two companies chosen were exposed to the threat of nationalisation, in that their earnings were directly affected by the nationalisation of oil and gas resources in Bolivia. Table 2 provides some fundamental information about both companies prior to the announcement of nationalisation.
Table 2. Fundamental Company Information

<table>
<thead>
<tr>
<th>Company</th>
<th>Market Capitalisation (GBP)</th>
<th>Weight in FTSE 100 Index (%)</th>
<th>Share Price (GBP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG Group Plc.</td>
<td>26 billion</td>
<td>1.76</td>
<td>737.0</td>
</tr>
<tr>
<td>BP Plc.</td>
<td>137 billion</td>
<td>9.24</td>
<td>676.5</td>
</tr>
</tbody>
</table>

Notes: Information in this table is sourced from Bloomberg. ‘GBP’ is an abbreviation for Great British Pound.


Bolivia held the referendum on a Sunday which means there was no trading activity on the LSE to estimate daily realised volatility on that day. However, the outcome of the referendum and the consequences of the results would not have become known until the days following the referendum. From both Figure 1 and Figure 2, we observe only a minimal increase in the daily realised volatility estimates for both BG Group Plc. and BP Plc. during this period. It appears that the market did not perceive a heightened risk of nationalisation in Bolivia due to the results of the referendum, as the daily realised volatility estimates did not increase significantly above the average daily realised volatilities.\(^1\) Furthermore, there was no significant increase in the volume of shares traded for both companies.

\(^1\) Data for the month of January were unavailable for inclusion in the average daily realised volatility calculations for 2004.
Figure 1. Daily Realised Volatility Estimate for BG Group Plc. – July 2004

Realised volatility
BG Group Plc. - July 2004

Date
1st July
18th July
30th July

Daily realised volatility
0.006
0.005
0.004
0.003
0.002
0.001

Average daily realised volatility (2004)

Trade volume
BG Group Plc. - July 2004

Date
1st July
18th July
30th July

Daily trade volume (Millions)
20
15
10
5

Daily trade volume

Daily realised volatility

Average daily realised volatility (2004)
Figure 2. Daily Realised Volatility Estimate for BP Plc. – July 2004
4.2. Law of Hydrocarbons (17 May 2005)

From both Figure 3 and Figure 4, we observe only a minimal increase in the daily realised volatility estimates for both BG Group Plc. and BP Plc. on the day after the Law of Hydrocarbons was passed. It appears that the market did not perceive a heightened risk of nationalisation in Bolivia due to the introduction of the new law. For BG Group Plc., the daily realised volatility estimate did not increase above the average volatility. For BP Plc., the daily realised volatility estimate increased only marginally above the average volatility. Furthermore, there was no significant increase in the volume of shares traded for both companies.

4.3. Election of Morales (18 December 2005)

Bolivia held the presidential election on a Sunday which means there was no trading activity on the LSE to estimate daily realised volatility on that day. However, the outcome of the election and the consequences of the results would not have become known until the days following the election. From Figure 5, we observe only a minimal increase in the daily realised volatility estimate for BG Group Plc. as a result of Morales being elected into power. From Figure 6, we observe no increase in the daily realised volatility estimate for BP Plc. These results indicate that the market was not concerned that Morales may implement more severe nationalisation policies. For BG Group
Figure 3. Daily Realised Volatility Estimate for BG Group Plc. – May 2005

![Realised volatility graph for BG Group Plc. - May 2005]

![Trade volume graph for BG Group Plc. - May 2005]
Figure 4. Daily Realised Volatility Estimate for BP Plc. – May 2005

Realised volatility
BP Plc. - May 2005

- Daily realised volatility
- Average daily realised volatility (2005)

Trade volume
BP Plc. - May 2005

- Daily trade volume

3rd May | 17th May | 31st May
---|---|---
Daily realised volatility

0.0004
0.0006
0.0008
0.0010
0.0012
0.0014
0.0016
0.0018

Date

Daily trade volume

30
35
40
45
50
55
60
65
70

Daily trade volume (Millions)
Figure 5. Daily Realised Volatility Estimate for BG Group Plc. – December 2005
Figure 6. Daily Realised Volatility Estimate for BP Plc. – December 2005

Plc., the daily realised volatility estimate increased only marginally above the average volatility, while the estimate for BP Plc. remained significantly below the average volatility. Furthermore, the volume of shares traded for both companies increased only marginally in the days following the election.
4.4. Volatility Patterns Pre- and Post-Events

In Table 3 and Table 4, we can observe the volatility patterns exhibited by BG Group Plc. and BP Plc. both before and after the national referendum, the Law of Hydrocarbons and the election of Morales. For both companies, there is no evidence that any of the events induced changes in realised volatility in the 5, 10, and 22 day periods following the events. Hence, these findings indicate that the events did not cause a shift in investors’ perceptions.

4.5. Discussion of Analysis

The findings that the share prices of both BG Group Plc. and BP Plc. did not exhibit an increase in volatility when the events occurred does not imply that the market misperceived the risk of nationalisation. Empirical evidence demonstrates that strong-form market efficiency holds in the pricing of liquid stocks (Jensen, 1978) which means all information is immediately reflected in their share prices. Due to their high trade volumes, both BG Group Plc. and BP Plc. are liquid stocks and this negates the possibility that investors misperceived the risk.

We posit that the lack of attention afforded to the risk of nationalisation by large multinational companies in the natural resource sector may be due to their willingness to undertake investments in risky locations. In this regard, Asiedu (2002) points out that political instability may not affect a country’s
Table 3. BG Group Plc. – Average Realised Volatility Around the Events that Occurred Prior to Nationalisation

<table>
<thead>
<tr>
<th></th>
<th>Pre-Event</th>
<th></th>
<th>Event Day</th>
<th></th>
<th>Post-Event</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22-Day</td>
<td>10-Day</td>
<td>5-Day</td>
<td></td>
<td>5-Day</td>
<td>10-Day</td>
</tr>
<tr>
<td>National Referendum</td>
<td>0.0017</td>
<td>0.0019</td>
<td>0.0012</td>
<td>0.0006</td>
<td>0.0014</td>
<td>0.0017</td>
</tr>
<tr>
<td>Law of Hydrocarbons</td>
<td>0.0013</td>
<td>0.0012</td>
<td>0.0010</td>
<td>0.0008</td>
<td>0.0010</td>
<td>0.0014</td>
</tr>
<tr>
<td>Election of Morales</td>
<td>0.0017</td>
<td>0.0018</td>
<td>0.0018</td>
<td>0.0019</td>
<td>0.0016</td>
<td>0.0016</td>
</tr>
</tbody>
</table>

Notes: The national referendum and the election of Morales both occurred on a Sunday and the market was closed. For these events, the realised volatility for the following day is used as the ‘Event Day’ estimate. Days with extreme outliers in the data were removed.

Table 4. BP Plc. – Average Realised Volatility Around the Events that Occurred Prior to Nationalisation

<table>
<thead>
<tr>
<th></th>
<th>Pre-Event</th>
<th></th>
<th>Event Day</th>
<th></th>
<th>Post-Event</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22-Day</td>
<td>10-Day</td>
<td>5-Day</td>
<td></td>
<td>5-Day</td>
<td>10-Day</td>
</tr>
<tr>
<td>National Referendum</td>
<td>0.0009</td>
<td>0.0009</td>
<td>0.0008</td>
<td>0.0005</td>
<td>0.0010</td>
<td>0.0011</td>
</tr>
<tr>
<td>Law of Hydrocarbons</td>
<td>0.0011</td>
<td>0.0010</td>
<td>0.0008</td>
<td>0.0014</td>
<td>0.0012</td>
<td>0.0011</td>
</tr>
<tr>
<td>Election of Morales</td>
<td>0.0013</td>
<td>0.0011</td>
<td>0.0007</td>
<td>0.0007</td>
<td>0.0006</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

Notes: The national referendum and the election of Morales both occurred on a Sunday and the market was closed. For these events, the realised volatility for the following day is used as the ‘Event Day’ estimate. Days with extreme outliers in the data were removed.
locational advantage when the returns on investments are so high as to outweigh the dangers posed by such instability. Furthermore, we posit that large multinational companies in the natural resource sector may be more capable of undertaking investments in risky locations due to the extent of their diversification. In a similar context, Beaulieu et al. (2005) contend that a multinational firm which is headquartered in Quebec but has operations in other countries can diversify away political risk and would be less affected by a possible Quebec independence than a company conducting business solely at local level. In contrast, small companies often have a large proportion of their assets and revenue streams concentrated in a single country, which heightens their vulnerability to specific country risk. In this regard, Schwert (2002, p.5) informs us that ‘small firms tend to be less diversified and younger, so they tend to be riskier than larger firms’. While such explanations are plausible, future research is required to support them in the context of our study.

5. Conclusion

The unique contribution of this paper involves the application of HFD to measure large multinational companies’ perceptions of the risk of nationalisation in the natural resource sector. At present, IPAs measure risk perceptions using qualitative methods that only provide a measurement of risk perceptions at a point in time; thus, they become outdated with developments in the political environment. In contrast to current methods, our approach
allows IPAs to speedily measure risk perceptions around market events using real-time data.

Using this innovative approach, the paper focuses on determining whether or not the risk of nationalisation in the natural resource sector is a concern for large multinational companies. Our findings demonstrate that such companies do not perceive nationalisation as a threat to future profitability. For each of the events that preceded and paved the way for the nationalisation of oil and gas resources in Bolivia, the market did not perceive nationalisation to be a concern for either BG Group Plc. or BP Plc. In both cases, the companies are large multinationals that operate in the natural resource sector.

From an IPA perspective, this finding has implications for guiding promotional efforts in countries where there is a risk of nationalisation. In such countries, IPAs could attract FDI to the natural resource sector by focusing their promotional efforts on investment generation and targeting large multinational companies that do not have negative perceptions about nationalisation risk. Evidence suggests that market efficiency exists in its strong form for large companies and this negates the possibility that investors misperceived the risk.

We identify two plausible explanations for the lack of attention afforded to the risk of nationalisation. Firstly, the profitable nature of natural resource investments may outweigh the risk involved. Secondly, large companies with operations in many countries may be less exposed to the risk. Thus, large multinational companies in the natural resource sector may be more
willing and capable of undertaking investments in countries where nationalisation is a threat. However, supporting such claims requires further analysis that is beyond the scope of this study.

Our findings also have implications for guiding promotional efforts in countries where changes in the political environment have reduced the risk of nationalisation. In such countries, IPAs tend to focus on image building to inform the investment community about the improved climate for FDI. Once the appropriate image of the location is formed in the minds of prospective investors, IPAs shift their focus from image building to investment generation (Wells and Wint, 2000). However, our findings demonstrate that IPAs that intend to attract large multinational companies to their natural resource sector should not focus promotional efforts towards image building. Such companies do not have negative perceptions about the risk of nationalisation; therefore, image building is unnecessary and would be wasteful of resources. Alternatively, IPAs should focus their promotional efforts towards investment generation activities. While predominantly beneficial for IPAs, these activities would also benefit the targeted companies that would immediately be made aware of investment opportunities in the IPA’s location.

While this paper focused on the risk of nationalisation, the methodology is generic and can be applied to any risk that hinders FDI. In countries where risks are changing, it allows IPAs to base their promotional efforts on up-to-date and relevant information. It allows IPAs to immediately identify the extent of investor concern and enables them to speedily determine
whether image building or investment generation activities should be conducted to attract FDI. By utilising this approach, IPAs could also assess targeted companies’ perceptions of risks that are similar to the risks that exist or existed in their own country. This would provide IPAs with a comparison measure of targeted companies and guide their promotional efforts in attracting the preferred investment.

References


Chapter 2 (Essay One)


Chapter 2  (Essay One)


THIS PAGE IS LEFT BLANK INTENTIONALLY
Chapter 3

(Essay Two)

Bilateral Investment Treaties and Foreign Direct Investment: Evidence of Asymmetric Effects on Vertical and Horizontal Investments
Bilateral Investment Treaties and Foreign Direct Investment: Evidence of Asymmetric Effects on Vertical and Horizontal Investments

Abstract

Bilateral investment treaties (BITs) are legal instruments used by developing and transition countries to provide investor protections and, by extension, promote higher levels of inward FDI. While the link between BITs and FDI has been extensively studied, little is known about the impact of the treaties on different forms of investment. Motivated by this observation, we examine the effects of BITs on vertical and horizontal FDI. We find that BITs are more positively related to vertical than to horizontal FDI. We also find that BITs tend to act as stronger substitutes for better institutions in the case of vertical relative to horizontal investments. The findings inform BIT strategies that are compatible with development objectives in developing and transition countries.

1. Introduction

Over the past two decades, the economic policy regimes of the majority of developing and transition countries have moved from inward-looking industrialisation strategies to a foreign direct investment (FDI)-assisted approach to economic development. Part of this policy shift has been the adoption of bilateral investment treaties (BITs) that aim to protect the
investments of multinationals and, by extension, encourage higher levels of FDI. BITs grant multinationals a broad set of investor rights and, in most instances, allow them to invoke an investor-state dispute settlement procedure in cases where those rights are violated. Developing and transition countries that sign BITs therefore incur restrictions on their sovereignty and risk costly arbitration proceedings on the basis that increased inward investment will stimulate growth and prosperity. Yet, it is not always the case that FDI contributes to development objectives. Indeed, the positive economic effects of FDI can differ substantially across different forms of investment (Narula and Guimon, 2010). A key question, therefore, is whether BITs promote the kinds of investment that bring desired benefits to host countries.

Although the link between BITs and FDI has been an extensively studied topic, practically all existing studies have focused on how the treaties impact aggregate levels of FDI and have produced mixed findings. Some studies find that BITs have a direct positive impact on FDI (Kerner and Lawrence, 2014; Busse et al., 2010; Kerner, 2009; Neumayer and Spess, 2005), others find no evidence of this link (Tobin and Rose-Ackerman, 2011; Hallward-Driemeier, 2003), while some show a positive connection that is dependent on institutional conditions in host countries (Tobin and Rose-Ackerman, 2011; Neumayer and Spess, 2005). An important issue not fully addressed in the literature, is the potentially heterogeneous impact of BITs across different forms of FDI. As a consequence, policymakers in developing
and transition countries lack complete information on whether the treaties promote investments that are compatible with their development objectives.

In this paper, we distinguish between vertical and horizontal FDI and examine the effect of BITs on each form of investment. Vertical FDI is undertaken by interlinked affiliates that divide the production process internationally, with the purpose to exploit cheaper factor prices available in foreign countries. In contrast, horizontal FDI is carried out by standalone affiliates that perform all business activities needed to serve the local market, with the purpose to reduce costs by selling through local subsidiaries rather than trade. Multinationals involved in vertical FDI are more vulnerable to host-country risks compared to those engaged in horizontal FDI, with the reason being that their entire global operations are vulnerable to production risks in the locations of their vertical enterprises. In contrast, for multinationals involved in horizontal FDI, the impact of host-country risks is limited to local operations (Slangen and Beugelsdijk, 2010; Desbordes, 2007). Moreover, multinationals involved in vertical FDI tend to be less tolerant of host-country risks compared to those engaged in horizontal FDI, with the reason being that they often have location choices for their vertical operations, whereas multinationals engaged in horizontal FDI are constrained by the need to access foreign markets (Woodward and Rolfe, 1993). Based on these differences in sensitivity to host-country risks, we expect BITs to be more positively related to vertical than to horizontal FDI. Additionally, we investigate whether the effects of BITs on vertical and horizontal FDI are conditional on institutional
environments in host countries. As multinationals involved in vertical FDI are more sensitive to host-country risks, they are likely to be more concerned about weak institutions, for which the treaties are designed to compensate. To the extent that BITs substitute for weak institutions, we expect them to have a stronger positive effect on vertical than on horizontal FDI in countries with weaker institutional conditions.

Understanding the impact of BITs on vertical and horizontal FDI is important for developing and transition countries seeking to achieve certain development objectives through inward FDI. Beugelsdijk et al. (2008) note that vertical investments have a more positive impact on employment generation, since they require a higher quantity of low-cost labour in order to produce inputs to serve multiple markets, while horizontal investments employ fewer workers because they need only to produce enough output to serve the local market. Zhang (2009) notes that vertical enterprises contribute to export revenue, as they have to ship their output to their home country or a third market for final assembly, while horizontal investments have no such impact because they sell output to the local market only. Notwithstanding their limitations, however, Beugelsdijk et al. (2008) contend that horizontal investments have the potential to impart larger spillovers to local firms. These investments bring extensive ownership advantages in order to outweigh their liability of foreignness, transferring knowledge capital from all parts of multinationals’ value chains to local subsidiaries. Furthermore, they seek to create linkages in the local economy, with the purpose to make them more
responsive to consumer needs, but which provide channels through which spillovers can occur. Vertical investments, on the other hand, relocate only the low-skilled labour-intensive parts of production in host countries, while they also tend not to create linkages so as to remove the possibility that local partners might endanger global production. Given that vertical and horizontal FDI have differing economic impacts on host-country employment, export performance, and technological upgrading, understanding the impact of BITs on these investments can inform decisions whether to pursue the treaties as a means to achieve development objectives.

Indeed, the question of whether BITs impact vertical and horizontal FDI is particularly important for developing and transition countries that seek explicitly to attract vertical or horizontal investments. For instance, China and Latin American economies have in recent decades aimed specifically to attract vertical investments through measures such as export processing zones, government grants and tax exemptions (Sinha et al., 2007; ECLAC, 2006). Moreover, in India, for example, vertical FDI promotion has even become considered to be a crucial requirement for continued economic development. The reason is that India’s economic progress is constrained by an excessive proportion of labour in unproductive agricultural activities, and vertical investments are considered necessary to shift this labour into manufacturing activities and, in turn, fuel economic growth (Choorikkadan, 2010). Other developing and transition countries, such as those in Latin America, have also aimed openly to promote horizontal FDI in recent years. With domestic
demand low in response to the global economic and financial crisis that commenced in 2007, many Latin American governments used measures such as tax cuts and credit market supports in order to boost horizontal investment (ECLAC, 2009). Given that developing and transition countries can have clear aims to attract vertical and horizontal FDI, addressing the question of whether BITs impact these investments can have direct policy implications.

Understanding the effectiveness of BITs in attracting vertical and horizontal investments is also important in light of current changes in global FDI patterns that are creating opportunities for developing and transition economies to attract and benefit from both vertical and horizontal investments. Because of rising wages and production costs, China is moving up the industrial ladder from low-skilled manufacturing to more innovative industries, with almost 100 million labour-intensive jobs in the process of relocating to lower-cost economies (Lin, 2011). Moreover, since the onset of the global economic and financial crisis in 2007, multinationals from developed countries have reacted to the fall in incomes in the developed world by seeking to enter or expand into new markets in developing regions. These changes present opportunities for developing and transition countries that are seeking to attract vertical and horizontal FDI, respectively. An implication of this research is that it demonstrates the value of BITs in attracting these investments.

From a broader perspective, a better understanding of the effects of BITs on FDI is ever more important given the significant fall in treaty participation in recent years. An increase in BIT claims has been at the root of
this trend and has called attention to the potency of the treaties, such as high compensation costs imposed on countries that violate BITs and rights of investors to challenge core policy changes that are considered to be in the public interest (Poulsen and Aisbett, 2013; UNCTAD, 2012). Increased awareness of the costs and obligations associated with the treaties has led to a gradual fall in the annual number of new BITs signed, with countries such as South Africa and India either reducing or suspending their treaty negotiations (IISD, 2013; Poulsen, 2013), while other countries, like Venezuela, have even moved to terminate existing agreements (IISD, 2012). An implication of these actions for developing and transition countries is that they may experience reduced FDI activity, while an even worse possible outcome is a slowdown in investments that match their development objectives. By examining the effects of BITs on vertical and horizontal FDI, this paper has implications for the continued use of the treaties as a means to promote foreign investment for development purposes. In particular, the findings may be applicable to developing or transition regions where foreign investors desire the protections provided by BITs. One notable example is the Caribbean, where FDI is shown to be highly sensitive to political risk (Kolstad and Villanger, 2008).

The paper is structured as follows: Section 2 provides a review of the relationship between BITs and FDI. It also discusses differences between vertical and horizontal FDI. Section 3 describes the model specifications, estimation technique and data used for empirical analysis. Section 4 presents the results. Section 5 concludes the paper with policy implications.
2. BITs and FDI

BITs contain provisions that aim to protect the investments of multinationals in developing and transition countries. While some variations exist, they are mostly standardised instruments that are based on model BITs designed by large capital-exporting economies. The standard provisions aim to provide foreign investors with a minimum absolute standard of treatment, fair treatment relative to national and most-favoured country investors, and adequate and prompt compensation for expropriated property, while a dispute settlement provision is also included to ensure compliance on the part of host governments (Neumayer and Spess, 2005).

A key function of BITs is to attend to the time-inconsistency problem that deters FDI. Prior to investments, host governments have an incentive to assure investor protections as they seek to secure the capital needed to start new business ventures. Once the set-up costs are met, however, their incentive often changes to seizing additional benefits from the investments (Neumayer and Spess, 2005). This change in attitude on the part of host governments acts as a disincentive to FDI because it can result in reduced investment returns through government interventions such as expropriation or discriminatory regulation. In an attempt to solve this issue and, by extension, promote higher levels of inward FDI, policymakers in developing and transition countries use BITs to inform foreign investors of their sincerity towards investor protection.
While providing a means to encourage FDI, BITs also impose a range of costs on signatory economies. Governments that sign BITs need to devote much time, effort and resources in order to negotiate and ratify the treaties, while they also incur restrictions on their sovereignty since the treaties are enforceable through binding legal procedures. Another potential cost is that the rights afforded to foreign investors often exceed those of domestic investors, reducing the competitiveness of local firms (Neumayer and Spess, 2005). Additionally, governments that breach the provisions of BITs face costs of litigation proceedings and compensation payouts, while they may also suffer a credit rating downgrade (Kerner, 2009), or reputational damage that deters future investment (Allee and Peinhardt, 2011; Tobin and Rose-Ackerman, 2011). Given these multitude of costs, developing and transition countries that sign BITs do so on the basis that they will enjoy significant economic benefits from increased inward investment.

