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Firm Level Multinationality in International Business and Finance

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A dissertation submitted in fulfilment of the requirements for the Degree of Doctor of Philosophy in Business Studies

Thesis supervisor: Professor Colm Kearney

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April 2009

DECLARATION

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Abstract

The Multinational Corporation (MNC) is one of the most important concepts in international business (IB) and international finance (IF). However, there is no commonly and widely agreed definition of what constitutes an MNC and no classification system for the many types of MNCs that exist. This lack of definitional consistency has curtailed theoretical advances and caused confusion in comparing the results of empirical studies. This thesis proposes a matrix of multinationality that can aid scholars to overcome the problems resulting from a lack of comparability in studies of the MNC. This matrix forms part of a broader taxonomic classification of firms. This taxonomic classification system uses six high-level descriptors; *type* (public, private listed, private unlisted), *industry* (SIC codes), *age* (years, based on the date of incorporation), *size* (sales), *location* (country of headquarters), and *degree of internationalisation* (a matrix of multinationality based on the breadth and depth of operations across countries and regions).

The classification system forms the basis of a unique dataset used in this thesis. Three samples of firms are classified using the system – the *Fortune 500* list in 2005, the *G7 1289* firms and a sample of Irish firms. The *Fortune 500* list contains the world's 500 largest firms as measured by sales. The *G7 1289* firms comprises all firms from Britain, Canada, France, Germany, Italy, Japan and the United States listed on the countries' exchanges (the FTSE 100, the TSX 60, the SBF 120, the HDAX 110, the MIB-SGI 174, the Nikkei 225 and the S&P 500). The sample of Irish firms includes two sub-samples – the 66 firms quoted on the Irish stock market and the 100 largest firms in Ireland. The classification system provides a more robust categorisation of firms than has appeared in the literature to date.

This classification scheme is used to provide an alternative perspective on three topics within the literature – the regionalisation/globalisation debate, the home bias puzzle in international portfolio analysis and the issue of whether the geographical dispersion of operations is reflected in the share price of firms.

I first study the regionalisation/globalisation debate. A significant part of this literature, mainly by Rugman and co-authors, concludes that the world's largest firms (the *Fortune 500* list) are regional rather than global. When *Fortune 500* firms are classified using my matrix of multinationality, however, results show that the world's largest firms are trans-regional and global rather than regional, and that this finding is also applicable to the larger *G7 1289* dataset.

I next consider the home bias puzzle. The *G7 1289* firms are used to investigate if investors can gain international exposure by investing in MNCs, and if this is a possible explanation for the home biased behaviour prevalent amongst international investors. Tests reveal that firms with greater global reach provide greater international diversification benefits. Results suggest that investors may exhibit home bias behaviour while still gaining the benefits of international portfolio diversification by investing in MNCs.

Finally, I apply the classification system to categorise Irish firms. The domestic market index, the *ISEQ* index, although influential on quoted Irish firms, only influences half of the largest firms in Ireland. The geographical distribution of operations is not reflected in the share price of Irish firms, and firms based in Ireland that are headquartered overseas are more influenced by the location of their headquarters than by the geographical distribution of their operations.

Overall, the thesis provides novel ways for IB and IF scholars to look at and analyse firm-level multinationality and international exposures. For example, it shows how corporate sector exposures to international factors can be influenced both by the degree of multinationality of indigenous firms, and by the global exposure of foreign firms located in the domestic market.

DEDICATION

To Deirdre, Denise and Mags.

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Chapter 1

Introduction and Overview

1.1 Introduction

The Multinational Corporation (MNC) is one of the most important concepts in international business (IB) and international finance (IF). However, definitions of MNCs are ambiguous throughout these literatures and the lack of a commonly and widely used classification system remains a significant short-coming. I am not aware of any other discipline in the natural or social sciences in which a concept of such central importance has no generally agreed approach to definition, classification, or measurement. As research into many aspects of the operations and strategies of MNCs broadens and intensifies, the need to agree on a classification system for MNCs is growing in importance. The primary focus of this thesis, therefore, is to develop a classification system that can be used to categorise firms for empirical analysis.

The thesis then applies the taxonomy to three literatures in IB and IF: the regionalisation/globalisation debate, the home bias puzzle in international portfolio analysis, and the issue of whether the geographical distribution of operations is reflected in the share price of firms. Each of these literatures produces conflicting results that may be due in significant measure to the lack of consistency in categorising firms for empirical analysis. The issue of whether MNCs are regional or global in their activities has yet to be resolved, the question of whether MNCs provide investors with the benefits of international portfolio diversification remains unanswered, and the topic of geographical dispersion of operations being reflected in the share price of firms remains ambiguous. This thesis provides a fresh perspective and some novel datasets to shed new light on these subjects. The application of my taxonomy of multinationality to these topics allows for more clarity and precision in attempting to resolve these issues.

The remainder of this chapter is structured as follows. Section 1.2 presents the main research questions and the motivations behind each question. Section 1.3 outlines the

structure of the thesis on a chapter by chapter basis. Section 1.4 lists the institutions and conferences where the results from this thesis have been presented. Finally, section 1.5 provides a brief summary and conclusion.

1.2 Main research questions and motivations

Taxonomy condenses and organises information to facilitate the comparison and contrast between object types within and across populations. Taxonomic classification systems are widely used in many disciplines across the arts, humanities, engineering, physical and social sciences. Well known taxonomies include the Linnaeus hierarchical taxonomy of plants and animals, the periodic table of chemical elements, Bloom's taxonomy of educational objectives, the Dewey library classification system, and the Myers-Briggs personality type indicator. Despite its widespread use in other disciplines, taxonomy has not been widely used in the international economics and finance literatures[1]. This thesis proposes a taxonomic classification system that may be used to categorise firms for empirical analysis.

The classification system is used to create a unique dataset. Three samples of firms are classified – the *Fortune 500* list in 2005, the *G7 1289* firms and a sample of Irish firms. The *Fortune 500* list contains the world's 500 largest firms as measured by sales. The *G7 1289* firms comprises all firms from Britain, Canada, France, Germany, Italy, Japan and the United States listed on the countries' main exchanges (the FTSE 100, the TSX 60, the SBF 120, the HDAX 110, the MIB-SGI 174, the Nikkei 225 and the S&P 500). The sample of Irish firms includes two sub-samples – the 66 firms quoted on the Irish stock market and the 100 largest firms in Ireland.

The primary research question investigates how firms should be categorised for empirical analysis. The classification system is developed in response to this question. It is then used to provide an alternative perspective on three important issues in the IB and IF literatures:

[1] Two notable exceptions are the North American industry classification system (NAICS) that classifies industries at increasing levels of specificity, and the Journal of Economic Literature (JEL) classification system that organises the business, economics and management disciplines in 20 main categories.

(1) Are MNCs regional or global in their activities?

(2) Are MNCs useful in attaining international portfolio diversification benefits?

(3) Is the geographical distribution of a firm's operations reflected in its share price?

Much of the current literature on the regionalisation/globalisation debate finds that the world's largest firms (the *Fortune 500* list) are regional rather than global. These results are based on an analysis of the geographical spread of firm-level sales data. This is over-simplistic. This first question is motivated by the need for a more careful analysis of the international exposure of firms. I show, using my taxonomy of multinationality, that when firms are analysed using a geographical breakdown of both their sales and subsidiaries, the *Fortune 500* firms contain a wide variety of firms with little emphasis on the home regions that the current literature accentuates. These results hold when my matrix of multinationality is applied to the larger *G7 1289* dataset.

The home bias puzzle in international portfolio analysis remains unsolved. Although numerous explanations have been tested, none has been widely accepted. One possibility is that investors may be able to indirectly gain foreign market exposure by investing domestically in MNCs. In this case, a home biased attitude to international investing may be justified and indeed optimal. MNCs are ambiguously defined throughout this literature, however, making comparison between empirical studies difficult. I use my matrix of multinationality to distinguish several categories of firm and provide a more robust investigation into the types of firms that provide international exposure.

The literature investigating if the geographical distribution of operations is reflected in the share price of firms is sparse. Most researchers use a two-factor market model, with a domestic and a world factor. This model however, cannot adequately capture the international exposure of firms with geographical distributions that differ substantially from the world factor used in the model. I extend this traditional model and further disaggregate the foreign factor into the 6 geographical regions defined in my system. I also use my classification system to provide a more robust categorisation of firms than has appeared in this literature to date. This allows a more in-depth investigation into the international exposure of firms.

1.3 Structure of the thesis

The structure of the thesis overall reflects the importance of the construction and application of the taxonomy of multinationality at the level of the firm in the IB and IF literatures. Because of this, the thesis does not include a chapter specifically devoted to reviewing the relevant literature. Rather Chapter 2 provides this. In essence the taxonomy arises from reviewing all the relevant literature concerning the subject matter of Chapters 2-5. The classification system is first outlined in Chapter 2. In subsequent chapters, it is applied to three topics within the literature. In Chapter 3, it is used to provide an alternative perspective on the regionalisation/globalisation debate. In Chapter 4, it is used to provide a more in-depth analysis on the types of firms that yield international portfolio diversification benefits. In Chapter 5, it is used to investigate whether the geographical distribution of operations is reflected in the share price of Irish firms. This section provides a brief description of each chapter.

Chapter 2 provides a theoretical overview of the MNC and the motivation behind the development of a classification system for firms. This chapter describes the main theories of the internationalisation process, reviewing previous attempts to define MNCs, and documenting the wide variety of operational definitions of MNCs that exist. It begins by analysing all 133 papers published in the *Journal of International Business Studies* (*JIBS*) from 1970 to 2007 that have used empirical samples of MNCs. It highlights the wide variety of operational definitions of MNCs that exist within several literatures and uses these examples to motivate the development of a classification system for firms. It presents a matrix of multinationality based on both the breadth and depth of operations across countries and regions. This matrix forms part of a broader taxonomic classification system that uses six high-level descriptors; *type* (public, private listed, private unlisted), *industry* (SIC codes), *age* (years, based on the date of incorporation), *size* (sales), *location* (country of headquarters), and the *degree of internationalisation* (the matrix of multinationality). The chapter concludes with a section highlighting the usefulness of the proposed taxonomy for theory building in IB and IF.

Chapter 3 introduces the regionalisation/globalisation debate, with a strong emphasis on the prior work of Rugman and his co-authors. Rugman and co-authors find that most of

the world's largest firms (the *Fortune 500* list) are regional rather than global and conclude that globalisation is a myth. This Chapter provides an alternative perspective on this debate. It applies the taxonomy of multinationality outlined in Chapter 2 to two samples of firms – the *Fortune 500* firms and the *G7 1289* list. Results show that both samples contain a wide variety of firms with little emphasis on the home regions that Rugman and his co-authors find. A detailed comparison between my system and that of Rugman and Verbeke (2004) ensues under four headings – triad regions, thresholds, accounting data and application of results to firm strategy. The robustness tests originally performed by Osegowitsch and Sammartino (2008) on the *Fortune 500* list in 2001 are replicated using the *Fortune 500* list in 2005. Further robustness tests are performed on the geographical regions used within my classification system and the chapter concludes that little evidence exists on the regionality of firms.

Chapter 4 uses the *G7 1289* dataset to provide an alternative perspective on the 'home bias' puzzle in international portfolio diversification. It investigates if investors can indirectly gain exposure to foreign markets by investing in MNCs, thereby justifying a home biased attitude to international investing. It begins with a review of the literature in three areas – how the degree of internationalisation affects firm performance, the extent to which investors can obtain the benefits of international portfolio diversification by investing in MNCs, and the possibility that the home bias puzzle may be exaggerated. It outlines the mean variance spanning and Sharpe ratio testing methodology used in the analysis. Results show that there are benefits to both domestic and international portfolio diversification, and that firms with greater global reach provide greater international diversification benefits. Several robustness tests are performed to investigate if the size or industrial classification of firms determines the results. Further tests assess the impact of the introduction of short sales constraints on the results.

Chapter 5 provides a taxonomic classification of the Irish corporate sector and investigates the international factors influencing Irish firms. It classifies two samples of Irish firms – the 66 firms quoted on the Irish stock market and the 100 largest firms in Ireland. International market models are used to investigate the influence of the domestic market index (the *ISEQ* index), the world market index and various regional indices on both samples of firms. Results show that the ISEQ index is not influencing firms in

Ireland. The Irish corporate sector comprises many large unlisted firms and many MNCs located in Ireland but not quoted on the Irish stock market. Ireland's strong position in attracting FDI has resulted in the ISEQ index becoming a marginal measure of the Irish corporate sector. Further results show that Ireland is gaining international exposure through foreign MNCs but this foreign exposure is not directly related to the regions where these firms do business.

Chapter 6 summarises the main findings and implications of the thesis and draws together the important conclusions. It also describes the thesis's limitations and discusses future work.

1.4 Conference presentations based on the thesis

The contributions reported in Chapters 2 and 3 were presented at the 12th Global Finance Conference (Dublin, June 2005), the 33rd AIB UK Annual Conference (Manchester, April 2006), the 48th Academy of International Business (AIB) Annual Conference (Beijing, China, June 2006), the 32nd European International Business Academy (EIBA) Annual Conference (Fribourg, Switzerland, December 2006), the 14th Global Finance Conference (Melbourne, Australia, April 2007) and the 5th INFINITI Conference on International Finance (Dublin, June 2007).

The results reported in Chapter 4 were presented at the AIB (UK and Ireland) Doctoral Colloquium, (Derry, November 2007), a research seminar at Manchester Business School (February 2008), the 22nd Irish Economic Association (IEA) Annual Conference (Westport, April, 2008), the 6th INFINITI Conference on International Finance (Dublin, June 2008), the European Financial Management (EFMA) Annual Conference (Athens, Greece, June 2008), the 50th Academy of International Business (AIB) Annual Conference (Milan, Italy, June 2008) and a research seminar at Sydney University Business School (August 2008).

An overview of the thesis was presented at the Doctoral Tutorial at the 33rd European International Business Academy (EIBA) Annual Conference (Catania, Italy, December 2007).

Three papers from this thesis are currently in various stages of preparation for submission to, or re-drafting and re-submission to IB and IF journals.

1.5 Summary and conclusions

This Chapter initially introduced the thesis's main research questions and provided an overview of the thesis. Subsequently, it described the thesis's structure, chapter by chapter. Finally, the various conferences where this research has been presented and debated during its development are detailed. I conclude by noting that it is now appropriate to introduce my taxonomy of firm-level multinationality, and as noted at the start of section 1.3, the discussion serves as an integral part of the literature survey relevant to the thesis.

Chapter 2

A taxonomy of firm-level multinationality

2.1 Introduction

The terms multinational company (MNC), multinational enterprise and transnational corporation are widely and often interchangeably used by international business and finance commentators and scholars. MNCs are traditionally thought of as successful firms that have grown over many years into large corporations that are international in their operations, vision, and strategy. This was certainly the case throughout most of the twentieth century because the prevailing technologies in communications and transport were associated with economies of scale that rendered small and medium-sized enterprises unable easily to internationalise. Recent technological innovations, particularly the advent of the internet, have removed many of these constraints, and scale is no longer a critical requirement for multinationality. The emergence of 'international new venture' (INV) firms that use new technologies to conduct their business on a global scale are testament to this. In today's international business environment, many firms operate across national borders – by exporting and importing raw materials and intermediate or finished products, by employing foreign capital, people and processes, and by establishing ventures abroad. Although these developments have broadened international business and finance research agendas, they have at the same time led to a further blurring of the already fuzzy term MNC.

Although many theoretical and operational definitions of MNC have been proposed, none has become standard. IB and IF scholars have adopted pragmatic approaches to operationally defining the MNC, relying on past usage, data availability and sub-discipline norms. MNCs have consequently been defined on the basis of characteristics as diverse as the size of the firm by sales, the proportion of foreign sales or foreign assets, the number of foreign subsidiaries, and the number of foreign workers, to name a few. The absence of an agreed theoretical or operational definition of MNC is reflected in the lack of consistency in how scholars conduct both high-level and domain-specific

theory building and testing. This has hindered the ability to compare and contrast alternative theoretical frameworks, it has caused confusion in the interpretation of empirical results, and it has stymied the emergence of effective replication studies. This in turn has curtailed the process of validating, refining and rejecting prevailing theory, which is necessary for advancement of the discipline (Kuhn, 1962; Popper, 1978). I am not aware of any other discipline in which a concept of such central importance has no generally agreed approach to definition or measurement.

The need for clarity on this issue is becoming critical. However, the complex and dynamic landscape of international business – characterised by continual change in the structures and strategies of firms as they evolve – suggests that no definitive theoretical or operational definition of MNC is likely to be agreed. A better approach would be to agree on a classification system that encompasses the current forms of multinational firm and that facilitates the study of new types of firm as they emerge. This chapter proposes a taxonomy of multinationality. The objective is to develop a taxonomy that is sufficiently detailed to encompass the important dimensions of multinationality and that can classify all firms with respect to their degree of international involvement, while at the same time being intuitive and easy to use. This taxonomy provides a perspective on high-level theory building and testing, and on theoretical modelling and empirical analysis of the many sub-topics that span the domain of the IB and IF disciplines. I propose a two-dimensional taxonomy that encompasses the breadth and the depth of multinational operations. The *breadth* of multinationality is the extent of geographical spread across the world (domestic, regional, trans-regional and global), and the *depth* is the degree of engagement with and exposure to these markets (trading, alliances, and investments).

This chapter is structured as follows. I begin in Section 2.2 by analysing all 133 papers published in the *Journal of International Business Studies* (*JIBS*) from 1970 to 2007 that have used empirical samples of MNCs. It demonstrates how the absence of an agreed approach to operationally defining, measuring or classifying multinationality has led to the use of a multiplicity of operational definitions, and that this has hindered the ability to generalise and draw conclusions across studies on particular topics. Section 2.3 borrows from the insights of applications in other business disciplines to show how taxonomy can be fundamental to the process of refining existing theory and to developing new insights,

intuition and theory. It illustrates how this applies to high-level theory by examining three main theories of internationalisation: the eclectic ownership-location-internalisation (OLI) paradigm, the process theory of internationalisation (PTI), and the new venture internationalisation theory (NVIT). The taxonomy is presented in section 2.4. Section 2.5 explains how the taxonomy encompasses the main high-level theories of the internationalisation process. It shows that, consistent with highly influential applications of taxonomy in the other business disciplines, this taxonomy provides insights and perspectives to guide high-level theory building and testing – by anchoring important conceptual norms and traditions, by highlighting areas that require theoretical refinement and renewal, and by provoking new ideas and directions. Concluding comments are presented in section 2.6.

2.2 Defining MNCs in IB and IF research

In common usage, *lexical definitions* describe a concept in simple terms to a wide audience. They tend to be inclusive by capturing the entirety of the term, which makes them too vague for scientific purposes. *Conceptual definitions* provide the meaning of a concept in a way that is compatible with a measurable occurrence. *Abstract definitions* are used when the meaning cannot be measured empirically. Finally, *operational definitions* provide a clear, concise meaning of a concept in a way that guides measurement to make it amenable to scientific investigation. Operational definitions should be consistent with their conceptual counterparts and easily quantifiable and repeatedly measurable. They should also point explicitly to what will be measured and how. In conducting empirical research, operational definitions should be clearly articulated prior to compiling samples in order to ensure that researchers collect, use and interpret it consistently. In describing the canons of good definition, Borsodi (1967) suggested that operational definitions should be clear, distinct, standard, and reproducible. He listed the four canons of definition as *adequacy* – enough to clarify the meaning, *differentiation* – eliminate confusion of the referent with other terms by including any attributes that distinguish it, *impartiality* – all characteristics of similar significance should be included and receive similar emphasis, and *completeness* – all important attributes should be included.

Although IB scholars have long been aware of the complexities involved in arriving at an appropriate definition of an MNC, the discipline has not succeeded in agreeing on either an abstract or an operational definition that embodies Borsodi's (1967) four canons. The earliest significant attempt to grapple with the problem was by Aharoni (1971), who considered three categories of definition of an MNC. *Performance definitions* are based on criteria such as foreign sales and earnings, foreign assets, and the number of foreign employees. *Structural definitions* are based on factors such as the number of countries in which the firm operates, the degree of multinationality among the firm's owners, the nationality of the firm's top management, and the organisational structure of the firm. *Behavioural definitions* focus on the extent to which management personnel think internationally about their strategic opportunities and investments. Aharoni's pioneering contributions to defining MNCs are insightful and potentially useful. However, rather than building on or amending earlier definitions, IB and IF scholars have tended to develop and propose alternative approaches.

Panel A of Table 2.1 lists 17 attributes that have been used as operational definitions to create empirical samples of MNCs in 133 studies published in JIBS from 1970 to 2007. These approaches are categorised using Aharoni's (1971) headings, and the studies span a wide range of sub-disciplines including culture, financial management and reporting, government relations, international business, international finance, international human resources, international management, international marketing, multinationality and performance, and sourcing strategies and structures. Panel A of the table has three columns. The first lists the number of studies that have used the particular attribute as the sole criterion for operationally defining MNCs; the second column presents the number of studies that have used the attribute as one in a multi-attribute definition; and the final column adds these together. The overall total of 173 for this column exceeds the number of studies because many have used multi-attribute definitions. In total, 94 studies have used single attribute and 39 have used multi-attribute definitions. In the single-attribute studies, the number of foreign subsidiaries is the most common attribute used (47 studies), followed by sales (25 studies). For 11 studies the attribute used is unclear. In the multi-attribute studies, sales (31 studies) is the most common, with foreign subsidiaries (27 studies) the runner-up. It is clear that a range of approaches has been used to operationally define MNCs, including (in order of most common usage)

Table 2.1
Defining and classifying MNCs in IB research

Panel A: Variables used to operationally define MNCs

	Single-attribute	Multi-attribute	Total
Performance definitions			
Subsidiaries	47	27	74
Sales	25	31	56
Foreign assets	1	4	5
Foreign income	1	2	3
International transactions	2		2
Foreign joint ventures	1		1
Mergers and acquisitions	1		1
Structural definitions			
Foreign exchange listing	1	5	6
Industry details	1	3	4
Foreign employees		3	3
Global accounts		1	1
Foreign equity	1		1
Behavioural definitions			
Foreign taxation		2	2
World mandates		1	1
Patents	1		1
Research and development	1		1
Unclear	11		11
Total	**94**	**79**	**173**

Panel B: Data sources used to classify MNCs

The Fortune List	34
Compustat	7
Corporate Families and International Affiliates	5
Directory of Corporate Affiliations	4
Directory of International Affiliations	4
The Forbes List	4
Directory of Japanese Overseas Affiliates	3
The Financial Times Global 500 List	3
Individual Stock Exchange Publications	3
International Directory of Corporate Affiliations	3
Who Owns Whom	3
US Bureau of Economic Analysis	2
Centre for Research on Security Prices Database	2
Directory of Foreign Invested Enterprises	2
Dunn and Bradstreet International Database	2
Electronics Manufacturing Firms in Asia	2
Global Business 1000 List	2

Notes. Panel A lists 17 attributes that have been used to create operational definitions of MNCs, and Panel B lists 17 data sources that have been used to create MNC samples in 133 empirical studies published in *JIBS* from 1970 to 2007. The total column adds to more than 133 because many studies have used multi-attribute definitions.

foreign subsidiaries, foreign sales, foreign listings, foreign assets, industry, employees, income and taxation.

Appendix 1 details the MNC sample, main result and the number of citations for each of these 133 papers. It details the authors of each paper, how they create their sample of MNCs, their main result and the number of citations[1]. These papers may be categorised under 10 broad headings suggesting that the inconsistency in classifying MNCs for empirical analysis has implications for each of the following subject areas:

1. Financial Management (19 papers)
2. Multinationality and Performance (8 papers)
3. International Finance (12 papers)
4. Financial Reporting/ Accounting (5 Papers)
5. International Human Relations (13 papers)
6. International Management (26 papers)
7. International Business (39 papers)
8. Sourcing Strategies and Structures (4 papers)
9. Government Relations (3 papers)
10. Culture (4 papers)

Amongst the *performance* definitions, Simonin (1999), Rugman and Verbeke (2004) focussed on sales as provided in the *Fortune 500* list. Aggarwal (1980) and Sullivan (1994) used the proportion of foreign to total sales, and Allen and Pantzalis (1996) and Pantzalis (2001) used the number of foreign subsidiaries. Kwok and Reeb (2000) operationally defined MNCs as having foreign asset ratios greater than 1 percent. Amongst the *structural* definitions, Lee and Kwok (1988) and Burgman (1996) used foreign tax ratios, and Lecraw (1983) used FDI levels of the firm's industry. Amongst the *behavioural* definitions, Fischer and Behrman (1979) used foreign R&D activities and Mascarenhas (1982) focussed on international involvements other than exporting. Nachum and Wymbs' (2005) sample firms entered the London or New York markets through merger and acquisition activity, and Frost and Zhou (2005) included

[1] The citation counts for each article are obtained from the *Web of Science* database produced by Thomson Scientific. This database provides access to 8700 journals worldwide. The citation counts are for all databases and all years.

firms with a minimum 30 patents in technical fields and at least 10 patents issued to foreign subsidiaries. Amongst the cases that fall outside Aharoni's (1971) categorisation are Leong and Tan (1993) who operationally defined MNCs as all firms invited by Singapore's Economic Development Board to a Global Strategies Conference.