From a theoretical perspective, BITs are expected to have a broad positive impact on inward FDI. On one hand, the treaties are expected to increase FDI flows from partner countries due to the binding commitments to protect and treat favourably the investors from those economies. This commitment effect is based on the idea that treaty non-compliance entails significant costs and so creates an incentive for host countries to ensure investment security (Kerner, 2009). Moreover, the treaties are expected to increase FDI flows from non-partner countries, by sending a signal to unprotected foreign investors that a country is serious about investment
protection. The basis for this signalling effect is that the costs associated with creating and negotiating treaties indicate a country’s resolve to maintain an investor-friendly environment (Kerner, 2009).

In addition to the direct link between BITs and FDI, theoretical arguments suggest that the impact of the treaties on foreign investment is dependent of the institutional environments in host countries. One argument is that, by conveying a credible expectation that a host government will protect foreign investments, BITs act as substitutes for better domestic institutions, having a more positive effect on FDI where institutions indicate weaker investment security. An alternative argument is that the treaties are more credible in economies with stronger institutions and, therefore, serve to complement rather than substitute for better institutions, in promoting FDI (Hallward-Driemeier, 2003). As both arguments have their merits, the extent to which BITs act as substitutes or complements to good domestic institutions, in promoting FDI, is largely an empirical question.

Although theory points to the positive effect of BITs on FDI, existing empirical studies that examine the impact of the treaties on foreign investment, using a variety of samples of countries and time periods, have produced inconsistent findings. On one hand, Neumayer and Spess (2005) find in a sample of 119 developing and transition countries between 1970 and 2001, that a higher number of BITs, weighted by partner countries’ shares of global FDI outflows, is positively associated with overall FDI flows in signatory economies. Similarly, Salacuse and Sullivan (2005) find in a sample of 31
developing countries over the period 1991–2000, that economies that enter into BITs with the US receive higher levels of FDI inflows from both the US and other countries. Controlling fully for the endogeneity between BITs and FDI, Kerner (2009) employs a sample of 127 developing and transition countries between 1982 and 2001 and shows that BITs encourage investments from both partner and non-partner countries. Using a sample of 83 developing and transition countries over the period 1978–2004, Busse et al. (2010) also finds that the treaties are positively related with overall FDI inflows. In contrast to these studies, Hallward-Driemeier (2003) finds no evidence that BITs have an independent impact on partner-country FDI flows to a sample of 31 developing economies over the period 1980–2000, while Tobin and Rose-Ackerman (2010) observe no direct link between a higher number of BITs and overall FDI inflows in sample of 97 developing and transition countries between 1984 and 2007. As for studies examining how BITs interact with domestic institutions to encourage FDI, empirical findings are also mixed. Busse et al. (2010) and Neumayer and Spess (2005) both find that the treaties act as substitutes for better institutions in promoting FDI, whereas Tobin and Rose-Ackerman (2010) find that they encourage more FDI by complementing better institutions.

Proponents of BITs have put forward a number of reasons to explain the weak empirical evidence in support of the treaties as credible instruments to promote FDI. One reason is that the treaties are likely to be more important for certain forms of FDI than others, and that their positive effects are obscured
when examining their impact on aggregate FDI (Kerner and Lawrence, 2014; Busse et al., 2010). To our knowledge, Kerner and Lawrence (2014) is the only empirical study that differentiates the effect of BITs according to investment type, finding that the treaties are more positively associated with fixed capital investments compared to other more liquid measures of multinational activity. The basis for this finding is that BITs are more important for investments that are more sensitive to host-country risk. Consistent with this argument, it is reasonable to expect that BITs have more positive effects on other forms of FDI with higher sensitivities to host-country risk.

Another possible reason for the weak evidence on BIT effectiveness is that it was not until the rise in the number of investment treaty claims in the late 1990s that both foreign investors and signatory countries became widely aware of the potency of the treaties. Prior to this period, foreign investors considered BITs to have little, if any, power to protect their investments, as the paucity of BIT claims provided scant evidence for a tangible impact of the treaties on investment security. However, since then, the proliferation of BIT claims has caused a heightened awareness among foreign investors of the full protective potential of the treaties (UNCTAD, 2009). Indeed, it is noted that foreign investors monitor closely the events at BIT arbitrations, while also receiving information on disputes through sources such as the media and political risk agencies (Allee and Peinhardt, 2011). Moreover, since the early 2000s, increased investor awareness of the power of BITs has been evident in the emergence of ‘BIT shopping’; a practice whereby investors restructure
investments to acquire treaty protection (Simmons, 2012; Legum, 2006). For BIT signatory countries, the rise in the number of investment treaty claims has also raised awareness of the full extent of the obligations and costs associated with the treaties (Poulsen and Aisbett, 2013; Jandhyala et al., 2011). Whereas most developing and transition countries once regarded BITs as merely tokens of goodwill, since the late 1990s they have been more aware of their requirements to maintain an investor friendly environment (Poulsen and Aisbett, 2013; Jandhyala et al., 2011). With awareness of the potency of BITs evolving over time, it is possible that the impact of the treaties on FDI is underestimated or obscured in studies using long historical sample periods.

The main contribution of this paper is to examine whether BITs have a more positive effect on vertical relative to horizontal FDI. While multinationals involved in vertical and horizontal FDI both face host-country risks, those involved in vertical investments are more sensitive to risks in the locations of their vertical enterprises. By relying on vertical activities to supply inputs for global production, their entire global operations are vulnerable to risks where their vertical enterprises are located (Slangen and Beugelsdijk, 2010; Desbordes, 2007). By separating production stages geographically, they also have limited substitutability between plants in different countries, reducing their capacity to cope with disruptions to vertical production (Aizenman and Marion, 2004). Insofar as they have location choices for their vertical activities, they are also less willing to tolerate risks where their vertical enterprises are located (Woodward and Rolfe, 1993). In contrast to these multinationals, those
involved in horizontal FDI are vulnerable only at a local level to host-country risks, since horizontal enterprises are detached from their parent companies. As they have identical production facilities in different countries, they also have some operational flexibility that reduces their vulnerability to specific country risks. With their location choices constrained by the need to access foreign markets, they are also more prepared to bear risks in the host countries of their horizontal enterprises. By having a more positive impact on investments that are more sensitive to host-country risks, we expect BITs to be more positively associated with vertical relative to horizontal FDI.

Another contribution that this paper makes is that it examines whether the effects of BITs on vertical and horizontal FDI are conditional on institutional environments in host countries. Insofar as BITs provide credible assurances of investment protection, they are expected to substitute for weak institutional conditions; namely, expropriation risk, poor law and order, and government instability (Neumayer and Spess, 2005). For foreign investors, vertical and horizontal alike, these institutional deficiencies pose various concerns which, in turn, can deter investment. Expropriation risk is a prominent concern as it can result in reduced investment profitability and, worse still, investment confiscation (Neumayer and Spess, 2005). Weak law and order poses concerns in terms of contract enforcement (Henisz, 2000), property rights protection (Lee and Mansfield, 1996), and discriminatory treatment by host governments (Neumayer and Spess, 2005). Government instability constitutes a concern in that it creates uncertainty about future
policies of an incoming regime (Alesina, 1996). To the extent that BITs have evolved over time to provide credible assurances of investment protection and, thus, substitute for weak institutional conditions, we expect them to have more positive effects on vertical and horizontal FDI in countries with higher expropriation risk, poorer law and order, and weaker government stability. We also expect these effects to be stronger in the case of vertical FDI which is more sensitive to host-country risks.

3. Modelling the Impact of BITs on Vertical and Horizontal FDI

3.1. Model Specifications and Estimation Technique

A series of regression models that employ three different dependent variables are used to analyse the effects of BITs on vertical and horizontal FDI. We use a proxy for vertical FDI as the dependent variable to examine the effect of BITs on vertical FDI, while we employ a measure of horizontal FDI as the dependent variable to determine the impact of the treaties on horizontal investments. To investigate the relative effects of BITs on vertical and horizontal FDI, the ratio of vertical to horizontal FDI is used as the dependent variable. This ratio is an appropriate dependent variable as it reflects any additional variance in vertical FDI that is not present in horizontal FDI, and vice versa. Based on this reasoning, the same dependent variable is also used
Chapter 3 (Essay Two)

by Slangen and Beugelsdijk (2010) who examine the relative effects of institutional hazards on vertical and horizontal FDI.

Equation (1) outlines the baseline models used to examine the impact of BITs on US vertical FDI, US horizontal FDI, and their ratio, respectively. These models are written as:

\[
FDI_{i,t} = \alpha + \beta BITs_{i,t-1} + \gamma X_{i,t} + \eta_t + \delta T + a_i + \varepsilon_{i,t}
\]

where \( FDI_{i,t} \) refers to the level of US vertical FDI, US horizontal FDI, and the ratio of US vertical to horizontal FDI, respectively; \( BITs_{i,t} \) refers to the number of BITs ratified with OECD countries, weighted by partner countries’ shares of global FDI outflows; \( X_{i,t} \) represents a set of host-country control variables; \( \eta_t \) is year effects; \( T \) is a country-specific time trend; \( a_i \) is country-specific effects; \( \varepsilon_{i,t} \) is a random error term; and the subscripts \( i \) and \( t \) represent each host country and year, respectively.

Equation (2) summarises the models used to examine whether the effects of BITs on US vertical FDI, US horizontal FDI, and their ratio, are conditional on institutional environments in host countries. In these models, interaction terms are added to equation (1) to capture the influence of
Chapter 3 (Essay Two)

expropriation risk, law and order, and government stability, respectively.\(^1\) The models are written as:

\[
FDI_{i,t} = \alpha + \beta BITs_{i,t-1} + \beta_1(BITs * ICRG)_{i,t-1} + \gamma X_{i,t-1} + \eta_t + \delta T + a_i + \epsilon_{i,t}
\]

where \(ICRG\) refers to the level of expropriation risk, law and order, and government stability, respectively.

A feasible generalized least squares (FGLS) estimator is used to estimate all models. Modified Wald chi-squared tests for heteroskedasticity in panel datasets show that all models contain within-panel heteroskedasticity, while Wooldridge’s (2002) test for autocorrelation in panel datasets also indicates that all models are first-order serially correlated. The FGLS technique corrects the models’ standard errors for both of these issues.

3.2. Data and Description of Variables

Data for the dependent variables, namely, the levels of US vertical FDI, US horizontal FDI, and their ratio, are obtained from the US Direct Investment Abroad Database of the Bureau of Economic Analysis (BEA). This database collects annual information on the financial and operational activities of foreign affiliates of all US parent companies, through surveys of US

\(^1\) A significantly negative coefficient on these interaction terms would indicate that BITs have a stronger positive effect on vertical FDI, horizontal FDI, and their ratio, in countries with higher expropriation risk, weaker law and order, and lower government stability.
Chapter 3 (Essay Two)

multinationals. Using BEA data on the destination of the sales of goods of US foreign affiliates, as well as data on the affiliation of buyers, we distinguish between US vertical and horizontal FDI. We measure the vertical FDI levels of US foreign affiliates in a particular host country as the aggregate sales of goods by the affiliates to their US parent companies and affiliated buyers in third countries, while we measure the horizontal FDI levels of US foreign affiliates in a particular host country as the aggregate sales of goods by the affiliates to unaffiliated buyers in the local economy. The same proxies of vertical and horizontal FDI are used by Slangen and Beugelsdijk (2010), Hakkala et al. (2008), and Aizenman and Marion (2004).

As regards BITs, which is our main independent variable of interest, data are obtained from country-specific lists of BITs published by UNCTAD. These lists provide information on all BITs signed by all countries worldwide, including details of partner countries, and dates of ratification. We construct the BIT variable as the number of BITs a country has ratified with OECD countries, weighted by partner countries’ shares of global FDI outflows.\(^2\) We consider BITs ratified with OECD countries only, as these treaties are the ones most likely to influence FDI decisions,\(^3\) while we use the weighting procedure

\(^2\) This measure is commonly used in the existing literature (Tobin and Rose-Ackerman, 2011; Neumayer and Spess, 2005; among others).

\(^3\) While developing and transition countries occasionally enter into BITs with each other, these treaties are often adopted for symbolic purposes and are generally not expected to have an impact on FDI (Tobin and Rose-Ackerman, 2011).
Chapter 3 (Essay Two)

to more accurately reflect the extent of protections provided by signatory countries.  

Because it takes times for multinational investments to produce positive results, multinationals sales are unlikely to respond instantly to BIT ratification. For this reason, we use the one-year lag of the BIT variable in order to better capture the influence of the treaties on multinational investment decisions. As the BIT variable is in part composed of US treaties, the use of its one-year lagged values also mitigates the potential reverse causality bias arising from higher US foreign affiliate sales motivating a country’s pursuit of a US treaty.

Information for the institutional variables, namely, expropriation risk, law and order, and government stability, are obtained from the indices of the International Country Risk Guide’s (ICRG) political risk ratings. The investment profile index measures risk related to expropriation and provides a score on a scale of one to 12. The law and order index assesses the strength and impartiality of the legal system, as well as popular observance of the law, and varies between one and six. The government stability index measures

---

4 This weighting procedure captures the expectation that BITs ratified with countries more dominant in global FDI outflows send a stronger signal of investment security to unprotected foreign investors (Tobin and Rose-Ackerman, 2011).
5 We have no clear expectation regarding the time period that might be required for BITs to influence multinational sales. However, the use of a one-year lag is in keeping with Kerner and Lawrence (2014) who also investigate the impact of the treaties on multinational activities.
6 It is only US BITs ratified within the period of analysis that may contribute to this reverse causality bias. The reason why this is the case is that BITs are exogenous to FDI decisions once they are ratified, as they remain in place for a long period of time (Aisbett, 2009). In our sample, two US BITs were ratified during the period of study; treaties with Czech Republic and Honduras. Using the one-year lag of the BIT variable mitigates the potential reverse causality bias associated with these treaties. In terms of BITs ratified with countries other than the US, reverse causality is not an issue, since a country’s decision to enter these treaties is exogenous to US FDI activity.
government unity, legislative strength, and popular support, and ranges from one to 12. In the case of each of these indices, lower values indicate higher risk, and vice versa.

Our set of independent variables includes host-country control variables that are expected to influence the sales levels of US foreign affiliates. These variables include measures of the average wage rate of employees of US foreign affiliates, openness to FDI, market size, market growth, and natural resource abundance.7 We measure the average wage rate of employees of US foreign affiliates as the total annual employee compensation of the affiliates divided by their total number of employees. Data for this variable are obtained from the BEA’s US Direct Investment Abroad Database. We measure openness to FDI as the inward stock of FDI as a percentage of GDP. Information for this variable is sourced from UNCTAD’s Foreign Direct Investment Database. We measure market size and market growth using the level of real GDP and the growth rate of real GDP per capita, respectively. Data for these variables are obtained from the World Development Indicators. We measure natural resource abundance through two variables; one being fuel exports relative to total exports, and the other being ores and metal exports relative to total exports. Data for these variables are obtained from the World Development Indicators.

---

7 These variables are the same as those used by Slangen and Beugelsdijk (2010), with some exceptions. We do not include country-specific variables, such as geographic distance, common language, and NAFTA, NATO and WTO dummies, as these effects are captured by our country dummies. Also, we measure market size using the level of real GDP rather than population size. In unreported models, we experimented using population size but we repeatedly found it to be insignificant.
In addition, we use country dummies to control for omitted variable bias that may be caused by time-invariant unobserved heterogeneity across countries. In studies of bilateral investment, the main source of this bias is ‘multilateral resistance’ which is described as the barriers to investment between two countries relative to their average barriers with other countries (Anderson and van Wincoop, 2003). The bias derives from foreign investors’ tendency to invest in countries where they encounter lower investment barrier than elsewhere. As explained by Anderson and van Wincoop (2003), to the extent that the multilateral resistance terms are slow-moving over time, the inclusion of country dummies is a suitable method to address this issue. Moreover, we use year dummies to account for year-specific factors that affect all US FDI in the same way, while we also include country-specific time trends to ensure that the independent variables are not biased by a time trend with the dependent variables.

3.3. Sample Characteristics

Our sample consists of 28 developing and transition countries for which data is available over the period 1999–2008. The sample size is determined by the availability of BEA data on US vertical and horizontal FDI in developing and transition economies.

Because the BEA data is not available for all developing and transition countries where US multinationals are located, our sample used for empirical
analysis is limited to economies that, among other things, have somewhat better institutional and economic environments relative to the entirety of developing and transition countries in which US multinationals invest. As a consequence, insofar as BITs are more (less) effective in promoting FDI in countries with stronger institutional and economic environments, our results may overestimate (underestimate) their effectiveness. Importantly, however, we see no clear reason why this issue would bias our results in relation to the impact of BITs on the ratio of vertical to horizontal FDI. Nevertheless, we cautiously draw attention to the possible risk to external validity inherent in the sample.

While another empirical limitation is that our sample is restricted to the period 1999–2008, this period was associated with heightened awareness of the potency of the treaties. Compared to previous studies that use long historical sample periods to ascertain the effects of BIT on FDI, we expect our more recent sample to be more likely to show the potentially positive effects of the treaties.

4. Empirical Results

This section presents our empirical results using the FGLS estimation procedure. Descriptive statistics of the data analysed are reported in Table 1. The results of equation (1), in which we investigate the impact of BITs on US vertical and horizontal FDI, respectively, are shown in Table 2. We find
that BITs have positive effects on both forms of US FDI. An increase of 1 percent in the weighted number of ratified BITs is associated with a 0.907 percent increase in sales arising from US vertical FDI (Model 1) and a 0.214 percent increase in sales by US horizontal FDI (Model 2). These findings imply that BITs promote both vertical and horizontal FDI by indicating a host-country’s sincerity to investment protection. The findings are consistent with those of Kerner and Lawrence (2014), Busse et al. (2011), Kerner (2009), and Neumayer and Spess (2005), who all find evidence of a positive impact of the treaties on FDI.

Equation (1) also tests whether BITs are positively associated with the ratio of US vertical to horizontal FDI, and the results are shown in Table 2. We find that BITs have a positive impact on the ratio of US vertical to horizontal FDI. A 1 percent increase in the weighted number of ratified BITs is associated with a rise of 0.694 percent in the sales ratio of US vertical to horizontal FDI (Model 3). This finding implies that BITs are more positively related to vertical than to horizontal FDI, and is consistent with the expectation that the treaties are more important to foreign investments that are more sensitive to host-country risks. In the case of multinationals involved in vertical FDI, their higher sensitivity to host-country risks is attributable to their global vulnerability to specific country hazards (Slangen and Beugelsdijk, 2010; Desbordes, 2007), their limited substitutability between plants in different economies (Aizenman and Marion, 2004), and their lower willingness to
Table 1. Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical FDI</td>
<td>8.148</td>
<td>1.533</td>
<td>3.784</td>
<td>11.742</td>
</tr>
<tr>
<td>Horizontal FDI</td>
<td>9.096</td>
<td>1.090</td>
<td>6.644</td>
<td>11.414</td>
</tr>
<tr>
<td>Vertical FDI/Horizontal FDI</td>
<td>-0.948</td>
<td>1.025</td>
<td>-4.888</td>
<td>1.143</td>
</tr>
<tr>
<td>BITs</td>
<td>0.526</td>
<td>0.218</td>
<td>0</td>
<td>0.888</td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>9.739</td>
<td>0.487</td>
<td>8.831</td>
<td>10.868</td>
</tr>
<tr>
<td>FDI Openness</td>
<td>3.348</td>
<td>0.935</td>
<td>1.225</td>
<td>6.343</td>
</tr>
<tr>
<td>Market Size</td>
<td>25.854</td>
<td>1.146</td>
<td>22.748</td>
<td>28.622</td>
</tr>
<tr>
<td>Market Growth</td>
<td>0.039</td>
<td>0.034</td>
<td>-0.117</td>
<td>0.162</td>
</tr>
<tr>
<td>Fuel Export Share</td>
<td>1.770</td>
<td>1.353</td>
<td>-2.706</td>
<td>4.541</td>
</tr>
<tr>
<td>Ores and Metals Export Share</td>
<td>1.219</td>
<td>1.104</td>
<td>-1.436</td>
<td>4.171</td>
</tr>
</tbody>
</table>

Notes: The mean, standard deviation, minimum and maximum are measured using annual data for the sample of 28 developing and transition countries and over the time period 1999–2008. All variables are as described in Section 3.2. Data is transformed to eliminate skewness and/or outliers. Vertical FDI, horizontal FDI, vertical FDI/horizontal FDI, average wage rate, FDI openness, market size, fuel export share, and ores and metals export share, are measured using their natural logarithms.
## Table 2. FGLS Regression Estimates of the Impact of BITs on Vertical FDI, Horizontal FDI, and Their Ratio

<table>
<thead>
<tr>
<th>Dependent Variable: Vertical FDI (Model 1)</th>
<th>Dependent Variable: Horizontal FDI (Model 2)</th>
<th>Dependent Variable: Vertical FDI / Horizontal FDI (Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BITs</td>
<td>0.907*** (0.289)</td>
<td>0.694** (0.533)</td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>0.267 (0.181)</td>
<td>-0.267 (0.189)</td>
</tr>
<tr>
<td>FDI Openness</td>
<td>0.327*** (0.123)</td>
<td>0.291** (0.120)</td>
</tr>
<tr>
<td>Market Size</td>
<td>1.561*** (0.534)</td>
<td>0.069 (0.533)</td>
</tr>
<tr>
<td>Market Growth</td>
<td>0.003 (0.008)</td>
<td>-0.005 (0.009)</td>
</tr>
<tr>
<td>Fuel Export Share</td>
<td>0.061 (0.041)</td>
<td>-0.043 (0.042)</td>
</tr>
<tr>
<td>Ores and Metals Export Share</td>
<td>-0.063 (0.094)</td>
<td>0.097 (0.093)</td>
</tr>
<tr>
<td>Constant</td>
<td>-37.495*** (13.819)</td>
<td>-1.791 (13.795)</td>
</tr>
</tbody>
</table>

**Notes:** This table reports the coefficient estimates from the FGLS regression estimation of equation (1), with robust standard errors corrected for heteroskedasticity and autocorrelation reported in parentheses under each corresponding coefficient. The variables included in the models are as defined in Section 3.2 and Table 1. All models include country and year dummies and a country-specific time trend, but these are not reported in order to conserve space. The total number of observations in each model is 202; this is associated with each model containing data from 28 developing and transition countries over the period 1999–2008 (See Appendix for the list of sample countries.) * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
tolerate risks where their vertical operations are located (Woodward and Rolfe, 1993). In contrast, multinationals involved in horizontal FDI have a lower sensitivity to host-country risks, with the reasons being that they are vulnerable only at a local level to specific country hazards, have some degree of flexibility to move production between countries, and are more prepared to bear risks in the countries of their horizontal enterprises.

The results of equation (2), in which we investigate whether the effects of BITs on US vertical and horizontal FDI are conditional on institutional environments in host countries, are shown in Tables 3–5. We find that BITs have a more positive effect on US vertical FDI in countries with higher expropriation risk, poorer law and order, and lower government stability. A 1 percent deterioration in a country’s expropriation risk profile, legal system, and government stability, raises the impact of its weighted number of ratified BITs on US vertical FDI sales, by 0.676 percent (Model 4), 0.346 percent (Model 7), and 0.337 percent (Model 10), respectively. These findings imply that BITs substitute for lower expropriation risk, better law and order, and higher government stability, in promoting vertical FDI. The findings support those of Busse et al. (2011) and Neumayer and Spess (2005), who show that BITs increase FDI inflows by substituting for better institutions. We also find that BITs have a more positive effect on US horizontal FDI in countries with weaker law and order; with a 1 percent reduction in the quality of a country’s legal system associated with a 0.199 percent rise in the impact of the weighted number of ratified BITs on US horizontal FDI sales (Model 8). However, we
Chapter 3 (Essay Two)

Table 3. FGLS Regression Estimates of the Interactive Effects of BITs and Expropriation Risk on Vertical FDI, Horizontal FDI, and Their Ratio

<table>
<thead>
<tr>
<th></th>
<th>Dependent Variable: Vertical FDI (Model 4)</th>
<th>Dependent Variable: Horizontal FDI (Model 5)</th>
<th>Dependent Variable: Vertical FDI / Horizontal FDI (Model 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BITs</td>
<td>1.745*** (0.651)</td>
<td>-0.095 (0.316)</td>
<td>2.135*** (0.712)</td>
</tr>
<tr>
<td>Expropriation Risk</td>
<td>-0.192 (0.227)</td>
<td>0.042 (0.640)</td>
<td>-0.117 (0.243)</td>
</tr>
<tr>
<td>BITs * Expropriation Risk</td>
<td>-0.676** (0.280)</td>
<td>0.059 (0.147)</td>
<td>-0.905*** (0.316)</td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>0.116 (0.175)</td>
<td>0.559*** (0.090)</td>
<td>-0.477** (0.186)</td>
</tr>
<tr>
<td>FDI Openness</td>
<td>0.249** (0.118)</td>
<td>0.034 (0.057)</td>
<td>0.385*** (0.114)</td>
</tr>
<tr>
<td>Market Size</td>
<td>1.351*** (0.412)</td>
<td>1.423*** (0.205)</td>
<td>0.204 (0.443)</td>
</tr>
<tr>
<td>Market Growth</td>
<td>-0.022 (0.008)</td>
<td>0.003 (0.005)</td>
<td>-0.025 (0.010)</td>
</tr>
<tr>
<td>Fuel Export Share</td>
<td>-0.026 (0.054)</td>
<td>0.064** (0.005)</td>
<td>-0.134*** (0.049)</td>
</tr>
<tr>
<td>Ores and Metals Export Share</td>
<td>-0.184 (0.092)</td>
<td>-0.145*** (0.046)</td>
<td>0.035 (0.092)</td>
</tr>
</tbody>
</table>
Chapter 3 (Essay Two)

Table 3 (Continued)

Notes: This table reports the coefficient estimates from the FGLS regression estimation of equation (2), with robust standard errors corrected for heteroskedasticity and autocorrelation reported in parentheses under each corresponding coefficient. The variables included in the models are as defined in Section 3.2 and Table 1. All models include country and year dummies and a country-specific time trend, but these are not reported in order to conserve space. The total number of observations in each model is 202; this is associated with each model containing data from 28 developing and transition countries over the period 1999–2008 (See Appendix for the list of sample countries.) * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
Table 4. FGLS Regression Estimates of the Interactive Effects of BITs and Law and Order on Vertical FDI, Horizontal FDI, and Their Ratio

<table>
<thead>
<tr>
<th></th>
<th>Dependent Variable: Vertical FDI</th>
<th>Dependent Variable: Horizontal FDI</th>
<th>Dependent Variable: Vertical FDI / Horizontal FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Model 7)</td>
<td>(Model 8)</td>
<td>(Model 9)</td>
</tr>
<tr>
<td>BITs</td>
<td>0.908*** (0.303)</td>
<td>0.238** (0.167)</td>
<td>0.513 (0.319)</td>
</tr>
<tr>
<td>Law and Order</td>
<td>-0.425 (0.154)</td>
<td>0.011 (0.085)</td>
<td>-0.602 (0.164)</td>
</tr>
<tr>
<td>BITs * Law and Order</td>
<td>-0.346*** (0.161)</td>
<td>-0.199** (0.095)</td>
<td>-0.083 (0.181)</td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>0.303 (0.184)</td>
<td>0.594*** (0.089)</td>
<td>-0.323* (0.196)</td>
</tr>
<tr>
<td>FDI Openness</td>
<td>0.257** (0.114)</td>
<td>0.054 (0.054)</td>
<td>0.353*** (0.116)</td>
</tr>
<tr>
<td>Market Size</td>
<td>1.439*** (0.383)</td>
<td>1.508*** (0.199)</td>
<td>-0.125 (0.430)</td>
</tr>
<tr>
<td>Market Growth</td>
<td>-0.021 (0.007)</td>
<td>0.001 (0.004)</td>
<td>-0.019 (0.008)</td>
</tr>
<tr>
<td>Fuel Export Share</td>
<td>-0.009 (0.050)</td>
<td>0.059** (0.029)</td>
<td>-0.117*** (0.042)</td>
</tr>
<tr>
<td>Ores and Metals Export Share</td>
<td>-0.126 (0.091)</td>
<td>-0.128*** (0.045)</td>
<td>0.050 (0.089)</td>
</tr>
<tr>
<td>Constant</td>
<td>-33.033*** (10.746)</td>
<td>-36.579*** (5.368)</td>
<td>5.172 (11.963)</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

Notes: This table reports the coefficient estimates from the FGLS regression estimation of equation (2), with robust standard errors corrected for heteroskedasticity and autocorrelation reported in parentheses under each corresponding coefficient. The variables included in the models are as defined in Section 3.2 and Table 1. All models include country and year dummies and a country-specific time trend, but these are not reported in order to conserve space. The total number of observations in each model is 202; this is associated with each model containing data from 28 developing and transition countries over the period 1999–2008 (See Appendix for the list of sample countries.) * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
Table 5. FGLS Regression Estimates of the Interactive Effects of BITs and Government Stability on Vertical FDI, Horizontal FDI, and Their Ratio

<table>
<thead>
<tr>
<th></th>
<th>Dependent Variable: Vertical FDI (Model 10)</th>
<th>Dependent Variable: Horizontal FDI (Model 11)</th>
<th>Dependent Variable: Vertical FDI / Horizontal FDI (Model 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BITs</td>
<td>1.135*** (0.419)</td>
<td>0.045 (0.248)</td>
<td>1.234** (0.504)</td>
</tr>
<tr>
<td>Government Stability</td>
<td>-0.033 (0.115)</td>
<td>0.015 (0.062)</td>
<td>-0.013 (0.126)</td>
</tr>
<tr>
<td>BITs * Government Stability</td>
<td>-0.337* (0.280)</td>
<td>-0.018 (0.104)</td>
<td>-0.433** (0.213)</td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>0.134 (0.183)</td>
<td>0.548*** (0.089)</td>
<td>-0.445** (0.199)</td>
</tr>
<tr>
<td>FDI Openness</td>
<td>0.274** (0.117)</td>
<td>0.054 (0.054)</td>
<td>0.342*** (0.118)</td>
</tr>
<tr>
<td>Market Size</td>
<td>1.637*** (0.414)</td>
<td>1.482*** (0.207)</td>
<td>0.246 (0.464)</td>
</tr>
<tr>
<td>Market Growth</td>
<td>-0.017 (0.007)</td>
<td>0.003 (0.004)</td>
<td>-0.019 (0.008)</td>
</tr>
<tr>
<td>Fuel Export Share</td>
<td>-0.030 (0.047)</td>
<td>0.059* (0.030)</td>
<td>-0.134*** (0.045)</td>
</tr>
<tr>
<td>Ores and Metals Export Share</td>
<td>-0.236** (0.095)</td>
<td>-0.134*** (0.045)</td>
<td>-0.027 (0.095)</td>
</tr>
<tr>
<td>Constant</td>
<td>-36.670*** (11.444)</td>
<td>-35.396*** (5.536)</td>
<td>-3.754 (12.684)</td>
</tr>
</tbody>
</table>
Table 5 (Continued)

Notes: This table reports the coefficient estimates from the FGLS regression estimation of equation (1), with robust standard errors corrected for heteroskedasticity and autocorrelation reported in parentheses under each corresponding coefficient. The variables included in the models are as defined in Section 3.2 and Table 1. All models include country and year dummies and a country-specific time trend, but these are not reported in order to conserve space. The total number of observations in each model is 202; this is associated with each model containing data from 28 developing and transition countries over the period 1999–2008 (See Appendix for the list of sample countries.) * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
find no evidence that the impact on BITs on these investments is conditional on the extent of expropriation risk or government stability in host economies (Model 5 and Model 11, respectively). These findings indicate that BITs act as substitutes for stronger law and order, but not for lower expropriation risk or higher government stability, in promoting horizontal FDI. A possible reason for these findings is that multinationals involved in horizontal FDI are primarily concerned only about the potential adverse effects of weak law and order on their horizontal operations. By competing directly with local businesses, horizontal enterprises are particularly vulnerable to the lobbying efforts of local firms who seek to ensure their competitiveness. As they create linkages locally, they are also vulnerable to disputes with local business partners. Weak law and order exacerbates these issues for horizontal enterprises by increasing the possibility of unfair treatment relative to local firms. Once more, the finding that BITs serve to substitute for better institutions, in this case stronger law and order, is consistent with the findings of Busse et al. (2011) and Neumayer and Spess (2005).

Equation (2) also tests whether the impact of BITs on the ratio of US vertical to FDI is conditional on institutional environments in host countries, and the results are shown in Tables 3–5. We find that BITs have a more positive effect on the ratio of US vertical to horizontal FDI in countries with higher expropriation risk and lower government stability. In this regard, a 1 percent deterioration in a country’s expropriation risk profile and government stability increases the impact of its weighted number of ratified BITs on the
Chapter 3 (Essay Two)

ratio of US vertical to horizontal FDI sales, by 0.905 percent (Model 6) and
0.433 percent (Model 12), respectively. We find no evidence, however, that the
effect of the treaties on this ratio is conditional on the strength of law and order
in host economies (Model 9). These findings confirm that BITs have a stronger
substitution effect for both lower expropriation risk and higher government
stability in promoting vertical relative to horizontal FDI, and are consistent
with the idea that the treaties are more important to foreign investments that are
more sensitive to host-country risks. A possible reason why we do not find
BITs to be more important for vertical FDI in countries with weaker law and
order, is that while vertical enterprises are generally more sensitive to host-
country risks, horizontal enterprises are more exposed to the possibility of
unfair treatment arising from weak legal systems.

Across all models, most of the control variables are either significant
with an intuitive sign or insignificant. As regards the former variables, market
size and openness to FDI show a repeated positive association with US vertical
FDI, while market size and the average wage rate are persistently positively
associated with US horizontal FDI. For vertical enterprises, larger markets, as
measured by real GDP, indicate higher productivity which, in turn, may
stimulate investment and sales, while more open FDI regimes may provide
more favorable conditions for the import of inputs and the export of processed
goods. In the case of horizontal enterprises, larger markets are important
drivers of sales and investment, as they provide larger consumer bases from
which to achieve higher returns, while higher wages imply increased consumer
demand which is conducive to sales. When the ratio of US vertical FDI to US horizontal FDI is the dependent variable, the average wage rate and openness to FDI are persistently significantly negative and positive, respectively. The basis for these results is that higher wages stimulate horizontal investments but not vertical investments, while, in contrast, FDI openness facilitates vertical investments but not horizontal investments.

A few other observations on other control variables are interesting to note. In models with US horizontal FDI as the dependent variable, both the fuel exports share and ores and metals exports share, persistently enter as significantly positive and negative, respectively. Although consistent with the results of Slangen and Beugelsdijk (2010), these observations appear somewhat surprising, since horizontal investments are not typically related to natural resources abundance. A possible reason for the positive association between fuel exports share and horizontal FDI is that countries with an abundance of natural resource often have dual economies in which low productive capacities in non-resource sectors encourage multinationals that want to expand in markets with low competition. A possible explanation for the negative association between ores and metals exports and horizontal FDI is that natural resource development can crowd out other economic activities and, in turn, deter horizontal investors.
5. Conclusion

Although the link between BITs and FDI has been an extensively studied topic, little is known about the potentially heterogeneous effects of the treaties on different forms of investment. Accordingly, it is not at all clear whether BITs promote the kinds of investments that bring desired benefits, or that are explicitly sought, by signatory countries. This paper addresses this issue by examining the effects of BITs on vertical and horizontal FDI. The findings of the paper show that BITs have a positive impact on both vertical and horizontal FDI but that they are more positively related to vertical investments. Moreover, the findings demonstrate that BITs have a more positive effect on vertical FDI in countries with higher expropriation risk, poorer law and order, and lower government stability, but that their impact on horizontal FDI is more positive in economies with poorer law and order only. Additionally, the findings confirm that BITs are more positively associated with vertical than horizontal FDI in countries with higher expropriation risk and lower government stability.

The main policy implications of the paper are that BITs can be used by developing and transition countries to promote higher levels of vertical FDI, and that they can be used more effectively for this purpose in economies with higher expropriation risk, poorer law and order, and lower government stability. Accordingly, developing and transition countries in which vertical investments are compatible with development objectives, or are indeed explicitly sought, in particular those countries with high expropriation risk,
poor law and order, and low government stability, should take BITs into consideration as a means to achieve their objectives. A current policy implication for such countries is that the treaties can be used as a means to attract the vertical manufacturing activities that are relocating from China to lower cost countries.

Other policy implications of the paper, albeit somewhat weaker ones, are that BITs can be used by developing and transition economies to encourage higher levels of horizontal FDI, and that they can be used more effectively for this purpose in countries with weaker law and order. Accordingly, developing and transition economies in which horizontal investments are compatible with development objectives, or are indeed specifically sought, in particular those economies with weak law and order, should consider BITs as a means to achieve their objectives. A current policy implication for such economies is that the treaties can be used to attract the horizontal investments of developed-country multinationals that are seeking to enter or expand into new markets in developing regions.

From a broader perspective, the paper also has implications for the continued use of BITs as a means to promote FDI. Whereas the treaties were once regarded as useful instruments to encourage foreign investments, their popularity as a policy tool has been reduced by the proliferation of treaty claims in recent decades. The rise in claims has caused developing and transition countries to reconsider the costs of BITs and, in turn, reduce their treaty activity. An important implication of this paper is that developing and
transition countries in which vertical FDI is compatible with development objectives, or is indeed explicitly sought, should carefully assess whether the costs of BITs are high enough warrant a reduction in treaty making. Indeed, it might be the case that vertical investments could lead to employment generation or export promotion outcomes that would outweigh the costs of the treaties. Another implication of the paper, though a somewhat weaker one, is that developing and transition economies in which horizontal FDI is compatible with development objectives, or is indeed specifically sought, should also carefully assess whether the costs of BITs are sufficiently high to warrant an aversion to the treaties. Indeed, it might be the case that that horizontal investments could lead to domestic technological upgrading that would outweigh the costs of a treaties.

The paper also contributes to the broad debate in the existing literature on BITs and FDI as to whether the treaties have a positive impact on foreign investment. Our findings indicate that BITs work as intended, promoting the sorts of investments that are most sensitive to host-country risks. With this in mind, it is possible that the mixed findings of the existing literature are in part attributable to the heterogeneous impact of the treaties on different forms of foreign investment. Moreover, our findings are obtained from a sample time period in which the proliferation of BIT claims had increased awareness of the full extent of obligations and costs associated with treaties. Accordingly, the weak evidence of BIT effectiveness in the existing literature may also be partly due to the use of long historical samples in which, for the most part, foreign
investors and signatory countries may have been less aware of the potency of the treaties.

While we consider the paper as a step closer to understanding the true effects of BITs on FDI, certain caveats must be noted. Our findings are based on only one source country of FDI, namely the US, while they are also obtained from a small sample of host countries and over a short period of time. More extensive analyses on the impact of BITs on vertical and horizontal FDI should be conducted before our findings can be generalised. A promising direction for future research might also be to investigate whether the contents of treaties differ for countries hosting mainly vertical or horizontal investments. In line with Allee and Peinhardt’s (2014) findings that large capital-exporting countries exert influence on the composition of their BITs, it may be the case that these countries seek stricter provisions when negotiating treaties with economies hosting their riskier vertical investments. Indeed, as our findings provide evidence that BITs are more important for foreign investments that are more sensitive to host-country risks, future research might want to explore how the treaties impact other kinds of FDI with different risk sensitivities. Only with these broader insights into the effects of BITs across all sorts of investments will we be able to fully appreciate the value of the treaties.
Appendix. List of 28 Recipient FDI Countries

Argentina, Brazil, Chile, China, Colombia, Costa Rica, Czech Republic, Dominican Republic, Ecuador, Egypt, Honduras, Hong Kong, Hungary, India, Indonesia, Korea Republic, Malaysia, Mexico, Panama, Peru, Philippines, Poland, Russia, Singapore, South Africa, Thailand, Turkey, Venezuela.

References


Chapter 3 (Essay Two)


ECLAC (2006) *Foreign Investment in Latin America and the Caribbean*, Chile: ECLAC.

ECLAC (2009) *Foreign Investment in Latin America and the Caribbean*, Chile: ECLAC.


Chapter 3 (Essay Two)


Available:  
[Accessed 11 July 2013].


Chapter 3 (Essay Two)


UNCTAD (2009) The Role of International Investment Agreements in Attracting Foreign Direct Investment to Developing Countries, New York: UNCTAD.


Chapter 3 (Essay Two)

Chapter 4

(Essay Three)

Local Conditions and Economic Growth

from South-South FDI
Chapter 4 (Essay Three)

Local Conditions and Economic Growth
from South-South FDI

Abstract

This paper applies a system generalized method-of-moments (GMM) estimator to a novel dataset on 46 Southern countries over the period 1980–2007 to investigate the mediating local conditions that are associated with economic growth from foreign direct investment (FDI) originating from Southern and Northern countries. The highly skilled labour and strong property rights protection required to achieve growth from Northern FDI are not necessary local conditions for achieving growth from Southern FDI. It is strong law and order that emerges as a critical condition, necessary to induce growth following Southern FDI. The results point to a distinctive impact of local conditions in activating growth from FDI.

1. Introduction

Over the past twenty years, average per capita income in developing and transition countries has increased at a much faster rate than in Europe, North America and Japan. This period has also seen a clear shift in the pattern of global foreign direct investment (FDI) flows. An increasing share of outward FDI has been attributed to investors from developing and transition countries and a higher proportion of these investments have flowed to other developing

* This essay has recently been submitted to an international peer-reviewed journal and is currently under review.
and transition economies in the form of South-South FDI.\(^1\) This is an important change that has pointed not only to the willingness and capability of Southern multinational corporations (MNCs) to invest in Southern economies, but also the potential for Southern countries to achieve growth through inward Southern FDI.

It is well-established theoretically that FDI can be an important catalyst for growth in recipient countries. In addition to neoclassical growth theory which asserts that FDI can induce short-term growth through additional capital formation, endogenous or ‘new’ growth theory predicts a long-run growth effect from FDI via technology and knowledge spillovers to domestic firms. Under this theory, FDI can foster the adoption of new technologies, processes, and managerial skills and, thus, raise productivity levels in host economies. These spillovers from FDI may occur through channels such as product and process imitation, training and labour mobility, competition effects, and backward and forward linkages with domestic firms (Crespo and Fontoura, 2007; Görg and Greenaway, 2004).

However, an absolute growth effect from FDI is not consistently evidenced in the empirical literature (Alfaro et al., 2004; Borensztein et al., 1998; Carkovic and Levine, 2005; Wang and Wong, 2009). Rather, the positive impact of FDI on growth is shown to be dependent of a country’s absorptive capacity. A prominent finding in this regard is that host-country conditions,

\(^{1}\) Throughout the paper, Southern FDI refers to FDI that originates in developing and transition countries, while South-South FDI refers to FDI from developing and transition countries that goes to other developing and transition economies. Northern FDI refers to FDI that originates in developed countries, while North-South FDI refers to FDI from developed countries that goes to developing and transition economies.
such as human capital (Borensztein et al., 1998), institutional environments (Saini et al., 2010), financial development (Alfaro et al., 2010), infrastructural quality (Li and Liu, 2005), and trade openness (Balasubramanyam et al., 1996), matter to absorb spillovers from FDI. Another factor shown to influence a country’s capacity to internalise spillovers is the technology gap between foreign and domestic firms. In this context, a low technology gap is found to increase the capacity of domestic firms to assimilate and adopt the technologies brought by FDI (Havranek and Irsova, 2011; Kokko et al., 1996; Li and Liu, 2005). Moreover, there is evidence of a link between the technological content of FDI and certain host-country conditions in determining the growth effect from FDI, with spillovers from high- and low-technology FDI shown to be sensitive to different local conditions (Amendolagine et al., 2013; Branstetter et al., 2011; Fortanier, 2007).

The existing macro-empirical literature examining the impact of FDI on growth has focused mainly on Northern FDI and has shown that its growth effect is dependent of host-country conditions necessary for the absorption of its spillovers (Alfaro et al., 2010; Balasubramanyam et al., 1996; Borensztein et al., 1998; Saini et al., 2010). To date, there has been no macro-empirical work examining the growth effect of FDI between Southern countries. It has been shown that MNCs from Northern countries employ sophisticated technologies that are difficult to absorb in Southern economies, whereas MNCs emerging from Southern countries adopt less complex technologies that are more in line with Southern technological capabilities (Aykut and Goldstein,
2007; UNCTAD, 2006). This presents the potential for a growth effect arising from Southern FDI that requires a distinctive set of local conditions not considered in traditional FDI literature.