The multi-attribute studies have in many cases developed rather complex approaches to defining MNCs. In a pre-JIBS multi-attribute study, Perlmutter (1969) included ownership, organisational structure, the nationality of senior executives, and the percentage of foreign investment. Sullivan (1994) used Aharoni's (1971) performance, structural and attitudinal attributes. He measured the performance attribute using the percentage of foreign to total sales, the percentage of foreign to total profits, advertising intensity and R&D intensity. The structural attribute was measured using the percentage of foreign to total assets and the percentage of foreign to total subsidiaries, and the attitudinal attribute by top managers' international experience. Using Nunnally's (1978) method, Sullivan (1994) then correlated each attribute with the sum of the scores of the others to derive the optimal combination as his measure of the degree of multinationality of MNCs.

Ramaswamy, Kroeck and Renforth (1996) argued that multinationality is more complex than Sullivan's (1994) index, and that important information is lost when factors are aggregated within an index. MNCs could have the same index score but differ significantly in how their scores are achieved, implying that there are different types of multinationality. Allen and Pantzalis (1996) pointed out that Sullivan's (1994) uni-dimensional measure with equal weighting of attributes implicitly assumes that each has the same impact on the degree of multinationality, and they suggested separating it into its component parts and analysing each separately. More recently, Gomes and Ramaswamy (1999) used the ratio of foreign to total sales, the ratio of foreign to total assets and the number of countries in which firms have subsidiaries, and using principal components they formed a composite index incorporating all three dimensions. It is not clear in this study, however, how the components are weighted in the final composite measure, leaving it to the 'black box' structure determined by the statistical methodology.

2.2.1 Confusion in MNC sampling

In addition to the multiplicity of approaches to operationally defining MNCs, IB scholars have used a wide range of data sources in compiling their empirical MNC samples. The 133 JIBS papers referred to in Panel A of Table 2.1 have used 50 different sources of data. Panel B of the Table lists the 17 sources that have been used in at least two studies, along with the number of studies that have used it. The most popular is the *Fortune* list[2], used in 34 studies. The second most common is Standard & Poor's Compustat database[3] (seven studies), and the third is Dun and Bradstreet's Corporate Families and International Affiliates[4] (five studies). Occupying joint fourth place are three sources: Moody's Directory of Corporate Affiliations[5], the Directory of International Affiliations[6] and the *Forbes* list[7], which have each been used in four studies.

In most empirical studies of MNCs, membership of a particular data set or company list is assumed to qualify firms as multinational. This has the effect of combining different kinds of firms into a broad category labelled 'MNC', and the resulting sample is used to test hypotheses about the nature, objectives, strategies and performance of 'MNCs'. This is clearly problematic, because it treats a multiplicity of firms as if they are the same. This has led researchers to draw inappropriate conclusions from their studies about the nature of the multinational firm. It has also impeded comparisons between related studies, and stymied the development of the discipline by curtailing both theoretical and empirical advancements.

These problems are illustrated by summarising the findings of particular research questions in three IB sub-disciplines: international marketing, international strategy, and

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[2] The *Fortune Global 500 List* ranks firms on the basis of total sales each year. It also provides information on each firm's profits, assets, stockholder's equity and number of employees.

[3] The *Compustat Database* provides annual and quarterly income statement and balance sheet data for over 10,000 firms. It also includes information on firms' foreign tax ratios.

[4] Dun and Bradstreet's *Corporate Families and International Affiliates* provides the names, address, sales, employee number, principal products and officers for US subsidiaries of foreign corporations as well as foreign subsidiaries of US corporations. It also includes the geographic area, SIC code, and subsidiary to ultimate parent indexes.

[5] Moody's *Directory of Corporate Affiliations* includes foreign parent companies with international subsidiaries and divisions, US parent companies with foreign holdings, and a geographical index.

[6] The *Directory of International Affiliations* contains information on foreign and US affiliations of firms operating in the US. It is compiled by the National Register.

[7] The Forbes List of Top 2000 Largest Public Companies ranks firms on a composite score of sales, profits, assets and market value.

international finance. The questions are: *first*, do standardised or localised marketing strategies work better for internationalising MNCs; *second*, does the extent of internationalisation affect the value of MNCs; and *third*, do MNCs provide the benefits of international diversification? For each of these questions I first show how the issue remains unsettled, and by detailing the sample selection process in two or three example studies, I then illustrate how inconsistent operational definition and data selection has contributed to the disparate results.

Do standardised or localised marketing strategies work better for MNCs? Research into whether MNCs should operate with standardised or localised product mix, pricing, branding, promotion and distribution channels in foreign markets, and which of these delivers superior performance, yields mixed results that are difficult to generalise and reconcile. On the question of standardised or localised strategies, Krum and Rau (1993) found that MNCs' product mix tends to be more standardised than their pricing, promotion, and distribution channels. Liu and Pak (1999) found that MNCs standardise their product mix and branding, but localise their promotion and distribution channels. Theodosiou and Katsikeas (2001) found that price standardisation depends on the similarity between home and foreign markets. Griffith, Chandra and Ryans (2003) found that the similarity between home and foreign markets, along with entry mode, have different effects on promotion strategies. On the question of which strategy delivers superior performance, Han and Kim (2003) found that product competitiveness strategy is superior to localisation strategy, and Cui and Lui (2005) found that firm size, entry mode and marketing intensity moderate first-mover advantages. Xu, Cavusgil and White (2006) also analysed the effect of a standardised marketing strategy on firm performance, finding that mediation and profile deviation, but not the moderation perspective, enhance MNC performance.

Liu and Pak (1999) compiled their sample based on personal relationships with the top management of 35 firms from Europe, Japan and the US with venture locations in Beijing and Shanghai. They concluded that Western marketing techniques have been effective in China. The sample firms were deeply engaged in China, so the success of their marketing techniques might also reflect consumer familiarity with the firms. No information about other aspects of the sample firms' multinationality is provided. Firms

with a shallower level of engagement in China – even if they were broadly and deeply engaged with other markets – might not be able to apply Western marketing techniques with the same success. Their MNC sample, therefore, limits the generalisability of their findings. Griffith, Chandra, and Ryans (2003) created a sample of 250 US *Fortune* firms with Indian operations. Firms were classified as MNCs based on total sales; no reference was made to the location of these sales. Given the sample selection procedure, their results are more likely to be generalisable to large firms rather than to MNCs. Finally, Han and Kim (2003) created an MNC sample of the 200 largest Korean exporters to China with head offices in metropolitan Seoul. They found that Korean MNCs with product competitiveness strategies had superior market performance to those pursuing localisation strategies. Because the categorisation of MNCs was based solely on the firms' exports to China – with no reference to their other multinational activities – the sample probably contains a range of firms with very different international experiences.

Does the extent of internationalisation affect the value of MNCs? Research into whether the degree of multinationality adds value to MNCs also produces mixed results. Douglas and Craig (1983), Lecraw (1983), Grant (1987), Allen and Pantzalis (1996) and Brouthers, Werner and Matulich (2000) found that the degree of multinationality is associated with rising profitability. In contrast, Mishra and Gobeli (1998) found that greater multinationality by itself does not deliver greater value, Berry (2006) reports that the benefits depend on the location and industrial patterns of internationalisation relative to the firm's experience, Gomes and Ramaswamy (1999) found that greater multinationality brings performance benefits to MNCs up to a point beyond which they cease and Kotabe, Srinivasan and Aulakh (2002) found that the benefits of multinationality are moderated by R&D and marketing capabilities. Doukas and Lang (2003) show that firms create value when they internationalise from their core activities, and that they destroy value when they attempt to internationalise their non-core activities.

Lecraw's (1983) sample comprises 153 MNC subsidiaries spread across five countries and six industries with substantial FDI. He found that MNCs' profitability rises with market share, advertising, R&D intensity and tariffs. This study used the multinationality of the industry to classify firms as MNCs, but the author provides scant information on

the individual firms. With no further information on the criteria for sample selection, little is known about the depth or breadth of the multinationality of these firms. Grant (1987) created an MNC sample of 304 British-owned manufacturing firms from the *Times 500* list of Britain's largest companies, ranked by total sales. He calculated a measure of overseas production as the ratio of the foreign subsidiary's sales to total sales. Particularly for this sort of question – does multinationality add value – this is a partial measure of multinationality at best. For example, sample firms may have substantial investments and alliances abroad that are not captured by sales figures.

Do MNCs provide the benefits of international diversification? Intuition suggests that firms with greater breadth and depth of multinationality should provide better diversification benefits. Early research by Hughes, Logue and Sweeney (1975), Agmon and Lessard (1977), Mikhail and Shawky (1979) and Logue (1982) concluded that investing in home-based internationalised firms does indeed yield international diversification benefits, and more recent work by Errunza, Hogan and Hung (1999), and Cai and Warnock (2004) supports these earlier findings. The issue is far from settled, however, because work by Jacquillat and Solnik (1978), Senchak and Beedles (1980), Brewer (1981), Fatemi (1984), Michel and Shaked (1986), Kim and Lyn (1990), Mathur, Singh and Gleason (2001), Salehizadeh (2003) and Rowland and Tesar (2004) have all found that investing in home-based internationalised firms does not yield significant international diversification benefits.

Michel and Shaked (1986) examined *Fortune 500* firms in the manufacturing sector, classifying them as MNCs if at least 20 percent of their total sales were foreign and if they had direct investment in at least six countries. The firms were classified as domestic if they had less than 10 percent of their sales, profits and assets abroad. These thresholds are problematic. For example, a firm with 20 percent foreign sales to one country in its home region would therefore be grouped together with another firm with 60 percent foreign sales to three continents. Another firm with 15 percent foreign sales spread over six countries in all continents would be classified as neither multinational nor domestic. Errunza, Hogan and Hung (1999) used a sample of the 30 largest US companies ranked by the *Fortune 100* list. Because it is based on total sales without any consideration of the worldwide spread of sales, their sample probably includes a broad range of firms by

multinationality, from purely domestic to deeply global. The application of my taxonomy of multinationality to the *Fortune 500* firms in section 2.5 reveals that this is indeed the case.

It is clear that the absence of a generally agreed approach to operationally defining the MNC has resulted in very diverse sets of firms being combined together in empirical samples. It is consequently not surprising that contradictory findings between studies are common. It is of interest to note that difficulties associated with definition were recognised in 1969 when Perlmutter (1969: 11) observed that:

> Part of the difficulty in defining the degree of multinationality comes from the variety of parameters along which a firm doing business overseas can be described ... no single criterion of multinationality such as ownership or the number of nationals overseas is sufficient ... external and quantifiable measures such as the percentage of investment overseas or the distribution of equity by nationality are useful but not enough.

Another early articulation of the problem is by Sanden and Vahlne (1974: 92), who argued that:

> There is, of course, no sharp demarcation line between multinational and national firms. Instead, there are firms with differences in multinationality which can be measured on a continuous scale.

More than 20 years ago, Fieldhouse (1986: 26) observed that:

> It is now widely, if not universally, accepted that Multinational is merely shorthand for a wide range of capitalist enterprises which share only one common and non-definitive feature: that beyond there is fundamental diversity camouflaged under an umbrella term.

Rather than searching for a single acceptable definition, this thesis suggests that scholars should instead agree on a classification system that is sufficiently flexible to encompass the known forms of international enterprise while allowing for new forms that may emerge in the future.

2.3 Theory and taxonomy in IB research

Taxonomic classification systems are widely used in theoretical and empirical analysis in many disciplines across the arts, the humanities, engineering, and the physical and social sciences. Amongst the best-know taxonomies are those used in biology – the Linnaeus hierarchical taxonomy of plants and animals; in chemistry – the periodic table; in

education – Bloom's taxonomy of educational objectives; in library studies – the Dewey classification system; and in psychology – the Myers-Briggs personality type indicator. Taxonomy combines similar objects to facilitate the compilation, storage, analysis, interpretation and retrieval of data. By focusing on agreed sets of characteristic dimensions, taxonomy condenses and organises information to facilitate comparison and contrast between object types within and across populations.

Although it is most popularly associated with organising and interpreting data, taxonomy is a vital component in the process of developing theory. This has long been understood in the business disciplines in which taxonomy has been used to classify firms, and a number of highly cited and influential applications of taxonomy have enhanced our understanding of the importance of the relation between theory and taxonomy. Foremost amongst these are Pavitt's (1984) taxonomy of technical change, McGee and Thomas' (1986) taxonomy of strategic groups, Greenberg's (1987) taxonomy of organisational justice, Weatherford and Bodily's (1992) taxonomy of asset yield management, Miller and Roth's (1994) taxonomy of manufacturing strategies, Law, Wong and Mobeley's (1998) taxonomy of multidimensional constructs, and Earl's (2001) taxonomy of knowledge management. The influence and usefulness of these contributions within their home disciplines and more broadly throughout the business disciplines is amply demonstrated by their exceptionally high citation rates[8].

These authors have shown that taxonomy informs theory building in five main ways. *First*, it provides the framework within which researchers can think about ideas and form opinions, it provokes new ways of thinking about ideas that previously seemed unrelated, and it provides direction in refining existing theories and developing new theory. *Second*, taxonomy emphasises the conceptual traditions from which theory develops. It ensures that concepts are applied consistently with the existing body of theory, and by identifying trends in the development of the literature, taxonomy sheds light on areas that need new theory-building, replication or validation studies, or new empirical approaches. *Third,* taxonomy assists in identify the common and disparate elements of alternative theories,

[8] At the time of writing, these eight papers have been cited more than 3,000 times according to the advanced search engine in Google Scholar, with their individual citation counts being 1,335, 322, 377, 267, 253, 174 and 310.

and clarifies the value of specific contributions. Further, by enhancing clarity and reducing confusion, it helps the discipline to focus on promising directions while avoiding sterile debates. *Fourth*, taxonomy supports the compilation of complete and systematic data to test the various theories, and this spurs the development of the discipline. *Finally*, it cautions researchers that because of the richness in variety across the business world no single high-level theory is likely to capture all this complexity, no matter how elegant its' theoretical framework.

Despite its widespread use in other disciplines, taxonomy has not been widely adopted or used in IB and IF research. Two exceptions spring to mind. The North American industry classification system (NAICS)[9] that classifies industries at increasing levels of specificity, and the Journal of Economic Literature (JEL) classification system[10] that organises the business, economics and management disciplines in 20 main categories, are familiar hierarchical taxonomies. Few scholars, however, have used classification systems in their theory building or in their empirical analysis. A notable exception is Bartlett and Ghoshal (1989) who proposed, based on empirical data and prescriptive components from 9 MNC case studies, a high-level typology of MNCs in four groups: multidomestic, international, transnational and global. Harzing (2000) reviewed prior typologies and confirmed the usefulness of Bartlett and Ghoshal's (1989) typology using an international sample of 208 MNC subsidiaries. Harzing's (2000) review of previous typologies confirms that they are few in number, and that they focus on variables such as control mechanisms, human resource practices, organisation design, strategy and subsidiary behaviour. None focus on any dimension associated with the degree of internationalisation or multinationality.

2.3.1 Taxonomy and internationalisation theory

As a firm seeks to internationalise, it must decide on two central aspects of its planned engagement with foreign markets. The *breadth* of engagement refers to the geographical, cultural or psychic distances of target markets from the firm's home base, and the *depth* of engagement refers to the nature and significance of the contractual arrangements that it enters into as it internationalises. Depth ranges from 'shallow' to 'deep'; that is, from

[9] See http://www.census.gov/naics/2007/index.html.
[10] See http://www.aeaweb.org/journal/jel_class_system.html.

trading, to forming alliances, to licensing, to engaging in joint ventures, and to foreign direct investment and production. The many alternative combinations of breadth and depth of engagement with foreign markets are associated with varying expected net returns, risks and degrees of operational control. Given its objectives and strategies and its financial, management, and knowledge resources, as well as the external opportunities and constraints that it faces, the internationalising firm tends to choose a combination of breadth and depth of engagement with foreign markets that maximises its risk-adjusted expected returns net of expected costs.

The rich ecology of international business, inhabited by firms of different age, size, industry, country of origin and degree of multinationality, ensures that each firm will have a unique combination of objectives, strategies, internal resources and external opportunities and constraints. One should therefore expect to observe many alternative patterns of internationalisation at the level of the firm. In this respect, this thesis agrees with an important implication of the taxonomies of Pavitt (1984), McGee and Thomas (1986), Greenberg (1987), Weatherford and Bodily (1992), Miller and Roth (1996), Law, Wong and Mobeley (1998), and Earl (2001) – that no single high-level theory is likely to capture the full range of patterns of internationalisation. The agenda of research in this area is rightly focussed on assessing whether a small, manageable set of high-level theories can explain a wide range of patterns in a meaningful, insightful and useful way.

The main theories of internationalisation have been discussed and evaluated by many scholars (for example, Andersen, 1993, 1997; Oviatt and McDougall, 1994; Coviello and McAuley, 1999; Jones, 1999; and Hutzschenreuter, Pederson and Volberda, 2007). To develop my argument in support of the usefulness of a taxonomy of multinationality for high-level theory-building, I briefly discuss three well-known theories of the internationalisation process: the OLI paradigm, the PTI and the NVIT.

The eclectic OLI paradigm of Dunning (1977, 1980, 1988, 2000) combines the insights of industrial organisation, international trade and market imperfections theories to explain the internationalisation process as governed by three general factors; the ownership advantages of the firm (O), the location advantages of the market (L), and the internalisation advantages of conducting transactions within the firm rather than on open

markets (I). The ownership advantages include the firm's asset and knowledge power, its international experience, and its ability to develop differentiated products. Traditionally, these were considered to be directly related to size, which helps the firm achieve scale economies, absorb the resource costs of international competition, and enforce contracts while protecting its patents (Stopford and Wells, 1972; Buckley and Casson; 1976). The location advantages refer to the earnings potential and risks associated with specific markets; firms will first seek to enter larger markets with the best growth potential and least risk (Forsyth, 1972; Herring; 1983). The internalisation advantages relate to the relative costs of integrating the assets and skills of the firm with a foreign counterpart. Shallow modes of entry tend to minimise these costs, while deeper modes of engagement involve higher costs (Williamson; 1985). Agarwal and Ramaswami (1992) describe how the optimal entry mode will usually be some compromise between firms' available resources, risk-adjusted expected net returns, and desired degree of control.

The PTI, sometimes referred to as the Uppsala model (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977, 1990; Turnbull, 1987; Engwell and Wallenstal, 1988; Welch and Luostarinen, 1988; Sullivan and Bauerschmidt; 1990, 1991; and Eriksson, Johanson, Magjkgard and Sharma, 1997) differs from the transactions costs approach of the OLI eclectic paradigm by focusing on the process through which firms incrementally engage in foreign markets via a learning process. At the early stages of internationalisation, firms have little knowledge or experience of doing international business or of specific foreign market conditions, implying a great deal of uncertainty and risk. Firms respond to this challenge by gradually building their international involvement and learning along the way as they build their knowledge, experience and commitment to internationalisation. The PTI predicts that firms will initially enter markets that are close to their home base (in terms of geographic, legal, cultural, or other economic measures of distance) because the costs, uncertainties and risks are lowest there, and that they will further internationalise over time.

While the OLI paradigm focuses on discrete rational decision-making and the PTI theory emphasises organisational learning, both imply that the internationalisation process will be a sequential one, in which firms initially internationalise into geographically, culturally and psychically close markets at shallow levels of entry mode. As their OLI

advantages increase over time, or as they learn and gain experience and confidence according to the PTI, firms will reach further afield at deeper levels of engagement. This process has been described in life cycle terms by Aharoni (1966), Stopford and Wells (1972) and Bilkey and Tesar (1977). Dunning (1993) outlines five stages of a firm's internationalisation: from exporting to direct sales, to part foreign production that leads over time to new foreign production that deepens and widens the value-added network, and finally to regional or global integration. More recent work by Barkema and Drogendijk (2007) and others, however, suggests that the time dimension of alternative internationalisation patterns can be very different across different firms. This notion is embedded in the NVIT of McDougall, Shane and Oviatt (1994), Barkema and Vermuelen (1997) and Oviatt and McDougall (1997). Oviatt and McDougall (2005) define an INV as a firm that seeks competitive advantage from its resources and outputs in many countries from inception, and several studies (Knight and Cavusgil, 1996; and Knight, Bell and McNaughton, 2001) confirm their pattern of rapid globalisation. INVs clearly do not fit the traditional profile of MNCs (Hashai and Almor, 2004), and their increasing pervasiveness poses challenges to the more traditional 'stages' theories of internationalisation.

Jones and Coviello (2005) have observed that combining the insights of the OLI paradigm, PTI theory and NVIT suggests that integrating multiple theoretical perspectives on firm-level characteristics and behaviour in a holistic and pluralistic manner will yield a more complete understanding of the internationalisation process. Hutzschenreuter, Pederson and Volberda (2007) have further observed that the key determinants of internationalisation in the OLI eclectic paradigm (assessing revenues, costs and risks) and PTI theory (accumulating experience) along with the knowledge-based view of Kogut and Zander (1993), yield incremental, path-dependent patterns that are largely external to managerial initiatives, positions and strategies. Given that a holistic approach to understanding internationalisation necessitates joint consideration of 'paths, process and positions', Hutzschenreuter, Pederson and Volberda (2007) ask whether each firm's journey is different or whether generic patterns exist. In so doing, they propose a taxonomy of managerial intentions to highlight the role of 'positions'. Each of these high-level theories of the internationalisation process is encompassed within my proposed taxonomy of multinationality. In other words, my taxonomy

embraces the 'paths', 'processes' and 'positions' that underlie the high-level theories of internationalisation.

2.4 Classifying MNCs

Firms can potentially be classified on the basis of any number characteristics, but the following six high-level categories are of particular interest to IB scholars:

1. Type (public, private listed, private unlisted)
2. Industry (NAICS or ICB codes)
3. Age (years, based on the date of incorporation)
4. Size (assets, employees, revenue, sales; micro, small, medium, large)
5. Location (country of headquarters)
6. Multinationality (operations across countries and regions)

Each of these contains sub-categories that can be specified in alternate ways. Category 1, for example, can be decomposed into ownership (public, private listed and unlisted), but it could also include other features such as main objective (for profit and non-profit). Category 3 can contain, for example, 'very old' (more than 100 years), 'old' (50–100 years), 'middle-aged' (10–49 years), 'young' (4–9 years) and 'new' (0–3 years). The focus in this analysis is on category 6 – multinationality.

2.4.1 The breadth and depth of multinationality

The taxonomy incorporates two dimensions of multinationality: *breadth* and *depth*. Breadth is measured as the extent of geographical spread using four broad categories: domestic, regional, trans-regional and global. To calibrate this, the world is divided into six regions based on the inhabited continents: Africa, Asia, Europe, North America, Oceania and South America. Asia includes the Middle East, the Russian Federation and Turkey. Europe includes countries as far east as Armenia, Azerbaijan, Belarus and Ukraine. North America includes Mexico and the countries of Central America as well as the United States and Canada, and Oceania comprises Australia, New Zealand and the Pacific islands.

The system specifies these six regions for three main reasons. *First*, by encompassing all countries of the world, this delineation is more inclusive than many of the groupings that

have been used in the IB literature. The 'triad' of Ohmae (1985) – the EU, Japan and the United States – was advocated on the basis that these regions constituted the world's three largest markets and are the headquarters to most large firms. This grouping was expanded by Rugman (2003) and Rugman and Verbeke (2004) to include the expanded EU, Asia and NAFTA, but it still excludes not only many countries (such as those in the Middle East and Central America) but also whole continents – Africa, South America, and Australasia. Flores and Aguilera (2007) demonstrate that there is considerable investment by US firms beyond the 'triad' countries, and suggest that scholars give more attention to other regions. *Second*, these six regions allow analysis of changing patterns in international business over time. This is increasingly important because the geographical distribution of production, investment and consumption are becoming ever more dynamic (UNCTAD, 2006). The emergence of Eastern Europe from communism in the early 1990s, the rapid rise of China and India during the last two decades, and more recent trends such as the rise of the South American economies and increasing flows of FDI into Africa are all now on the research agendas of IB and IF scholars. *Third*, these regions are based on the geographic rather than the political map of the world, as political boundaries and groupings change over time. The importance of this element is underlined by the obsolete groupings of such studies as Hirsch and Lev (1971), who used seven regions including the now defunct EFTA, and Miller and Pras (1979) whose seven regions included COMECON.