In this paper, we examine growth in Southern economies arising from FDI from both Southern and Northern economies. We are particularly interested in exploring those local conditions that are necessary for growth, thus providing some inference on the characteristics of FDI from those respective regions. Covering the period 1980–2007, our analysis applies a system generalized method-of-moments (GMM) estimator to a novel dataset that distinguishes between South-South and North-South FDI flows.

By distinguishing between FDI originating in Northern and Southern countries, our findings build on the results from a number of recent macro-level studies showing differences in the growth effects from FDI by source country (Ford et al., 2008; Fortanier, 2007). We provide a timely perspective on the local conditions necessary to realise growth from Southern FDI, as distinct from Northern FDI growth effects which have been mapped in previous studies (Alfaro et al., 2010; Balasubramanyam et al., 1996; Borensztein et al., 1998; Saini et al., 2010). One of the key policy implications relates to the effective allocation of costs in attracting FDI. As noted by Rolfe et al. (1993) and Harding and Javorcik (2007), Southern countries frequently incur significant costs in attracting FDI, for example, through the provision of incentives to MNCs. The desire to activate economic growth from the resultant investment is identified as a key motivation for these incentives (Blomstrom et
Chapter 4 (Essay Three)

The results from this paper provide some direction to policymakers as well as investment promotion agencies (IPAs) tasked with identifying those MNCs with the greatest expected growth impact. Indeed, with Southern nations expected to account for up to 60 percent of global gross domestic product (GDP) by 2030,\(^2\) there may also be increased opportunities for Southern countries to consider FDI opportunities from other Southern venues. To our knowledge, this paper is the first to distinguish between those local conditions necessary to achieve growth arising from Northern and Southern FDI respectively.

The remainder of this paper is structured as follows: In Section 2, we discuss how differences between Northern FDI and Southern FDI may influence how they generate growth in recipient Southern countries. In Section 3, we outline the model specifications, data and methodology used for empirical analysis. In Section 4, we present and discuss the empirical findings. In Section 5, we conclude the paper with policy implications.

2. North-South FDI, South-South FDI and Host-Country Growth

Economic growth is understood to arise in part from technology spillovers that are a consequence of FDI. These spillovers occur when domestic firms imitate

\(^2\) See, [http://www.oecd.org/newsroom/economydevelopingcountrieosettoaccountfor60ofworldgd](http://www.oecd.org/newsroom/economydevelopingcountrieosettoaccountfor60ofworldgd) dpby2030accordingtonewestimates.htm
the technologies used by MNCs or when MNCs share technology and knowledge with local partner firms. Increased competition from MNCs can also cause spillovers by inducing domestic firms to make more efficient use of their existing resources and technology or even to adopt new technologies (Crespo and Fontoura, 2007). Historically, Northern MNCs have possessed the most cutting-edge technologies and know-how and, thus, have provided significant scope for spillovers through FDI (UNCTAD, 2006). Recent empirical work has shown that the link between Northern FDI and growth is not a consistent one (Alfaro et al., 2004; Borensztein et al., 1998; Carkovic and Levine, 2005). Growth is found to be dependent on a country’s ‘absorptive capacity’ to exploit new technology and knowledge (Alfaro et al., 2010; Balasubramanyam et al., 1996; Borensztein et al., 1998; Saini et al., 2010). In this regard, the availability of host-country conditions, such as human capital (Borensztein et al., 1998), institutional quality (Saini et al., 2010), and financial development (Alfaro et al., 2010), is found to be critical for absorbing spillovers from Northern FDI.

Absorptive capacity which is generally defined as a firm’s ability to recognise and integrate valuable new knowledge into its own processes, depends not only on host-country conditions but also on the suitability of foreign technology relative to local production capabilities. For this reason, much empirical research at both the macro and firm level has sought to determine whether the technological gap between foreign and domestic firms influences spillover absorption. In particular, the existence of a low
technological gap between foreign and domestic firms has a positive impact on growth consequences arising from FDI (Havranek and Irsova, 2011; Kokko et al., 1996; Li and Liu, 2005). Higher levels of human capital and strong property rights are important growth drivers only within high-technology sectors (Branstetter et al., 2011; Fortanier, 2007). Similarly, FDI by foreign firms with a technological content close to that of domestic firms is more likely to create linkages and, by extension, produce spillover effects, in countries with better legal systems (Amendolagine et al., 2013).

The distinct characteristics of Southern MNCs may have the potential to generate growth from investment in other Southern host countries, in a way distinct from Northern FDI. Because of low levels of technological development in the Southern world, MNCs that originate from Southern economies tend not to possess the traditional ownership advantages of cutting-edge technologies which characterise Northern MNCs. Rather, their ownership advantages tend to derive from their familiarity and experience operating in the Southern world and, thus, comprise of less complex technologies that are more suited to Southern markets (Aykut and Goldstein, 2007; Lipsey and Sjoholm, 2011; UNCTAD, 2006; World Bank, 2006). To illustrate, many Southern MNCs located in East and South East Asia are based primarily in low-technology industries, such as textiles and apparel, food processing, and wood, paper and rubber manufacturing (Lipsey and Sjoholm, 2011). Indeed, even Southern MNCs that operate in technology-intensive sectors tend not to compete on a high-technological level but rather by developing products and
services less complex and, by extension, more suited to Southern markets (Prahalad and Hart, 2002). A commonly cited example in this regard, is Tata who designed a $2,200 car and a $24 water filter for Southern markets, while another is Bharti Airtel, who brought a low-cost mobile telephone service to India (Ramamurti, 2011).

Although both Northern FDI and Southern FDI may have the potential to lead to positive growth outcomes in recipient Southern economies, the difference in their technological content suggests that their contributions to growth may be dependent of different host-country conditions, such as levels of human capital and the support of property rights. Also, since better legal systems are shown to matter for linkage formation primarily between low-technology investment between foreign and domestic firms in Southern economies, this condition may only be important to the growth effect from Southern FDI.

3. Modelling the Impact of FDI on Host-Country Growth

3.1. Model Specifications

We employ dynamic panel data to investigate the growth effects from Southern FDI and Northern FDI in recipient Southern countries. Our sample consists of

Our baseline model to examine whether Southern FDI and Northern FDI have an independent influence on growth is given as:

\[
y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta_1 SFDI_{i,t} + \beta_2 NFDI_{i,t} + \gamma X_{i,t} + \epsilon_{i,t}
\]

where \( y \) refers to real per capita GDP; \((\alpha - 1)\) is the convergence coefficient related to initial real GDP per capita; \( SFDI \) refers to inflows of Southern FDI as a share of GDP; \( NFDI \) refers to Northern FDI as a share of GDP; \( X \) is a vector of explanatory variables that affect growth (other than initial real GDP per capita); \( \gamma \) is a vector of coefficients for these variables; \( \epsilon \) is the composite

---

3 Our sample consists of countries classified by United Nations Conference on Trade and Development (UNCTAD) as developing or transition economies, while it also includes countries listed on the Dow Jones list of emerging markets. See Appendix for the full list of countries. The period 1980–2007 is chosen on the basis of FDI data availability.

4 Although the averaging time frame is an arbitrary decision, the use of five-year averages is the common approach in the literature (Di Maria and Lazarova, 2012). As data for the full sample of countries is available only up until 2007, data are averaged over a three-year period from 2005–2007.

5 Initial real GDP per capita is the real per capita GDP in the first year of each five-year period.
error term, which can be decomposed into the unobserved country-specific effect, \( a \), and the idiosyncratic error term, \( u \); the subscripts \( i \) and \( t \) represent each country and time period, respectively. We also include dummy variables to account for each time period, but these are not shown in either the equations or our results.\(^6\)

Substituting equation (2) into equation (1), gives the standard growth equation:

\[
y_{i,t} = \alpha y_{i,t-1} + \beta_1 SFDI_{i,t} + \beta_2 NFDI_{i,t} + \gamma X_{i,t} + a_i + u_{i,t}
\]

In extended specifications, we examine the influence of local conditions in Southern countries on the growth effect from Southern FDI and Northern FDI, respectively. Interaction terms are included in equation (3) to capture the influence of human capital, property rights protection, and law and order, respectively.\(^7\) These specifications are written as:

\[
y_{i,t} = \alpha y_{i,t-1} + \beta_1 SFDI_{i,t} + \beta_2 NFDI_{i,t} + \gamma X_{i,t} + a_i + u_{i,t}
\]

\[
+ \beta_3 (SFDI * LocalCondition) + \beta_4 (NFDI * LocalCondition) + a_i + u_{i,t}
\]

\(^6\) The inclusion of time dummies is consistent with the growth literature. Time dummies are necessary to capture the changes in growth that are common to all countries in a specific time period. Bond et al. (2001) explain that the inclusion of time dummies is necessary in convergence models where the mean of per capita GDP increases over time. These variables are not reported in order to conserve space.

\(^7\) A positive interaction coefficient would indicate that the growth effect from Southern FDI or Northern FDI is enhanced through higher levels of human capital, property rights protection, or law and order, respectively. For interpretation purposes, the variables in the interaction terms are demeaned.
where LocalCondition refers to the level of human capital, property rights protection, and law and order, respectively.\(^8\)

As a robustness check, we examine the growth effect from Southern FDI and Northern FDI in Southern countries above and below the median of the relevant local conditions. Equation (3) is extended to include dummy variables for above-median countries which are assigned a value of one. We treat below-median countries as the omitted group. The growth effect from Southern FDI and Northern FDI in above- and below-median countries is captured by including the dummies in interactions with Southern FDI and Northern FDI, respectively. The model specifications with dummies are written as:

\[
y_{i,t} = \alpha y_{i,t-1} + \beta_1 SFDI_{i,t} + \beta_2 NFDI_{i,t} + \beta_3 \left( SFDI_{i,t}, AboveMedian \right) \\
+ \beta_4 \left( NFDI_{i,t}, AboveMedian \right) + \gamma X_{i,t} + a_i + u_{i,t}
\]

where AboveMedian refers to countries above the median levels of the relevant local conditions.

### 3.2. Data and Description of Variables

Economic growth is measured as the growth rate of real GDP per capita. We use per capita GDP figures in order to eliminate the effect of population

---

\(^8\) To ensure that the interaction terms do not represent Southern FDI, Northern FDI or the particular local condition, these variables are included independently in the relevant models.
changes on growth. The data for this variable are sourced from the World Bank’s World Development Indicators.

FDI inflows consist of equity capital, reinvested earnings and other capital (mainly intra-company loans), and are measured as a percentage of GDP. We obtain these data from UNCTAD’s Data Extract Service which provides information on aggregate FDI flows to Southern countries from both Southern and Northern source economies. We follow the UNCTAD classifications in identifying Northern developed countries and Southern countries, comprising of developing and transition economies. Because many Southern economies do not disclose information on the origin of their FDI inflows, our sample is limited to 46 Southern countries that receive FDI from both Northern and Southern economies.

The level of human capital is measured as the average years of total schooling for the population over 25 years of age. This proxy for human capital provides information on the overall level of educational attainment embodied in the current workforce (Cohen and Soto, 2007). Data for this variable is sourced from the Barro and Lee (2010) dataset. Information on property rights protection and law and order is obtained from the International Country Risk Guide’s (ICRG) political risk indices. The investment profile index measures the protection of property rights based on risks related to expropriation and contract enforcement, and provides a score on a scale of one to 12. The law and order index evaluates the strength and impartiality of the legal system, as well as popular observance of the law, and varies between one and six. Higher
scores on these indices indicate better security of property rights and stronger law and order, respectively.\(^9\)

Our set of independent variables includes other determinants of growth that have been identified in the literature: initial GDP, government consumption, private credit provided to the private sector, trade openness and inflation. The same variables are used by Carkovic and Levine (2005) and Levine et al. (2000), among others. Data for these variables are sourced from the World Bank’s World Development Indicators.

Initial GDP is measured as real per capita GDP in the first year of each five-year period. It controls for the convergence effect whereby poorer countries tend to growth faster than richer countries due to their higher marginal product of capital (Barro, 1991). Government consumption is measured as the ratio of current government expenditure to GDP. Higher government expenditure can inhibit growth because of public sector inefficiencies that lead to higher tax rates (Anwar and Sun, 2011; Barro, 1991). Higher taxes have the effect of inhibiting capital accumulation and crowding-out private investment in human and physical capital (Hansson and Henrekson, 1994). Private credit provided to the private sector refers to financial resources provided to the private sector as a percentage of GDP. Financial sector development can raise growth by supporting innovation and, by extension, increasing domestic productivity. It can also foster growth by increasing domestic savings and attracting foreign capital, which in turn enhance capital

\(^9\) See [http://www.prsgroup.com/ICRG_Methodology.aspx#PolRiskRating](http://www.prsgroup.com/ICRG_Methodology.aspx#PolRiskRating) for the methodology used to calculate the ICRG ratings.
accumulation (Beck et al., 2000). Trade openness is measured as the sum of exports and imports relative to GDP. Openness to trade can accelerate growth by reason of resource allocation on the basis of comparative advantage, which by extension promotes specialization and economies of scale. It can also induce growth by providing access to the markets and technological knowledge of trade partners (Balasubramanyam et al., 1996). Inflation is calculated as the percentage change in the GDP deflator. High inflation can inhibit growth due to resource misallocation (Rousseau and Wachtel, 2002). It has the effect of deterring investors from entering into long-term contracts, which in turn inhibits both investment and innovation.

3.3. Dynamic Econometric Modelling

A dynamic panel methodology is common in FDI-growth studies, as it captures the dynamic nature of economic growth by including the initial level of GDP among the set of explanatory variables. It also controls for the potential endogeneity of the FDI variable, while at the same time overcoming omitted variable bias that is caused by unobserved heterogeneity between countries, such as geographical location, ideology and culture.

A prominent endogeneity concern is that the relationship between FDI and growth may be driven by reverse causation. While FDI has the potential to raise growth, higher growth rates may also attract more FDI by both increasing the demand for existing goods and services and generating new markets.
(Tekin, 2012). Empirical evidence in support of this bi-directional causality between FDI and growth is provided by Basu et al. (2003). The lagged GDP variable introduces a further endogeneity issue due to its correlation with the country-specific effects. The dynamic panel estimator used here addresses these concerns.

The first-difference GMM technique was devised by Arellano and Bond (1991) to eliminate both omitted variable bias and endogeneity. The county-specific fixed effects are removed by transforming all variables by first-differencing. This technique is appropriate as the effects are invariant over time. Equation (3) can then be written as:

\[
\begin{align*}
    y_{i,t} - y_{i,t-1} &= \alpha (y_{i,t-1} - y_{i,t-2}) + \beta_1 (SFDI_{i,t} - SFDI_{i,t-1}) \\
    &+ \beta_2 (NFDI_{i,t} - NFDI_{i,t-1}) + \gamma (X_{i,t} - X_{i,t-1}) + \left(u_{i,t} - u_{i,t-1}\right)
\end{align*}
\]

This procedure introduces a new error term, \(u_{i,t} - u_{i,t-1}\), which by construction is correlated with the differenced lagged GDP variable, \(y_{i,t-1} - y_{i,t-2}\). Internal instrumentation is used to overcome this endogeneity, and also the potential endogeneity of the differenced FDI variables, \(SFDI_{i,t} - SFDI_{i,t-1}\) and \(NFDI_{i,t} - NFDI_{i,t-1}\). Instruments are required to be correlated with the first-differences respectively, and uncorrelated with the differenced error term.

---

10 Since \(y_{i,t}\) is a function of \(a_t\) in equation (3), \(y_{i,t-1}\) is also a function of \(a_t\). Thus, a correlation exists between \(y_{i,t-1}\) and \(a_t\).
Arellano and Bond (1991) propose that suitably lagged values of $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ are valid instruments provided that the error terms, $u_{i,t}$, are serially uncorrelated.\footnote{11} Using lagged values also assumes that $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ are weakly exogenous, in the sense that they are uncorrelated with subsequent realizations of the error term, $u_{i,t}$, respectively. The absence of serial correlation in the errors, $u_{i,t}$, and the assumption of weak exogeneity of $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ implies the following moment conditions:

\begin{align*}
(7) & \quad E[y_{i,t-s}(u_{i,t} - u_{i,t-1})] = 0 \quad \text{for } s \geq 2; t = 3, \ldots, T \\
(8) & \quad E[SFDI_{i,t-s}(u_{i,t} - u_{i,t-1})] = 0 \quad \text{for } s \geq 2; t = 3, \ldots, T \\
(9) & \quad E[NFDI_{i,t-s}(u_{i,t} - u_{i,t-1})] = 0 \quad \text{for } s \geq 2; t = 3, \ldots, T
\end{align*}

There are shortcomings associated with the difference GMM estimator, which are applicable to growth studies. While the first-differencing procedure removes the cross-country dimension of the data, the lagged levels provide weak instruments for variables that exhibit persistence over time. This shortcoming intensifies when the number of time series observations is small.

\footnote{11} $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ are treated as endogenous variables, which implies that only lagged values of two periods and further of these variables can be used as instruments. The first lags are incompatible since a correlation exists between endogenous variables and the error term at time $t$.\footnote{11}
In growth studies, it is common for GDP to be highly persistent over time, while the averaging procedure to remove cyclical dynamics has the effect of reducing the number of time periods used (Bond et al., 2001).

To address these issues, Arellano and Bover (1995) and Blundell and Bond (1998) put forward the system GMM estimator which combines the regression in levels (equation (3)) with the regression in first-differences (equation (6)). This estimator has superior finite sample properties since it retains some time-series information that would otherwise be discarded. However, it requires a further assumption as the country-specific effects are not eliminated from the levels regression. The lagged first-differences of $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ are used as instruments and are valid on condition that $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ have a constant correlation over time with $a_i$.\textsuperscript{12} This assumption implies there is no correlation between the differences of $y_{i,t}$, $SFDI_{i,t}$ and $NFDI_{i,t}$ with $a_i$, respectively. Thus, the following moment conditions apply:

\begin{align}
(10) \quad & E\left[y_{i,t-s} - y_{i,t-s-1} \left(a_i + u_{i,t}\right)\right] = 0 \quad \text{for } s = 1 \\
(11) \quad & E\left[SFDI_{i,t-s} - SFDI_{i,t-s-1} \left(a_i + u_{i,t}\right)\right] = 0 \quad \text{for } s = 1
\end{align}

\textsuperscript{12} Given that lagged levels are used as instruments in the differenced regression, only the most recent lagged differences are used as instrument in the levels regression. Using additional differences would result in redundant moment conditions (Arellano and Bover, 1995).
The system GMM estimator performs better than difference GMM provided that the moment conditions are valid (Blundell and Bond, 1998). Therefore, we conduct two specification tests to ensure the soundness of the conditions used. The Sargan test of over-identifying restrictions examines the validity of the instruments such that they are uncorrelated with the error terms. We also test the assumption of no serial correlation in the errors, \( u_{i,t} \). This procedure involves testing whether the differenced error terms are second-order serially correlated.\(^{13}\)

4. Empirical Findings

This section presents our empirical findings under the system GMM estimation procedure. Descriptive statistics are summarised in Table 1.

Controlling for the conventional set of growth determinants, we find that neither Northern FDI nor Southern FDI directly influence growth (Table 2, Model 1), but rather are conditional on the set of local conditions within the host economy. In the case of Northern FDI, this finding is consistent with

\(\begin{align*}
E[NFDI_{t,s} - NFDI_{t,s-1} (a_t + u_{t,s})] = 0 & \quad \text{for } s = 1
\end{align*}\)

13 The error terms in the levels regression are expected to exhibit some degree of autocorrelation since they contain the country-specific effects. The errors in the differenced regression are likely to be first-order serially correlated since consecutive differenced errors are mathematically related (Roodman, 2006). For example, \( u_{t,t} - u_{t,t-1} \) and \( u_{t,t-1} - u_{t,t-2} \) share the common term, \( u_{i,t-1} \). Thus, we test for serial correlation in the errors, \( u_{i,t} \), by investigating for the presence of second-order serial correlation in the differenced error terms.
### Table 1. Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>0.030</td>
<td>0.033</td>
<td>0.031</td>
<td>-0.049</td>
<td>0.126</td>
</tr>
<tr>
<td>Initial Growth</td>
<td>7.789</td>
<td>7.756</td>
<td>1.024</td>
<td>5.228</td>
<td>10.322</td>
</tr>
<tr>
<td>Government Consumption</td>
<td>-2.095</td>
<td>-2.041</td>
<td>0.324</td>
<td>-3.099</td>
<td>-1.242</td>
</tr>
<tr>
<td>Private Credit</td>
<td>-1.082</td>
<td>-1.055</td>
<td>0.739</td>
<td>-3.154</td>
<td>0.822</td>
</tr>
<tr>
<td>Trade Openness</td>
<td>-0.370</td>
<td>-0.381</td>
<td>0.616</td>
<td>-1.860</td>
<td>1.378</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.073</td>
<td>0.202</td>
<td>0.492</td>
<td>-0.060</td>
<td>3.267</td>
</tr>
<tr>
<td>Human Capital</td>
<td>1.939</td>
<td>1.877</td>
<td>0.403</td>
<td>0.574</td>
<td>2.572</td>
</tr>
<tr>
<td>NFDI</td>
<td>0.021</td>
<td>0.026</td>
<td>0.026</td>
<td>-0.001</td>
<td>0.185</td>
</tr>
<tr>
<td>SFDI</td>
<td>0.003</td>
<td>0.008</td>
<td>0.015</td>
<td>-0.000</td>
<td>0.128</td>
</tr>
<tr>
<td>Property Rights Protection</td>
<td>2.027</td>
<td>1.965</td>
<td>0.310</td>
<td>0.981</td>
<td>2.485</td>
</tr>
<tr>
<td>Law and Order</td>
<td>1.386</td>
<td>1.203</td>
<td>0.410</td>
<td>0.000</td>
<td>1.792</td>
</tr>
</tbody>
</table>

**Notes:** Growth is measured as the natural logarithm of \((1 + \text{the growth rate of GDP per capita in real terms})\); Initial growth is measured as the natural logarithm of real per capita GDP in the first year of each five-year period; Government consumption is measured as the natural logarithm of the ratio of current government expenditure to GDP; Private credit is measured as the natural logarithm of the ratio of financial resources provided to the private sector to GDP; Trade openness is measured as the natural logarithm of the sum of exports and imports relative to GDP; Inflation is measured as the natural logarithm of \((1 + \text{the percentage change in the GDP deflator})\); Human capital is measured as the natural logarithm of the average years of total schooling for the population over 25 years of age, as measured by Barro and Lee (2010); NFDI is measured as the natural logarithm of \((1 + \text{Northern FDI inflows as a share of GDP})\); SFDI is measured as the natural logarithm of \((1 + \text{Southern FDI inflows as a share of GDP})\); Property rights protection is measured as the natural logarithm of the investment profile component of the ICRG index; Law and order is measured as the natural logarithm of the law and order component of the ICRG index. The median, mean, standard deviation, minimum and maximum are measured using data at five-year intervals for the sample of 47 developing and transition countries and over the time period 1980–2007.
### Table 2. System GMM Estimation of the Impact of Northern FDI and Southern FDI on Growth in Recipient Southern Countries

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
</tr>
<tr>
<td>Initial Growth</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
</tr>
<tr>
<td>Government Consumption</td>
<td>-0.019</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
</tr>
<tr>
<td>Private Credit</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
</tr>
<tr>
<td>Trade Openness</td>
<td>0.017*</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.012**</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
</tr>
<tr>
<td>Human Capital</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
</tr>
<tr>
<td>NFDI</td>
<td>-0.319</td>
</tr>
<tr>
<td></td>
<td>(0.283)</td>
</tr>
<tr>
<td>SFDI</td>
<td>-0.068</td>
</tr>
<tr>
<td></td>
<td>(0.300)</td>
</tr>
<tr>
<td>Sargan Test</td>
<td>0.407</td>
</tr>
<tr>
<td>Serial Correlation Test</td>
<td>0.346</td>
</tr>
</tbody>
</table>

**Notes:** The table reports the coefficient values from the system GMM estimation of equation (3), with robust standard errors reported in parentheses under each corresponding coefficient. The variables are as defined in Table 1. Dummy variables are included for each time period but are not reported in order to conserve space. Initial growth, NFDI and SFDI are treated as endogenous variables. The Sargan test for over-identifying restrictions is performed with non-robust standard errors, with the reported p-values from this test reported in the table based on the null hypothesis that the instruments are not correlated with the residuals. The serial correlation test is the Arellano-Bond test and p-values are reported in the table based on the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation. * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.

traditional FDI-growth studies, however the separate finding that Southern FDI alone does not generate growth in recipient Southern countries is novel and creates the imperative for exploring those local conditions that are conducive to growth in this setting.
Our findings in relation to Northern FDI are generally supportive of both the existing literature as well as the policy objectives of Southern countries seeking Northern FDI. In relation to human capital requirements, we find that higher levels of human capital in Southern countries contribute to a growth effect from Northern FDI. An improvement of 1 percent in the quality of human capital enables Northern FDI inflows (as a share of GDP) to produce a 1.681 percent higher impact on the growth rate of GDP per capita (Table 3, Model 2). Additionally, in countries above the median level of human capital, a 1 percent rise in Northern FDI inflows (as a share of GDP) induces a 1.609 percent increase in the rate of growth (Table 4, Model 5). These findings support our expectation that higher skilled workers are critical for absorbing the advanced technologies of Northern MNCs. Conversely, we note that in countries below the median human capital level, Northern FDI has a negative effect on growth. In these economies, a 1 percent rise in Northern FDI inflows (as a share of GDP) reduces the growth rate by 1.542 percent (Table 4, Model 5).

In addition, we note that stronger property rights protection in Southern countries is also critical for realizing growth from Northern FDI, a condition that likely creates the environment for innovation and the opportunity to capture high-technology spillovers from Northern investments. An improvement of 1 percent in the security of property rights is associated with Northern FDI inflows (as a share of GDP) contributing a 1.02 percent more

---

14 Note that this interpretation refers to a percentage change in the GDP per capita growth rate, not a percentage point change. As the dependent variable as well as all independent variables are log transformed in each model, the same interpretation applies to all coefficient estimates.
<table>
<thead>
<tr>
<th></th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>0.005</td>
<td>0.012</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>(0.092)</td>
<td>(0.071)</td>
<td>(0.095)</td>
</tr>
<tr>
<td><strong>Initial Growth</strong></td>
<td>-0.013</td>
<td>-0.015</td>
<td>-0.022*</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.012)</td>
<td>(0.013)</td>
</tr>
<tr>
<td><strong>Government Consumption</strong></td>
<td>-0.027***</td>
<td>-0.018</td>
<td>-0.018</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.012)</td>
</tr>
<tr>
<td><strong>Private Credit</strong></td>
<td>-0.003</td>
<td>0.006</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.010)</td>
</tr>
<tr>
<td><strong>Trade openness</strong></td>
<td>0.016</td>
<td>0.019*</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.010)</td>
<td>(0.013)</td>
</tr>
<tr>
<td><strong>Inflation</strong></td>
<td>-0.014**</td>
<td>-0.013*</td>
<td>-0.013***</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.007)</td>
<td>(0.004)</td>
</tr>
<tr>
<td><strong>Human Capital</strong></td>
<td>0.018</td>
<td>0.021</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.037)</td>
<td>(0.023)</td>
</tr>
<tr>
<td><strong>NFDI</strong></td>
<td>-0.572</td>
<td>-0.641**</td>
<td>-0.188</td>
</tr>
<tr>
<td></td>
<td>(0.378)</td>
<td>(0.269)</td>
<td>(0.301)</td>
</tr>
<tr>
<td><strong>SFDI</strong></td>
<td>0.700</td>
<td>0.412</td>
<td>-0.767</td>
</tr>
<tr>
<td></td>
<td>(0.270)</td>
<td>(0.534)</td>
<td>(0.572)</td>
</tr>
<tr>
<td><strong>NFDI * Human Capital</strong></td>
<td>1.681**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.816)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SFDI * Human Capital</strong></td>
<td></td>
<td>-1.386</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.525)</td>
<td></td>
</tr>
<tr>
<td><strong>Property Rights Protection</strong></td>
<td>0.030</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.026)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3 (Continued)

<table>
<thead>
<tr>
<th></th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFDI * Property Rights Protection</td>
<td>1.020**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.444)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFDI * Property Rights Protection</td>
<td>-0.599</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and Order</td>
<td></td>
<td>0.024*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.012)</td>
<td></td>
</tr>
<tr>
<td>NFDI * Law and Order</td>
<td>-0.528</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.711)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFDI * Law and Order</td>
<td>2.570*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.543)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sargan Test</td>
<td>0.433</td>
<td>0.389</td>
<td>0.298</td>
</tr>
<tr>
<td>Serial Correlation Test</td>
<td>0.197</td>
<td>0.593</td>
<td>0.249</td>
</tr>
</tbody>
</table>

**Notes:** The table reports the coefficient values from the system GMM estimation of equation (4), with robust standard errors reported in parentheses under each corresponding coefficient. The variables are as defined in Table 1. Dummy variables are included for each time period but are not reported in order to conserve space. Initial growth, NFDI and SFDI are treated as endogenous variables. The Sargan test for over-identifying restrictions is performed with non-robust standard errors, with the reported p-values from this test reported in the table based on the null hypothesis that the instruments are not correlated with the residuals. The serial correlation test is the Arellano-Bond test and p-values are reported in the table based on the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation.* indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
### Table 4. System GMM Estimation of the Impact of Northern FDI and Southern FDI on Growth in Recipient Southern Countries: Above and Below the Median Values of Human Capital, Property Rights Protection, and Law and Order

<table>
<thead>
<tr>
<th></th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.086</td>
<td>0.082</td>
<td>0.091*</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.068)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>Initial Growth</td>
<td>-0.016</td>
<td>-0.018*</td>
<td>-0.023**</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Government Consumption</td>
<td>-0.023**</td>
<td>-0.021*</td>
<td>-0.023*</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Private Credit</td>
<td>-0.001</td>
<td>0.004</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.007)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.020**</td>
<td>0.022*</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.012)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.012**</td>
<td>-0.014**</td>
<td>-0.014***</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Human Capital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFDI</td>
<td>-1.542***</td>
<td>-0.777</td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td>(0.555)</td>
<td>(0.397)</td>
<td>(0.345)</td>
</tr>
<tr>
<td>SFDI</td>
<td>1.286</td>
<td>0.746</td>
<td>-2.232</td>
</tr>
<tr>
<td></td>
<td>(0.720)</td>
<td>(0.520)</td>
<td>(1.055)</td>
</tr>
<tr>
<td>NFDI – Human Capital (Above Median)</td>
<td>1.609***</td>
<td>(0.547)</td>
<td></td>
</tr>
<tr>
<td>NFDI – Property Rights Protection (Above Median)</td>
<td>0.821**</td>
<td>(0.320)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4 (Continued)

<table>
<thead>
<tr>
<th></th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFDI – Property Rights Protection (Above Median)</td>
<td>-0.631</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.476)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFDI – Law and Order (Above Median)</td>
<td>-0.039</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.274)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFDI – Law and Order (Above Median)</td>
<td>2.422**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sargan Test</td>
<td>0.590</td>
<td>0.539</td>
<td>0.429</td>
</tr>
<tr>
<td>Serial Correlation Test</td>
<td>0.170</td>
<td>0.337</td>
<td>0.096</td>
</tr>
</tbody>
</table>

**Notes:** The table reports the coefficient values from the system GMM estimation of equation (5), with robust standard errors reported in parentheses under each corresponding coefficient. The variables are as defined in Table 1. Dummy variables are included for each time period but are not reported in order to conserve space. Initial growth, NFDI and SFDI are treated as endogenous variables. The Sargan test for over-identifying restrictions is performed with non-robust standard errors, with the reported p-values from this test reported in the table based on the null hypothesis that the instruments are not correlated with the residuals. The serial correlation test is the Arellano-Bond test and p-values are reported in the table based on the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation. * indicates significance at the 90% level; ** at the 95% level; and *** at the 99% level of significance.
positive impact on the growth rate of GDP per capita (Table 3, Model 3). In addition, in countries above the median score for property rights protection, a rise in Northern FDI inflows (as a share of GDP) of 1 percent leads to a 0.821 percent increase in the rate of growth (Table 4, Model 6). In contrast, we observe no growth dividend from Northern FDI where the security of property rights is below the median level (Table 4, Model 6).

The distinguishing feature of this paper, resides in its empirical analysis of those mediating local conditions that relate to the growth effects of Southern FDI. The absorption of the basic technologies of Southern FDI is not dependent on the stock of human capital in Southern countries (Table 3, Model 2). Similarly, growth outcomes from Southern FDI do not require an environment that is highly protective of property rights (Table 3, Model 3). Additionally, in Table 4, we note that Southern FDI has no impact on growth in Southern economies with high levels of human capital or property rights protection (Model 5 and Model 6, respectively). While the low-technology spillovers from Southern FDI may have a growth impact, higher skilled labour does not help to absorb the basic technologies of Southern MNCs who also are not sensitive to having extensive property rights protection when undertaking investment decisions in Southern countries.

With the ongoing rebalancing in global FDI flows towards Southern countries, the outcomes on those local conditions relating to the legal and policing systems are policy relevant, with the growth effects from Southern FDI found to be strongly predicated on law and order in Southern economies.
For every 1 percent improvement in a country’s legal system, Southern FDI inflows (as a share of GDP) produce a 2.57 percent more positive impact on the growth rate of per capita GDP (Table 3, Model 4). Furthermore, in countries where the quality of the legal system is above the median level, a rise of 1 percent in Southern FDI inflows (as a share of GDP) is associated with a 2.422 percent increase in the rate of growth (Table 4, Model 7). These findings support our expectation that effective legal systems are critical for realising the growth possibilities arising through linkages between Southern MNCs and domestic firms in Southern countries. This outcome from Southern FDI can be clearly distinguished from that occurring from Northern FDI whose contribution to growth is not dependent of the quality of the local legal system (Table 3, Model 4). Even those Southern economies with above median levels of law and order capture no additional growth effect from Northern FDI (Table 4, Model 7). It appears that high-technology spillovers from Northern MNCs do not significantly increase in response to linkages facilitated by legal system reliability in Southern countries.

5. Conclusion

There is a good a priori case to presume that Southern FDI can generate growth in Southern host countries, in a way distinct from Northern FDI. Compared to Northern MNCs that tend to use sophisticated technologies which are difficult to absorb in Southern economies, Southern MNCs tend to employ less complex
technologies that are more in line with Southern technological capabilities (Aykut and Goldstein, 2007; UNCTAD, 2006). As a consequence, Southern FDI may be expected to contribute to growth in Southern economies by bringing new technologies that are better suited to spillovers to domestic firms. In addition, the low-technological content of Southern FDI suggests that its growth effect in Southern economies may be dependent on host-country conditions conducive to the absorption of low-technology spillovers, and not on conditions that matter primarily to capture spillovers from high-technology Northern FDI.

Using a system GMM estimator and a novel panel dataset, this paper investigates the mediating local conditions that are critical to realizing economic growth from Southern FDI and Northern FDI, respectively. The highly skilled labour and strong property rights protection required to achieve growth from Northern FDI are not necessary local conditions for achieving growth from Southern FDI. Rather, Southern economies with the capability to attract Southern FDI must put in place effective legal and policing systems if they are to meet policy objectives.

In seeking FDI, host-country governments offer a range of incentives to attract MNC investment, such as subsidies, grants and tax concessions (Rolfe et al., 1993). These incentives are a cost which are often justified by expected growth arising from increased FDI (Blomstrom et al., 2003). Thus, in directing efforts and costs towards attracting FDI, host countries must consider those local conditions that matter for the growth effect from FDI. This paper
provides further support for the traditional literature on Northern FDI, acknowledging that growth effects are dependent on a highly skilled local population and the strong protection of property rights (Branstetter et al., 2011; Fortanier, 2007). The existence of a strong legal system within Southern economies, however, is critically important for realising growth from Southern FDI. This condition must be in place if the local economy is to fully benefit from FDI spillovers from MNCs that are characterised by similar technological capabilities to domestic firms.

Appendix. List of 46 Southern Host Countries

Algeria, Argentina, Armenia, Bangladesh, Bolivia, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Ecuador, El Salvador, Estonia, Honduras, Hong Kong, Hungary, India, Kazakhstan, Korea Republic, Lithuania, Malaysia, Mexico, Moldova, Morocco, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Venezuela.

References


Chapter 4 (Essay Three)


THIS PAGE IS LEFT BLANK INTENTIONALLY
Chapter 5

(Essay Four)

Emerging Markets and

Portfolio Foreign Exchange Risk:

An Empirical Investigation Using a

Value-at-Risk Decomposition Technique
Emerging Markets and
Portfolio Foreign Exchange Risk:
An Empirical Investigation Using a
Value-at-Risk Decomposition Technique*

Abstract

The correlation between a portfolio’s equity and foreign exchange components plays a role in reducing foreign exchange exposure. Investors must account for this correlation when determining the extent of foreign exchange risk in emerging market equity portfolio investments. This study employs a VaR risk factor mapping technique, under the variance-covariance VaR approach, to decompose portfolio risk in Argentina, Brazil, China, India, Mexico and Russia. For comparison purposes, the same technique is used to decompose portfolio risk in the US. The study is conducted from the perspective of a European equity investor with a portfolio of equities in each country. By employing the VaR decomposition technique, the correlation between a portfolio’s equity and foreign exchange components is taken into account and portfolio foreign exchange risk is extracted from portfolio systematic risk. Our results uniquely demonstrate significant variation in foreign exchange risk in emerging markets.

1. Introduction

Emerging markets have been widely acclaimed for offering strong potential for growth and providing investors with higher expected returns than developed

markets. In 2012, real GDP growth is forecast to be 4% higher in emerging markets (IMF, 2011). Furthermore, they offer diversification benefits due to low correlations with developed markets. However, the benefits of emerging market investments are tempered by additional risks that are generally not as prominent in developed markets.

For international investors, foreign exchange risk is the risk in which the value of an investment will change due to fluctuations in the foreign exchange rate. Emerging markets in particular have been characterised by periods of high inflation which in turn heightens the risk of currency depreciations. Moreover, political risks in emerging markets can result in investors losing confidence in the economic strength of a country and disposing of those assets denominated in the country’s currency. This phenomenon is known as capital flight and it reduces the demand for the currency of the affected country.

While it is widely recognised that emerging market investments incur a high degree of foreign exchange risk, a gap exists in the literature in relation to the foreign exchange risk of equity portfolios. This paper makes a unique contribution to existing literature on foreign exchange risk in emerging markets by measuring the extent of such risk in the context of equity portfolio investments and providing a comparative analysis among a number of emerging market economies. Furthermore, our approach considers the correlation between a portfolio’s equity and foreign exchange components from a risk management perspective.
We employ a VaR risk factor mapping technique that allows us to decompose portfolio VaR into its constituent risks. This process involves mapping the portfolio to its different types of risk factors and calculating the corresponding VaRs. We apply the risk decomposition technique to isolate foreign exchange risk of portfolios constructed using equities from the following emerging markets: Argentina, Brazil, China, India, Mexico and Russia. For comparison purposes, the same technique is applied to a portfolio of US equities. This allows for an investigation into portfolio foreign exchange risk in each country and an assessment of whether such risk is greater in emerging or developed markets.

2. Literature Review

2.1. International Portfolio Diversification

Since the pioneering work of Markowitz (1959), the benefits of international diversification have been well documented in financial literature. By diversifying across countries that are not in the same business cycle as the domestic market, an investor can reduce portfolio risk due to lower or even negative correlations between equities in the domestic and foreign markets. In recent years, the effects of globalisation and deregulation have increased linkages across economies. Despite this, low correlations were present in the late 1990s as studies highlight that diversification opportunities
still existed through international diversification (Solnik, 1995; McManus and Tezel, 1998). More recently, Chiang and Leonhard (2007) explore the benefits of international diversification across different regions. Their findings indicate a decline in the effectiveness of regional diversification within the EU over a 25-year period up to 2005. However, they reveal that international investors can still avail of greater diversification benefits by overcoming their bias towards familiar locations and investing in different regions. Paradoxically, it is often the additional risks of international investments that deter investors from investing overseas. In this regard, Fidora et al. (2007) conduct a study in which exchange rate volatility accounts for 20% of the equity home bias.

### 2.1.1. Portfolio Diversification and Foreign Exchange Risk

Much literature suggests that emerging markets provide investors with greater opportunities for diversification. For instance, Kohers et al. (1998) conduct a study to determine the extent to which such markets improve the risk-return performance of international portfolios and establish whether or not investors should avoid these markets in favour of developed markets. By constructing various portfolios that comprise of different combinations of emerging and developed market equities, it is shown that the inclusion of just a small number of emerging market equities allows an investor to achieve the benefits of diversification. The low correlations between emerging and developed markets are highlighted as the reason for enhanced portfolio performance. Similarly,
Naranjo and Porter (2007) find that adding emerging market equities to an international portfolio results in larger diversification benefits when compared to adding developed market equities. Gupta and Donleavy (2008) also show that emerging markets offer diversification benefits; however, they are careful to point out that the gains from such investments are largely determined by common risks in emerging markets, such as foreign exchange risk and political instability.

For international investors, the domestic currency return of a foreign equity consists of three components: the return from the foreign equity in domestic terms, the return from the exchange rate appreciation or depreciation, and the return from the exchange rate appreciation or depreciation of the foreign equity return. The investment in the exchange rate is realised when an investor converts the foreign currency into domestic currency. Michaelides (2003) points out that foreign exchange risk makes foreign investments less attractive, especially for risk adverse investors, while Gourinchas and Rey (2005) explain that the exchange rate has a considerable influence on portfolio composition. According to Hau and Rey (2005), exposure to foreign exchange risk requires an understanding of both the volatility of the exchange rate and the correlation between exchange rate returns and foreign equity returns.
2.2. Political Instability and Inflation Risk

The relationship between political risk and capital flight has been examined by Lensink et al. (2000) and Vu Le and Zak (2006). Both find that political risk results in a greater amount of capital flight from developing countries. More specifically, Vu Le and Zak (2006) conclude that the rate of capital flight increases due to political risks such as government change, internal uprisings and policy changes. Large outflows of capital can lead to a country’s exchange rate becoming volatile and the value of its currency depreciating. As a result, the country suffers from a reduction in wealth. For a foreign investor in the troubled country, the depreciation of the exchange rate can result in lower portfolio returns and even losses.

In the context of exchange rate determinants, any factor that affects international capital flows and supply or demand of a currency has an influence on the value of the currency and the exchange rate. Such factors generally include inflation rates, interest rates, income levels, and government restrictions and intervention (Madura, 1996). Purchasing power parity (PPP) theory identifies relative inflation rates as the key driver of competitiveness. High inflation can affect a country’s balance of trade through a reduction in exports and a rise in imports, and consequently a depreciation in the value of the country’s currency. For emerging markets, the risk of inflation is heightened by weak institutions, poor regulations (Mishkin, 2004) and high
growth rates (Henderson, 2006). Such economies are therefore more susceptible to currency depreciations.

Due to the increased risk of political instability (Lensink et al., 2000; Vu Le and Zak, 2006) and inflation (Mishkin, 2004; Henderson, 2006) in emerging markets, existing literature suggests there is a heightened risk of foreign exchange losses in such economies. In an attempt to measure foreign exchange risk, Novak et al. (2007) conduct a study on foreign exchange exposure in Mexico by applying a VaR technique to the Mexican Peso/US Dollar exchange rate. Between 1996 and 2005, their results indicate a 1% probability each day that a US investor in Mexico would have lost 3.1% of their investment due to foreign exchange risk.

It is also recognised that a relationship exists between equity returns and foreign exchange returns due to the potential impact of exchange rate movements on expected cash flows (Shapiro, 1974; Dumas, 1978). Hau and Rey (2005) study this relationship and provide evidence that equity and foreign exchange returns are sometimes negatively correlated for industrial countries. In emerging markets, Carrieri and Majerbi (2006) point out that stock markets and exchange rates may be correlated when driven by similar macroeconomic factors. In export-orientated markets, Lane and Shambaugh (2007) explain that a depreciation of the currency could be accompanied by improvements in the wealth of exporters. In such a scenario, there is an increase in the foreign currency price of exports which offsets the related foreign exchange loss. In this paper, we employ a VaR risk factor mapping technique that takes into
consideration the relationship between equity and foreign exchange returns; thus, our approach provides a more accurate estimation of foreign exchange risk for emerging market equity portfolio investors.