MNCs are defined on the *breadth* dimension as follows. An activity associated with a firm that takes place entirely within the home country is defined as domestic (*D*), and an activity conducted in the region in which the firm is headquartered is referred to as regional (*R*). *Regional* is further delineated into three categories: *R1* (less than one-third of the countries in the region), *R2* (between one-third and two-thirds) and *R3* (more than two-thirds). For example, a British firm that is headquartered in London and sells its products in one or two countries in continental Europe would be classified as *R1*. If, however, it exports throughout Europe (and not elsewhere), it would be classified as *R3*. If a firm conducts a particular activity in more than one region (but not fully globally) it is defined as trans-regional (*T*), and this category is further subdivided into *T2* (two regions), *T3* (three regions), *T4* (four regions) and *T5* (five regions). Firms are classified as 'global' (*G*) if a particular activity takes place in all six regions of the world. Although

this measure of the breadth of multinationality does not explicitly include any metric for distance, it implicitly acknowledges that activities that are trans-regional or global will generally be more distant from the internationalising firm's home base than domestic or home region activities. A number of distance metrics, such as cultural, legal, economic or psychic, could be used in conjunction with this breadth measure. Such metrics, however, have the disadvantage of being rather subjective. They can also change over time, whereas this breadth measure, based purely on geography, is not only more objective but is not affected by changing economic or cultural conditions.

The *depth* of market engagement is measured by the contractual arrangements that firms engage in as they internationalise. Depth ranges from the 'shallow' engagement in foreign markets associated with exports and imports to the 'deep' commitment of foreign direct investment (FDI). The three broad categories of depth are *trading*, *alliances,* and *investments*. Trading (*T*) involves sales and purchases made by the firm. Alliances (*A*), such as licensing and franchising, are associated with greater asset specificity and resource commitments to foreign markets. Licensing and franchising arrangements are well understood to involve greater risk than exporting or importing, but are usually less costly and risky than investing in real foreign assets and setting up foreign subsidiaries. Investments (*I*), such as joint ventures and subsidiaries, entail a deep engagement with and exposure to the business and political risks in foreign markets.

2.4.2 Taxonomy of multinationality

Combining the breadth and depth dimensions leads to a taxonomy in which any firm can be classified by the extent of its multinationality. For ease of exposition, a simplified version of the taxonomy is presented here. It contains the four broad dimensions of the breadth of multinationality: domestic (*D*), regional (*R*), trans-regional (*T*), and global (*G*), and two of the three depth measures of market engagement: trading (*T*) and investments (*I*). Putting these together, yields the *2x4* matrix shown in Panel A of Table 2.2, in which the first letter refers to the breadth, and the second letter the depth of multinationality. This leads to 16 categories of firms, ranging from purely domestic firms (*DT-DI*) that operate entirely within their home countries, to deeply global firms (*GT-GI*) that have trading activities and subsidiaries in all regions of the world. These are

Table 2.2
Taxonomy of multinationality

Panel A: Matrix of multinationality

Depth of market engagement	Breadth of geographical spread			
	Domestic	Regional	Trans-regional	Global
Trading	*DT*	*RT*	*TT*	*GT*
Investments	*DI*	*RI*	*TI*	*GI*

Panel B: Types of firms by extent of multinationality

	Symbol	Firm type
Domestic firms		
1	DT-DI	Domestic trading, domestic investments
Regional and trans-regional firms		
2	*RT-DI*	Regional trading, domestic investments
3	*TT-DI*	Trans-regional trading, domestic investments
4	*DT-RI*	Domestic trading, regional investments
5	*RT-RI*	Regional trading, regional investments
6	*TT-RI*	Trans-regional trading, regional investments
7	*DT-TI*	Domestic trading, trans-regional investments
8	*RT-TI*	Regional trading, trans-regional investments
9	*TT-TI*	Trans-regional trading, trans-regional investments
Global firms		
10	*GT-DI*	Global trading, domestic investments
11	*GT-RI*	Global trading, regional investments
12	*GT-TI*	Global trading, trans-regional investments
13	*DT-GI*	Domestic trading, global investments
14	*RT-GI*	Regional trading, global investments
15	*TT-GI*	Trans-regional trading, global investments
16	*GT-GI*	Global trading, global investments

Notes. This table presents a simplified matrix of my two-dimensional taxonomy of multinationality to describe 16 types of firm. I include in this analysis two measures of depth: *trading* (*T*), which involves sales and/or purchases made by the firm, and *investments* (*I*), which includes joint ventures and subsidiaries. The breadth of geographical spread has 4 main categories: domestic (*D*), regional (*R*), trans-regional (*T*) and global (*G*). The first letter in the taxonomic symbol denotes the breadth type and the second letter denotes depth type; thus *RT*, for example, is *regional trading*.

presented in Panel B, which describes eight types of regional and trans-regional firms (numbered 2 to 9) and seven types of global corporation (numbered 10 to 16).

Consider a simple example of the intuition behind this taxonomy. Two hypothetical Canadian firms, Maple Inc and Rocky Inc, export their products to the United States and Europe. Maple's goods are manufactured in Canada (it has no subsidiaries abroad) so it is a type 3 firm (*TT-DI*). Rocky is a type 9 firm (*TT-TI*) because its products are manufactured by a subsidiary in Thailand. If these two firms were classified by sales – the most common approach to defining multinationality – they would be deemed the same. Clearly, however, these firms face dissimilar challenges, costs and risks. Combining them in a sample to test hypotheses about issues such as sourcing strategy, the influence of culture on workplace practices, or the effects of exchange rate risk on firm valuation, would weaken the validity of the findings and undermine the ability to generalise beyond the sample.

2.5 The usefulness of the taxonomy for theory building

Section 2.3 notes how applications of taxonomy to other business disciplines have informed theory-building in important ways. The literature on organisation taxonomy recognises that an effective classification system should be consistent with high-level theory (see, for example, McKelvey, 1975, 1978; Carper and Snizek, 1980, Rich, 1992). This generates confidence in its applicability, relevance and usefulness to researchers in the discipline. To be widely accepted, it should also appeal to practitioners and other stakeholders by reflecting the world as it is perceived. This proposed taxonomy, built around the widely recognised breadth and depth dimensions of multinationality, also encompasses the high-level theories of internationalisation and is consistent with the conceptual traditions from which they emerge. Consider three alternative patterns of internationalisation as follows.

Example 1: shallow internationalisation in stages: DT-DI (1) → *RT-DI* (2) → *TT-DI* (3) → *GT-DI* (10). A purely domestic type 1 firm (*DT-DI)* (Panel B of Table 2.2) internationalises across the 'trading' row of the matrix (Panel A) as it expands its export operations within its home region to become a type 2 (*RT-DI)* firm, then across regions to become a type 3 (*TT-DI)* firm, and eventually across all regions to become a type 10 (*GT-DI)* firm, with global trading and no foreign subsidiaries.

Example 2: balanced internationalisation in stages, DT-DI (1) → *RT-RI* (5) → *TT-TI* (9) → *GT-GI* (16). This firm expands the geographical spread of its trading operations along with its foreign subsidiaries into its home region to become a type 5 (*RT-RI*) firm, then expands its sales while extending its network of subsidiaries across regions to become a type 9 (*TT-TI)* firm, and eventually across all regions to become a deeply global type 16 (*GT-GI)* firm.

Example 3: rapid shallow internationalisation, RT-DI (2) → *TT-DI* (3).
This pattern describes the rapid shallow internationalisation of an INV, in which the firm begins by trading in its region as a type 2 (*RT-DI*) firm and quickly expands to other regions as a type 3 (*TT-DI).*

Examples 1 and 2 are consistent with the OLI paradigm and PTI, and example 3 is consistent with the NVIT that 'skips' through the more traditional stages of internationalisation. Many other patterns of internationalisation can be described within the proposed taxonomy. Some will be consistent with either or both the OLI paradigm and PTI and some will be consistent with the NVIT. Others will be incompatible with all three, and this taxonomy accommodates as yet unobserved patterns. In this vein, Matthews and Zander's (2007) recent suggestion of 'international entrepreneurial dynamics' to capture the study of the pre-internationalisation entrepreneurial experiences of INV firms is also encompassed within my proposed taxonomy, as it includes domestic firms at one end of the spectrum of multinationality.

The proposed taxonomy is non-hierarchical in the sense that categories of firms with broader geographical spread or deeper market engagement in Panel A of Table 2.2 do not subsume those with lower degrees of multinationality. This turns out to be important. When the taxonomy is applied to the *Fortune 500* firms in Chapter 3, results show that there are almost no firms that have full regional penetration, and most are trans-regional. This is consistent with a pattern of internationalisation in which firms tend to move from being domestic, to operating in a small number of countries in their home region, and then on to other regions without first spreading more fully across their home region. Many of the world's largest firms, therefore, seem to skip broad regionalisation and proceed to trans-regionalisation. This is an example of how taxonomy can inform theory and testing, because it provides an insight that researchers might be interested in exploring further. For example, does this occur only in large firms, or for firms in particular industries?

The proposed taxonomy is dynamic in the sense that it encompasses evolutionary theories of the firm, changing patterns of international business, and the evolving nature of globalisation. Hull (1965) describes how biological taxonomy prior to Darwin was static insofar as species were classified into fixed groups on a permanent basis. Darwin's evolutionary theory showed how species can evolve within and across groups, and this stimulated the emergence of phylogenic (or evolutionary) taxonomy. McKelvey (1975, 1978, 1982) and others have reinterpreted Darwinian evolutionary theory to describe how organisations can evolve across groups within phylogenic taxonomies, and Rich (1992) illustrates how theory builders can use phylogenic taxonomy as a lens to look into the past in order to explain the present.

Current thinking on evolutionary biology is that although the traditional model sees evolution occurring slowly over long periods, it is sometimes 'revolution' in the sense that external shocks can create 'jumps' in evolutionary adaptation. IB and IF have seen the revolution that is the INV; the 'shock' being fast-developing innovations in communication and transportation technology. This taxonomy encompasses the broad range of patterns of internationalisation that we now observe, from the slowly evolving large firm to the dynamic and ambitious INV. It also facilitates the study of the 'pre-internationalising' firm (Matthews and Zander's, 2007). Lastly, this taxonomy can be used in historical IB and IF analysis (Jones and Khanna, 2006).

2.6 Summary and conclusions

A distinguishing feature of the discipline of IB is its use of alternative theoretical frameworks to approach empirical questions at different levels of analysis such as the industry, the firm, its management, and other stakeholders (Buckley and Lessard, 2005). The domain of questions spanned by the discipline includes the activities, decision-making processes, strategies and structures of MNCs; the interactions between MNCs and other agents; the cross-border activities of firms and how they are affected by the international environment; comparative studies of businesses, processes and organisational behavior in different countries and environments; and the international dimensions of organisational forms and activities (Eden, 2008). This chapter argues that multinationality – which is one of the discipline's most important dimensions and which cuts across all theoretical frameworks, levels of empirical analysis, and domains of

investigation – is not tied down. The absence of an agreed approach to defining, measuring or classifying multinationality is reflected in a lack of consistency in how IB scholars conduct both high-level and domain-specific theory-building and testing at all levels of analysis. This has seriously hampered the development of the discipline by stymieing innovation in theory and causing confusion in empirical testing. This in turn has curtailed the validation, refinement and rejection of existing theory – a process that is essential for scientific advancement.

The classification system presented in this chapter focusses on one level of analysis – the firm. Given the rich ecology of firms of varying age, size, industry, strategy and international scope, it is unlikely that widespread agreement will ever be reached on defining the term *MNC*. It follows that IB and IF scholars should instead seek agreement on a classification system like the taxonomies that have been successfully applied in many other disciplines. This chapter proposes a taxonomy of multinationality that can classify all firms with respect to their degree of international involvement. This taxonomy is not intended to be the finished product. Rather, it should be considered the starting point of a discourse about the potential for taxonomy to contribute to a more coherent and consistent epistemology and methodology in firm-level analysis within the IB and IF literatures.

Chapter 3

The globalisation-regionalisation debate: a new perspective and some further evidence in favour of globalisation

3.1 Introduction

The pace of globalisation over the past quarter century is reflected in the extent to which trade has outpaced world growth since the 1980s (OECD (2007)), the acceleration in FDI since the 1990s (UNCTAD (2007)), and the increasingly global production networks and supply chains (De Bakker and Yamano (2007)). The world's largest multinational companies (MNCs) have been well placed to avail of these opportunities, and they have responded by internationalising their activities across greater geographical and cultural distances by trading, by licensing, by forming strategic alliances and joint ventures, and by foreign direct investment (FDI). The *Forbes Global 2000* list of the world's largest two thousand MNCs – based on assets, sales, profits and market values – shows that these firms collectively owned $119 trillion in assets in 2008, they earned $30 trillion in revenues and $2.4 trillion in profits, and they employed about 72 million people. Many of them are instantly recognisable household names throughout the world in the banking, electronics, entertainment, food, oil and transport industries[1]. Viewed together, they conjure images of a globalised business world dominated by gargantuan conglomerates that overshadow many sovereign states. Using GDP data from the World Bank together with sales data from the *Fortune 500* list, Anderson and Cavanagh (2000) show that of the world's 100 largest economic entities, 51 are MNCs and 49 are countries!

Although the trends towards enhanced integration are widely recognised, the interpretations and operational definitions of the terms globalisation, regionalisation and regionalism differ

[1] These firms include Bank of America, Basf, BHP Billiton, BNP Paribus, Boeing, British Petroleum, Citigroup, Cisco Systems, Exxon Mobil, General Motors, Hewlett Packard, Honda, IBM, Johnson & Johnson, McDonalds, Microsoft, Nestle, Nissan, Nokia, Pfizer, Royal Dutch Shell, Toyota, Vodafone, Volkswagon, Time Warner, Unilever and Walmart.

depending upon the contexts in which they are used. Marchand, Boas and Shaw (1999), for example, show that while regionalisation can be seen as part of the globalisation process, it can also be seen as the reaction by stakeholders to protect their perceived interests in the face of globalisation. The new regionalism theory described by Hettne, Inotai and Sunkel (1999) analyses regional and global interdependencies at multidimensional levels in historical context. International integration has led to increasingly global production, distribution and consumption systems, and it has also led to economic and political ideologies, knowledge and cultural identities being expressed and manifested in increasingly global rather than country-specific contexts. The process is not uni-directional, however, because international regionalism has emerged in many dimensions as a counter force to globalisation. Buckley et al (2001), for example, show that greater regional integration in North America has led to increased inward FDI from European countries. The regional actions of governments on issues such as international finance (such as managed floats, fixed pegs and currency unions), trading agreements (such as preferential tariffs, free trade areas and economic unions) and security agreements (such as NATO and SEATO) form the complex landscape within which MNCs in the third millennium operate and compete.

In assessing whether the international business activities, strategies and vision of the world's MNCs are predominantly regional or global, it is important that the meanings attributed to key concepts are clear and unambiguous, and that important terms are appropriately defined. As we shall see, however, this is not always the case in international business and management. Rather, the extent to which the world's MNCs have become truly global in their operations, strategy and vision remains a hotly debated topic. Many international business analysts and scholars argue that global business strategy is paramount (see, for example, Yip (2002) and Govindarajan and Gupta (2008)). Buckley and Ghauri (2004) review the challenges and consequences of globalisation for MNC strategy. Many others, however, question the extent to which the world's largest MNCs have become truly global. Doremus, Keller, Pauly and Reich (1998) argue that the world has not achieved anything remotely close to full globalisation, that state sovereignty remains strong, and that the world's largest MNCs retain a national and regional focus. Ghemawat (2001, 2003) clarifies how this is at least partly explained by escalating costs as MNCs internationalise over

greater geographical and cultural distances, and Hejazi (2007) uses the gravity model to show how US MNCs remain over-represented in their home country and region.

In a series of papers, Rugman (2000, 2003, 2005), Rugman and Brain (2003), Rugman and Girod (2003), Rugman and Hodgetts (2001), Rugman and Verbeke (2003, 2004, 2007, 2008) and Collinson and Rugman (2008) argue that the world's largest firms are regional rather than global. Basing their analysis on Ohmae (1985), Rugman and his co-authors divide the world into variously defined 'triads' comprising alternative sets of countries from North America, Europe and the Asia-Pacific region. Using mostly sales data from the *Fortune 500* list, Rugman and his co-authors conclude that most of the world's largest MNCs are not global, that globalisation is a myth, and that regional rather than global strategy is paramount. The considerable evidence assembled by Rugman and his co-authors in favour of regionalisation rather than globalisation of the world's largest MNCs has been scrutinised by Asmussen (2006), by Osegowitsch and Sammartino (2007, 2008) using sales data, and by Dunning, Fujita and Yakova (2007) using FDI data. While supportive of the broad trust of Rugman and his co-authors, these researchers have introduced refinements to the data analysis, they have shown that the evidence in favour of regionalisation rather than globalisation is not overwhelming, and they have questioned the extent to which it implies that global strategy is a myth. Further studies argue that globalisation is about more than trade and economic events, and that sales (the principal variable used by regionalists) does not adequately capture MNCs' international activities (see, for example, Bird and Stevens (2003), Clarke and Knowles (2003), Clarke et al. (2004), Stevens and Bird (2004)). Flores and Aguilera (2007), in their review of the regionalisation-globalisation debate, highlight the need for "an improved definition and operationalization of MNC activities and regions" (pp. 1189). This chapter contributes to the literature by using the taxonomy of multinationality outlined in Chapter 2 to shed new light on the regionalisation-globalisation debate.

This chapter provides a new perspective and a new set of data to examine the question of whether the world's firms are regional or global in their operations. Building on the taxonomy of firm-level multinationality in Chapter 2, it provides a detailed classification of the multinationality of firms' operations from the geographical spread of their sales and their

subsidiaries. This taxonomy has several advantages within the existing literature. It uses two variables – sales and subsidiaries – to measure the multinationality of each firm, and it therefore provides a more robust categorisation of firms. It encompasses the entire world with six clearly defined regions, and is therefore more inclusive than other systems. Finally, it is not based on political or economic groupings but rather on geographical areas and therefore is not time variant. I construct a sample of 1,289 firms from the G7 countries including Britain, Canada, France, Germany, Italy, Japan and the United States. For brevity, this is referred to as the *G7 1289* list. The sample comprises all firms listed on these countries' indices (the *FTSE 100*, the *TSX 60*, the *SBF 120*, the *HDAX 110*, the *MIB-SGI 174*, the *Nikkei 225* and the *S&P 500*) for which the full set of data is available. The insights to be gained by studying the *G7 1289* list are as follows. *First*, this list is over three times as large as other data sets investigated by prior researchers referred to above. For example, Rugman and Verbeke (2004) analyse 320 firms from the *Fortune 500* list. *Second*, the *G7 1289* list contains many more firms from each of the G7 countries than is contained in the *Fortune 500* list, which is the most common data source used in related studies. *Third*, this list contains different weightings of firms of different types, sizes, ages and industrial sectors to the *Fortune 500* list. I compare the results from this expanded data set with the results obtained from analysing the sales and subsidiaries data for the *Fortune 500* companies. Overall, I show that using the combined resources of the *Fortune 500 list* of the world's largest firms and the much larger data set of firms in the G7 countries, the world's largest MNCs are mostly trans-regional, and many are global in both their sales and subsidiaries, particularly in regard to the latter. I conclude that global strategy is not a myth, but a reality of international business and finance in the third millennium.

The remainder of this chapter is structured as follows. In section 3.2, the prior work of Rugman and his co-authors is reviewed. Section 3.3 describes the dataset and applies the taxonomy of multinationality to two samples of firms – the *G7 1289* list and the *Fortune 500* firms. The *Fortune 500* list contains the world's 500 largest firms as measured by sales[2]. Results show that the world's largest firms exhibit a wide range in their degree of

[2] It is the most commonly used data source for compiling MNC samples in research published in *JIBS*.

multinationality, from purely domestic firms to fully global corporations, with some interesting patterns of internationalisation amongst them. The *G7 1289* list produces similar results. Section 3.4 compares my findings to those of Rugman and Verbeke (2003, 2004), Dunning, Fujita and Yakova (2007) and Osegowitsch and Sammartino (2008). Osegowitsch and Sammartino (2008) perform several robustness tests on Rugman's classification system using the *Fortune 500 List* for 2001. I replicate these tests using the *Fortune 500 List* in 2005[3] and find support for Osegowitsch and Sammartino (2008) against the argument made by Rugman and co-authors that globalisation is a myth. Several robustness tests on the geographical regions used within my classification system are performed in section 3.6. Finally, section 3.7 summarises my main findings and discusses my main conclusion that global strategy is alive and well for the world's largest firms.

3.2 The debate to date: regional, trans-regional or global?

Rugman and his co-authors claim that the world economy is now a triad one as the economic regions of North America, Europe and Asia-Pacific dominate international business[4] (Rugman 2003). They use various sets of countries to define alternatively the 'core triad' (the United States, the EU and Japan), the 'triad' (NAFTA, the EU-15 and Asia) and the 'extended triad' (NAFTA, the expanded EU (25 countries) and Asia). It is not always clear which 'triad' is being analysed. Perhaps the clearest definition is in Rugman and Hodgetts (2001), where footnote 4 defines NAFTA as comprising Canada, Mexico and the United States; the EU-15 comprising Austria, Belgium, Britain, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain and Sweden; and the Asia-Pacific-12 comprising Australia, China, India, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Singapore, South Korea, Taiwan and Thailand. Other articles are less clear[5]. This can be misleading as Rugman and Verbeke's (2004) European region

[3] These robustness tests are performed on the *Fortune 500* firms to enable comparisons with the work of Rugman and his co-authors. One limitation of this research is that they are not performed on the larger G7 dataset. I leave this to future work.

[4] Rugman notes that the triad includes the three largest markets in the world for most new products. In 2000, 430 of the worlds' largest 500 firms had their headquarters in these core triad regions. In 1996, it was 443; in 1991 it was 410 and in 1981 it was 445.

[5] For example, Rugman and Girod (2003) refer to the 'triad' as comprising the United States, the EU and Japan (p28 and Table 5), and they later refer to the 'triad' as comprising NAFTA, Europe and Asia (p29 and Table 6). These alternative regional groupings are potentially very different, and no details of constituent countries are

includes, in some cases countries located in Africa and the Middle East, and their Asian region may include Oceania countries.

Given their alternative versions of the 'triad', Rugman and his co-authors apply thresholds to determine four categories of the degree of multinationality of the world's largest firms; 'home-regional', 'bi-regional', host-regional' and 'global'. The thresholds are as follows. 'Home-regional' firms have at least 50 percent of their sales in their home region. 'Bi-regional' firms have less than 50 percent of their sales in any one region and at least 20 percent in each of two 'triad' regions. 'Host-regional' firms, have at least 50 percent of their sales in a 'triad' region other than the home region. Finally, 'global' firms have less than 50 percent of their sales in any one region and at least 20 percent in each of the three regions.

Their benchmark dataset is the Fortune Global 500 list, which ranks firms on the basis of absolute sales figures in any given year. Rugman (2003) shows that most firms on the Fortune 500 list lack global sales activity. For the 500 largest global firms ranked by total sales in 2001, 72 percent of all sales are within the home region of the triad. He classifies only 9 firms as truly global, in that they have at least 20 percent of their sales in each region of the triad – most of these 9 are in the computer, telecom and hi-tech sectors. 58 of these firms have zero foreign sales – 100 percent of their sales are in the home region. Results show that most firms operate in the home region of the triad or, at best, are bi-regional. He concludes that most of the worlds' largest firms are not global but home-region based.

In a similar analysis, Rugman and Verbeke (2004) define the triad as NAFTA, the expanded EU and Asia. They confirm that most of the Fortune 500 firms in 2001 do not operate globally. For the 320 firms with geographic sales data available, on average, 80.3 percent of their total sales are in their home region of the triad. Rugman and Collinson (2005) also use the Fortune 500 list from 2001 to consider the geographical breakdown of sales for the 118 European firms on this list. They find that only 3 firms – LVMH, Philips and Nokia – are

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made explicit. Rugman and Verbeke (2004) refer to the 'triad' as comprising North America, the EU and Asia (p3), but they present their analysis of the 'broad triad' as comprising NAFTA, the expanded EU and Asia (p5). They do not clarify what countries are in the latter two regions.

truly global[6]. The 118 firms have, on average 62.8 percent of their sales in their home region. These studies rely on sales data as the only measure of multinationality. Rugman and Collinson (2008) use empirical data for both marketing (sales) and production (assets). They analyse 64 Japanese firms from the Fortune 500 list in 2003. Results show that only 3 firms operate globally; whereas 57 firms have an average of 81 percent of their sales in their home region. Both sets of data (on sales and assets) confirm the regional nature of the activities of Japanese MNCs and they conclude that most Japanese firms are regional, not global. Rugman and Brian (2003) show that even the 20 most international firms on the Fortune 500 List (those with the highest ratio of foreign to total sales) are mainly home region based in their activities. From this analysis, Rugman and his co-authors conclude that MNC strategy is regional rather than global, and they suggest that MNC CEOs should 'Encourage all [their] managers to think regional, act local – and forget global' (Rugman and Hodgetts (2001), pp. 341).