3. Value-at-Risk (VaR)

The risk associated with equity investments is quantified using the volatility or standard deviation of equity returns. Jorion (2001) explains that such measures consider both positive and negative changes in equity prices as constituting risk, even though most investors disregard positive changes in a risk context. VaR focuses on the negative changes and attempts to derive a single measure of possible losses, either in nominal or percentage terms. It provides a measure of the potential loss in value of a portfolio over a specific time period, and in doing so, aggregates all the risks of a portfolio into a single measure which can be easily understood by both portfolio managers and investors.

There are three general approaches for calculating VaR, with many variations within each approach. The historical simulation approach estimates VaR by using historical data to create a hypothetical return distribution. The variance-covariance approach makes assumptions about the return distributions for market risks, and the variances and covariances across these risks are used to compute VaR. The Monte Carlo simulation approach involves taking the current returns as a starting point and simulating expected returns over a period of time, generating thousands of possible alternative paths. Extensive research
into applying a type of generalized autoregressive conditional heteroskedasticity (GARCH) model in a multivariate context has also been undertaken by Engle and Kroner (1995) and Engle and Sheppard (2001). Both approaches estimate volatility in a univariate context and then estimate correlations between standardised residuals using a small number of parameters. While being theoretically validated, these methods remain unproven in an empirical context and are not considered here.

3.1. VaR Parameters

According to Alexander (2008), VaR models consist of two basic parameters: the confidence level and the risk horizon. Both of these parameters should be chosen with risk management objectives in mind. From an investor’s perspective, the choice of confidence level depends on their level of risk tolerance. Higher confidence levels, such as 99%, are generally applied to VaR estimates for risk adverse investors. In relation to the risk horizon, Jorion (2001) states that it should correspond to the length of time required to hedge the market risks. As active trading portfolios are often subject to change, the use of short risk horizons, such as one day, is more appropriate than long risk horizons.
3.2. Variance-Covariance Approach

The variance-covariance approach was developed by JP Morgan as the ‘Riskmetrics’ methodology. Under this approach, there are three simplifying assumptions: normality, serial independence and an absence of non-linear positions (Hendricks, 1996). These assumptions allow for an easily worked risk model which is applied in financial institutions. Firstly, the assumption of normality implies that risk factor returns are normally distributed and that their combined distribution is multivariate normal. By assuming market risk factors have normally distributed returns, it follows that the returns on a portfolio that is exposed to the different risk factors will also have normally distributed returns. According to Alexander (2008), this assumption means that the covariance matrix of risk factor returns is all that is needed to estimate VaR. Secondly, the assumption of serial independence means that the magnitude of the VaR estimate on any particular day will have no impact on the VaR estimate over a longer horizon. The significance of this assumption is that the VaR for a long horizon can be obtained by multiplying the 1-day VaR estimate by the square root of the number of days in the required horizon. Thirdly, the variance-covariance approach is only suitable for portfolios that have a linear relationship between risk and portfolio positions.

Once the variances and covariances are estimated, the variance-covariance approach is straightforward to compute. As a result, it is suitable for intra-day VaR calculations of market risk. Furthermore, the assumption of
serial independence allows portfolio managers to estimate VaR to coincide with the regularity of risk reports that clients demand (Alexander, 2008).

3.3. Limitations of VaR

Similar to all measures of risk, VaR has its shortcomings in that it is subject to model and implementation risk (Dowd, 2002). A more specific issue, however, relates to the problem of coherency. Artzner et al. (1999) introduced the concept of coherent risk measures by defining four properties that must be satisfied in order for a risk measure to be described as coherent. These properties include monotonicity, homogeneity, sub-additivity and translational invariance. Krause (2003) explains that these qualities essentially ensure that investments that are more risky are given a higher value of a risk measure.

When the returns on an investment are normally distributed, VaR is a coherent risk measure. However, in general, VaR is not deemed coherent. This incoherency arises with non-normal distributions as VaR does not take into account the magnitude of the losses beyond the VaR estimate. Such losses are not weighted according to their size and are therefore treated identical. For instance, consider two portfolios that have the same VaRs but different shapes in the tails of their return distributions such that one portfolio has a short left tail and the other has a long left tail. While the VaR estimates suggest that both investments have identical risk, the losses beyond VaR are larger when return distributions have longer left tails; thus, it is logical to conclude that such
portfolios are a riskier investment. Due to this failure to account for extreme losses, VaR fails to satisfy the property of sub-additivity and is considered an incoherent risk measure. According to Dowd (2005), sub-additivity reflects an expectation that when we aggregate the risks of individual assets, a diversification effect will occur such that the combined risk of the assets will always be less than or equal to the sum of the risks. However, contrary to this logical assumption, it can be shown that the VaR of a portfolio can be greater than the sum of the VaRs of its components.

In response to the problem of VaR incoherency, Artzner et al. (1999) propose a measure of risk that satisfies the four desirable properties of a coherent risk measure, known as expected shortfall. While VaR informs us how much we can expect to lose if a tail event does not occur, expected shortfall tells us what we can expect to lose if a tail event does occur (Dowd, 2002). It addresses the extent of losses beyond the VaR estimate by focusing on the average of such exceedances.

Despite its incoherency, VaR remains a widely used measure of risk in the portfolio management industry. In comparison to more sophisticated techniques, VaR’s ease of use is recognised as a major advantage that enhances a decision maker’s ability to comprehend the levels of risk involved in portfolio investments (Krause, 2003). For these reasons, we consider a VaR approach more applicable in the context of this paper. Furthermore, such an

---

1 In the literature, expected shortfall is also commonly referred to as expected tail loss (ETL), conditional VaR (CVaR), tail VaR, tail conditional expectation and worst conditional expectation.
approach allows for comparisons with the vast amount of literature that is currently available on the topic.

4. Methodology

In this study, equity portfolio VaR is decomposed into equity and foreign exchange components. The study is conducted from the perspective of a European investor with portfolios of equities in Argentina, Brazil, China, India, Mexico, Russia and the US respectively. For the Brazilian, Chinese, Indian, Mexican and US portfolios, the VaRs are estimated over the period January 2003–December 2010. For the Argentinian and Russian portfolios, the VaRs are estimated over the periods January 2004–December 2010 and January 2006–December 2010 respectively. The VaRs are estimated over a 1-day horizon and at a 99% confidence level.

4.1. Portfolio Composition and Data Requirements

To analyse foreign exchange risk in emerging markets, six portfolios are constructed consisting solely of Argentinian, Brazilian, Chinese, Indian, Mexican and Russian equities respectively. For comparison purposes, a portfolio of US equities is also constructed as a benchmark for foreign exchange risk in developed markets. Throughout the periods of study, each
portfolio is equally weighted and the nominal value of each portfolio remains constant at €1 million.

To decompose the VaRs of each portfolio into equity and foreign exchange components, a window of 750 days of historical returns is used to calculate the betas, variances and covariances on the first day of each period of study. An exponentially weighted moving average (EWMA) approach is subsequently used for these calculations. Thus, to calculate the inputs for the first days, equity and foreign exchange data are required for 751 days prior to the first day of each period of study. Table 1 shows the data requirements for each portfolio.

4.2. Exponential Weighting

An EWMA approach is adopted to calculate the inputs for the VaR estimations. EWMA addresses the issue of volatility clustering by placing a greater emphasis on the most recent observations; thus, it recognises that volatility is not constant over time. Under this approach, the most recent observation receives the largest weight while observations further in the past are assigned weights that decline exponentially over time (Best, 1998). In this study, the standard decay factor of 0.94 that is used by the Riskmetrics approach for daily volatility calculations is adopted in calculating the betas, variances and covariances which are required for each daily VaR estimate.
Table 1. Data Requirements for Each Portfolio

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Equity Data</th>
<th>Foreign Exchange Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentinian Portfolio</td>
<td>IBG Index Data</td>
<td>ARS/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>Brazilian Portfolio</td>
<td>Bovespa Index Data</td>
<td>BRL/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>Chinese Portfolio</td>
<td>SSE Composite Index Data</td>
<td>CNY/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>Indian Portfolio</td>
<td>BSE 500 Index Data</td>
<td>INR/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>Mexican Portfolio</td>
<td>IPC Index Data</td>
<td>MXN/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>Russian Portfolio</td>
<td>RTS Index Data</td>
<td>RUB/EUR Exchange Rate Data</td>
</tr>
<tr>
<td>US Portfolio</td>
<td>S&amp;P 500 Index Data</td>
<td>USD/EUR Exchange Rate Data</td>
</tr>
</tbody>
</table>

Notes: Data are collected from 15/02/2000 to 31/12/2010 for the Brazilian, Chinese, Indian, Mexican and US portfolios. Due to data constraints, data are collected from 14/02/2001 to 31/12/2010 and 14/02/2003 to 31/12/2010 for the Argentinian and Russian portfolios respectively. All data are sourced from Datastream Advance. The equity data for the Brazilian, Chinese, Indian, Mexican and US portfolios consist of the top 20 equities by market capitalisation (on 23/03/2011) that have been listed on each respective equity index since 15/02/2000. Due to data constraints, the equity data for the Argentinian portfolio consist of the top 20 equities by market capitalisation (on 23/03/2011) that have been listed on the IBG Index since 14/02/2001. Due to data constraints, the equity data for the Russian portfolio consist of the top 12 equities by market capitalisation (on 23/03/2011) that have been listed on the RTS Index since 14/02/2003. The listings of equities by market capitalisation for the Argentinian, Brazilian, Indian, Mexican, Russian and US portfolios are sourced from Reuters 3000 Xtra. The listing of equities by market capitalisation for the Chinese portfolio is sourced from Bloomberg. ‘EUR’ is an abbreviation for Euro, ‘ARS’ is an abbreviation for Argentine Peso, ‘BRL’ is an abbreviation for Brazilian Real, ‘CNY’ is an abbreviation for Chinese Yuan Renminbi, ‘INR’ is an abbreviation for Indian Rupee, ‘MXN’ is an abbreviation for Mexican Peso, ‘RUB’ is an abbreviation for Russian Rouble and ‘USD’ is an abbreviation for US Dollar.
Alexander (2008) provides the following formulae to perform these calculations. Both formulae are used in calculating the EWMA betas.²

The EWMA formula for the variance estimate at time $t$ of a time series of returns $\{r_t\}$ can be expressed in a recursive form, as

$$\sigma_t^2 = (1-\lambda)\sigma_{t-1}^2 + \lambda \sigma_{t-1}^2, \quad t = 2, \ldots, T,$$

where $\lambda$ represents the decay factor, and $0 < \lambda < 1$.

Similarly, the EWMA covariance of two contemporaneous time series of returns $\{r_{1t}\}$ and $\{r_{2t}\}$ can also be expressed in a recursive form, as

$$\sigma_{12t} = (1-\lambda)r_{1t-1}r_{2t-1} + \lambda \sigma_{12t-1}, \quad t = 2, \ldots, T.$$

The salient difference between EWMA and a GARCH (1, 1) model is that the former does not account for mean reversion (Alexander, 2008). Thus, EWMA is essentially a restricted case of GARCH (1, 1) where its mean reversion term is equal to zero and the sum of its remaining parameters is equal to one.

² See Section 4.5 for the formula used in the beta calculations.
Chapter 5 (Essay Four)

4.3. Risk Attribution Using Risk Factor Mapping

While an overall VaR measure provides valuable information about possible portfolio losses, it fails to offer any insight into the factors that contribute to the loss amount. The ability to decompose VaR into the different components that contribute to the total risk of a portfolio is essential in managing the overall risk exposure. In this study, a risk attribution technique is used to decompose the VaRs of equity portfolios into their constituent risks. Alexander (2008) explains that the process of risk attribution involves mapping the portfolio to its different types of risk factors for which the corresponding VaRs can be estimated. This study makes an assumption that equity risk and foreign exchange risk are the only risks that affect the portfolio returns i.e. the equity indices from which the equities are listed and the exchange rates between the foreign currencies and the Euro are the only risk factors.3

The risk factor mapping process measures the VaR of a portfolio in terms of systematic VaR which Alexander (2008, p.31) describes as ‘the risk that is captured by mapping the portfolio to risk factors’. The risk that is not captured by the mapping process is called specific VaR. The portfolio systematic VaR is equal to the sum of the marginal VaRs of each risk factor;

---

3 For the Argentinian portfolio, the IBG Index and the ARS/EUR exchange rate are the risk factors. For the Brazilian portfolio, the Bovespa Index and the BRL/EUR exchange rate are the risk factors. For the Chinese portfolio, the SSE Composite Index and the CNY/EUR exchange rate are the risk factors. For the Indian portfolio, the BSE 500 Index and the INR/EUR exchange rate are the risk factors. For the Mexican portfolio, the IPC Index and the MXN/EUR exchange rate are the risk factors. For the Russian portfolio, the RTS Index and the RUB/EUR exchange rate are the risk factors. For the US portfolio, the S&P 500 Index and the USD/EUR exchange rate are the risk factors.
therefore, the marginal VaRs provide a measure of relative risk contribution. By ranking each marginal VaR in accordance with the amount of risk it contributes to the portfolio systematic VaR, an investor can either remove or hedge risks that have a significant impact on the overall portfolio risk. This decomposition is particularly important when the VaR of an investor’s portfolio exceeds their desired level of risk aversion.

4.4. Marginal VaR

Marginal VaR is a measure of a position's contribution to portfolio systematic VaR. It can also be described as the sensitivity of VaR to the risk factor sensitivities:

\[ \theta = (\theta_1, \ldots, \theta_n) \]

where \( \theta \) is the marginal VaR and \( \theta_1 \) to \( \theta_n \) are the risk factor sensitivities.

The first step in explaining the methodology behind the decomposition of portfolio VaR is to derive an expression for marginal VaR as a function of the risk factor sensitivities. This is done by assuming that the portfolio VaR is a function of the marginal VaRs:

\[ VAR = f(\theta) \]
The gradient vector of first partial derivatives is:

\[ g(\theta) = (f_1(\theta), \ldots, f_n(\theta))' \]

where \( f_i(\theta) = \frac{df_i(\theta)}{d\theta_i} \) for \( i = 1, \ldots, n \).

Therefore, a first order Taylor approximation to VaR is:

\[ f(\theta) \approx \theta'g(\theta) = \sum_{i=1}^{n} \theta_i f_i(\theta) \]

Each term is called the \( i \)th marginal VaR. Under the variance-covariance approach, the sum of the marginal VaRs is exactly equal to the portfolio systematic VaR (Alexander, 2008).
4.5. Estimation of Risk Factor Sensitivities

In relation to the marginal equity VaR, each portfolio has a sensitivity called ‘beta’ to the equity indices from which the equities are listed. A positive beta implies that the returns on a portfolio follow the market index. For example, a portfolio beta of 1.5 would suggest that a 1% increase in the value of the market index would result in the portfolio returns increasing by 1.5%. On the other hand, a negative beta implies that the returns on a portfolio inversely follow the market index. In this case, a portfolio beta of -1.5 would suggest that a 1% increase in the value of the market index would result in the portfolio returns decreasing by 1.5%. According to Crouhy et al. (2006), a beta that is greater than one implies that the portfolio is riskier than the market. Conversely, a beta that is less than one implies that the portfolio is not as risky as the market. Thus, a lower beta implies lower equity risk and a higher beta implies higher equity risk.

To calculate the portfolio betas, it is necessary to calculate the betas of the individual equities in the portfolio. The portfolio betas are then the equally weighted averages of the betas of the individual equities in the portfolio.\(^4\) In this study, an EWMA approach is used to calculate the portfolio betas as described in Section 4.2.

\(^4\) The absolute values of all betas are used in our VaR calculations.
The formula used to calculate the EWMA beta of an individual equity is:

$$\beta_i = \frac{Cov_\lambda (r_e, r_m)}{Var_\lambda (r_m)}$$

where $\beta_i$ is the EWMA beta of the equity, $Cov_\lambda$ is the EWMA covariance, $Var_\lambda$ is the EWMA variance, $r_e$ is the return on the equity and $r_m$ is the return on the market index.

In relation to the marginal foreign exchange VaR, each portfolio simply has a sensitivity of one to the exchange rate between the respective foreign country currency and the Euro.

4.6. Advantages and Disadvantages of Risk Factor Mapping

Over the past decade, the technique of risk factor mapping has become increasingly important due to portfolio complexity. Only a minority of portfolios are small enough that investors or risk managers do not need to use mapping. For many portfolios, it is not feasible to map the portfolio to all of its constituent assets, which means the mapping of risk factors is the only available alternative for analysing and decomposing risk. The usefulness of the technique becomes apparent when we consider the computational impracticality of calculating variance-covariance VaR. For example, the key
inputs in the calculation of variance-covariance VaR for an equity portfolio are the covariances between the pairs of equities in the portfolio. In this context, Damordaran (2007) explains that a portfolio consisting of 100 assets will have 49,500 covariances that need to be inputted. With risk factor mapping, the estimation of the risk factor sensitivities eliminates this computational workload.

A disadvantage of using the technique is that it is sometimes less accurate than normal VaR estimations. However, this study focuses on long-only portfolios and Jorion (2001) informs us that mapping methods produce satisfactory results for such portfolios. Similar to all methods of calculating VaR, there is also potential for model risk when we use risk factor mapping. There is a degree of subjectivity with the mapping process whereby the selection of risk factors may differ from one risk manager to another. The risk factor sensitivities are also prone to some degree of error depending on the method used for their calculations. In addition, the specific VaR element of the total portfolio VaR is not taken into account.

5. Empirical Analysis

5.1. Preliminary Data Analysis

For each portfolio, the daily equity index returns are calculated by taking the logarithmic difference of the equity index price on consecutive days throughout
the periods of study. Similarly, the daily exchange rate returns are calculated by taking the logarithmic difference of the exchange rate on consecutive days throughout the periods of study. Both series of returns are tested for stationarity and normality using the Augmented Dickey-Fuller (ADF) test and the Jarque-Bera (JB) test, respectively. Table 2 and Table 3 report the descriptive statistics and the results of both the ADF test and the JB test for each series of returns for each portfolio, while Figure 1 and Figure 2 contain normal probability plots of the returns.

Both exchange rate volatility and the correlation between exchange rate returns and foreign equity returns are contributory factors in the foreign exchange risk of equity portfolio investments. For instance, an exchange rate that is highly volatile deters foreign investors as there is a greater likelihood of negative returns. On the contrary, a negative correlation between exchange rate returns and foreign equity returns reduces the overall return variability in domestic currency terms and makes international investments more appealing. In this study, investors in Brazil and Mexico were subject to extremely volatile exchange rates. In contrast, exchange rate volatility was a lesser issue in both China and Russia. Investors in India were exposed to exchange rate movements that were similar to that in the US, while investors in Argentina were initially subject to extremely volatile exchange rates which subsequently became less volatile and similar to that in the US. Figure 3 provides a graphical representation of all exchange rate volatilities, while Table 4 contains the descriptive statistics of the volatilities.
Chapter 5 (Essay Four)

Table 2. Descriptive Statistics, Augmented Dickey-Fuller Test and Jarque-Bera Test for Exchange Rate Log Returns

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Range</th>
<th>Mean</th>
<th>ADF Test Statistic</th>
<th>JB Test Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARS/EUR Log Returns</td>
<td>-1.1942</td>
<td>0.5667</td>
<td>1.7608</td>
<td>-0.0007</td>
<td>-71.7930* (-2.5688)</td>
<td>195417769.4609* (9.5939)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>BRL/EUR Log Returns</td>
<td>-0.0773</td>
<td>0.0984</td>
<td>0.1757</td>
<td>-0.0009</td>
<td>-56.2667* (-2.5687)</td>
<td>4218.7480* (9.5602)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>CNY/EUR Log Returns</td>
<td>-0.0421</td>
<td>0.0449</td>
<td>0.0870</td>
<td>-0.0003</td>
<td>-53.6422* (-2.5687)</td>
<td>913.1654* (9.5602)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>INR/EUR Log Returns</td>
<td>-0.0368</td>
<td>0.0308</td>
<td>0.0676</td>
<td>-0.0001</td>
<td>-57.6535* (-2.5687)</td>
<td>302.0595* (9.5602)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>MXN/EUR Log Returns</td>
<td>-0.0902</td>
<td>0.0647</td>
<td>0.1549</td>
<td>-0.0002</td>
<td>-55.0661* (-2.5687)</td>
<td>6894.3438* (9.5602)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>RUB/EUR Log Returns</td>
<td>-0.0593</td>
<td>0.0459</td>
<td>0.1052</td>
<td>-0.00009</td>
<td>-48.7245* (-2.5690)</td>
<td>6759.9863* (9.6857)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
<tr>
<td>USD/EUR Log Returns</td>
<td>-0.0368</td>
<td>0.0292</td>
<td>0.0660</td>
<td>-0.0001</td>
<td>-54.2592* (-2.5687)</td>
<td>211.9403* (9.5602)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.001]</td>
</tr>
</tbody>
</table>

Notes: ‘Min’ and ‘Max’ are the minimum and maximum values of the sample data respectively. ‘ADF’ is the Augmented Dickey-Fuller test which is based on the null hypothesis of non-stationarity. ‘JB’ is the Jarque-Bera test which has a null hypothesis of normally distributed returns. ‘Log’ is an abbreviation for logarithmic. Numbers in parentheses are the critical values for the ADF test and the JB test at the 1% significance level. Numbers in square brackets are the corresponding $p$-values which indicate exact significance levels. * indicates significance at the 1% level.
### Table 3. Descriptive Statistics, Augmented Dickey-Fuller Test and Jarque-Bera Test for Stock Index Log Returns