3.3 Classification of firms

I investigate the regionalisation versus globalisation of firms using two samples – the *Fortune 500* list in 2005 and the *G7 1289* list. The *G7 1289* list comprises 1,289 firms listed on the stock exchanges in Canada, France, Germany, Italy, Japan, the United Kingdom and the United States from the following indices: the *TSX 60*, the *SBF 120*, the *HDAX 110*, the *MIB-SGI 174*, the *Nikkei 225,* the *FTSE 100* and the *S&P 500.* This list is compiled from the websites of each country's stock exchange in 2006. The geographical breakdown of firm-level sales is obtained from the *Worldscope* databank. This data is taken from company accounts for the year end 31 December 2005 or as close to this date as possible. The geographical breakdown of each firm's subsidiaries is obtained from *Dunn and Bradstreet's* 'Who Owns Whom' 2005/06, which lists the parents and subsidiaries of firms, with the country of each subsidiary[7]. I use the taxonomy outlined in Chapter 2 to classify firms in both samples. This taxonomy contains 6 high-level descriptors; *type* (public, private listed, private unlisted), *industry* (ICB codes), *age* (years, based on the date of incorporation), *size*

[6]The results also show that 8 firms are host-region orientated, 16 are bi-regional, and 86 are home region based.
[7]All entries in Who Owns Whom are published free of charge and there is no size criteria for entry.

(sales), *location* (country of headquarters), and *multinationality* (the depth and breadth of operations across countries and regions). As detailed in Chapter 2, I define the degree of multinationality of a firm along two dimensions: *breadth* and *depth* and combine the *breadth* and *depth* dimensions of the degree of internationalisation to form a *2x4* matrix of multinationality.

3.3.1 Classifying the Fortune 500 firms

The vast majority of the *Fortune 500* firms (482) are private listed; 17 are public firms and 1 is private unlisted. The *Fortune 500* firms span 7 broad Industry Classification Benchmark (ICB)[8] categories: financials (126 firms), consumer goods (123 firms), consumer services (118 firms), industrials (53 firms), basic materials (38 firms), utilities (27 firms) and health care (15 firms). They are on average rather elderly, with a mean incorporation date of 1927 implying an average age of about 80 years. The age range is wide, with dates of incorporation ranging from 1473 (UniCredito Italiano) to 2003 (China Life Insurance and Japan Post). The largest firm is Exxon Mobil with annual sales of US$339.9 billion, and the smallest is Nike with US$13.7 billion; the average size is US$37.9 billion. Firms are headquartered in 32 countries in five of the six geographical regions in my taxonomy: North America (189 firms), Europe (177), Asia (121), Oceania (8) and South America (5).

The multinationality of firms in terms of both their trading (sales) and investments (subsidiaries) is summarised in Table 3.1. Full details appear in Appendix 2. For this exercise I use the full range of breadth dimensions – domestic (*D*), regional (*R1*, *R2* and *R3*), trans-regional (*T2*, *T3*, *T4* and *T5*), and global (*G*). As measured by sales, 53 of the 374 firms with available data are domestic, 8 are regional, 285 are trans-regional, and 28 are global. All the regional firms are classified as *R1*; there are no *R2* or *R3* firms (that is, firms with sales in more than one third of their home region). In contrast, firms that are classified as trans-regional by sales are fairly evenly distributed between *T2*, *T3*, *T4* and *T5*. Given that 77 percent of firms are trans-regional and that a further 7 percent are global in their sales, the vast majority (313 firms or 84 percent) of the 374 *Fortune 500* firms trade beyond their home region. The

[8] The ICB system was developed by Dow Jones and FTSE. It uses a system of 10 industries, partitioned into 18 super-sectors, which are further divided into 39 sectors, which then contain 104 sub-sectors.

Table 3.1
International Classification of F500 and G7 Firms

	F500	*Canada*	*France*	*Germany*	*Italy*	*Japan*	*UK*	*US*	*G7*
					Panel A: Sales				
D	**53 (14)**	**13 (23)**	**6 (6)**	**5 (5)**	**46 (30)**	**16 (9)**	**7 (8)**	**136 (29)**	**229 (20)**
R1	**8 (2)**	**7 (12)**	**8 (7)**	**3 (3)**	**7 (5)**		**5 (6)**	**10 (2)**	**40 (4)**
T2	76 (20)	17 (30)	16 (15)	26 (27)	37 (24)	33 (20)	22 (24)	110 (23)	261 (23)
T3	70 (19)	10 (18)	23 (21)	19 (19)	16 (11)	45 (27)	16 (18)	78 (17)	207 (18)
T4	78 (22)	7 (12)	27 (25)	15 (15)	20 (13)	49 (29)	19 (21)	78 (17)	215 (19)
T5	61 (16)	3 (5)	21 (20)	24 (24)	17 (11)	25 (15)	14 (15)	48 (10)	152 (13)
T	**285 (77)**	**37 (65)**	**87 (81)**	**84 (85)**	**90 (59)**	**152 (91)**	**71 (78)**	**314 (67)**	**835 (73)**
G	**28 (7)**		**6 (6)**	**7 (7)**	**9 (6)**		**7 (8)**	**10 (2)**	**39 (3)**
Total	374	*57*	*107*	*99*	*152*	*168*	*90*	*470*	*1143*
					Panel B: Subsidiaries				
D	**47 (10)**	**5 (12)**	**19 (18)**	**5 (5)**	**50 (36)**	**20 (9)**	**6 (7)**	**87 (18)**	**192 (17)**
R1	28 (6)		20 (20)	13 (13)	31 (23)	6 (3)	13 (15)	34 (7)	117 (10)
R2			1 (1)	3 (3)	4 (3)				8 (1)
R	**28 (6)**		**21 (21)**	**16 (16)**	**35 (26)**	**6 (3)**	**13 (15)**	**34 (7)**	**125 (11)**
T2	55 (12)	16 (37)	9 (9)	19 (19)	19 (14)	29 (14)	11 (12)	75 (16)	178 (15)
T3	72 (16)	11 (25)	15 (15)	17 (17)	13 (10)	58 (28)	12 (14)	70 (15)	196 (17)
T4	64 (14)	8 (19)	14 (14)	9 (9)	6 (4)	53 (25)	14 (16)	67 (14)	171 (15)
T5	86 (19)	2 (5)	5 (5)	7 (7)	4 (3)	28 (13)	13 (15)	85 (18)	144 (12)
T	**277 (61)**	**37 (86)**	**43 (42)**	**52 (52)**	**42 (31)**	**168 (80)**	**50 (57)**	**297 (63)**	**689 (59)**
G	**103 (23)**	**1 (2)**	**19 (19)**	**26 (27)**	**10 (7)**	**16 (8)**	**19 (21)**	**58 (12)**	**149 (13)**
Total	*455*	*43*	*102*	*99*	*137*	*210*	*88*	*476*	*1155*

Notes. This Table classifies each firm listed on the G7 markets indices and the Fortune 500 List using my classification system. The left column lists the scale on the breadth of multinationality. The four main categories: domestic, regional, trans-regional and global appear in bold. Sub categories are also listed. The Table shows the number of firms falling into each category in terms of their sales data (Panel A) and their subsidiary data (Panel B). Figures in parentheses are the percentage of firms in each category. The total figures are the number of firms for which data are available. For example, sales information is available for 168 firms on the Nikkei index – 16 firms (9 percent) are classified as domestic and 49 firms (29 percent) as T4. The G7 column shows the total number of firms in each category summed across all G7 indices.

subsidiary data tell us that 47 of the 455 firms with available data are domestic, 28 are regional, 277 are trans-regional, and 103 are global. As with the sales data, all the regional firms are classified as *R1*. This implies a pattern of internationalisation whereby, at both 'shallow' and 'deep' levels of engagement, the world's largest MNCs seem to move across regions rather than first spreading throughout their home region. As 61 percent of all firms are trans-regional and a further 23 percent are global in their subsidiaries, we can conclude that for the 455 *Fortune 500* firms for which subsidiary data are available, the vast majority of these firms engage in activities beyond their home region. It is clear, however, that if a firm is classified as global, it is more likely to be on the investments rather than the sales dimension.

3.3.2 Classifying the G7 Firms

I next classify the *G7 1289* firms. All G7 firms are privately listed. G7 firms span all 10 ICB industries as follows: industrials (237 firms), financials (231 firms), consumer services (195 firms), consumer goods (174 firms), technology (109 firms), basic materials (106 firms), health care (88 firms), oil and gas (65 firms), utilities (62 firms) and telecommunications (22 firms). The mean incorporation date is 1922, with ages ranging from more than 5 centuries (Banca Monte dei Paschi dates from 1472) to one year (NYSE Euronext - 2007). The largest firm is Exxon Mobil with annual sales of US$339.9 billion, and in terms of the smallest, 5 firms report zero sales (Cott in Canada and Hanson, Kelda, Reed Elsevier and Segro in the UK); the average size is US$13.9 billion. The firms are headquartered in seven countries in three of the six geographical regions in our taxonomy: North America (560 firms), Europe (504) and Asia (225).

The multinational classification of the *G7 1289* firms is presented in Table 3.1. The percentage of firms with purely domestic sales ranges from 5 percent of German firms to 30 percent of Italian firms. The average amount of firms classified as domestic in their sales is 20 percent. The percentage of firms with all domestic subsidiaries ranges from 5 percent of German firms to 36 percent of Italian firms with an average of 17 percent. These data suggest that while market indices are a good measure of the domestic stock market, they may not be a good measure of the domestic economy and economic activity within the

domestic market. They also show that each market index differs in how appropriately it represents domestic factors. At the other end of the spectrum, the percentage of firms with global sales ranges from 8 percent for the UK to zero for Canada and Japan. The percentage of firms with global subsidiaries ranges from 2 percent of Canadian firms to 27 percent of German firms. In all countries, the majority of firms are classified as trans-regional. On average, 76 percent of firms in the G7 markets are trans-regional or global in their sales and 72 percent are trans-regional or global in their subsidiaries. These data demonstrate that firms in the G7 countries are trans-regional and global rather than regional in their outlook.

Both sales and subsidiary data are available for 351 Fortune 500 firms and for 1,015 G7 firms. These firms are classified using the matrix of multinationality in Table 3.2. The Fortune 500 firms are spread across 12 of the 16 categories. 27 firms are fully domestic on both dimensions. They include Kroger, Amerisourcebergen, DR Horton and JC Penney. 13 firms are global on both dimensions. They include J.P. Morgan Chase, Volkswagen, Nestle, British American Tobacco and 3M. 114 firms (32 percent) are global in at least one variable. The majority of firms (49 percent) are classified as trans-regional in both sales and subsidiaries (TT-TI). G7 firms are spread across 15 categories. 107 firms (11 percent) are fully domestic on both dimensions and 16 firms (2 percent) are fully global. The majority of firms (53 percent) are again trans-regional in both variables while 16 percent are global in at least one variable. These data show that trans-regionality best describes firms in both samples. The percentage of firms in each category is remarkable similar for both samples. Little evidence is found in favour of the regionality of firms. This evidence provides an interesting counterpoint to Rugman's contention that MNCs are regional entities. In the next section, the Fortune 500 firms in 2005 are classified using the methodology of Rugman and his co-authors, and I then investigate the causes as to why both sets of results differ in their conclusions as to whether firms are regional or global.

3.4 A comparison between my system and Rugman and Verbeke's (2004)

I categorise firms on the Fortune 500 List in 2005 using Rugman and Verbeke's (2004) 'triad' grouping. Of the 349 firms for which sales data are available, 283 (81 percent) are classified as home-region orientated, 9 (3 percent) as host-region orientated, 50 (14 percent)

Table 3.2
Taxonomic Classification of F500 and G7 Firms

	Symbol	MNC type	F-500 Firms	G7 Firms
		Purely domestic firm		
1	*DT-DI*	Domestic trading, domestic investments	27 (8)	107 (11)
		Regional and trans-regional firms		
2	*RT-DI*	Regional trading, domestic investments	2 (1)	14 (1)
3	*TT-DI*	Trans-regional trading, domestic investments	3 (1)	17 (2)
4	*DT-RI*	Domestic trading, regional investments	5 (2)	28 (3)
5	*RT-RI*	Regional trading, regional investments	4 (1)	14 (1)
6	*TT-RI*	Trans-regional trading, regional investments	3 (1)	17 (2)
7	*DT-TI*	Domestic trading, trans-regional investments	20 (6)	73 (7)
8	*RT-TI*	Regional trading, trans-regional investments	2 (1)	41 (4)
9	*TT-TI*	Trans-regional trading, trans-regional investments	171 (49)	538 (53)
		Global firms		
10	*GT-DI*	Global trading, domestic investments	0	2 (0)
11	*GT-RI*	Global trading, regional investments	0	0
12	*GT-TI*	Global trading, trans-regional investments	12 (3)	53 (5)
13	*DT-GI*	Domestic trading, global investments	0	4 (0)
14	*RT-GI*	Regional trading, global investments	0	4 (0)
15	*TT-GI*	Trans-regional trading, global investments	89 (25)	87 (9)
16	*GT-GI*	Global trading, global investments	13 (4)	16 (2)
		Total	**351**	**1,015**

Notes. This Table uses a simplified matrix of my two-dimensional measure of multinationality to describe 16 types of MNC, ranging from a purely domestic firm to a fully global corporation. Within the G7 list, there are 44 Canadian, 91 French, 91 German, 107 Italian, 156 Japanese, 81 United Kingdom and 453 United States firms. The right hand columns show the number of firms from the Fortune 500 List (2005) and the G7 market indices falling into each category. Figures in parenthesis are percentages.

as bi-regional and 7 (2 percent) as global firms. Rugman's classifications based on percentages in each region are not applicable to subsidiary data as the percentage of subsidiaries in each region has little meaning given that they vary in size and activities. The 7 firms classified as global using Rugman and Verbeke's (2004) system are Christian Dior, Coca Cola, HSBC Holdings, Henkel, Mazda Motors, Schlumberger, and Sony. These 7 firms are classified as trans-regional in their sales using my matrix of multinationality. Sony, for example, has sales in four out of six regions, with 21 percent of its sales in Europe, 30 percent in North America and 31 percent in Asia. Taking another example, HSBC Holdings is classified as T4 using my system. It has 35 percent in Europe, 36 percent in North America and 24 percent in Asia. My system classifies 28 firms as global in their sales[9]. Using Rugman and Verbeke's (2004) system, 13 of these firms are home-region orientated because they have at least 50 percent of their sales in their home region, another 13 are classified as bi-regional and 2 cannot be classified. No firm is classified as global using both systems.

My matrix of multinationality classifies 53 firms as domestic in their sales – 52 of these are classified as home-region orientated using Rugman and Verbeke's (2004) system and one firm (J. Sainsbury) is classified as host-region orientated. Taking the 283 firms classified as 'home-region orientated' using Rugman and Verbeke's (2004) system and re-classifying them using my system, there are 52 domestic firms, 6 regional firms, 211 trans-regional firms and 13 global firms. This highlights the differences between the two approaches. Rugman and Verbeke (2004) classify firms based on the location of the majority of their sales. My system classifies firms based on the location of their total sales, and thus provides a more complete view of each firm's breadth of multinationality. By defining the home region so broadly, Rugman and co-authors conclude on the basis of the shallower measure of market engagement based on sales data that most *Fortune 500* firms are regional and that

[9] They are 3M, Air France – KLM, Anglo American, AREVA, AstraZeneca, BAE Systems, BHP Billiton, Boeing, Bouygues, British Airways, British American Tobacco, Cemex, Fonciere Euris, General Dynamics, Hochtief, Hutchison Whampoa, JP Morgan Chase, Luftansa, MAN Group, Merrill Lynch, Nestle, Nike, Novartis, PPR, Rio Tinto Group, Roche Group, Societe Generale and Volkswagan.

very few are global. My argument in a nutshell is that this conclusion is drawn from a singular dimensional operational definition of what constitutes an MNC that does not adequately capture either the *breadth* or the *depth* of multinationality. By using my two-dimensional taxonomy of multinationality that combines a more general specification of the breadth with the depth of multinationality, I provide a more complete and more accurate classification of the multinationality of *Fortune 500* firms.

Close inspection of the data, however, does reveal some support for Rugman's regionality argument. For many firms the bulk of sales or subsidiaries are in one region – commonly the company's home region – even when the firm is classified as operating in several. Boeing, for example, is classified as *T4* in its subsidiaries. It has 69 in all; 58 in North America, 8 in Europe, 2 in Oceania and 1 in Asia. Another example is Volkswagen, which is classified as *G* in trading, but most sales are in Europe (73 percent), with 14 percent in North America, 5 percent in South America, 3 percent in Asia, 3 percent in Oceania and 2 percent in Africa. This is generally consistent with Rugman (2003) and Rugman and Verbeke (2004). The claim by Rugman and his co-authors that the world's largest firms are mostly home-region oriented and that very few are global in their reach and strategic vision has been scrutinised by a number of researchers including Aharoni (2006), Asmussen (2006), Westney (2006), Osegowitsch and Sammartino (2007, 2008) and Dunning, Fujita and Yakova (2007). The main issues of debate concern the appropriateness of the 'triad' regions, the effects of imposing thresholds on the level of activity within and across regions in classifying firms, the almost exclusive focus on sales data, and the extent to which the conclusions about global or regional strategic vision are supported by the analysis. I now discuss each of these in turn.

3.4.1 Triad regions

The 'triad' regions used by Rugman and his co-authors are defined in a manner that compromises the analysis from the start and restricts its usefulness to a broader set of issues in international business research. Three main issues have been identified. *First*, the 'triad' was advocated by Ohmae (1985) and expanded upon by Rugman and his co-authors on the basis that it incorporates the world's largest markets and is headquarters to most of the

world's largest firms. Although this is true, the 'triad' excludes many countries and firms of interest to IB scholars on a wide range of issues that relate directly to the debate about whether MNC strategy is predominantly regional or global. Many of the emerging economies in Asia, Eastern Europe, the Middle East and South America are excluded from the 'triad' analysis, as is the whole continent of Africa (a South African firm, for example, has no place in this system). But these countries are significant for sourcing, sales and FDI by triad countries and their largest MNCs (Flores and Aguilera (2007)). Flores and Aguilera (2007) show that there is considerable investment by US firms beyond the 'triad' countries. This point is emphasised in my empirical analysis as 25 firms on the Fortune 500 list in 2005, with a geographical breakdown of sales information available, cannot be analysed using Rugman and Verbeke's (2004) system. The Commonwealth Bank of Australia, for example, has all its sales classified under Oceania and Other. It is classified as T2 using my system but shows zero sales in the Triad and therefore, cannot be classified using Rugman and Verbeke's (2004) system.

Second, patterns of international business evolve over time in ways that are not captured within the 'triad' analysis. While business activity is at present concentrated in these regions, there is no certainty that this will continue to be the case. Internationalisation at the level of the firm, industry and country evolve continuously over time, and the geographical distribution of production, investment and consumption are becoming ever more dynamic (UNCTAD, 2006). The emergence of Eastern Europe from communism in the early 1990s, the rapid rise of China and India during the last two decades and their rising engagement with Africa, and more recent trends such as the rise of the South American economies and increasing flows of FDI into Africa are all firmly on the research agendas of IB scholars[10]. These factors, together with the insights to be gained from longitudinal studies, suggest that a broader definition of regions would be more appropriate and useful.

[10] The dynamic nature of international business is exemplified by the obsolete groupings in studies as Hirsch and Lev (1971), who used seven regions including the now defunct EFTA, and Miller and Pras (1979) whose seven regions included COMECON.

Third, as was pointed out by Osegowitsch and Sammartino (2008), there is no room within the 'triad' regions for the fully domestic firm because the 'home' region includes the home country, and this category therefore includes domestic firms. This exaggerates estimates of regionalism within the 'triad' analysis. As shown above, the Fortune 500 List in 2005 contains 283 home region orientated firms. My taxonomy shows that 52 of these firms are domestic in their sales and 27 are domestic in both their sales and subsidiaries. My taxonomy has a place for the purely domestic firm at one end of the multinationality continuum in addition to the truly global firm.

My system provides an alternative to the triad system. It has the advantage that it includes the entire geography of the world and is therefore, more inclusive than the triad regions. Osegowitsch and Sammartino (2008) and Dunning *et al* (2007) have shown that there are strong trends to greater internationalisation at the firm and at the country level in recent years. My system allows for changing patterns of internationalisation over time. Regions are based on the geographic rather than the political map of the world, as political boundaries and groupings change over time. It is also noteworthy that my taxonomy of multinationality is non-hierarchical in the sense that categories with increasing degrees of multinationality do not subsume those with lower degrees of multinationality. This turns out to be important. When I apply my taxonomy to the Fortune 500 firms, no firm has full regional penetration while most are trans-regional. This is consistent with a pattern of internationalisation amongst the world's largest firms in which they tend to move from being domestic to operating within a small number of countries in their home region, to then taking a significant step to being trans-regional without first spreading more fully across their home region. In short, I find that many of the world's largest firms tend to skip regionalisation and proceed at an early stage to trans-regionalisation. This provides an example of how taxonomy relates to theory and testing, because it provides an interesting insight that theory builders and empirical researchers may be interested in exploring.

3.4.2 Thresholds

My system classifies firms based on the existence of sales or subsidiaries in a region and therefore avoids the use of thresholds. Several points are worth noting in relation to the use

of thresholds by Rugman and his co-authors. *First*, given that the 'triad' markets are the largest in the world, the use of thresholds based on sales in these markets to determine whether MNCs have significant activity in other regions is neither helpful nor intuitive. MNCs with vast sales in the United States will find it virtually impossible to achieve more than 20 percent of this activity in a region of the world with much smaller economies and a fraction of the resources of the United States. This does not mean, however, that these firms are not thinking and acting trans-regionally or globally, but the threshold biases the finding away from globalisation. Similarly, the 50 percent home-region oriented threshold biases the system towards defining firms as home-region oriented and away from the likelihood that any firm is considered global. *Second*, although Rugman and his co-authors classify firms with more than 50 percent of their sales in the home region of the 'triad' as 'home-regional', all these sales could be in its home country, so it would in fact be a domestic firm. Alternatively, up to 50 percent of firms' sales could be spread over most countries throughout the world, both within and outside the 'triad', making them truly global firms. This threshold drives the result that most firms in the 'triad' analysis are 'home-regional'. *Third*, the threshold applied to 'global' firms as having under 50 percent of their sales in their home region and at least 20 percent of their sales in each of the other two regions of the 'triad' also curtails the number of firms that are classified as 'global'. Related to the previous two points, this threshold excludes alternative patterns of globalisation whereby firms consolidate within their home region with more than 50 percent of sales located there, and accompany this with uneven distributions of their remaining sales in most countries of the world. Ruigrok and van Tulder (1995) argue that MNCs strengthen their global competitiveness by strengthening their positions within their home triad or region. *Fourth,* the use of thresholds creates empirical pitfalls in that it restricts the number of firms that may be classified using Rugman and Verbeke's (2004) system. Anglo American, for example, has sales in all 6 regions of the world. It has 33 percent of sales in Europe, 4 percent in Asia and 2 percent in North America and 61 percent in other regions. It is classified as global using my system but cannot be classified using Rugman and Verbeke's (2004) system.

The choice of threshold percentages is an arbitrary decision. Osegowitsch and Sammartino (2008) perform five robustness tests on Rugman and Verbeke's (2004) findings by altering

the various thresholds in their system, using the Fortune 500 List in 2001. I perform a similar analysis on the Fortune 500 List in 2005, using the classification method of Rugman and Verbeke (2004) and the robustness tests of Osegowitsch and Sammartino (2008). As shown in Table 3.3, the most notable difference between the Fortune Lists in 2001 and 2005 is the increase in the number of bi-regional firms in 2005. In Table 3.3, I present the results from the robustness tests on the Fortune 500 Lists in 2001 and 2005. Both sets of robustness tests produce remarkably similar results. In the first set of tests, I reduce the 20 percent host region threshold to 15 percent and then 10 percent, while retaining the 50 percent home region threshold. This results in 10-21 bi-regional firms being re-categorised as global. I next eliminate the 50 percent home region threshold and retain the 20 percent host region threshold. Similar to the results of Osegowitsch and Sammartino (2008), I find a dramatic increase in the number of bi-regional firms. I then eliminate the 50 percent home-region threshold and reduce the host-region thresholds to 15 percent and 10 percent. The number of global firms increases but remains relatively few in number overall. The number of bi-regional firms again increases substantially. My results confirm the findings of Osegowitsch and Sammartino (2008) that the case for home-regionalisation is overstated and the 50 percent home-region threshold is driving Rugman's classification. When I alter the percentage thresholds, my results differ quite substantially from Rugman's. These results raise concerns regarding the robustness of Rugman's system.