<table>
<thead>
<tr>
<th>Index Log Returns</th>
<th>Min</th>
<th>Max</th>
<th>Range</th>
<th>Mean</th>
<th>ADF Test Statistic</th>
<th>JB Test Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBG</td>
<td>-0.1210</td>
<td>0.1367</td>
<td>0.2577</td>
<td>0.0009</td>
<td>-47.5466* (-2.5688)</td>
<td>4597.931* (9.5939)</td>
</tr>
<tr>
<td>Bovespa</td>
<td>-0.1210</td>
<td>0.1368</td>
<td>0.2578</td>
<td>0.0005</td>
<td>-53.1566* (-2.5687)</td>
<td>1962.3650* (9.5602)</td>
</tr>
<tr>
<td>SSE Composite</td>
<td>-0.0926</td>
<td>0.0940</td>
<td>0.1866</td>
<td>0.0002</td>
<td>-53.3399* (-2.5687)</td>
<td>2213.5829* (9.5602)</td>
</tr>
<tr>
<td>BSE 500</td>
<td>-0.1244</td>
<td>0.1462</td>
<td>0.2706</td>
<td>0.0004</td>
<td>-48.2629* (-2.5687)</td>
<td>4865.0056* (9.5602)</td>
</tr>
<tr>
<td>IPC</td>
<td>-0.0827</td>
<td>0.1044</td>
<td>0.1871</td>
<td>0.0006</td>
<td>-48.1554* (-2.5687)</td>
<td>2454.5281* (9.5602)</td>
</tr>
<tr>
<td>RTS</td>
<td>-0.2120</td>
<td>0.2020</td>
<td>0.4140</td>
<td>0.0008</td>
<td>-39.9898* (-2.5690)</td>
<td>12417.0243* (9.6857)</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>-0.0947</td>
<td>0.1096</td>
<td>0.2043</td>
<td>-0.00004</td>
<td>-58.1058* (-2.5687)</td>
<td>7579.6346* (9.5602)</td>
</tr>
</tbody>
</table>

**Notes:** ‘Min’ and ‘Max’ are the minimum and maximum values of the sample data respectively. ‘ADF’ is the Augmented Dickey-Fuller test which is based on the null hypothesis of non-stationarity. ‘JB’ is the Jarque-Bera test which has a null hypothesis of normally distributed returns. ‘Log’ is an abbreviation for logarithmic. Numbers in parentheses are the critical values for the ADF test and the JB test at the 1% significance level. Numbers in square brackets are the corresponding p-values which indicate exact significance levels. * indicates significance at the 1% level.
Figure 1. Normal Probability Plots of Exchange Rate Log Returns

ARS/EUR log returns

BRL/EUR log returns

CNY/EUR log returns

INR/EUR log returns

MXN/EUR log returns

RUB/EUR log returns

USD/EUR log returns
Figure 2. Normal Probability Plots of Stock Index Log Returns
Chapter 5 (Essay Four)

Figure 3. Exchange Rate Volatilities

Note: An EWMA approach with a smoothing constant of 0.94 is used to estimate the volatilities on each day during each period of study.
Table 4. Descriptive Statistics of Exchange Rate Volatilities

<table>
<thead>
<tr>
<th></th>
<th>Min (%)</th>
<th>Max (%)</th>
<th>Range (%)</th>
<th>Mean (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARS/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2004 – Dec 2004</td>
<td>7.59</td>
<td>77.75</td>
<td>70.16</td>
<td>18.85</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>5.06</td>
<td>12.52</td>
<td>7.46</td>
<td>8.64</td>
</tr>
<tr>
<td><strong>BRL/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>8.37</td>
<td>30.02</td>
<td>21.65</td>
<td>15.52</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>6.19</td>
<td>52.40</td>
<td>46.21</td>
<td>17.11</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>7.90</td>
<td>47.40</td>
<td>39.50</td>
<td>14.60</td>
</tr>
<tr>
<td><strong>CNY/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>5.87</td>
<td>13.44</td>
<td>7.57</td>
<td>9.73</td>
</tr>
<tr>
<td><strong>INR/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>6.06</td>
<td>24.03</td>
<td>17.97</td>
<td>11.85</td>
</tr>
<tr>
<td><strong>MXN/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>5.54</td>
<td>18.79</td>
<td>13.25</td>
<td>12.78</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>5.56</td>
<td>52.84</td>
<td>47.28</td>
<td>11.88</td>
</tr>
<tr>
<td><strong>RUB/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2006 – Dec 2006</td>
<td>2.79</td>
<td>11.01</td>
<td>8.22</td>
<td>5.83</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>1.80</td>
<td>17.30</td>
<td>15.50</td>
<td>4.92</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>5.21</td>
<td>35.12</td>
<td>29.91</td>
<td>11.38</td>
</tr>
<tr>
<td><strong>USD/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>4.77</td>
<td>11.50</td>
<td>6.73</td>
<td>8.19</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>3.74</td>
<td>24.82</td>
<td>21.08</td>
<td>9.10</td>
</tr>
</tbody>
</table>

Notes: The full periods of study are broken down into subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the exchange rate volatilities in each subperiod respectively.
A negative correlation between SSE Composite Index returns and CNY/EUR exchange rate returns was a contributory factor in reducing the foreign exchange VaR of the Chinese portfolio. Similarly, the correlation between IBG Index returns and ARS/EUR exchange rate returns, and the correlation between S&P 500 Index returns and USD/EUR exchange rate returns, both decreased significantly and became largely negative over the course of the study. From a foreign exchange risk management perspective, the negative correlation made investments in China, Argentina and the US more appealing as it acted as a natural hedge that reduced the portfolio foreign exchange VaR. In contrast, a relatively high and positive correlation between Bovespa Index returns and BRL/EUR exchange rate returns was a contributory factor in the high foreign exchange VaR of the Brazilian portfolio. From a foreign exchange risk management perspective, this high positive correlation made investments in Brazil less attractive as it increased the return variability in domestic currency terms. The correlation between BSE 500 Index returns and INR/EUR exchange rate returns had little impact on the foreign exchange VaR of the Indian portfolio. Similarly, for the majority of the periods of study, the correlation between IPC Index returns and MXN/EUR exchange rate returns, and the correlation between RTS Index returns and RUB/EUR exchange rate returns, had little impact on the foreign exchange VaRs of the Mexican and Russian portfolios respectively. Figure 4 provides a graphical representation of all correlations between index returns and exchange rate returns, while Table 5 contains the descriptive statistics of the correlations.
Figure 4. Correlations Between Index Returns and Exchange Rate Returns

**Note:** An EWMA approach with a smoothing constant of 0.94 is used to estimate the correlations on each day during each period of study.
Table 5. Descriptive Statistics of Correlations Between Index Returns and Exchange Rate Returns

<table>
<thead>
<tr>
<th></th>
<th>Min (%)</th>
<th>Max (%)</th>
<th>Range (%)</th>
<th>Mean (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IBG Index and ARS/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2004 – Dec 2004</td>
<td>-26.03</td>
<td>34.94</td>
<td>60.97</td>
<td>6.63</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-61.45</td>
<td>33.06</td>
<td>94.51</td>
<td>-23.46</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-79.14</td>
<td>-5.45</td>
<td>73.69</td>
<td>-44.15</td>
</tr>
<tr>
<td><strong>Bovespa Index and BRL/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>-1.81</td>
<td>78.42</td>
<td>80.23</td>
<td>42.02</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>-13.60</td>
<td>78.75</td>
<td>92.35</td>
<td>37.13</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-3.59</td>
<td>86.55</td>
<td>90.14</td>
<td>49.22</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-26.82</td>
<td>74.06</td>
<td>100.88</td>
<td>35.07</td>
</tr>
<tr>
<td><strong>SSE Composite Index and CNY/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>-41.96</td>
<td>27.72</td>
<td>69.68</td>
<td>-6.16</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-57.79</td>
<td>30.72</td>
<td>88.51</td>
<td>-8.61</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-53.76</td>
<td>20.80</td>
<td>74.56</td>
<td>-17.40</td>
</tr>
<tr>
<td><strong>BSE 500 Index and INR/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>-38.50</td>
<td>49.91</td>
<td>88.41</td>
<td>9.37</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>-42.86</td>
<td>59.36</td>
<td>102.22</td>
<td>6.20</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-34.45</td>
<td>52.96</td>
<td>87.41</td>
<td>17.01</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-19.36</td>
<td>63.23</td>
<td>82.59</td>
<td>17.10</td>
</tr>
<tr>
<td><strong>IPC Index and MXN/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>-46.29</td>
<td>52.84</td>
<td>99.13</td>
<td>4.92</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-26.47</td>
<td>57.53</td>
<td>84.00</td>
<td>12.69</td>
</tr>
<tr>
<td><strong>RTS Index and RUB/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2006 – Dec 2006</td>
<td>-30.32</td>
<td>52.27</td>
<td>82.59</td>
<td>2.35</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-47.83</td>
<td>44.14</td>
<td>91.97</td>
<td>-9.73</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-21.42</td>
<td>75.15</td>
<td>96.57</td>
<td>29.23</td>
</tr>
<tr>
<td><strong>S&amp;P 500 and USD/EUR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>-45.32</td>
<td>78.23</td>
<td>123.55</td>
<td>16.29</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>-48.14</td>
<td>38.77</td>
<td>86.91</td>
<td>-4.07</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-67.97</td>
<td>59.69</td>
<td>127.66</td>
<td>-4.27</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-73.38</td>
<td>-18.38</td>
<td>55.00</td>
<td>-48.96</td>
</tr>
</tbody>
</table>

**Notes:** The full periods of study are broken down into subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the correlations between index returns and exchange rate returns in each subperiod respectively.
Chapter 5 (Essay Four)

The following section reveals the extent of foreign exchange risk in emerging market equity portfolio investments. For each country considered, we produce results on the decomposition of portfolio systematic VaR into equity and foreign exchange components. The periods of study have been arbitrarily divided into subperiods to facilitate the analysis. Our findings indicate that investors in Brazil and Mexico were subject to a high degree of foreign exchange exposure, while investors in China and Russia were less affected by such risk. For the majority of the periods of study, Argentina and India exhibited levels of foreign exchange risk that were similar to that of the US.

5.2. Decomposition of VaR for Argentinian Portfolio

Over the period January 2004–December 2010, there was a significant decrease in foreign exchange risk in Argentina. Between January 2004 and December 2004, European investors in Argentina were subject to a high degree of foreign exchange risk. However, between January 2005 and December 2010, the impact of foreign exchange risk in Argentina was relatively insignificant as it did not add much exposure to the Argentinian portfolio. Figure 5 illustrates the decomposition of variance-covariance VaR for the Argentinian portfolio.
Figure 5. Decomposition of Variance-Covariance VaR for Argentinian Portfolio (January 2004 to December 2010)

Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

Our results reveal that the average nominal exposure to foreign exchange risk was €22,231 over the period January 2004–December 2004. During this period, there was a 1% probability each day that a European investor in Argentina would have lost an average of 2.23% of their investment due to foreign exchange risk. This high exposure to foreign exchange losses was largely attributable to an extremely volatile ARS/EUR exchange rate. However, from January 2005 onwards, there was a decrease in the foreign exchange VaR of the Argentinian portfolio which coincided with a similar

5 Throughout the Empirical Analysis, all percentages are rounded upwards.
reduction in the volatility of the exchange rate. At the same time, the risk of foreign exchange losses was further reduced by a decrease in the correlation between IBG Index returns and ARS/EUR exchange rate returns.

Over the period January 2005–December 2006, foreign exchange risk decreased such that the average nominal exposure was €7,873. During this period, there was a 1% probability each day that an investor in Argentina would have lost an average of 0.79% of their investment due to foreign exchange exposure. Between January 2007 and December 2008, the average nominal exposure to foreign exchange risk decreased further to €3,837. During this period, there was a 1% probability each day that an investor in Argentina would have lost an average of 0.39% of their investment due to foreign exchange risk. A negative correlation between IBG Index returns and ARS/EUR exchange rate returns played a role in reducing the exposure to foreign exchange losses.

From January 2009 to December 2010, the average nominal exposure to foreign exchange risk was €4,297. During this period, there was a 1% probability each day that an investor in Argentina would have lost an average of 0.43% of their investment due to foreign exchange risk. Again, a high negative correlation between the portfolio’s equity and foreign exchange risk factors had an impact on reducing the exposure to foreign exchange losses. From a foreign exchange risk management perspective, this negative correlation made investments in Argentina more appealing as it acted as a natural hedge that reduced the portfolio foreign exchange VaR. Table 6
contains the descriptive statistics of the marginal foreign exchange VaR for the Argentinian portfolio.

Table 6. Descriptive Statistics of Marginal Foreign Exchange VaR for Argentinian Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>1,741</td>
<td>16,223</td>
<td>14,482</td>
<td>7,873</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-7,683</td>
<td>12,192</td>
<td>19,875</td>
<td>3,837</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-7,544</td>
<td>19,833</td>
<td>27,377</td>
<td>4,297</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Argentinian portfolio in each subperiod respectively. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

5.3. Decomposition of VaR for Brazilian Portfolio

Over the period January 2003–December 2010, European investors in Brazil were subject to a high degree of foreign exchange risk. Figure 6 illustrates the decomposition of variance-covariance VaR for the Brazilian portfolio.

Our results reveal that the average nominal exposure to foreign exchange risk was €18,138 over the period January 2003–December 2004. During this period, there was a 1% probability each day that a European investor in Brazil would have lost an average of 1.82% of their investment due to foreign exchange risk. Over the period January 2005–December 2006, the average nominal exposure to foreign exchange risk was €15,727. During this
**Figure 6. Decomposition of Variance-Covariance VaR for Brazilian Portfolio (January 2003 to December 2010)**

Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period.

period, there was a 1% probability each day that an investor in Brazil would have lost an average of 1.58% of their investment due to foreign exchange risk. Over the period January 2007–December 2008, the average nominal exposure to foreign exchange risk was €19,452. During this period, there was a 1% probability each day that an investor in Brazil would have lost an average of 1.95% of their investment due to foreign exchange risk. From January 2009 to December 2010, the average nominal exposure to foreign exchange risk was €16,131. During this period, there was a 1% probability each day that an investor in Brazil would have lost an average of 1.62% of their investment due to foreign exchange risk. The high foreign exchange VaR of the Brazilian
portfolio over the entire period of study can be attributed to an extremely volatile BRL/EUR exchange rate and a high positive correlation between Bovespa Index returns and BRL/EUR exchange rate returns. Table 7 contains the descriptive statistics of the marginal foreign exchange VaR for the Brazilian portfolio.

Table 7. Descriptive Statistics of Marginal Foreign Exchange VaR for Brazilian Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>3,673</td>
<td>70,964</td>
<td>67,291</td>
<td>19,452</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>4,684</td>
<td>58,197</td>
<td>53,513</td>
<td>16,131</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Brazilian portfolio in each subperiod respectively.

5.4. Decomposition of VaR for Chinese Portfolio

Over the period January 2003–December 2010, the foreign exchange VaR for the Chinese portfolio indicates that foreign exchange risk is not always a significant source of risk in emerging markets. Figure 7 illustrates the decomposition of variance-covariance VaR for the Chinese portfolio.

Our results reveal that the average nominal exposure to foreign exchange risk was €6,529 over the period January 2003–December 2004.


**Notes:** VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

During this period, there was a 1% probability each day that a European investor in China would have lost an average of 0.66% of their investment due to foreign exchange risk. Between January 2005 and December 2006, the average nominal exposure to foreign exchange risk decreased to €3,198. During this period, there was a 1% probability each day that an investor in China would have lost an average of 0.32% of their investment due to foreign exchange risk. Over the period January 2007–December 2008, the average nominal exposure to foreign exchange risk decreased further to €1,605. During this period, there was a 1% probability each day that an investor in China
would have lost an average of 0.17% of their investment due to foreign exchange risk. From January 2009 to December 2010, the average nominal exposure to foreign exchange risk increased to €4,835. During this period, there was a 1% probability each day that an investor in China would have lost an average of 0.49% of their investment due to foreign exchange risk. The low foreign exchange VaR of the Chinese portfolio over the entire period of study can be largely attributed to a relatively stable CNY/EUR exchange rate and a negative correlation between SSE Composite Index returns and CNY/EUR exchange rate returns. Table 8 contains the descriptive statistics of the marginal foreign exchange VaR for the Chinese portfolio.

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>1,168</td>
<td>14,361</td>
<td>13,193</td>
<td>6,529</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-5,602</td>
<td>19,157</td>
<td>24,759</td>
<td>1,605</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-5,111</td>
<td>20,804</td>
<td>25,915</td>
<td>4,835</td>
</tr>
</tbody>
</table>

**Notes:** The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Chinese portfolio in each subperiod respectively. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

**5.5. Decomposition of VaR for Indian Portfolio**

Over the period January 2003–December 2010, the impact of foreign exchange risk in India was relatively insignificant as it did not add much exposure to the
Indian portfolio. Figure 8 illustrates the decomposition of variance-covariance VaR for the Indian portfolio.

**Figure 8. Decomposition of Variance-Covariance VaR for Indian Portfolio (January 2003 to December 2010)**

Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

Our results reveal that the average nominal exposure to foreign exchange risk was €8,431 over the period January 2003–December 2004. During this period, there was a 1% probability each day that a European investor in India would have lost an average of 0.85% of their investment due to foreign exchange risk. Over the period January 2005–December 2006, the average nominal exposure to foreign exchange risk decreased to €6,270.
During this period, there was a 1% probability each day that an investor in India would have lost an average of 0.63% of their investment due to foreign exchange risk. Over the period January 2007–December 2008, the average nominal exposure to foreign exchange risk was €6,660. During this period, there was a 1% probability each day that an investor in India would have lost an average of 0.67% of their investment due to foreign exchange risk. From January 2009 to December 2010, the average nominal exposure to foreign exchange risk increased to €10,830. During this period, there was a 1% probability each day that an investor in India would have lost an average of 1.09% of their investment due to foreign exchange risk. Over the entire period of study, the INR/EUR exchange rate volatility was relatively stable and was similar to the USD/EUR exchange rate volatility. Furthermore, the correlation between BSE 500 Index returns and INR/EUR exchange rate returns had little impact on the foreign exchange VaR of the Indian portfolio. Table 9 contains the descriptive statistics of the marginal foreign exchange VaR for the Indian portfolio.

5.6. Decomposition of VaR for Mexican Portfolio

Over the period January 2003–December 2010, European investors in Mexico were subject to a high degree of foreign exchange risk. Figure 9 illustrates the decomposition of variance-covariance VaR for the Mexican portfolio.
Table 9. Descriptive Statistics of Marginal Foreign Exchange VaR for Indian Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>1,887</td>
<td>15,767</td>
<td>13,880</td>
<td>8,431</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>1,021</td>
<td>15,261</td>
<td>14,240</td>
<td>6,270</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-1,682</td>
<td>23,618</td>
<td>25,300</td>
<td>6,660</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>2,871</td>
<td>28,223</td>
<td>25,352</td>
<td>10,830</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Indian portfolio in each subperiod respectively. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

Figure 9. Decomposition of Variance-Covariance VaR for Mexican Portfolio (January 2003 to December 2010)

Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period.
Our results reveal that the average nominal exposure to foreign exchange risk was €14,313 over the period January 2003–December 2004. During this period, there was a 1% probability each day that a European investor in Mexico would have lost an average of 1.44% of their investment due to foreign exchange risk. Over the period January 2005–December 2006, the average nominal exposure to foreign exchange risk was €10,211. During this period, there was a 1% probability each day that an investor in Mexico would have lost an average of 1.03% of their investment due to foreign exchange risk. Over the period January 2007–December 2008, the average nominal exposure to foreign exchange risk was €12,199. During this period, there was a 1% probability each day that an investor in Mexico would have lost an average of 1.22% of their investment due to foreign exchange risk. From January 2009 to December 2010, the average nominal exposure to foreign exchange risk was €12,894. During this period, there was a 1% probability each day that an investor in Mexico would have lost an average of 1.29% of their investment due to foreign exchange risk. The high foreign exchange VaR of the Mexican portfolio can be largely attributed to an extremely volatile MXN/EUR exchange rate over the entire period of study, while the correlation between IPC Index returns and MXN/EUR exchange rate returns had little impact for the majority of the period studied. Table 10 contains the descriptive statistics of the marginal foreign exchange VaR for the Mexican portfolio.
Table 10. Descriptive Statistics of Marginal Foreign Exchange VaR for Mexican Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>5,917</td>
<td>25,551</td>
<td>19,634</td>
<td>14,313</td>
</tr>
<tr>
<td>Jan 2005 – Dec 2006</td>
<td>3,537</td>
<td>19,221</td>
<td>15,684</td>
<td>10,211</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>267</td>
<td>69,185</td>
<td>68,918</td>
<td>12,199</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>5,078</td>
<td>28,140</td>
<td>23,062</td>
<td>12,894</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Mexican portfolio in each subperiod respectively.

5.7. Decomposition of VaR for Russian Portfolio

Over the period January 2006–December 2010, the foreign exchange VaR for the Russian portfolio indicates that foreign exchange risk is not always a significant source of risk in emerging markets. Figure 10 illustrates the decomposition of variance-covariance VaR for the Russian portfolio.

Our results reveal that the average nominal exposure to foreign exchange risk was €2,262 over the period January 2006–December 2006. During this period, there was a 1% probability each day that a European investor in Russia would have lost an average of 0.23% of their investment due to foreign exchange risk. From January 2007 to December 2008, the average nominal exposure to foreign exchange risk was €344. During this period, there was a 1% probability each day that an investor in Russia would have lost an average of 0.04% of their investment due to foreign exchange risk. The low foreign exchange VaR of the Russian portfolio between January 2006 and
Chapter 5 (Essay Four)

Figure 10. Decomposition of Variance-Covariance VaR for Russian Portfolio (January 2006 to December 2010)

Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

December 2008 can be largely attributed to a stable RUB/EUR exchange rate. A low and negative correlation between RTS Index returns and RUB/EUR exchange rate returns also played a role in reducing the exposure to foreign exchange losses.

Between January 2009 and December 2010, there was an increase in the volatility of the exchange rate which coincided with a similar rise in the foreign exchange VaR of the Russian portfolio. Furthermore, the correlation between RTS Index returns and RUB/EUR exchange rate became largely positive during this period. The average nominal exposure to foreign exchange
risk increased to €10,584, and there was a 1% probability each day that an investor in Russia would have lost an average of 1.06% of their investment due to foreign exchange risk. Table 11 contains the descriptive statistics of the marginal foreign exchange VaR for the Russian portfolio.

### Table 11. Descriptive Statistics of Marginal Foreign Exchange VaR for Russian Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2006 – Dec 2006</td>
<td>-1,153</td>
<td>9,167</td>
<td>10,320</td>
<td>2,262</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-5,318</td>
<td>5,326</td>
<td>10,644</td>
<td>344</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>1,134</td>
<td>34,240</td>
<td>33,106</td>
<td>10,584</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the Russian portfolio in each subperiod respectively. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

### 5.8. Decomposition of VaR for US Portfolio

Over the period January 2003–December 2010, the impact of foreign exchange risk in the US was relatively insignificant as it did not add much exposure to the US portfolio. Figure 11 illustrates the decomposition of variance-covariance VaR for the US portfolio.