My taxonomy provides a more complete view of each firm's breadth of multinationality, and it allows researchers to set their own thresholds if appropriate to the context of the study. I suggest that any thresholds imposed should be lower than those used by Rugman and his co-authors. Osegowitsch and Sammartino (2008) also advocate lower thresholds, particularly in the case in which the researcher wishes to study the process of internationalisation over time. A firm might be rapidly internationalising by expanding sales and manufacturing capacity all over the world, but this trend would not be picked up for years (if at all) using the Rugman approach. The higher the threshold, the less likely these sorts of interesting trends would be detected. My taxonomy is designed to facilitate the study of the fast-changing, dynamic nature of international business that we observe today, and will continue to observe in the future.

Table 3.3
Robustness Tests on the Fortune 500 Lists in 2001 and 2005

	Home-Regional	*Bi-Regional*	*Host-Regional*	*Global*
Fortune List 2001				
Rugman's Classification	320 (88)	25 (7)	11 (3)	9 (2)
15% Host Threshold	320 (88)	19 (5)	11 (3)	15 (4)
10% Host Threshold	320 (88)	11 (3)	11 (3)	24 (6)
No 50% Home Threshold	267 (73)	87 (24)	2 (0.5)	9 (2.5)
15% Host, No Home Threshold	232 (64)	114 (31)	1 (0)	19 (5)
10% Host, No Home Threshold	200 (55)	122 (33)	1 (0)	42 (12)
Fortune List 2005				
Rugman's Classification	283 (81)	50 (14)	9 (3)	7 (2)
15% Host Threshold	283 (81)	40 (11)	9 (3)	17 (5)
10% Host Threshold	283 (81)	29 (8)	9 (3)	28 (8)
No 50% Home Threshold	246 (71)	92 (26)	4 (1)	7 (2)
15% Host, No Home Threshold	215 (62)	109 (31)	3 (1)	22 (6)
10% Host, No Home Threshold	187 (54)	114 (33)	2 (0)	46 (13)

Notes. This Table shows the categorisation of the Fortune 500 firms for both 2001 and 2005. The 2001 results are taken directly from Osegowitsch and Sammartino (2008). I replicate their tests using the 2005 Fortune List. I show the number of firms in each category. Figures in brackets represent percentages.

3.4.3 Accounting data

Rugman and co-authors categorise firms primarily on sales data. Rugman and Verbeke (2004) make the following firm specific observations. Coca Cola is classified as global. McDonalds, however, is not – it has 36.6 percent of its sales in North America, 37.1 percent in Europe but only 13.8 percent in Asia. This result that McDonalds is not classified as a global firm is difficult to accept given that McDonalds has over 30,000 restaurants in more than 119 countries worldwide[11]. It implies that analysing firms based solely on sales figures provides an incomplete picture. Other firms, such as Nike, have sourcing structures that are much more geographically dispersed than their sales. Nike sources 99 percent of its products abroad but the majority (58.2 percent) of its sales are in the US[12]. The use of assets by Rugman and Collinson (2008) and Rugman and Verbeke (2008) gives a more representative view of each firm but still does not provide a complete picture. To highlight the limitations of relying solely on accounting data, I categorise each firm on the Fortune 500 List in 2005 using five accounting variables – sales, assets, income, capital expenditure and depreciation. Individual firm details are presented in Appendix 2 and Table 3.4 provides a summary of results. The results show that most firms have the same classification for all reported accounting variables. Although relative percentages may change, the elimination or addition of a further geographical region seldom occurs, and is unlikely to occur if firms are using a standardised geographical analysis in their accounts. 325 firms on the Fortune 500 List in 2005 have information on more than one of the five accounting variables. Only 44 (13 percent) of these firms do not classify all variables within the same category. In other words, if a firm's sales are classified as T4, the other accounting variables will also be classified as T4. This implies that the accounting detail used by firms significantly impacts on its classification, and using further accounting variables in addition to sales data will likely add little to the analysis.

Further limitations lie in the fact that firms on the *Fortune 500* list use a variety of geographical groupings to categorise accounting variables, such as the Commonwealth of

[11]This information is obtained from the following website: http://www.mcdonalds.com/corp/about.html, and from The Economist Magazine, November 30, 2004.
[12] 29 percent of its sales are in Europe and 12.9 percent in Asia.

Table 3.4
Multinationality of Fortune 500 Firms

	D	*R1*	*R2*	*R3*	*T2*	*T3*	*T4*	*T5*	*G*	*Total*
Trading:										
Sales	53	8			76	70	78	61	28	374
Investments:										
Subsidiaries	47	28			55	72	64	86	103	455
Other accounting data:										
Assets	53	7			62	58	62	47	16	305
Income	64	6			62	20	38	31	11	232
Capital Expenditure	49	5			18	20	21	19	13	145
Depreciation	49	1			10	8	8	10	5	91

Notes. This Table shows the number of firms classified at each level of multinationality using several variables. The totals on the right hand side show the number of firms for which data are available for each variable. No variables are classified as R2 or R3 as no variable exists across more than 33 percent of the countries in the home region.

Independent States (CIS), Europe, Middle East and Africa (EMEA), Asia-Pacific, Latin America, Pacific Basin and 'Far East and Other'. These areas are often ambiguously defined making classification difficult[13]. Most firms also create a category 'Other' or 'Rest of the World' to include all remaining items after the most significant areas have been detailed in the accounts. In my analysis, 228 out of the 374 firms for which sales data are available use the category 'Other' or 'Rest of the World' – the amounts in this category range from 0.0003 percent (Unicredito Italiano) to 84 percent (Lukoil) of total sales, with an average of 12 percent. This creates further ambiguity when categorising firms based solely on accounting data[14].

The number of *Fortune 500* firms reporting subsidiaries is larger than the number of firms reporting sales in each of the six geographical regions in my system. 60 firms report sales in Africa and 155 report subsidiaries there. In Asia, 198 firms report sales and 346 report subsidiaries. 246 firms report sales and 373 report subsidiaries in Europe. 313 firms report sales and 397 report subsidiaries in North America. In Oceania, 205 firms report subsidiaries but only 47 firms report sales, making this region the one with the greatest discrepancy between sales and subsidiary data. Finally, 119 firms report sales and 233 report subsidiaries in South America. These figures again point to the limitations of classifying firms based solely on accounting data, and they also question the appropriateness of drawing conclusions about the breadth of multinationality of MNC operations based solely on accounting variables. My system has the advantage that it uses both sales and subsidiary data and therefore does not rely solely on accounting data.

3.4.4 Application of results to firm strategy

In relation to the extent to which the conclusions about global or regional strategy are supported by the analysis of Rugman and his co-authors, there are at least two important

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[13] In my system, I classify CIS as European as it contains 6 European and 5 Asian countries. The Middle East is ambiguously defined. It traditionally includes Southwest Asia and parts of North Africa. As most definitions include predominantly Asian countries, I classify the Middle East as Asia and divide EMEA figures equally between Europe, Asia and Africa. All classifications in my system are based on the geographical location of the countries involved.

[14] Using my system, when a variable has a classification 'Other', I add one area to the original classification. If a firm for example, has sales in the categories Europe, North America and 'Other', I classify sales as T3.

strands to the emerging debate. *First*, Rugman and Verbeke (2004, 2007) argue that firm-specific advantages (FSA's) are largely 'bounded' within the firm's home region and cannot easily be transferred across regions through trading, forming alliances or investing in foreign subsidiaries. MNCs, they argue, tend to focus their efforts within their home regions, and to expand further afield at considerably greater cost and risk only when these markets are exhausted. This conjecture, although consistent with high-level internationalisation theory such as the process theory of internationalisation of Johanson and Vahlne (1977, 1990), it is not fully supported by a rigorous analysis of the data and its limitations. When the thresholds are weakened, and/or when the regions are defined more completely, the patterns of internationalisation that emerge are not necessarily consistent with firms internationalising predominantly within their home regions. Rather, it is more consistent with MNCs expanding beyond their home regions and reaching across regions and globally long before they have exhausted their home region markets (Osegowitsch and Sammartino (2008)).

Second, Rugman and his co-authors use industry-specific examples to attempt to refute the validity of global strategy. Using their sales data analysis to show that over 85 percent of all North America's cars are built there by 'core triad' firms, over 90 percent of cars produced in the EU are sold there, and over 93 percent of Japan's cars are built domestically, Rugman and Hodgetts (2001) argue that the automobile industry is 'triad-based, not global' and that 'There is no global car'. Closer inspection of the car business reveals that it is very much global, and car manufacturers need to have global strategies. Cars are used in every country in the world. While it is obviously the case that the 'triad' MNCs are the biggest producers, the typical car produced in any of the 'triad' regions, or anywhere else for that matter, is essentially the assembly of many component parts produced through a complex global web of trading, licensing, joint venturing and subsidiaries across many countries within and outside the 'triad' however defined. The statement that there is no global car is a gross simplification that does not recognise the sophistication of the industry's manufacturers. Lampell and Mintzberg (1996) describe how modern customer-focussed manufacturing specifications have evolved from the more traditional mass customisation, Alford, Sackett and Nelder (2000) describe how this has been adopted within the automobile industry, and

Humphry and Memedovic (2003) document how the automobile industry expanded outside the 'triad' during the 1990s into the strongly growing emerging markets to offset the oversupply and stagnation within the 'triad'. In addition to these trends, the prices of important components such as chemicals, metals, plastics, rubber, glass, and the prices of complementary products such as oil and petrol, ensure that car manufacturers and component suppliers throughout the world have a clear global strategy and vision that is also influenced and shaped by global issues such as climate change.

Based on this analysis, I argue that my taxonomy of multinationality represents a significant improvement on the 'triad' system used by Rugman and his co-authors. In the next section, I perform several robustness tests on the geographical regions used in my system.

3.5 Robustness analysis

In this section, I examine the robustness of my taxonomy by re-classifying the *Fortune 500* firms with available sales data (374 firms) and subsidiaries data (455 firms), using several alternative regional groupings. Table 3.5 presents the main findings, with Panel A detailing classifications based on sales and Panel B on subsidiaries. The first row in Panels A and B present the numbers for my classification system. In the second, third and fourth rows in each panel, I re-classify the firms assuming that there are 5 instead of 6 regions; by combining North and South America, Asia with Oceania and Europe with Africa respectively. The number of firms classified as domestic and regional change little when the continents are aggregated in this way. The major difference is that more are classified as global and fewer trans-regional. In the fifth row in each panel, I re-classify assuming a 3-region world: Africa/Europe, the Americas, and Asia/Oceania. Clearly the number of firms considered global increases dramatically when there are 3 'mega-regions'. This is notably at odds with Rugman (2003) and Rugman and Verbeke (2004). It arises because unlike these researchers, our regions include all countries in the world, and because we do not apply thresholds in classifying our firms within particular regional groupings.

Table 3.5
Robustness Analysis Based on Geographical Regions

	D	R	T	G	Total
Panel A: Based on sales data					
1: Our 6-region system Africa, Asia, Europe, North America, South America and Oceania	53	8	285	28	374
2: 5-region system Africa, Asia, the Americas, Europe, Oceania (North and South America merged)	53	9	273	39	374
3: 5-region system Africa, Asia/Oceania, North America, South America, Europe (Asia and Oceania merged)	53	8	236	77	374
4: 5-region system Africa/Europe, Asia, North America, South America and Oceania (Africa and Europe merged)	53	8	246	67	374
5: 3-region system Africa/Europe, the Americas and Asia/Oceania	53	9	80	232	374
6: Dunning *et al*'s (2007) 'alternative' regions The Americas, Europe, Asia, Other	53	9	185	127	374
Panel B: Based on subsidiary data					
1: Our 6-region system Africa, Asia, Europe, North America, South America and Oceania	47	28	277	103	455
2: 5-region system Africa, Asia, the Americas, Europe, Oceania (North and South America merged)	47	30	268	110	455
3: 5-region system Africa, Asia/Oceania, North America, South America, Europe (Asia and Oceania merged)	47	28	249	131	455
4: 5-region system Africa/Europe, Asia, North America, South America and Oceania (Africa and Europe merged)	47	28	223	157	455
5: 3-region system Africa/Europe, the Americas and Asia/Oceania	47	30	80	298	455
6: Dunning *et al*'s (2007) 'alternative' regions The Americas, Europe, Asia, Other	47	30	157	221	455
7: Dunning *et al*'s (2007) 6 regions Anglo, Latin European, Germanic/Nordic, Latin American, Far Eastern, Other	47	25	225	158	455

Notes: This Table classifies the *Fortune 500* firms in 2005 for which I have sale and subsidiary data, using several alternate regional groupings. The columns titled *'D', 'R', 'T'* and *'G'* denote the categories of multinationality as domestic, regional, trans-regional and global. Panel A details the number of firms in each regional grouping category based on sales data, and Panel B does likewise for the subsidiary data.

The sixth and seventh rows in Panel B and the sixth row in Panel A present the results of re-classifying the *Fortune 500* firms using Dunning *et al*'s (2007) main and alternate regional groupings. Dunning *et al* divided the world into six regions using a geographical clustering originally proposed by Ronen and Shenkar (1985) and Shenkar (2001): *Anglo* (Australia, Canada, Ireland, New Zealand, South Africa, the United Kingdom and the United States), *Latin European* (Belgium, France, Italy, Portugal, Spain), *Nordic and Germanic* (Austria, Denmark, Finland, Germany, the Netherlands, Norway, Sweden and Switzerland), *Latin American* (Argentina, Brazil, Chile, Columbia, Mexico, Peru and Venezuela), *Far Eastern* (China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Singapore, Philippines, Taiwan and Thailand), and *Other* (all other countries). I use this system with the subsidiary data (row 7 of Panel B). While the Dunning *et al* system is an intuitive approach that encompasses elements of cultural and psychic distance, it has the disadvantage that it cannot be used at the firm level to classify by multinationality based on sales, because most firms do not report sales or other accounting data in sufficiently fine geographic detail. For this reason, I also use Dunning *et al*'s (2007) 'alternate' 4-regions – the Americas, Europe, Asia and 'Other' – to re-classify the Fortune 500 based on both sales and subsidiaries (row 6 of Panels A and B).

As can be seen in Panel B of Table 3.5, the number of firms classified as domestic and regional are similar when Dunning *et al*'s (2007) 6-region system is compared with mine, except that the Dunning system classifies more firms as global and fewer as trans-regional. This difference is explained by Dunning *et al*'s (2007) 'Other' region, which is a large and diverse 155-country grouping, and also by the fact that three of their regions capture European countries. These quirks of the Dunning *et al* system throw up a few anomalies when using it at the firm level. For example, a firm with subsidiaries throughout Europe and in South America and Asia would be classified as global, and a firm with subsidiaries in Belgium, Germany, Luxembourg and the UK would be classified as trans-regional even though all of its subsidiaries are in Europe.

3.6 Summary and conclusions

This chapter provides an alternative perspective on the regionalisation-globalisation debate. I use my taxonomy of multinationality to classify two samples of firms – the *G7 1289* firms and the *Fortune 500* firms in 2005. I show that both samples contain a wide variety of firms, ranging from purely domestic corporations to fully global MNCs, with many regional and trans-regional firms. Contrary to Rugman (2003) and Rugman and Verbeke (2004) who have argued that most *Fortune 500* firms are regional rather than global, I find that many of these firms are trans-regional and global. Classification of the *G7 1289* firms reveals similar results. I provide a detailed comparison of both systems (Rugman's triad system and my matrix of multinationality) under four headings: triad regions, thresholds, accounting data and application of results.

Overall, I conclude that my six geographical regions are more inclusive than the 'triad' regions, that my avoidance of the use of thresholds and my use of both accounting and non-accounting data represent an improvement on Rugman's system, and that the conclusions drawn by Rugman warrant further scrutinisation. Finally, I test the robustness of my system to various geographical regions and conclude that my six-region system is the most appropriate. It follows from my analysis that global strategy, contrary to Rugman and his co-authors, is not a myth.

Chapter 4

International diversification and the home bias puzzle: the role of MNCs

4.1 Introduction

Enhanced integration throughout the world's commodity, service and financial sectors has created expanding opportunities for both firms and investors to reap the synergistic gains from internationalisation. *Firms* have responded by internationalising their activities across greater geographical and cultural distances through trading, forming alliances, licensing, joint venturing and foreign direct investment (FDI). Given their financial, knowledge and management resources, they choose the patterns of internationalisation that maximize their risk-adjusted expected returns net of expected costs (Caves (1971), Dunning (1980, 1988)). The extent to which they create value by successful internationalisation remains a controversial issue, with many studies finding contradictory results. *Investors* have responded by holding greater proportions of more geographically and culturally distant foreign assets in their portfolios. Interestingly, however, the extent to which investors have diversified internationally remains significantly less than what many financial analysts and researchers believe should be observable. Aurelio (2006) documents how US foreign investments have grown at over twice the pace of household net worth during the two decades to 2005, and although the share of foreign stock holdings in total foreign assets has grown strongly from 5 percent to 28 percent of total assets, the 12 percent of equity portfolios held in foreign stocks remains inexplicably below the 41 percent minimum variance portfolio that would deliver significantly greater returns with lower risk. This is the so-called 'international diversification puzzle', also called the 'home-bias puzzle'. It arises because although the benefits of international portfolio diversification are significantly positive, and although the costs and risks associated with achieving them appear small relative to those associated with internationalising at the level of the firm, investors continue to hold the majority of their financial portfolios in domestic rather than international assets.

Although the observed home bias of portfolio investors appears to be inefficient, the literature offers a number of explanations for the phenomenon including transaction costs, taxes, information asymmetries, currency risk, legal restrictions, political risk and other controls. Tesar and Werner (1995), for example, show that geographical proximity, language compatibility and trade links are more important than correlation structures for international portfolio investors. Baxter and Jermann (1997) argue that because labour income is about 60 percent of national income and its return is highly correlated with physical capital, investors should hold short positions in domestic assets in order to hold a diversified world portfolio. Hasan and Simaan (2000) and Ahearne, Griever and Warnock (2004) show how home bias results from poor or costly information and/or information asymmetries. Overall, it is widely agreed that home bias continues to exist despite the benefits of international diversification, and that it results from investor preferences at least as much as from market imperfections (see *inter alia*, Cooper and Kaplanis (1994), Portes and Rey (1998, 2005), Coval and Moskowitz (1999), Lewis (1999), Wei (2000), Portes, Rey *et al* (2001), Karolyi and Stulz (2002), Guerin (2006), and Rosati and Secola (2006)).

This chapter examines an alternative explanation to the home bias phenomenon. It investigates if investors can use MNCs to indirectly gain foreign market exposure. In this case, a home biased attitude to international investing may be justified and indeed optimal. It provides a detailed classification of the multinationality of the *G7 1289* sample of firms outlined in Chapter 3, and measures their performance using 2,216 observations of daily firm-level and market-level data from 1 January 1999 to 30 June 2007. Using this multi-country, firm-level dataset with almost 3 million observations, it examines the extent to which investors can gain international diversification without having to invest in foreign markets. By investing in internationalised firms that are listed on the exchanges in their home countries, investors can 'free ride' the costs and risks associated with internationalisation at the level of the firm by reaping the benefits directly from home-based internationalised firms.

This chapter has a number of novel features. *First*, the classification of the degree of multinationality of MNCs provides a deeper analysis than has appeared in the literature to

date of the types of firm, developed in chapter 2 and applied in chapter 3, that provide diversification benefits to investors. Classifying firms as 'domestic', 'regional', 'trans-regional' or 'global', this analysis involves the construction of investment portfolios from the firm-level characteristics in order to examine the benefits of diversification at various degrees of internationality. *Second*, existing studies of the diversification benefits of investing in MNCs (such as Huberman and Kandel (1987), Bekaert and Urias (1996) and Errunza, Hogan and Hull (1999)) typically examine the question from a United States perspective. The United States has one of the most diversified economies and one of the most developed stock markets in the world, and is unlikely to yield results that apply to representative investors in other countries. Following Rowland and Tesar (2004) who take the viewpoint of investors in each of the G7 countries, this research takes the perspective of investors in each G7 country. *Third*, using mean variance spanning tests to calculate the statistical significance of differences in performance, and using changes in Sharpe ratios to measure the economic significance of such differences, this chapter examines the diversification benefits to investing in firms that are internationalised to varying degrees. It considers in turn the case of frictionless markets in which investors can short sell assets without costs, and the case where there are short selling constraints. Although it is likely that short selling restrictions are relevant in this context, previous studies have not considered how these constraints affect their results. *Finally*, unlike previous studies that have focussed exclusively on the advantages of international diversification by using market indices or a sample of arbitrarily defined domestic firms to represent the domestic market, this approach establishes and tests a richer set of hypotheses about the extent to which the benefits of diversification are consistent across firms and countries at the 'regional', 'trans-regional' and 'global' levels of internationalisation, and whether investors in any country can obtain better diversification benefits by investing in home-based or foreign-based firms.

Amongst the main findings are the following. *First*, results confirm that there are benefits to international diversification, using both conventional tests and tests based on my classification system. *Second,* findings show that there are statistically and economically significant benefits to domestic diversification in all G7 countries. They are greatest in the UK and the US, and they are smallest in Canada, Germany and France. *Third*, foreign-based

domestic firms yield approximately equal diversification benefits to foreign-based internationalised firms in all G7 countries. *Fourth*, when each category of firm is combined across all countries, firms with global sales and global subsidiaries provide the largest benefits to diversification. This finding is both intuitive and robust, and it demonstrates that when differences in firm-level internationalisation are considered, investors can exhibit home bias while reaping the benefits from international diversification.

The remainder of this chapter is structured as follows. Section 4.2 reviews previous related studies of the home bias puzzle in international portfolio investment and how domestic investment in internationalised firms might explain it. Section 4.3 describes the dataset, presents my five hypotheses and outlines the testing methodology. Results are presented in section 4.4. Section 4.5 provides a set of robustness tests. Finally, section 4.6 summarises the main argument and draws together some conclusions.

4.2 Firm-level investment and the home bias puzzle

If capital markets in each country were perfectly developed, and if international capital mobility was unimpeded, the returns on stocks in each country would include only the value of their contribution to the risk of the fully diversified world portfolio, and international diversification at the level of the firm would be inconsequential. In reality, however, no country has perfect capital markets, and there are substantial barriers, costs and risks associated with international portfolio investment. Because of this, investors are only partially diversified internationally, and even if they are keen to diversify, they tend to hold a limited number of assets to reduce transaction costs (see Falkenstein (1996), Barber and Odean (2000) and Benartzi and Thaler (2001)). Barberis and Thaler (2003) provide a review of this 'insufficient diversification' puzzle.

It follows that the degree of internationalisation can potentially raise firm value, and investors can obtain at least part of their desired degree of international diversification by investing in home-based internationalised firms. This raises two closely related but distinct questions. *First*, how does the degree of internationalisation affect firm performance, and is it reflected in share valuation? *Second*, to what extent can investors obtain the benefits of

international portfolio diversification by investing in home-based internationalised firms, and are these diversification services reflected in share valuation? In relation to the first question, the main theories of firm-level internationalisation include Johanson and Vahlne's (1977) experiential learning model, Dunning's (1980, 1988) eclectic paradigm, Kogut and Zander's (1993) knowledge-based view, and Oviatt and McDougall's (1994) international new venture theory. Although these frameworks emphasize different aspects of the internationalisation process, they collectively suggest that given their financial, knowledge and management resources, and given the external environmental constraints and opportunities that confront them, firms choose the patterns of internationalisation that maximize their risk-adjusted expected returns net of expected costs. The benefits to internationalising firms include larger markets to apply their specialist knowledge and management skills, scale economies in production, and rents from imperfectly competitive factor and product markets. The costs include initial investments, higher coordination and management costs over geographical and cultural distances, enforcement of contracts, protection of patents, and the risks associated with foreign exchange, taxation, and political factors. The many patterns of internalisation imply alternative combinations of benefits and costs, and an extensive literature has sought to identify and measure these patterns. As discussed in Chapter 2, the literature is divided as to whether internationalisation at the level of the firm adds value. Overviews of the literature are provided by Annavarjula and Beldona (2000), Majocchi and Zuchella (2003) and Li (2007). Chapter 2 shows that these mixed results are at least partly explained by inconsistencies in how researchers have operationalised their definitions of firm-level internationalisation.