Our results reveal that the average nominal exposure to foreign exchange risk was €11,391 over the period January 2003–December 2004. During this period, there was a 1% probability each day that a European investor in the US would have lost an average of 1.14% of their investment due to foreign exchange risk. Over the period January 2005–December 2006, the
Notes: VaRs are estimated over a 1-day horizon and at a 99% confidence level. An EWMA approach using a smoothing constant of 0.94 is used to estimate the VaRs on each day over the period. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

average nominal exposure to foreign exchange risk decreased to €7,961. During this period, there was a 1% probability each day that an investor in the US would have lost an average of 0.80% of their investment due to foreign exchange risk. As the decade progressed, equity investments in the US became even more appealing from a foreign exchange risk management perspective. Over the period January 2007–December 2008, the average nominal exposure to foreign exchange risk decreased further to €3,693. During this period, there was a 1% probability each day that an investor in the US would have lost an average of 0.37% of their investment due to foreign exchange risk. From
January 2009 to December 2010, the average nominal exposure to foreign exchange risk was €1,614. During this period, there was a 1% probability each day that an investor in the US would have lost an average of 0.17% of their investment due to foreign exchange risk. The reduction in foreign exchange risk over the course of the study coincided with a similar decrease in correlation between S&P 500 Index returns and USD/EUR exchange rate returns. In this context, a negative correlation made investments in the US more appealing as it acted as a natural hedge that reduced the portfolio foreign exchange VaR. Table 12 contains the descriptive statistics of the marginal foreign exchange VaR for the US portfolio.

Table 12. Descriptive Statistics of Marginal Foreign Exchange VaR for US Portfolio

<table>
<thead>
<tr>
<th>Period</th>
<th>Min (€)</th>
<th>Max (€)</th>
<th>Range (€)</th>
<th>Mean (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2003 – Dec 2004</td>
<td>5,285</td>
<td>17,953</td>
<td>12,668</td>
<td>11,391</td>
</tr>
<tr>
<td>Jan 2007 – Dec 2008</td>
<td>-15,792</td>
<td>12,855</td>
<td>28,647</td>
<td>3,693</td>
</tr>
<tr>
<td>Jan 2009 – Dec 2010</td>
<td>-7,502</td>
<td>9,576</td>
<td>17,078</td>
<td>1,614</td>
</tr>
</tbody>
</table>

Notes: The full period of study is broken down into four subperiods. ‘Min’ and ‘Max’ are the minimum and maximum values of the marginal foreign exchange VaR for the US portfolio in each subperiod respectively. Negative VaRs indicate a 99% probability of making a gain due to foreign exchange exposure.

5.9. VaR Backtesting

Backtesting techniques are employed to determine the accuracy of VaR models. The most common procedures attempt to establish whether actual
portfolio losses are consistent with corresponding VaR estimates. The term ‘exceedance’ refers to an instance when portfolio losses are greater than corresponding VaR estimates in the backtest (Alexander, 2008). A VaR model that is perfectly accurate has a number of exceedances that is consistent with the VaR confidence level. For instance, we would expect a VaR estimate over a 1-day horizon and at a 99% confidence level to produce an exceedance once every 100 days to be deemed completely accurate. However, Alexander (2008) notes that VaR models rarely achieve such a high degree of accuracy. Models often have too many exceedances and underestimate risk or too few exceedances and overestimate risk. Alexander (2008) proposes the use of a confidence interval around the expected number of exceedances within which it is likely that the observed number of exceedances will occur. Such intervals can be constructed using the standard error of the expected number of exceedances, \( \sqrt{n\alpha(1-\alpha)} \), which provides a measure of uncertainty around the expected value. Under the null hypothesis that the VaR model is accurate, the two-sided 99% confidence interval for the number of exceedances is approximately

\[
(n\alpha - 2.57583\sqrt{n\alpha(1-\alpha)}, n\alpha + 2.57583\sqrt{n\alpha(1-\alpha)})
\]

where \( n \) is the number of observations and \( \alpha \) is the expected proportion of exceedances.

\( ^{6} \) In the literature, the terms ‘breaches’ and ‘violations’ are also used when referring to ‘exceedances’.
Unconditional coverage tests, which were pioneered by Kupiec (1995), are also based on the amount of VaR exceedances. The Kupiec (1995) test is used to determine whether the observed number of exceedances is significantly different from the expected number of exceedances.

The null hypothesis for the Kupiec (1995) test is

\[ H_0 : \pi_{\text{exp}} = \pi_{\text{obs}} = \frac{n_1}{n} \]

where \( \pi_{\text{exp}} \) is the expected proportion of exceedances, which is equal to one minus the VaR confidence level, \( \pi_{\text{obs}} \) is the observed proportion of exceedances, \( n \) is the number of observations and \( n_1 \) is the number of exceedances. The test is conducted as a likelihood-ratio (LR) test such that

\[ LR_{\text{uc}} = \frac{\pi_{\text{exp}}^{n_1} (1 - \pi_{\text{exp}})^{n_0}}{\pi_{\text{obs}}^{n_1} (1 - \pi_{\text{obs}})^{n_0}} \]

where \( n_0 = n - n_1 \). The asymptotic distribution of \(-2 \ln LR_{\text{uc}}\) is chi-squared with one degree of freedom. To reduce rounding errors, Alexander (2008) recommends that the log of the likelihood-ratio statistic is computed initially using the following formula:

\[
\ln(LR_{\text{uc}}) = n_1 \ln(\pi_{\text{exp}}) + n_0 (1 - \pi_{\text{exp}}) - n_1 \ln(\pi_{\text{obs}}) - n_0 \ln(1 - \pi_{\text{obs}})
\]
Table 13 summarises the backtesting results for all portfolio VaRs estimated in this study. The backtesting period for the Brazilian, Chinese, Indian, Mexican and US portfolios spans from 02/01/2003 to 31/12/2010, while the backtesting periods for the Argentinian and Russian portfolios span from 02/01/2004 to 31/12/2010 and 03/01/2006 to 31/12/2010 respectively. The backtesting results highlight that the number of exceedances for the Argentinian and US portfolios lie within the 99% confidence intervals and are accepted by the Kupiec (1995) test at the 1% significance level. Thus, it can be inferred from these results that our VaR model accurately measures the risk of these portfolios. The number of exceedances for the Brazilian, China, Indian, Mexican and Russian portfolios lie outside the 99% confidence intervals and are not accepted by the Kupiec (1995) test at the 1% significance level. For each portfolio, the number of exceedances is above the higher bound of the confidence interval. This indicates that the VaR model underestimates the risk of these portfolios. Figure 12 provides a graphical representation of the VaR estimates and portfolio returns for all portfolios.
Table 13. Backtesting Results for Systematic VaR of Each Portfolio

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>No. of Exceedances</th>
<th>VaR Confidence Interval</th>
<th>Kupiec Test Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentinian Portfolio</td>
<td>18</td>
<td>[7.31, 29.21]</td>
<td>-0.3529*</td>
</tr>
<tr>
<td>Brazilian Portfolio</td>
<td>37</td>
<td>[9.16, 32.58]</td>
<td>8.9153**</td>
</tr>
<tr>
<td>Chinese Portfolio</td>
<td>70</td>
<td>[9.16, 32.58]</td>
<td>67.5669***</td>
</tr>
<tr>
<td>Indian Portfolio</td>
<td>47</td>
<td>[9.16, 32.58]</td>
<td>22.2432***</td>
</tr>
<tr>
<td>Mexican Portfolio</td>
<td>43</td>
<td>[9.16, 32.58]</td>
<td>16.3558***</td>
</tr>
<tr>
<td>Russian Portfolio</td>
<td>69</td>
<td>[3.79, 22.29]</td>
<td>112.9588***</td>
</tr>
<tr>
<td>US Portfolio</td>
<td>30</td>
<td>[9.16, 32.58]</td>
<td>2.6847*</td>
</tr>
</tbody>
</table>

Notes: ‘No. of exceedances’ is the number of times the 99% systematic VaR of each portfolio was less than portfolio losses. VaR confidence interval is the non-rejection region which indicates the number of exceedances that could be observed without rejecting the null hypothesis that 1% is the correct probability at the 99% confidence level. The critical values for the Kupiec test are 6.6349 and 10.828 at the 1% and 0.01% significance levels respectively. * indicates significance at the 1% level. ** indicates significance at the 0.1% level. *** indicates significance beyond the 0.1% level.
Chapter 5 (Essay Four)

Figure 12. VaR and P&L for All Portfolios

Notes: ‘P&L’ is an abbreviation for Profit and Loss. Where P&L intersects Minus VaR indicates a VaR exceedance. The legend applies to all subplots.
6. Conclusion

In the context of equity portfolio investments, the purpose of this study has been to investigate whether foreign exchange risk is greater in emerging markets compared to developed markets. The results of the VaR decomposition show that the foreign exchange risk in Brazil and Mexico was significant in comparison to the US, while foreign exchange risk in China and Russia was less significant when compared to the US. For the majority of our study, Argentina and India exhibited levels of foreign exchange risk that were similar to that of the US. For investors in emerging markets who are concerned about exposure to foreign exchange losses, this paper highlights the need to individually assess such markets in order to determine the extent of foreign exchange risk. Furthermore, foreign exchange risk should be considered in a portfolio context as the correlation between equity returns and foreign exchange returns has an effect on the level of such risk. The methodology we employ provides a framework to identify the foreign exchange exposure of equity portfolio investments and allows investors to quantitatively measure this exposure themselves.
References


Chapter 6

Conclusion
Conclusion

Foreign investment is not only a major source of capital for developing and emerging countries but it also has the potential to make important contributions to economic development in these economies. In particular, FDI can deliver significant economic benefits in terms of employment creation, export generation, tax revenue, and capital formation, while it also produce spillover effects for domestic firms, thereby raising productivity in recipient countries. FPI can also provide the capital needed to stimulate economic activity, while at the same time helping to strengthen domestic capital markets and improve their functioning, thus resulting in an overall healthier economy. Considering these potential economic effects, it is not surprising that a wide academic literature has been devoted to examining foreign investments. However, much of this literature is still relatively new, and there is still much work to be done in order for the world’s lower-income countries to fully realise the economic gains from these investments. In the four essays in this thesis, the aim has been to address knowledge gaps in the existing literature and support a more positive contribution of foreign investment to economic development in developing and emerging economies.

Considering the prominent role of IPAs in attracting FDI, the first essay focused on guiding their choice of promotional efforts between image building and investment generation activities; a choice that they make based on investor perceptions of their location. Motivating this research was the observation that
IPAs face a difficult task in determining investor perceptions, particularly in the presence of political risks that can change over time due to changes in a country’s political environment. The shortcomings associated with traditional methods used by IPAs to assess investor perceptions were another motivating factor. An innovative quantitative finance technique was used to gauge investor perceptions and this approach exploited financial market data to measure the volatility of companies stock prices around events that may be expected to cause a rise in risk perceptions. An important advantage of this technique is that it enables the timely identification of investors’ risk perceptions upon market events, thereby providing IPAs with more up-to-date and relevant information upon which to base their promotional efforts. Furthermore, it allows these agencies to assess the risk perceptions of target companies and, thus, tailor their promotional efforts towards attracting their preferred investors.

Using this approach, the essay focused on determining whether large MNE resource companies operating in Bolivia were concerned about nationalisation risk around events that preceded and paved the way for the nationalisation of the country’s oil and gas resources in May 2006. The stock prices of two companies, BG Group Plc. and BP Plc., that were affected by the nationalisation, were found not to exhibit any increase in volatility around these events, implying that these companies were not particularly concerned about risk of nationalisation. The findings support the view that large MNE resource companies may be more willing and more capable of conducting
investments in countries where nationalisation poses a threat to business operations. Considering the high profits associated with natural resource investments, the results suggest that political hazards may not be a significant cause for concern for MNEs when expected investment returns are high enough to outweigh the associated investment risks. The fact that large MNEs operating in a variety of geographic locations can diversify away the effect of political risk may also partly explain the findings.

In relation to guiding the promotional efforts of IPAs, the implications of the findings are relevant for agencies seeking to encourage investment in their natural resource sector. In countries where nationalisation is a risk, IPAs can engage in investment generation activities to promote investments from large MNEs that do not hold negative perceptions about locations where nationalisation may be a threat to business activities. Moreover, in countries where political conditions have changed such that the risk of nationalisation has reduced, IPAs can also conduct investment generation activities to entice investments from these companies. Whereas IPAs may have previously conducted image building activities to inform these investors of the improved environment for FDI, the findings indicate that large MNE resource companies are not concerned about nationalisation risk and, thus, image building activities are likely to be unnecessary and wasteful of resources.

In addition to investment promotion efforts, the adoption of BITs has been another key initiative pursued by developing and emerging economies seeking to attract FDI. These treaties have been signed with the expectation
that they will induce an increase in inward investment which will stimulate growth and prosperity. However, they also entail costs for signatory states, imposing restrictions on their sovereignty and resulting in high compensation pay-outs in the event that they violate a treaty. The prominence of these treaties in international investment policymaking has been somewhat surprising given that the existing studies examining their effects on FDI have produced inconclusive findings. Moreover, very little has been known about whether the treaties influence forms of investment that may be compatible with a country’s development objectives. In effect, policymakers have been making decisions whether or not to sign BITs without knowing the precise effects of these treaties on both their inward FDI flows and their economy’s development.

In the second essay, the aim was to provide a better understanding of the impact of BITs on FDI. To this end, the essay focused on examining the influence of the treaties on the vertical and horizontal FDI activities of MNEs. It also investigated whether the effects of BITs on these investments is conditional on institutional environments in host countries. Due to the higher sensitivity of MNEs engaged in vertical FDI to host-country risks, the expectation was that BIT would be more positively associated with vertical investments. Given that the treaties are designed to substitute for weak institutions, it was also expected that they would have a stronger positive effect on vertical than on horizontal FDI in countries with weaker institutional conditions.
Chapter 6

The essay’s findings provided support for these hypotheses. Using BEA data to distinguish between US vertical and horizontal FDI activities in a sample of 28 developing and transition countries between 1999 and 2008, it was found that BITs have a positive impact on both vertical and horizontal FDI but that they are more positively related to vertical investments. It was also shown that the treaties have a more positive effect on vertical FDI in countries characterised by higher expropriation risk, weaker law and order, and lower government stability. The link between BITs and horizontal FDI was found to be more positive only in economies with poorer law and order. In addition, the treaties were shown to be more positively related to vertical than to horizontal FDI in countries with higher levels of expropriation risk and government instability.

From a policy perspective, the findings recommend that developing and emerging countries seeking to attract vertical FDI should give particular consideration to BITs as a means to encourage these investment. It is also advised that economies with development priorities that can be satisfied through vertical FDI, for example employment creation or export generation, consider BITs as a means to achieve their objectives. Indeed, these recommendations are noted as being most relevant for countries with weak institutional conditions in terms of expropriation risk, law and order and government stability. Another policy implication, albeit a somewhat weaker one, is that countries seeking to attract horizontal FDI, as well as those with development priorities that can be satisfied through horizontal investments, for
instance technological upgrading, should also consider BITs as a means to achieve their development objectives. For these countries, the benefits of the treaties is shown to be particularly relevant for those with weak law and order.

The main contribution of the essay to the existing literature on BITs and FDI was it showed the treaties to be more effective in promoting investments that are more sensitive to host-country risks. It also added to studies that have found a positive link between BITs and aggregate FDI, as well as those that show that the treaties work to substitute for weak institutional conditions. Moreover, the findings pointed to the possibility that the weak existing evidence of a positive effect of BITs on FDI may be somewhat attributable to the heterogeneous effect of the treaties on different forms of FDI. In this regard, future research could look to examine this issue further and explore how the treaties impact other kinds of FDI with different risk sensitivities. For policymakers, these studies could provide them with a better understanding of the effects of BITs on other forms of FDI and could help them make more informed decisions as to whether they should adopt the treaties as a means to achieve their development objectives. Interestingly, the results of the essay were derived from an analysis that used a recent time period in which the proliferation of BIT claims had raised awareness of the obligations and costs associated with the treaties for signatory economies. In this regard, the findings suggest that the weak evidence on the effectiveness of the treaties may also be partly attributable to the use of longer historical sample periods in which there may have been a lower awareness of the potency of the
treaties. This presents another possible direction for future research, examining whether the effects of the treaties have increased over time. While this essay can be considered a step closer to understanding the true effects of BITs on FDI, certain caveats must be also be noted. The findings are based on only one source country of FDI, namely the US, while they are also obtained from a small sample of host countries and over a short period of time. More extensive analyses on the effect of BITs on vertical and horizontal FDI is needed before the findings can be generalised.

While the first two essays in this thesis addressed issues related to attracting FDI to developing and emerging countries, the focus of third essay shifted to examining the effect of FDI on economic growth in these economies. More specifically, this essay investigated the link between Southern FDI and economic growth in recipient Southern economies, paying particular attention to the role of local conditions in mediating this relationship. The case for a growth effect from Southern FDI was based on the premise that Southern MNEs tend to use less complex technologies that are more in line with Southern technological capabilities. Thus, from a technology gap perspective, Southern FDI was identified as having the potential to bring new technologies that local firms may have the capacity to absorb. Moreover, the use of less sophisticated technologies in Southern FDI provided a rationale for examining whether the growth effect from these investments in Southern economies is dependent of different local conditions compared to those that matter to achieve growth through Northern FDI. In this regard, the low-technological
content of Southern FDI suggested that its contribution to growth in Southern economies may be dependent of local conditions conducive to the absorption of low-technology spillovers, and not on conditions that matter primarily to capture spillovers from high-technology Northern FDI.

By applying a system GMM estimator to a sample of 46 Southern host economies over the period 1980–2007, the findings of the essay provided evidence of a growth effect from Southern FDI that is dependent of different local conditions than those required for growth through Northern FDI. Whereas a highly skilled workforce and strong property rights protection were found to be conducive to the growth effect from Northern FDI, it was strong law and order that emerged as a critical condition necessary to achieve growth following Southern FDI. The findings in relation to Northern FDI add to existing studies showing that higher levels of human capital and property rights protection are important growth drivers within high-technology sectors. The finding that strong law and order influences the growth consequences from Southern FDI adds support to the view that FDI by foreign firms with a technological content close to that of domestic firms is more likely to create linkages and, by extension, produce spillover effects, in countries with better legal systems.

For Southern policymakers, the findings of the essay have implications for the initiatives they may take to attract Southern FDI. Given that host-governments frequently offer incentives to MNEs, and that they often justify the use of these incentives on the basis of expected growth arising from
increased inward investment, it is critical that they consider those local conditions that matter for FDI to contribute to growth. Indeed, IPAs also spend much time and resource in the pursuit of FDI that will contribute to growth and development. For these agencies, the decision to commit resources to attracting FDI may also depend on its potential growth contribution. In directing costs towards attracting Southern FDI, the findings recommend that consideration should be given to the strength of the domestic legal system in a Southern country.

The main contribution of this essay to the existing literature on FDI and economic growth was that it distinguished between FDI originating from Northern and Southern countries and demonstrated that distinct host-country conditions are conducive to the growth effects from these investments in recipient Southern countries. In this context, it adds to the recent macro-level studies showing that the growth consequences from FDI are dependent of the source country of investment. It also provides a more nuanced understanding of the role of local conditions in achieving growth from FDI. In contrast to existing macro-level research that focuses mainly on host-country conditions that matter for the growth effect from Northern FDI, this essay identifies distinct conditions that are important for the growth effects from Southern FDI and Northern FDI, respectively. In doing so, it provides support to the literature pointing to the importance of effective legal institutions in capturing spillovers from MNEs that have similar technological capabilities to domestic firms. Indeed, it also provides further support to traditional FDI studies showing that
Chapter 6

the growth effects from high-technology Northern investments are dependent on a highly skilled local population and the strong protection of property rights. While the essay is an important step in understanding the link between Southern FDI and growth in recipient Southern countries, it also presents avenues for future research. For instance, there may be other local conditions that matter specifically for the growth consequences from Southern FDI, which future studies could seek to identify. Where data allows, industry or firm-level research could also look to explore the local conditions that matter for growth effects stemming from Southern FDI at a more disaggregated level. These studies could document in greater detail the channels through which spillovers occur from Southern MNEs.

In the final essay in the thesis, the focus shifted to gaining a better understanding of the risks associated with FPI. More specifically, this essay examined the extent to which equity portfolio investments in emerging economies are affected by foreign exchange risk. The motivations for this research were the observations that foreign exchange risk is often a significant cause for concern for foreign investors in emerging economies, and that no study has examined this risk in an equity portfolio context. A VaR risk factor mapping technique, under the variance-covariance VaR approach, was used to decompose equity portfolio risk into its equity and foreign exchange components. This process involved mapping a portfolio its risk factors and calculating the corresponding VaRs. A key advantage of this approach was that
it captured the correlation between a portfolio’s equity and foreign exchange components, which can play a role in reducing foreign exchange exposure.

The VaR decomposition technique was applied to measure the foreign exchange risk associated with equity portfolios investments in Argentina, Brazil, China, India, Mexico and Russia; and for comparison purposes, the same technique was applied to a portfolio of US equities. The study was conducted from the perspective of a European investor. The findings demonstrated that significant variation exists in equity portfolio foreign exchange risk across these six emerging economies. The results showed that the foreign exchange risk of the Brazilian and Mexican portfolios was higher than of the US portfolio, while the foreign exchange risk of the Chinese and Russian portfolio was less than that of the portfolio of US equities. For the majority of the study, the portfolios in Argentina and India were found to exhibit levels of foreign exchange risk that were similar to that of US portfolio.

The main conclusion to be drawn from this essay is that emerging market equity portfolio investors who are concerned about foreign exchange losses need to individually assess these markets in order to determine and manage their exposure to foreign exchange risk. For these investors, foreign exchange risk needs to be considered in a portfolio context as the correlation between equity returns and foreign exchange returns has an effect on the level of this risk. The VaR methodology applied in the essay provides a framework for investors to measure this risk and, thus, help them to manage their portfolio investments in emerging economies.
THIS PAGE IS LEFT BLANK INTENTIONALLY