The second question considers if home-based internationalised firms provide the benefits of international portfolio diversification. In a world of perfect markets, the advantages to be gained by investing in internationalised firms do not arise from the diversification benefits of the latter's asset base. Analogously to the two-fund separation theorem, individual investors can obtain this diversification by investing in different firms. Hughes, Logue and Sweeney (1975) recognised that assuming that firms maximize shareholder wealth, they will internationalise in order to avail of their advantages in management, knowledge, and to avail of scale economies. The advantages to investors depend on whether there are gains to

internationalisation in the same way as there are synergistic gains to conglomerate mergers, because with perfect markets, investors can build their own conglomerations. The same argument applies to international firms. If there are no or limited benefits to internationalisation, and if managers maximise shareholder value, they would either not internationalise at all or they would stop at some optimum degree of internationalisation. Intuition suggests that firms with greater breadth and depth of multinationality should provide better diversification benefits. Chapter 2 details the conflicting results from the literature on whether MNCs provide the benefits from international portfolio diversification and show that these conflicting results are due to inconsistencies in how researchers have classified firm-level internationalisation in their empirical studies.

There also exists within the literature, the possibility that the home bias puzzle may be exaggerated. Cohn and Pringle (1973) observed that although the empirical finance literature typically views the portfolio of shares in the market index in any country as a proxy for the market portfolio of investment opportunities in the CAPM, it contains diversifiable risk if extended to other countries. The question is, however, how much internationally diversifiable risk does it contain? The force of my argument in this chapter is that the international economics and finance literatures inappropriately assume that the answer is zero, or if it is not, that it still does not contain international diversification benefits. The most articulate expression of this argument is by Lewis (1999).

> '[Another] explanation for home bias based upon country specific risks argues that the diversification potential from foreign equities are already contained in domestic equities. Thus, US investors don't need to hold foreign stocks to gain the benefits of foreign diversification. After all, it is reasoned, the US has many large multinational firms. These firms have foreign operations, and thereby provide the equity holder with returns that depend upon foreign economies.
>
> While this argument seems plausible, it does not hold up empirically. The stocks of multinationals usually move quite closely with their respective national stock market indices. Indeed, studies have shown that the betas of these stocks with respect to their own markets are usually relatively close to one. Therefore, the multinationals provide little better diversification than the domestic market.
>
> When viewed in light of the evidence described earlier, this result is, perhaps, not surprising. Many multinational firms are important components of the national stock market index. Therefore, the low correlation between these indexes and foreign stocks must arise from the importance of foreign stocks themselves, not multinational stocks

> that are correlated with the domestic index. The international diversification gains require holdings of foreign assets that are not a part of the domestic index.' (p582).

Lewis (1999) argues that although it seems plausible that home-based internationalised firms provide international diversification benefits, the argument does not hold up empirically. But she fails to explain why this is the case. Rather, she asserts that foreign-based firms are important for international diversification rather than home-based internationalised firms because of the low correlation between the market index and the foreign-based firms rather than because of the high correlation between the largest home-based internationalised firms and the home market index. She consequently dismisses the international diversification benefits of home-based internationalised firms as a possible explanation for home bias. I do not agree with this analysis. To the extent that home-based internationalised firms are highly correlated with their home market index, and to the extent that the latter is less correlated with foreign-based firms, implies that home-based internationalised firms will themselves be less correlated with foreign-based firms. But this does not mean that home-based internationalised firms do not themselves contain international diversification benefits. Rather, it reflects the fact that the market indices contain both industrial and internationalisation diversification benefits. It follows that Lewis' (1999) dismissal of the possibility of home-based internationalised firms providing international diversification benefits to domestic investors is misplaced and worthy of further analysis. This was recognised by Agmon and Lessard (1977) who argued two decades earlier that while the benefits of international portfolio investment are well understood, the benefits of international diversification at the level of the firm do not follow straightforwardly from less than perfect correlations. Two conditions are required; there must be greater barriers or costs to foreign portfolio investment (FPI) than to FDI, and investors must recognise that home-based internationalised firms provide diversification opportunities not available elsewhere at similar or less costs. This chapter argues that the market index in any country already contains a significant degree of international diversification, and this does contain international diversification benefits. Furthermore, using market indices as the domestic market, and testing whether the addition of other market indices provides superior risk adjusted performance is not a true measure of the benefits of international diversification.

Errunza, Hogan and Hung (1999), whose work was not reviewed by Lewis (1999), introduce the concept of foreign-based international diversification (FID) that necessitates investors holding foreign assets that only trade in foreign markets, and home-based international diversification (HID) that is achieved by holding only claims on foreign assets that trade in the investor's home country. Recognising that HID can achieve some of the full benefits of FID, they note that this is consistent with the observed home bias in investors' portfolios. They examine whether the full gains from FID can be obtained from HID in the United States, by supplementing domestic market indices with American depository receipts (ADRs), closed-end country funds (CFs) and MNC stocks. They find that for most markets, the gains to international diversification beyond HID are both statistically and economically insignificant. They conclude their section 2 on replicating portfolios by noting that correlations of market-wide index returns should not be used as a measure of the benefits to international diversification available by FID using foreign traded assets, because such gains should properly be measured beyond those that can be achieved by HID. This is essentially my point from a more international perspective. The home bias literature exaggerates the degree of home bias by measuring FID rather than FID *less* HID.

4.3 Data and methodology

4.3.1 Data and preliminary analysis

The dataset for this analysis is the *G7 1289* firms detailed in Chapter 3. Each firm is classified using the matrix of multinationality outlined in Chapter 2, and their performance is measured using daily returns from 1 January 1999 to 30 June 2007. Four categories of multinationality – domestic, regional, trans-regional and global – are used for both sales and subsidiaries. This leads to the creation of up to eight categories of firm within each country. Market capitalisation indices are calculated using a similar methodology to that of the S&P 500 and the FTSE 100[1]. This results in 24 sales indices and 27 subsidiary indices (Canada

[1] The value of the index each day is calculated using the following formula:

and Japan do not have firms with global sales, Japan and Germany do not have firms with regional sales and Canada has no firms with regional subsidiaries). This leads to a total of 51 indices with 113,016 daily observations. Daily exchange rate data from Datastream is used to convert each of the 51 indices into each of the five currencies of the G7 countries – a total of 255 indices and 565,080 daily observations. Each of the seven market indices are converted into each of the five currencies of the G7 countries – a further 35 indices with 77,560 daily observations. I next create aggregate market value weighted indices of *all* domestic, *all* regional, *all* trans-regional and *all* global firms (from all of the G7 countries combined together). Sales and subsidiary indices are analysed separately. Eight aggregate indices are created in each currency with 17,728 daily observations. Each of these indices is converted into each of the five currencies within the dataset leading to a total of 40 indices with 88,640 daily observations. Any firm with missing market value data is excluded from the index calculation. Three-month Treasury Bill rates are used as the risk free rate in each country[2].

The tests used build on the concepts of home-based international diversification (*HID*) and foreign-based international diversification (*FID*) introduced by Errunza, Hogan and Hung (1999). The aggregate market index in any country comprises domestic firms (*D*) and internationalised firms (*R*, *T* and *G*) through which domestic investors can potentially obtain *HID*. Equation (4.1) describes the return on the aggregate market index in country *i*, R_m^i, as the sum of the returns on domestic firms in the index multiplied by their value weights, $\omega_D^i R_D^i$, plus the returns on internationalised firms in the index multiplied by their value weights, $\omega_{HID}^i R_{HID}^i$. The latter is described in equation (4.2) as comprising all

$$IndexValue = \frac{\sum_{j=1}^{n} MV_{jt}}{\sum_{j=1}^{n} MV_{jb}} \times 100$$

where MV_{jt} is the market value of firm *j* at time *t*, MV_{jb} is the market value of firm *j* at the base year and *n* is the number of firms in the index.

[2] There is some ambiguity within the literature on the most appropriate risk-free rate to use. We follow Driessen and Laeven (2007) who use 3-month Treasury Bill rates as the risk free rate in each country.

internationalised firms that are regional, trans-regional and/or global, multiplied by their respective weights in the aggregate market index of country *i*.

$$R_m^i = \omega_D^i R_D^i + \xi_{HID}^i R_{HID}^i \tag{4.1}$$

$$R_{HID}^i = \omega_R^i R_R^i + \omega_T^i R_T^i + \omega_G^i R_G^i \tag{4.2}$$

Table 3.1 showed the number of domestic, regional, trans-regional and global firms in the overall market index for each of the G7 countries. 229 of the 1,143 firms (20 percent) with available sales data are categorised as domestic, and this figure ranges from a high of 30 percent and 29 percent in Italy and the United States, to 23 percent in Canada, and to lows of 9, 8 and 5 percent in Japan, the UK and Germany. The relative sizes of the domestic sub-component of the aggregate market indices vary considerably across countries, and by implication so do the relative sizes of the internationalised components. Overall, the potential for *HID* arises in 80 percent of all firms in all countries in the sample. It applies to over 70 percent of firms in each country, rising to more than 90 percent of all firms in France, Germany, Japan and the UK. The size of the US economy explains the large size of its domestic sector, which in turn implies that the potential benefits of *HID* are proportionately greater in the US than in other countries. Of the international firms, 835 (73 percent) are trans-regional, 40 (4 percent) are regional, and 39 (3 percent) are global. Using the sales data, therefore, the market indexes in each of the seven countries are dominated by trans-regional firms to a greater or lesser extent. Panel B of Table 3.1 shows that this finding is closely replicated using the subsidiary data.

Table 4.1 details the correlation coefficient (in each domestic currency) between each market index and the other six markets. While systematic, market-wide volatility is most important to the holders of well-diversified portfolios, both total and idiosyncratic volatility are

Table 4.1
Correlation Structures

Panel A: Sales Classifications

	Canada	France	Germany	Italy	Japan	UK	US	Average
Market Index	0.362	0.608	0.583	0.504	0.202	0.536	0.347	0.449
Domestic	0.185	0.194	0.237	0.383	0.132	0.331	0.270	0.247
Regional	0.190	0.203	Na	0.491	Na	0.362	0.228	0.295
Trans-Regional	0.341	0.586	0.574	0.528	0.22	0.498	0.341	0.441
Global	Na	0.486	0.451	0.359	Na	0.341	0.296	0.387

Panel B: Subsidiary Classifications

	Canada	France	Germany	Italy	Japan	UK	US	Average
Domestic	0.189	0.432	0.256	0.500	0.138	0.408	0.258	0.312
Regional	Na	0.366	0.237	0.480	0.103	0.298	0.289	0.300
Trans-Regional	0.317	0.567	0.508	0.518	0.198	0.476	0.34	0.418
Global	0.213	0.557	0.567	0.367	0.219	0.431	0.32	0.382

Notes. This Table shows the average correlation coefficients (in local currencies) between each category of firm and the 6 foreign market indices in our sample. Panel A details firms classified based on sales data and Panel B details firms classified based on subsidiary data. For example, the average correlation between the S&P500 and the other 6 market indices is 0.347 and the average correlation of US firms with domestic sales and the other 6 market indices is 0.270. The final column shows the average correlation of each category of firm with all foreign market indices. For example, firms with domestic sales have an average correlation with foreign market indices of 0.247.

relevant for incompletely diversified investors[3]. The Nikkei index is the least correlated with the other indices suggesting that Japanese investors benefit most from diversification within the G7 countries. European investors benefit least from international diversification within the G7 countries. The correlations suggest that geographical proximity has a strong influence on the relationship between markets. The right hand column of the table shows the average correlation of each category of firm with the six foreign indices in the sample. The trans-regional firms in all countries are the most highly correlated with the foreign market indices. Domestic firms are the least correlated with foreign market indices in all countries with the exception of the US and Italy. Italy provides an unusual case in that global firms are the least correlated with foreign market indices.

4.3.2 Testing methodology

Five sets of mean variance spanning tests are performed to explore the extent to which the degree of internationalisation yields diversification benefits. The *first* 'anchor' test is of the statistical and economic significance of the diversification benefits of holding a world portfolio versus a portfolio of each country's market index. As discussed previously, however, these conventional tests cloud the debate about the home bias phenomenon by including all firms, regardless of the extent to which they are themselves internationalised, in the domestic market index. Using these conventional tests based on market index data consequently leads to biased estimates of the benefits of international diversification because each market index is partly internationalised to varying degrees depending on the openness of the country. The *second* test is a purer test of the benefits of international diversification. It investigates the benefits of holding a world portfolio versus an index of purely domestic firms rather than the domestic market index. This results in greater benefits on average, because the benefits from home-based international diversification (*HID*) are now excluded. This leads us to the third and fourth tests, which focus on whether these benefits of international diversification can be obtained by investors in each country. The innovation in these tests is that they are based on the same 'pure' benchmark of the market portfolio of domestic (*D*) firms in the home country. The *third* test examines the extent to which

[3] Campbell, Lettau, Malkiel and Xu (2001) and Kearney and Poti (2008) examine trends in correlations and their implications for diversification strategies in the United States and Europe respectively.

domestic investors in each country can gain *HID* benefits by investing in home-based firms of varying degrees of internationalisation, ranging from regional to trans-regional and global. Results show that there are benefits to HID. The *fourth* test examines the extent to which investors in each country can gain *FID* benefits by investing in foreign-based firms of varying degrees of internationalisation, ranging from domestic to global firms. Results show that they can, and that they can gain approximately equal benefits by investing in foreign-based domestic firms as they can by investing in foreign-based internationalised firms. Finally, the *fifth* test combines all domestic, (*D*), regional (*R*), trans-regional (*T*) and global (*G*) firms across all countries, and conducts a series of novel firm-level tests of the statistical and economic significance of the extent to which firms that are more internationalised provide greater international diversification benefits. Results show that this is indeed the case - regional and trans-regional firms provide better diversification benefits than domestic firms, and global firms provide the best international diversification benefits. Comparing the results in tests 2, 3, 4 and 5 to the conventional measures derived in test 1 allows me to shed light on how the home bias puzzle can be explained by investors obtaining significant international diversification benefits without having to invest in foreign-based firms or portfolios.

Mean variance spanning tests are constructed following Huberman and Kandel (1987), De Roon and Nijman (2001) and Kan and Zhou (2001). They consider a set of K benchmark assets and N test assets and investigate whether, conditional on the K benchmark assets, the addition of the N test assets can shift the mean variance efficient frontier. Alternatively, conditional on the $K+N$ benchmark and test assets, can the subset of K benchmark assets yield the same diversification benefits? In common parlance, these tests investigate whether the K benchmark assets span the extended set of $K+N$ assets. $R_{1,t}$ is defined as the $K\times 1$ vector of returns on the K benchmark assets at time t, $R_{2,t}$ is defined as the $N\times 1$ returns on the N test assets at time t, and $R_{1,t}$ and $R_{2,t}$ are combined in the $K+N$ vector $R_t = [R_{1,t}^{'}, R_{2,t}^{'}]^{'}$. The expected returns $E[R_t]$ and the variances $Var[R_t]$ on these $K+N$ assets can be written as

$$E[R_t] = \mu = \begin{vmatrix} \mu_1 \\ \mu_2 \end{vmatrix} \qquad Var[R_t] = V = \begin{vmatrix} V_{11} & V_{12} \\ V_{21} & V_{22} \end{vmatrix} \tag{4.3}$$

The mean variance spanning test proceeds by estimating the following model, which regresses the N test asset returns on the K benchmark asset returns,

$$R_{2,t} = \alpha + \beta R_{1,t} + \varepsilon_t \tag{4.4}$$

with $\varepsilon_t \sim N(0, \Sigma)$, $\alpha = E[R_{2,t}] - \beta E[R_{1,t}] = \mu_2 - \beta\mu_1$ and $\beta = V_{21}V_{11}^{-1}$.

By defining $\delta = 1_N - \beta 1_K$, it can be seen that in order to test whether the set of K benchmark assets spans the broader set of $K+N$ assets amounts to testing the joint hypothesis that $\alpha = \delta = 0_N$. If this hypothesis is upheld, it implies that for every test asset, a portfolio of the K benchmark assets can be obtained that has the same expected return (because $\alpha = 0_N$ and $\beta 1_K = 1_N$) and a lower variance (because $R_{1,t}$ and ε_t are uncorrelated while $Var(\varepsilon_t)$ is positive definite).

To derive the form of the mean variance spanning test used in the next section, equation (4.4) is re-written in matrix notation as

$$R = X\beta + \Sigma \tag{4.5}$$

with the unconstrained maximum likelihood estimates of β and Σ being determined as usual by

$$\hat{\beta} = (X'X)^{-1}(X'R) \text{ and } \hat{\Sigma} = \frac{1}{T}\left(R - X\hat{\beta}\right)'\left(R - X\hat{\beta}\right)$$

To derive the tests of spanning and to facilitate their geometric presentation, I define $\hat{\mu} = \sum_{t=1}^{T} R_t / T$ and $\hat{V} = \frac{1}{T}\sum_{t=1}^{T}(R_t - \hat{\mu})(R_t - \hat{\mu})'$, and I define four constants *a*, *b*, *c* and *d* that are important determinants of the location and shape of the efficient frontier. This is done for the efficient frontiers with *K* and with *K+N* assets. For *K* assets, $\hat{a}_K = \hat{\mu}_K' \hat{V}_{11}^{-1} \hat{\mu}_K$, $\hat{b}_K = \hat{\mu}_K' \hat{V}_{11}^{-1} 1_K$, $\hat{c}_K = \hat{1}_K' \hat{V}_{11}^{-1} 1_K$ and $\hat{d}_K = \hat{a}_K \hat{c}_K - \hat{b}_K^2$. The equivalent for *K+N* assets is $\hat{a}_{K+N} = \hat{\mu}_{K+N}' \hat{V}^{-1} \hat{\mu}_{K+N}$, $\hat{b}_{K+N} = \hat{\mu}_{K+N}' \hat{V}^{-1} 1_{K+N}$, $\hat{c}_{K+N} = \hat{1}_{K+N}' \hat{V}^{-1} 1_{K+N}$ and $\hat{d}_{K+N} = \hat{a}_{K+N}\hat{c}_{K+N} - \hat{b}_{K+N}^2$. Moving from the frontier with *K* benchmark assets to the more general frontier with *K+N* assets, these constants will change by $\Delta\hat{a} = \hat{a}_{K+N} - \hat{a}_K$, $\Delta\hat{b} = \hat{b}_{K+N} - \hat{b}_K$ and $\Delta\hat{c} = \hat{c}_{K+N} - \hat{c}_K$. The following two matrices are now formed, the latter of which is termed the marginal information matrix (see Jobson and Korkie (1989)).

$$\hat{G} = \begin{vmatrix} 1 + \hat{a}_K & \hat{b}_K \\ \hat{b}_K & \hat{c}_K \end{vmatrix} \text{ and } \hat{H} = \begin{vmatrix} \Delta\hat{a} & \Delta\hat{b} \\ \Delta\hat{b} & \Delta\hat{c} \end{vmatrix} \tag{4.6}$$

Combining the $\hat{G}$ and $\hat{H}$ matrices in (4.6), recalling that $\hat{\Sigma}$ denotes the unconstrained (with *K+N* assets) maximum likelihood estimate of Σ in (4.5), denoting the constrained (with *K* assets) maximum likelihood estimate of Σ in (4.5) as $\tilde{\Sigma}$, and letting $U = \left|\hat{\Sigma}\tilde{\Sigma}^{-1}\right|$, the likelihood ratio test of whether the *K* benchmark assets span the *K+N* benchmark and test assets is:

$$LR = -T \ln(U) \tag{4.7}$$

where

$$U = \left|\hat{\Sigma}\tilde{\Sigma}^{-1}\right| = \frac{\left|\hat{G}\right|}{\left|\hat{G} + \hat{H}\right|} = \frac{(1 + \hat{a}_K)\hat{c}_K - \hat{b}_K^2}{(1 + \hat{a}_{K+N})\hat{c}_{K+N} - \hat{b}_{K+N}^2} = \left(\frac{\hat{c}_K}{\hat{c}_{K+N}}\right)\left(\frac{1 + \frac{\hat{d}_K}{\hat{c}_K}}{1 + \frac{\hat{d}_{K+N}}{\hat{c}_{K+N}}}\right)$$

Huberman and Kendel (1987) and Jobson and Korkie (1989) show that the distribution of the likelihood ratio test under the null is distributed as

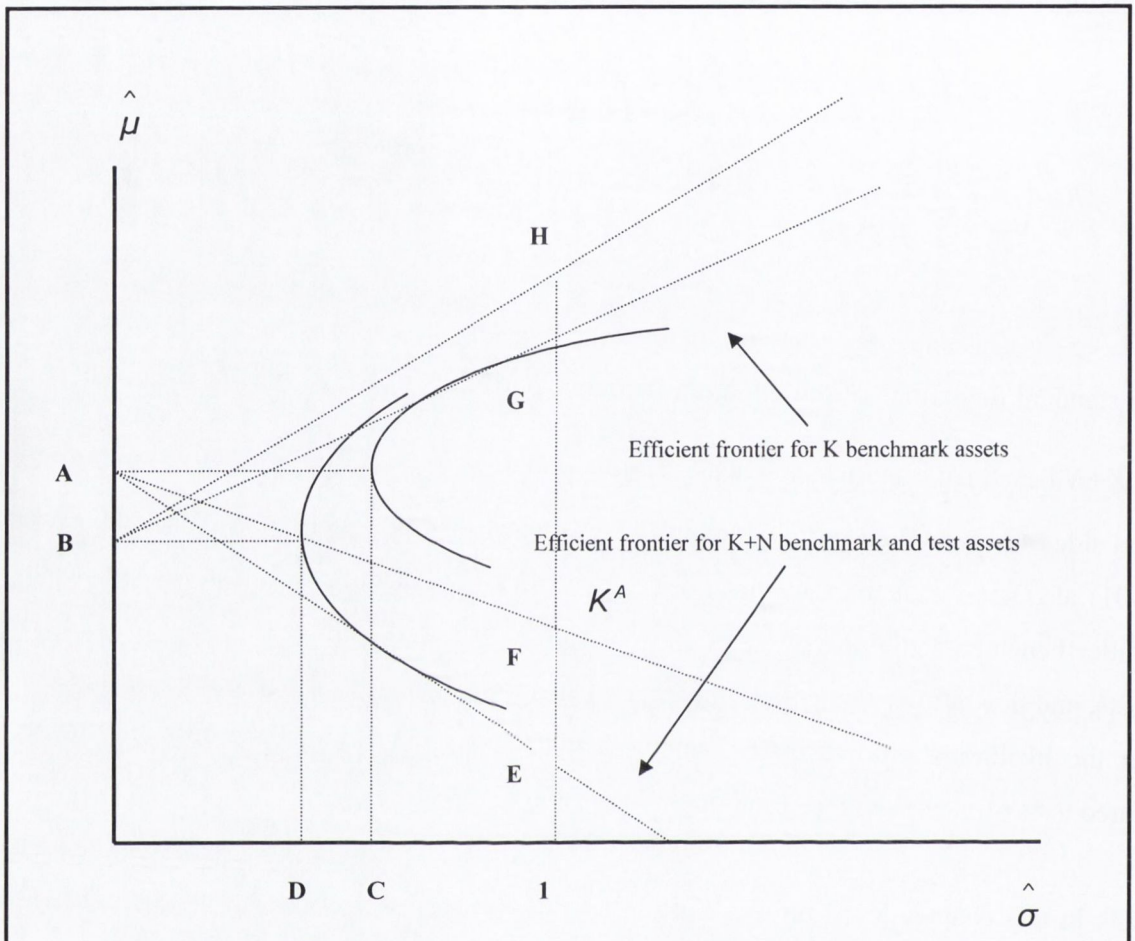
$$F = \left(\frac{T-K-N}{N}\right)\left(U^{-\frac{1}{2}} - 1\right) = \left(\frac{T-K-N}{N}\right)\left[\left(\frac{\sqrt{\hat{c}_{K+N}}}{\sqrt{\hat{c}_K}}\right)\left(\frac{\sqrt{1+\frac{\hat{d}_{K+N}}{\hat{c}_{K+N}}}}{\sqrt{1+\frac{\hat{d}_K}{\hat{c}_K}}}\right) - 1\right] \tag{4.8}$$

The standard deviations of the minimum variance portfolios of the K benchmark assets and the $K+N$ benchmark and test assets are $1/\sqrt{\hat{c}_K}$ and $1/\sqrt{\hat{c}_{K+N}}$, so the first ratio on the right hand side of (4.8) is their ratio, which is always greater than or equal to one. Kan and Zhou (2001) also show that the second ratio is the length of the asymptote to the $K+N$ efficient frontier benchmark divided by its equivalent to the restricted frontier of the K benchmark assets, and this ratio is also greater than one. Diagrammatically, Kan and Zhou (2001) show that the likelihood ratio test, the Wald test and the Lagrange multiplier test are closely related tests of mean variance spanning as shown in Figure 4.1.

Tests in this chapter focus on the Wald test for the case of $N = 1$. Kan and Zhou (2001) show that although the power of the three spanning tests is difficult to gauge when $N > 1$, the likelihood ratio test is generally not the most powerful. They also show that for the case of $N = 1$, differences in the minimum variance portfolio are more important that differences in the tangent portfolio, and the Wald test is the most powerful of the three. Equation (4.4) is estimated using OLS and the $2n$ restrictions are tested using a Wald test. The distribution of the asymptotic Wald test statistic of the null hypothesis is:

$$W = T(\lambda_1 + \lambda_2) \sim \chi^2_{2n} \tag{4.9}$$

Figure 4.1
Testing for mean variance spanning



Notes. Derived from Kan and Zhou (2001). In this figure, the geometry of the likelihood ratio (LR) test, the Wald test and the Lagrange multiplier (LM) tests for spanning are as follows.

$$LR = \left(\frac{OC}{OD}\right)\left(\frac{BH}{AF}\right) - 1$$

$$WALD = \left(\frac{OC}{OD}\right)^2 - 1 + \left(\frac{AE}{AF}\right)^2 - 1$$

$$LM = 1 - \left(\frac{OD}{OC}\right)^2 + 1 - \left(\frac{BG}{BH}\right)^2$$

Kan and Zhou (2001) outline a procedure whereby mean-variance spanning tests can be decomposed into two parts: the spanning of the global minimum-variance portfolio and the spanning of the tangency portfolio. In this case, the Wald test statistic can be re-written as:

$$W = T\left(\frac{\left(\hat{\sigma}_{R_1}\right)^2}{\left(\hat{\sigma}_R\right)^2} - 1\right) + T\left(\frac{1+\hat{\theta}_R\left(R_1^{GMV}\right)^2}{1+\hat{\theta}_{R_1}\left(R_1^{GMV}\right)^2} - 1\right) \tag{4.10}$$

where $(\hat{\sigma}_{R1})^2$ and $(\hat{\sigma}_R)^2$ are the global minimum-variance of the benchmark assets and benchmark plus the extended assets respectively. $\hat{\theta}_{R1}(R_1^{GMV})$ is the slope of the asymptote of the mean-variance frontier for the benchmark assets, and $\hat{\theta}_R(R_1^{GMV})$ is the slope of the tangency line of the mean-variance frontier for the benchmark portfolio plus the extended set (based on the return of global minimum-variance portfolio for the benchmark assets, R_1^{GMV}). The first term measures the change of the global minimum-variance portfolios due to the addition of the new asset. The second term measures whether there is an improvement of the squared tangency slope when the extended set of assets is added to the benchmark asset.

Kan and Zhou (2001) show that the asymptotic tests have very good power for test assets that can reduce the variance of the global minimum-variance portfolio, but have little power against test assets that can only improve the tangency portfolio. They therefore suggest a step-down procedure, whereby they first test $\alpha = 0_n$ and then test $\delta = 0_n$ conditional on $\alpha = 0_n$. The step-down asymptotic Wald tests can then be written as:

$$\begin{aligned} W_1 &= T(\lambda_3) \sim \chi_n^2, \\ W_2 &= T(\lambda_4) \sim \chi_n^2 \end{aligned} \tag{4.11}$$

If the hypothesis is rejected due to the first test, the tangency portfolios are different, and if it is rejected due to the second test, the global minimum-variance portfolios are different.

The OLS tests above assume the error terms are normally distributed and homoskedastic. In order to test the robustness of this assumption, all tests are performed using the Generalised Method of Moments (GMM) approach. The GMM approach has the advantage that it does not require information on the exact distribution of the error terms. The following GMM Wald test is used:

$$W_a = T \times vec\left(\hat{\Theta}'\right)'\left[\left(A_T \otimes I_N\right)S_T\left(A_T' \otimes I_N\right)\right]^{-1} vec\left(\hat{\Theta}'\right) \sim \chi^2_{2N} \tag{4.12}$$

where the moment condition is

$$E[g_t] = E(X \otimes E) = 0_{n(1+k)}' \tag{4.13}$$

$$S_T = E[g_t' g_t] \tag{4.14}$$

$$A_T = \begin{bmatrix} 1+\hat{a}_1 & -\hat{\mu}_1' \hat{V}_{11}^{-1} \\ \hat{b}_1 & -1_k' \hat{V}_{11}^{-1} \end{bmatrix} \tag{4.15}$$

Step-down GMM Wald tests to disentangle the two sources of spanning are also conducted. The step-down GMM Wald test statistics are distributed as chi-square with N degrees of freedom.

The null hypothesis is that the mean variance portfolio frontiers coincide at all points. If the null hypothesis of spanning is rejected, however, this does not provide information about the magnitude of the shift in the efficiency frontier. The economic significance of the diversification benefits is measured using changes in the Sharpe (1966) ratio of the optimal portfolios. The Sharpe ratio for the mean-variance efficient portfolio is calculated based on the K benchmark assets (and a risk-free asset) and the Sharpe ratio for the mean variance efficient portfolio based on all $K + N$ assets (and a risk free asset), both in the case of frictionless markets and in the case of short selling constraints. The efficient portfolio is identified by solving the following maximisation problem:

$$Max\theta \equiv \frac{\overline{R_P} - R_f}{\sigma_P} = \sum_{i=1}^{N} x_i\left(\overline{R_i} - R_f\right) \Big/ \left[\sum_{i=1}^{N}\sum_{j=1}^{N} x_i x_j \sigma_{ij}\right]^{1/2} \tag{4.16}$$

subject to $\sum_{i=1}^{N} x_i = 1$ (and $x_i > 0$ when short sales are not allowed)

where x_i = the fraction of the portfolio invested in the ith index,

$\overline{R_i}$ = the expected return on the ith index,

$\overline{R_P}$ = the expected return on the portfolio,

R_f = the risk-free rate,

σ_{ij} = the covariance of returns between the ith and jth index,

σ_P = the standard deviation of returns on the portfolio.

Note that θ in equation (4.16) is the ex ante Sharpe (1966) ratio. As shown by Tobin (1958), the composition of the tangency portfolio is independent of investors' preference structure. A difference between the Sharpe ratios of the benchmark and extended set assets indicates that investors can increase their risk-return trade off by investing in the *N* additional assets. If there is spanning, then there is no improvement in the Sharpe ratio possible by including the additional assets in the portfolio.

4.4 Results

Test 1: Conventional tests of the benefits of international portfolio diversification

As mentioned earlier, the most common approach to assessing the benefits of international diversification involves using the home market index as the benchmark, and examining the extent to which the addition of foreign market indices shifts the mean variance efficient frontier. This conventional approach is replicated here by using the home market index, R_m^i, as the benchmark portfolio in each country $i = 1\ldots7$, and the foreign market indices, R_m^j, ($j \neq i = 1\ldots7$) as the extended sets in the mean variance spanning tests. The vantage point of investors in each of the G7 countries is accounted for by converting all foreign assets to the

home currency. The mean variance spanning test equivalent to equation (4.4) takes the form as presented in equation (4.17).

$$R^{j}_{m,t} = \alpha^{i} + \beta^{i} R^{i}_{m,t} + \varepsilon^{i}_{m,t}, \quad \text{with } i \text{ and } j = \text{countries } 1 \ldots 7, \text{ and } j \neq i \qquad (4.17)$$

In this case, I define $\delta^{i} = 1_{N} - \beta^{i} 1_{K}$ and test the joint hypothesis that $a^{i} = \delta^{i} = 0_{N}$. Table 4.2 details the results from 42 (7 x 6) tests of whether each country's market index spans itself plus each of the other country's market indices, all converted to the home country's currency. The first three rows of the Table present the test results of whether the benchmark and extended portfolios are statistically different from each other, and the last four rows present the Sharpe ratios (multiplied by 100 for presentation purposes) to measure the economic significance of the differences. The first row of the Table shows the Wald test for mean variance spanning. The second and third rows present the Kan and Zhou (2001) step-down Wald tests of whether the tangency portfolio of the extended and benchmark assets are statistically different ($\alpha = 0$), and whether the minimum variance portfolios of the extended and benchmark assets are statistically different ($\beta = 1$). The fourth and fifth rows present the Sharpe ratios of the benchmark and extended portfolios, the sixth row presents the absolute change in the Sharpe ratios, and the final row presents the percentage increase in the Sharpe ratio. As expected, spanning is rejected in almost all cases (in 41 of the 42 tests), confirming that the benefits to international diversification are statistically significant in the data set. In all 41 tests where spanning is rejected, it is because the global minimum variance portfolios rather than the tangency portfolios differ significantly from each other. In all cases, therefore, the greatest diversification benefits are achieved at lower levels of risk. The GMM analysis confirms these results.

The final rows in Table 4.2 compare the diversification benefits from a portfolio of the home market index plus *all* foreign market indices to the home market index in each country. For each country, optimally weighted world portfolios, R^{W}, are formed by converting the foreign index returns to each home country's currency, and conducting seven additional tests as described in equation (4.18), in which the benchmark asset is each country's aggregate

Table 4.2
Test 1: Conventional tests of the benefits of international portfolio diversification

	Canada	France	Germany	Italy	Japan	UK	US
Canada							
Wald		324.62	516.29	171.62	835.42	233.90	134.23
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$		2.33	2.38	2.77	4.76	3.43	5.58
		(0.13)	(0.12)	(0.10)	(0.03)	(0.06)	(0.02)
$\beta = 1$		646.52	1029.55	340.20	1663.27	463.87	262.33
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark		1.7859	1.7797	1.1722	1.5393	1.4966	0.5634
SR Extended Set		3.4044	3.3901	3.4242	4.8474	5.0184	4.7730
SR Change		1.6186	1.6104	2.2520	3.3081	3.5218	4.2096
SR Change (%)		90.63	90.49	192.12	214.91	235.32	747.18
France							
Wald	292.97		308.18	10.10	573.59	5.59	259.41
	(0.00)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.00		0.14	0.47	1.41	1.25	1.22
	(0.98)		(0.71)	(0.50)	(0.24)	(0.26)	(0.27)
$\beta = 1$	586.20		616.47	19.74	1145.57	9.92	517.54
	(0.00)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	2.7853		1.7797	1.1722	1.5393	1.4966	0.5634
SR Extended Set	2.8284		1.8444	1.8060	2.9487	3.9093	2.0358
SR Change	0.0431		0.0647	0.6338	1.4094	2.4127	1.4725
SR Change (%)	1.55		3.64	54.07	91.56	161.21	261.36
Germany							
Wald	154.80	4.36		10.19	473.20	2.17	110.96
	(0.00)	(0.01)		(0.00)	(0.00)	(0.11)	(0.00)
$\alpha = 0$	0.00	0.07		0.47	1.36	1.00	1.12
	(0.96)	(0.79)		(0.49)	(0.24)	(0.32)	(0.29)
$\beta = 1$	309.75	8.65		19.92	944.89	3.35	220.78
	(0.00)	(0.00)		(0.00)	(0.00)	(0.07)	(0.00)
SR Benchmark	2.7853	1.7859		1.1722	1.5393	1.4966	0.5634
SR Extended Set	2.8205	1.8585		1.8088	2.9141	3.6894	2.0729
SR Change	0.0352	0.0727		0.6366	1.3747	2.1928	1.5196
SR Change (%)	1.26	4.07		54.31	89.31	146.52	269.72
Italy							
Wald	783.69	779.20	1295.05		794.63	396.57	716.30
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.00	0.03	0.11		0.95	0.42	0.93
	(0.95)	(0.85)	(0.74)		(0.33)	(0.51)	(0.33)
$\beta = 1$	1568.08	1559.04	2591.04		1588.35	792.92	1431.71
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
SR Benchmark	2.7853	1.7859	1.7797		1.5393	1.4966	0.5634
SR Extended Set	2.9152	1.7916	1.7810		2.5833	2.3178	1.5096
SR Change	0.1299	0.0057	0.0013		1.0440	0.8212	0.9462
SR Change (%)	4.66	0.32	0.07		67.82	54.87	167.94

Japan							
Wald	464.99	403.64	619.08	89.84		329.35	502.89
	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)
$\alpha = 0$	0.01	0.02	0.03	0.00		0.06	0.33
	(0.92)	(0.90)	(0.86)	(0.95)		(0.80)	(0.56)
$\beta = 1$	930.39	807.63	1238.68	179.76		658.92	1005.76
	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)
SR Benchmark	2.7853	1.7859	1.7797	1.1722		1.4966	0.5634
SR Extended Set	2.8940	1.7896	1.7806	1.1762		1.5827	0.8808
SR Change	0.1087	0.0038	0.0009	0.0040		0.0861	0.3174
SR Change (%)	3.90	0.21	0.05	0.34		5.75	56.34
UK							
Wald	471.46	216.67	534.08	93.73	807.44		441.58
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)
$\alpha = 0$	0.29	0.34	0.12	0.001	0.57		0.42
	(0.59)	(0.56)	(0.73)	(0.97)	(0.45)		(0.52)
$\beta = 1$	942.92	433.12	1068.46	187.55	1614.62		882.97
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)
SR Benchmark	2.7853	1.7859	1.7797	1.1722	1.5393		0.5634
SR Extended Set	3.2748	2.3505	2.1162	1.1838	2.2009		1.0279
SR Change	0.4895	0.5647	0.3303	0.0116	0.6616		0.4645
SR Change (%)	17.57	31.62	18.56	0.99	42.98		82.45
US							
Wald	200.62	340.58	492.81	208.60	969.47	264.42	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
$\alpha = 0$	1.79	0.04	0.07	0.01	0.42	0.01	
	(0.18)	(0.84)	(0.79)	(0.94)	(0.52)	(0.92)	
$\beta = 1$	399.31	681.40	985.95	417.39	1939.04	529.07	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
SR Benchmark	2.7853	1.7859	1.7797	1.1722	1.5393	1.4966	
SR Extended Set	4.2527	1.9547	2.0203	1.1857	2.0380	1.8622	
SR Change	1.4674	0.1688	0.2406	0.0135	0.4986	0.3656	
SR Change (%)	52.68	9.45	13.52	1.15	32.39	24.43	
World							
Wald	564.74	1241.20	1226.08	555.69	674.52	260.36	542.98
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	2.06	6.55	7.41	5.33	8.40	10.28	9.45
	(0.15)	(0.01)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)
$\beta = 1$	1126.90	2469.66	2437.71	1103.90	1336.18	508.23	1072.43
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	4.047	2.896	1.698	3.274	3.570	1.680	1.587
SR Extended Set	4.602	5.613	5.400	5.541	7.306	5.752	6.168
SR Change	0.555	2.717	3.702	2.267	3.736	4.072	4.580
SR Change (%)	13.72	93.81	218.07	69.25	104.64	242.44	288.54

Notes. This table shows the results from conventional international diversification tests. It reports the results for the OLS mean variance spanning tests when the local market index is used as the benchmark portfolio and the remaining G6 market indices are used as the extended sets, first individually and then as an optimally weighted 'world' portfolio. Short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries. The first row reports the F-statistic from the Wald test of the joint hypothesis that $\alpha = 0$ (the tangency portfolios coincide) and $\beta = 1$ (the minimum standard deviation portfolios coincide). The second and third rows report the results from the OLS step down Wald tests for each country. The p-values from each test are in parentheses. The fourth and fifth rows present the Sharpe ratios (SR) of the benchmark and extended portfolios, the sixth row presents the absolute change in the Sharpe ratios, and the final row presents the percentage increase in the Sharpe ratio. The Sharpe ratios are multiplied by 100 for presentation purposes.

market index and the test asset is an optimally weighted portfolio of the remaining six countries' market indexes converted to the home country's currency.

$$R_t^W = \alpha^i + \beta^i R_{m,t}^i + \varepsilon_{m,t}^i \quad \text{with } i = \text{countries } 1 \ldots 7. \tag{4.18}$$

As before, I define $\delta^i = 1_N - \beta^i 1_K$ and test the joint hypothesis that $a^i = \delta^i = 0_N$. The Wald tests indicate that spanning is rejected in all countries. The step-down Wald tests of $\beta = 1$ indicate that the minimum variance portfolios of the extended and benchmark assets are statistically different in every country, and the step-down Wald tests of $\alpha = 0$ indicate that the tangency portfolios are also statistically different in every country except Canada. The latter result is not surprising, because the Sharpe ratio of the benchmark domestic index in Canada, at 4.047, shows that this market performed by far the best amongst all countries over the sample period. The percentage increase in the Sharpe ratios vary from 13.72 percent for Canada to 288.54 percent for the United States, and they average 147 percent. Overall, therefore, the statistical and economic tests confirm that using conventional approaches to measuring the benefits of international diversification by comparing the performance of home market indexes with optimal portfolios of world market indexes reveals substantial and statistically significant benefits.

Test 2: A purer test of the benefits of international portfolio diversification

Domestic market indices are not truly domestic because they include many internationalised firms, so measuring the benefits of international diversification using market index data is biased. In this and the following two tests, 'cleaner' tests of the benefits from diversification are conducted by using home-based domestic firms as the benchmark. The extended set in this case, is an optimal portfolio of all (domestic, regional, trans-regional and global) firms in the other G6 countries. Mean variance spanning tests equivalent to equation (4.4) are performed as presented in equation (4.19).

$$R_{M,t}^j = \alpha^M + \beta^M R_{D,t}^i + \varepsilon_t^M \qquad (j \neq i = 1 \ldots 7) \tag{4.19}$$

and test the joint hypothesis that $a^h = \delta^h = 0_N$. The results of this test are presented in Table 4.3 which is formatted similarly to Table 4.2.

Panel A of Table 4.3 shows the results for the sales indices. The Wald tests indicate that spanning is rejected in all seven cases. Furthermore, the step-down Wald tests of $\alpha = 0$ and $\beta = 1$ indicate that both the tangency and the minimum variance portfolios of the extended sets are statistically different from the benchmark domestic firms in all cases. This is a strong result, confirming that a 'clean' test of the benefits of foreign-based firm-level diversification results in strongly significant statistical improvements in the efficient mean variance frontiers at all levels of risk. These differences are also economically significant. Moving from the benchmark of home-based domestic firms to all foreign-based (*D*, *R*, *T* and *G*) firms, the Sharpe ratios rise by 173.70 percent on average, ranging from 48.64 percent for France to 280.61 for Japan. These benefits are greater than the benefits in test 1 because *HID* is excluded in this test. Panel B shows that these results are closely replicated using subsidiary classifications. Spanning is again rejected in all seven cases, with Sharpe ratio increases ranging from 24.32 percent for Italy to 318.20 for the UK. This is a pure test of the benefits of international portfolio diversification. The next test investigates the benefits of *HID*, the difference between tests 1 and 2.

Test 3: The benefits of home-based international diversification (HID)

Test 3 investigates how investors in each country can gain international diversification benefits by investing only in home-based internationalised firms that range in their degrees of internationalisation from regional to global. After experimenting with various combinations, the extended sets presented here are optimal portfolios of home-based regional, trans-regional and global (*R*, *T* and *G*) firms. The following mean variance spanning tests equivalent to equation (4.4) are performed as presented in equation (4.20), and the joint hypothesis that $a^h = \delta^h = 0_N$ is tested.

Table 4.3
Test 2: A pure test of the benefits of international portfolio diversification

	Canada	France	Germany	Italy	Japan	UK	US
			Panel A: Sales Indices				
Wald	969.47	1195.83	8232.22	1428.77	1671.55	2878.38	1143.34
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	11.92	13.31	24.99	23.23	23.64	24.45	24.81
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\beta = 1$	1917.57	2365.20	16263.30	2806.14	3285.85	5672.25	2237.81
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	5.762	6.597	3.778	3.774	2.809	4.115	2.828
SR Extended Set	8.800	9.805	10.399	10.206	10.690	13.617	10.105
SR Change	3.038	3.208	6.620	6.433	7.881	9.502	7.277
SR Change (%)	52.72	48.64	175.23	170.47	280.61	230.89	257.34
			Panel B: Subsidiary Indices				
Wald	645.17	673.35	548.36	1379.26	2861.11	3476.01	385.96
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.98	11.76	17.75	12.58	21.98	20.87	22.03
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00
$\beta = 1$	1487.20	2456.76	1295.77	2084.99	3619.73	4298.54	1025.62
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.076	3.714	6.023	1.569	3.181	1.144	3.458
SR Extended Set	5.091	6.059	7.488	5.029	7.030	4.785	7.799
SR Change	2.015	2.345	1.465	3.459	3.849	3.641	4.341
SR Change (%)	65.50	63.14	24.32	220.42	121.00	318.20	125.53

Notes. This table shows the results for the mean variance spanning tests when the domestic index is used as the benchmark portfolio. The extended set is an optimally weighted portfolio all foreign listed firms. Firms are classified based on sales data in Panel A and subsidiary data in Panel B. Short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries. The first row reports the F-statistic from the Wald test of the joint hypothesis that $\alpha = 0$ and $\beta = 1$. Rows 2 and 3 then report the results from the step down Wald tests for each country. The p-values from each test are in parentheses. Subsequent rows show the increase in the Sharpe ratios of the optimal portfolios

$$R^i_{HID,t} = \alpha^i + \beta^i R^i_{D,t} + \varepsilon^i_t \qquad (4.20)$$

The results are presented in Table 4.4. Panel A details the results based on sales classifications and Panel B based on subsidiary classifications. The Wald tests indicate that spanning is rejected in all countries based on the sales categorisations. The step-down Wald tests of $\beta = 1$ indicate that the minimum variance portfolios of the extended sets of home-based regional, trans-regional and global firms are statistically different from the benchmark of domestic firms in all countries, and the step-down Wald tests of $\alpha = 0$ indicate that the tangency portfolios are statistically different in two countries; France and the United Kingdom. Moving from home-based domestic firms to home-based internationalised (R, T and G) firms, the percentage increase in the Sharpe ratios vary from 8.14 percent in Canada to 96.45 percent in Japan, with an average increase of 36.25 percent. Interestingly, the most internationalised firms are included in the optimal portfolios of *HID* in all countries. These results confirm that there are statistically and economically significant benefits to *HID* in every country. They are greatest in the United Kingdom, the United States, Italy and Japan, and they are smallest in Canada, Germany and France. Panel B shows that these results are closely replicated using the subsidiary classifications. The next test looks at *FID* and investigate the types of foreign-based firms that are leading to the large benefits in test 2.

Test 4: The benefits of foreign-based international diversification (FID)

This test focuses on *FID*, and asks how investors in each country can gain international diversification benefits by investing only in foreign firms that range in their degrees of internationalisation from domestic to global. The extended sets are an optimal portfolio of foreign-based domestic firms (classified from their sales in the foreign G6 countries) and an optimal portfolio of foreign-based internationalised (*R*, *T*, and *G*) firms in the foreign G6 countries. Two mean variance spanning tests equivalent to equation (4.4) are performed as presented in equations (4.21a) – (4.21b).

$$R^j_{D,t} = \alpha^D + \beta^D R^i_{D,t} + \varepsilon^D_t \qquad (j \neq i = 1 \ldots 7) \qquad (4.21a)$$

Table 4.4
Test 3: The benefits of home-based international diversification (HID)

	Canada	France	Germany	Italy	Japan	UK	US
			Panel A: Sales Indices				
Wald	439.50	718.08	2289.54	289.78	274.02	472.01	1.07
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.34)
$\alpha = 0$	1.93	5.11	1.46	1.37	1.25	4.15	0.72
	(0.17)	(0.02)	(0.23)	(0.24)	(0.26)	(0.04)	(0.40)
$\beta = 1$	876.70	1428.39	4576.65	578.10	546.74	938.54	1.42
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.23)
SR Benchmark	5.762	6.597	3.778	3.774	2.809	4.115	2.828
SR Extended Set	6.231	7.935	4.393	5.193	3.662	8.085	4.090
SR Change	0.469	1.338	0.615	1.419	0.854	3.970	1.262
SR Change (%)	8.14	20.29	16.28	37.62	30.39	96.45	44.61
			Panel B: Subsidiary Indices				
Wald	2265.62	794.68	419.37	459.46	92.41	2915.85	74.88
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	3.18	3.52	0.99	5.73	0.67	4.42	0.03
	(0.07)	(0.06)	(0.32)	(0.02)	(0.41)	(0.04)	(0.85)
$\beta = 1$	4523.62	1584.04	837.74	911.26	184.18	5818.30	149.78
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.076	3.714	6.023	1.569	3.181	1.144	3.458
SR Extended Set	4.418	5.127	6.345	4.944	3.639	3.461	4.327
SR Change	1.342	1.413	0.321	3.375	0.458	2.316	0.868
SR Change (%)	43.62	38.03	5.34	215.02	14.38	202.41	25.11

Notes. This Table shows the results for the OLS mean variance spanning tests when the domestic index is used as the benchmark portfolio and an optimally weighted portfolio of the remaining domestically listed indices (regional, trans-regional and global) are used as the extended sets. Firms are classified based on sales data in Panel A and subsidiary data in Panel B. Short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries. The first row reports the F-statistic from the Wald test of the joint hypothesis that $\alpha = 0$ and $\beta = 1$. Rows 2 and 3 then report the results from the step down Wald tests for each country. The p-values from each test are in parentheses. Subsequent rows report the results from the Sharpe ratio analysis.

$$R^{j}_{RTG,t} = \alpha^{RTG} + \beta^{RTG} R^{i}_{D,t} + \varepsilon^{RTG}_{t} \qquad (j \neq i = 1 \ldots 7) \tag{4.21b}$$

and test the joint hypothesis that $a^h = \delta^h = 0_N$.

The results are presented in Table 4.5. Panel A details the results based on the sales classifications. The Wald tests indicate that spanning is rejected in all 14 cases. Furthermore, the step-down Wald tests of $\alpha = 0$ and $\beta = 1$ indicate that both the tangency and the minimum variance portfolios of the extended sets are statistically different from the benchmark domestic firms in all cases. This is a very strong result, confirming that a 'clean' test of the benefits of foreign-based firm-level diversification results in strongly significant statistical improvements in the efficient mean variance frontiers at all levels of risk. These differences are also economically significant. Moving from the benchmark home-based domestic firms to foreign-based domestic (*D*) firms, the Sharpe ratios rise by 147.98 percent on average, ranging from 37.38 percent for Canada to 247.31 for Japan. Moving from the same benchmark of home-based domestic firms to foreign-based internationalised (*R*, *T* and *G*) firms, the Sharpe ratios rise by similar amounts; 142.33 percent on average, ranging from 36.23 percent for Canada to 242.44 for Japan.

Panel B of Table 4.5 shows that the subsidiary classifications produce similar results. Spanning is again rejected in all 14 tests. The step-down Wald tests indicate that both the tangency and the minimum variance portfolios of the extended sets are statistically different from the benchmark domestic firms in all cases. The Sharpe ratio tests show that the average increase in moving from home-based domestic firms to foreign-based domestic firms is 99.55 percent, ranging from 33.55 for Germany to 220.06 percent for the UK. The average increase in moving from home-based domestic firms to foreign-based internationalised firms is 91.44 percent, ranging from 16.81 percent for Germany to 195.94 for the UK. The fundamental insight remains, however, that from the viewpoint of investors in each country, internationalising over foreign-based domestic firms yields approximately equal benefits to diversifying over foreign-based internationalised firms. Putting this another way, in each G7 country, investors seeking *FID* can gain most of the benefits that are obtainable from

Table 4.5
Test 4: The benefits of foreign-based international diversification (FID)

	Canada	France	Germany	Italy	Japan	UK	US
Panel A: Sales Classifications							
Foreign-based D firms							
Wald	529.56	943.55	6193.66	1013.28	1276.88	2368.91	820.89
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	8.11	10.88	18.96	18.33	19.47	18.73	19.76
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\beta = 1$	1047.63	1867.90	12268.86	1992.64	2513.31	4681.64	87.15
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	5.762	6.597	3.778	3.774	2.809	4.115	2.828
SR Extended Set	7.916	9.184	9.217	9.255	9.755	12.321	9.144
SR Change	2.154	2.587	5.439	5.482	6.946	8.205	6.316
SR Change (%)	37.38	39.22	143.96	145.26	247.31	199.38	223.34
Foreign-based R, T and G firms							
Wald	837.25	941.17	6116.66	1025.62	1508.29	2243.01	997.55
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	8.30	10.12	17.78	14.75	18.90	19.81	19.03
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\beta = 1$	1660.72	1864.53	12123.68	2023.92	2973.62	4428.62	1960.11
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	5.762	6.597	3.778	3.774	2.809	4.115	2.828
SR Extended Set	7.850	9.013	8.956	8.404	9.618	12.613	8.902
SR Change	2.088	2.417	5.178	4.630	6.809	8.498	6.074
SR Change (%)	36.23	36.64	137.05	122.7	242.44	206.48	214.79
Panel B: Subsidiary Classifications							
Foreign-based D firms							
Wald	487.41	971.16	896.47	1038.78	1047.96	2045.83	1085.73
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	5.86	7.24	4.39	11.41	10.13	18.97	11.21
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\beta = 1$	1034.62	1147.66	1097.64	1998.77	1769.02	2055.92	1659.7
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.076	3.714	6.023	1.569	3.181	1.144	3.458
SR Extended Set	4.329	5.714	8.044	4.151	6.273	3.662	6.462
SR Change	1.253	2.000	2.021	2.582	3.092	2.518	3.004
SR Change (%)	40.72	53.86	33.55	164.59	97.22	220.06	86.86
Foreign-based R, T and G firms							
Wald	563.96	843.96	903.77	974.57	1136.78	1565.92	977.65
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	542.08	7.21	4.98	12.53	10.74	19.31	12.49
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\beta = 1$	998.98	1087.95	1011.11	1744.31	1632.07	1953.68	1549.44
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.076	3.714	6.023	1.569	3.181	1.144	3.458
SR Extended Set	4.217	5.753	7.036	3.871	6.182	3.386	6.722
SR Change	1.141	2.039	1.013	2.301	3.001	2.242	3.263
SR Change (%)	37.08	54.89	16.81	146.64	94.34	195.94	94.36

Notes. This table shows the results for the mean variance spanning tests when the domestic (D) firms are used as the benchmark portfolio. The extended sets are an optimally weighted portfolio of foreign listed domestic firms (from the remaining G6 countries) and an optimally weighted portfolio of foreign listed foreign firms (regional, trans-regional and global firms). Firms are classified based on sales data in Panel A and subsidiary data in Panel B. Short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries.

investing in an optimal portfolio of all foreign market indices from restricting their investment to a portfolio of foreign-based domestic firms.

Interestingly, Hughes, Logue and Sweeney (1975) eloquently articulated this more than 30 years ago.

> 'If international capital markets are perfectly integrated, if transactions costs are low, and if investors are rational and risk averse, then there are no diversification benefits inherent to multinational firms that could not be obtained by investors making direct portfolio investments in the countries in which the multinational firms would otherwise operate. That is, in the case of perfect financial market integration there is no systematic advantage to owning shares in a multinational firm versus holding shares in a number of *domestic firms in different countries*.' (p628-629, italics mine).

This result can be explained with an example from Table 4.5, which shows that a United States investor can avail of a Sharpe ratio of 2.83 percent on his/her portfolio of home-based domestic firms. By extending this to include foreign-based domestic (*D*) firms, he/she can raise the Sharpe ratio by 223 percent to 9.14 percent, and by a further 0.96 percent to 10.11 percent by investing in an efficient portfolio of all (*D, R, T* and *G*) foreign-based firms. The reasoning here is that the foreign-based internationalised firms, unlike the foreign-based domestic firms, are likely to have exposures back to the United States, so including them does not yield significantly more diversification benefits to those available from investing in foreign-based domestic (*D*) firms that are likely to be less correlated with the United States domestic firms.

Overall, the average *HID* across all countries, measured by the average percentage increase in the Sharpe ratios moving from home-based domestic firms to home-based internationalised firms, at 36.25 percent, is equal to one quarter of the 142.33 average percentage increase in the Sharpe ratios moving from home-based domestic firms to foreign-based internationalised firms, and it is equal to one fifth of the diversification benefits available from investing in the world portfolio. This explains a significant part of the observed home bias phenomenon.

Test 5: Do more internationalised firms provide greater diversification benefits?

The conventional tests reported in test 1 consider the benefits available to investors in one country who hold rights to the earnings of firms that are based in foreign countries – without considering the extent to which the foreign-based firms are themselves internationalised. This test uses my firm-level data to abstract from country effects and to focus instead on the degree of firm-level internationalisation. The 1,289 firms across all seven countries in the sample are combined, and used to form four market-value portfolios of all domestic, (*D*), regional (*R*), trans-regional (*T*) and global (*G*) firms. A series of mean variance spanning tests is performed on these portfolios of firms categorised by their levels of internationalisation. The objective is to discover whether, abstracting from country effects, firm-level internationalisation provides international diversification benefits. This is a novel test that, to my knowledge, has not been performed in prior research, and it is enabled and informed by my classification system for the degree of firm-level internationalisation. Results are converted to the home currencies of each country in the sample.

The market-value portfolios of all domestic R_D^W, regional R_R^W, trans-regional R_T^W, and global R_G^W, firms are formed as follows.

$$R_D^W = \sum_{k=1}^{K} \varsigma_D^k R_D^k \qquad R_R^W = \sum_{k=1}^{K} \varsigma_R^k R_R^k \qquad R_T^W = \sum_{k=1}^{K} \varsigma_T^k R_T^k \qquad R_G^W = \sum_{i=1}^{K} \varsigma_G^k R_G^k \qquad (4.22)$$

where ς_h^k is the market value-weighted share of type *h* firms in the world portfolio of type *h* firms, R_h^W, with $h = D, R, T$ and G.[4]

The benchmark for test 5 is the world portfolio of all domestic firms, R_D^W, and the method used here sequentially extends the test assets to the world portfolios of all regional, R_R^W, all

[4] It is worth noting that although the number of firms in each category is different, ie *K* differs across *h* in equation (4.22), I take this as understood and have not signalled it in order to preserve notational simplicity.

trans-regional, R_T^W, and all global firms, R_G^W. Three mean variance spanning tests equivalent to equation (4.4) are conducted as presented in equations (4.22a) – (4.22c).

$$R_{R,t}^W = \alpha^R + \beta^R R_{D,t}^W + \varepsilon_{m,t}^R \quad (4.22a)$$

$$R_{T,t}^W = \alpha^T + \beta^T R_{D,t}^W + \varepsilon_{m,t}^T \quad (4.22b)$$

$$R_{G,t}^W = \alpha^G + \beta^G R_{D,t}^W + \varepsilon_{m,t}^G \quad (4.22c)$$

In this case, I define $\delta^h = 1_N - \beta^h 1_K$ where $h = R$, T and G, and test the joint hypothesis that $a^i = \delta^i = 0_N$. The results of these tests are presented in Table 4.6.

The Wald tests indicate that spanning is rejected in all countries. The step-down Wald tests of $\beta = 1$ indicate that the minimum variance portfolios of the extended sets of regional, trans-regional and global firms are statistically different from the benchmark domestic firms regardless of what currency is used. In contrast to this, the step-down Wald tests of $\alpha = 0$ indicate that none of the tangency portfolios are statistically different. Moving from domestic firms to regional firms, the percentage increase in the Sharpe ratios vary from 1.91 percent when measured in Japanese yen to 39.47 percent using the Canadian dollar, with an average gain of 13.17 percent. Moving from domestic firms to trans-regional firms, the percentage increase in the Sharpe ratios are broadly similar, with an average gain of 7.58 percent. Moving from domestic firms to global firms, however, the results are more striking. The percentage increase in the Sharpe ratios vary from 29.40 percent when measured in Japanese yen to 159.59 percent using the Canadian dollar, with an average gain of 83.75 percent. Results from this test imply that more internationalised firms provide greater diversification benefits. Global firms provide the greatest increase in Sharpe ratios regardless of the currency in which the tests are conducted, and this is followed by regional and trans-regional firms, which are broadly similar. Overall, this is a strong result that shows how the degree of firm-level internationalisation provides diversification benefits when firms are combined across countries and classified by their degrees of internationalisation.

Table 4.6
Test 5: Do more internationalised firms provide greater diversification benefits? (Sales Classifications)

	Canada	France	Germany	Italy	Japan	UK	US
			Regional (R) firms				
Wald	66.83	43.27	43.27	43.27	22.49	41.55	79866.77
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.18	0.15	0.15	0.15	0.13	0.16	0.07
	(0.67)	(0.70)	(0.70)	(0.70)	(0.72)	(0.69)	(0.79)
$\beta = 1$	133.52	86.42	86.42	86.42	44.87	82.98	72.90
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	1.637	2.409	2.395	2.424	3.972	1.969	3.190
SR Change	0.463	0.208	0.211	0.205	0.074	0.321	0.091
SR Change (%)	39.47	9.46	9.67	9.25	1.91	19.51	2.92
			Trans-regional (T) firm				
Wald	95.01	53.20	53.20	53.20	60.38	61.67	77266.38
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.092	0.06	0.06	0.06	0.02	0.05	0.003
	(0.76)	(0.81)	(0.81)	(0.81)	(0.89)	(0.82)	(0.95)
$\beta = 1$	190.00	106.39	106.39	106.39	120.78	123.34	151.20
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	1.500	2.302	2.287	2.318	3.910	1.820	3.123
SR Change	0.326	0.101	0.103	0.099	0.012	0.172	0.024
SR Change (%)	27.76	4.59	4.71	4.47	0.31	10.45	0.79
			Global (G) firm				
Wald	99.78	105.09	105.09	105.09	42.62	94.17	104854.6
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	2.14	2.74	2.74	2.74	2.28	2.66	2.65
	(0.14)	(0.10)	(0.10)	(0.10)	(0.13)	(0.10)	(0.10)
$\beta = 1$	197.32	207.29	207.29	207.29	82.91	185.54	129.75
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	3.048	3.956	3.942	3.970	5.044	3.522	4.471
SR Change	1.874	1.755	1.758	1.751	1.146	1.875	1.372
SR Change (%)	159.59	79.73	80.5	78.93	29.4	113.82	44.26

Notes. This Table shows the results for mean variance spanning tests when the aggregate domestic index is used as the benchmark portfolio and the remaining aggregate indices are used as the extended sets. Firms are classified based on sales data and short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries. The Table reports the F-statistic from the Wald test of the joint hypothesis that $\alpha = 0$ and $\beta = 1$, and the results from the step down Wald tests for each country. The p-values from each test are in parentheses. It also details the increases in the Sharpe ratios of the optimal portfolios.

When firms are classified based on their subsidiary data, the Sharpe ratio tests confirm my original findings. Table 4.7 shows that the global subsidiary index (from all the G7 countries combined) is again the best performing index in all countries, followed in this case by the trans-regional and regional indices.

4.5 Robustness analysis

The results in this chapter show that there are benefits to both international and domestic diversification within the G7 countries and that global firms provide the greatest benefits. This section tests the robustness of these results under three broad headings. Section 4.5.1 investigates if global firms provide the greatest benefits because they are larger. Section 4.5.2 classifies all firms into four broad industrial sectors and tests the robustness of results to the industrial classification of firms. The mean variance spanning tests used throughout the analysis assume unlimited short sales are allowed. Section 4.5.3 tests the robustness of these results to the introduction of short sales constraints where only positive amounts of any index may be held.

4.5.1 Size of firms

The tests in this chapter show that global firms provide the greatest benefits to diversification. This sub-section investigates the robustness of this result to the size of firms. Table 4.8 details the size of each firm using 2005 sales figures, converted to US dollars. The average size of all firms across the G7 countries is $13,958 billions. Firms are segregated into two categories – small (sales below average) and large (sales above average), and mean variance spanning and Sharpe ratio tests are performed on both categories of firm. The hypothesis of spanning is rejected in all tests. The OLS step down results show that spanning is rejected because the global minimum variance portfolios (rather than the tangency portfolios) differ significantly from each other. The increase in the Sharpe ratios of the optimal portfolios are shown in Table 4.9, when domestic firms are used as the benchmark set and regional, trans-regional and global firms are used as the extended sets. These results confirm that global firms provide the greatest benefits to diversification for both large and small firms across all G7 countries. In all tests, global firms provide the greatest benefits

Table 4.7
Test 5: Do more internationalised firms provide greater diversification benefits? (Subsidiary Classifications)

	Canada	France	Germany	Italy	Japan	UK	US
			Regional (R) firms				
Wald	130.23	132.27	132.27	132.27	51.32	137.26	108.78
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.19	0.26	0.26	0.26	0.26	185.54	0.57
	(0.66)	(0.61)	(0.61)	(0.61)	(0.61)	(0.00)	(0.45)
$\beta = 1$	260.35	264.36	264.36	264.36	102.43	274.34	217.03
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	1.6714	2.8342	2.8143	2.8555	4.6838	2.2211	3.9984
SR Change	0.0955	0.1173	0.1162	0.1184	0.1223	0.0918	0.2036
SR Change (%)	6.06	4.32	4.31	4.33	2.68	4.31	5.37
			Trans-regional (T) firm				
Wald	5.72	1.74	1.74	1.74	0.41	0.21	0.45
	(0.00)	(0.18)	(0.18)	(0.18)	(0.66)	(0.81)	(0.64)
$\alpha = 0$	0.33	0.49	0.49	0.49	0.38	0.43	0.36
	(0.56)	(0.48)	(0.48)	(0.48)	(0.54)	(0.51)	(0.55)
$\beta = 1$	11.12	2.99	2.99	2.99	0.45	0.00	0.54
	(0.00)	(0.08)	(0.08)	(0.08)	(0.50)	(0.98)	(0.46)
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	2.0449	3.0818	3.0649	3.1000	4.7460	2.5421	4.0118
SR Change	0.4689	0.3649	0.3668	0.3629	0.1845	0.4128	0.2170
SR Change (%)	29.75	13.43	13.59	13.26	4.04	19.39	5.72
			Global (G) firm				
Wald	12.61	1.31	1.31	1.31	0.93	4.68	6.90
	(0.00)	(0.27)	(0.27)	(0.27)	(0.40)	(0.01)	(0.00)
$\alpha = 0$	0.82	0.95	0.95	0.95	0.91	0.87	0.70
	(0.37)	(0.33)	(0.33)	(0.33)	(0.34)	(0.35)	(0.40)
$\beta = 1$	24.40	1.67	1.67	1.67	0.95	8.50	13.10
	(0.00)	(0.20)	(0.20)	(0.20)	(0.33)	(0.00)	(0.00)
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	2.5776	3.4295	3.4148	3.4451	4.9942	2.9677	4.2282
SR Change	1.0016	0.7126	0.7168	0.7081	0.4326	0.8384	0.4334
SR Change (%)	63.55	26.23	26.57	25.87	9.48	39.37	11.42

Notes. This Table shows the results for mean variance spanning tests when the aggregate domestic index is used as the benchmark portfolio and the remaining aggregate indices are used as the extended sets. Firms are classified based on subsidiary data and short sales are allowed. Results are presented from the point of view of investors in each of the G7 countries. The Table reports the F-statistic from the Wald test of the joint hypothesis that $\alpha = 0$ and $\beta = 1$, and the results from the step down Wald tests for each country. The p-values from each test are in parentheses. It also details the increases in the Sharpe ratios of the optimal portfolios.

Table 4.8
Firm Size

	Canada	France	Germany	Italy	Japan	UK	US	Average
Average Size	7,940	14,674	15,425	5,142	14,479	23,941	16,106	13,958
Sales Indices								
Domestic	7,939	1,039	2,119	1,892	6,348	18,771	11,319	7,061
Regional	9,651	631		14,908		9,171	19,544	10,781
Trans-Regional	8,109	17,466	23,896	5,978	15,537	29,727	18,947	17,094
Global		39,279	28,898	14,334		20,466	21,220	24,839
Subsidiary Indices								
Domestic	1,825	9,086	1,936	4,263	8,352	10,648	9,961	6,582
Regional		10,182	3,520	1,519	4,526	4,841	13,160	6,291
Trans-Regional	9,300	18,627	15,834	7,794	11,132	18,153	14,654	13,642
Global	20,268	26,924	41,543	20,449	52,536	41,329	37,312	34,337

Notes. This Table shows the average size of firms in each index, measured using 2005 sales data. The first row shows the average size of firms in each market index. Subsequent rows show the average size of firms in each of the domestic, regional, trans-regional and global indices, categorised based on sales and subsidiaries. Columns are empty if no firms exist within that specific category. All figures are in billions of US dollars.

Table 4.9
Robustness Results – Size

	Regional		***Trans-Regional***		***Global***	
	Small	*Large*	*Small*	*Large*	*Small*	*Large*
Wald	109.7752	55.22361	10.90265	383.0202	39.63460	226.5338
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\alpha = 0$	0.883281	0.203241	0.049324	0.089260	1.920686	3.115529
	(0.3474)	(0.6522)	(0.8243)	(0.7651)	(0.1659)	(0.0777)
$\beta = 1$	218.6786	110.2837	21.76534	766.2665	77.31634	449.5223
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
SR Benchmark	0.033062	0.02653	0.033062	0.02653	0.033062	0.02653
SR Extended Set	0.037069	0.028806	0.033269	0.026584	0.043041	0.043077
SR Change	0.004007	0.002275	0.000207	0.000054	0.009979	0.016547
SR Change (%)	12.12	8.58	0.63	0.20	30.18	62.37

Notes. In this table, firms are first categorised as small or large based on their sales figures (in US dollars). The results from mean variance spanning (Wald) tests and Sharpe ratio tests are reported. The domestic sales index is used as the benchmark portfolio and the remaining indices (regional, trans-regional and global) are used as the extended sets. Short sales are allowed. Results are based on firms in all G7 countries combined and are presented from the point of view of US investors.

followed by regional firms and finally trans-regional firms. This confirms the previous results and suggests that results are robust to the size of firms.

4.5.2 Industrial analysis

This sub-section tests the robustness of results to the industrial classification of firms. Each firm in the sample is classified into one of four broad industries – Consumer Goods and Services, Energy and Utilities, Finance and Real Estate and Industrials. This categorisation follows Rowland and Tesar (2004), who use these four industrial categories as defined in Datastream. Panel A of Table 4.10 outlines the industrial structure of each of the seven market indices and Panel B details the industrial structure of the domestic, regional, trans-regional and global sales index in each country. Most firms in the sample (46%) are in the Consumer Goods and Services industry. The Energy and Utilities industry has the fewest firms overall and in all countries with the exception of Canada.

Table 4.11 details the results of mean variance spanning tests within each of the four industries. In all tests, the index of domestic firms is used as the benchmark set and the indices of regional, trans-regional and global firms are used as the extended sets. Tests are performed using aggregate indices combined across all seven countries (expressed in US dollars). The hypothesis of spanning is rejected in all twelve tests with one exception – tests in the Finance and Real Estate industry where domestic firms are used as the benchmark portfolio and global firms as the extended set. The OLS step down results reveal that in all tests where spanning is rejected, it is because the global minimum variance portfolios (rather than the tangency portfolios) differ significantly from each other. In the Energy and Utilities sector, regional firms also differ significantly from each other at the tangency portfolios. The increase in the Sharpe ratios of the optimal portfolios measures the economic significance of these benefits. Global firms provide the largest increase in three out of four industries (all industries with the exception of Energy and Utilities). These tests suggest that results are robust to the industrial classification of firms.

Table 4.10
Industrial Structure of Indices

	Consumer Goods and Services	Energy and Utilities	Finance and Real Estate	Industrials	Totals
		Panel A: Market Indices			
Canada	19 (32)	14 (23)	9 (15)	18 (30)	60
France	62 (52)	11 (9)	16 (13)	31 (26)	120
Germany	47 (43)	2 (2)	18 (16)	43 (39)	110
Italy	74 (43)	13 (7)	48 (28)	39 (22)	174
Japan	86 (38)	9 (4)	26 (12)	104 (46)	225
UK	44	13	26	19	100
US	265 (53)	65 (13)	90 (18)	80 (16)	500
Totals	594 (46)	127 (10)	235 (18)	333 (26)	1289
		Panel B: Sales Indices			
Canada					
Domestic	4 (50)	3 (38)		1 (12)	8
Regional	1 (20)	2 (40)		2 (40)	5
Trans-Regional	9 (27)	8 (25)	7 (21)	9 (27)	33
France					
Domestic			3 (100)		3
Regional	1 (33)		2 (67)		3
Trans-Regional	37 (54)	7 (10)	4 (6)	21 (30)	69
Global	2 (40)	1 (20)	2 (40)		5
Germany					
Domestic	2 (100)				2
Trans-Regional	23 (43)	2 (3)	6 (11)	23 (43)	54
Global	2 (33)		1 (17)	3 (50)	6
Italy					
Domestic	11 (28)	4 (10)	15 (37)	10 (25)	40
Regional	3 (43)		3 (43)	1 (14)	7
Trans-Regional	43 (52)	3 (4)	16 (20)	20 (24)	82
Global	3 (37)	3 (38)		2 (25)	8
Japan					
Domestic	11 (69)	2 (12)	1 (6)	2 (13)	16
Trans-Regional	51 (35)	2 (1)	8 (5)	86 (59)	147
UK					
Domestic	3 (60)		2 (40)		5
Regional	4 (80)	1 (20)			5
Trans-Regional	22 (37)	9 (15)	17 (29)	11 (19)	59
Global	4 (57)			3 (43)	7
US					
Domestic	55 (44)	23 (18)	38 (31)	9 (7)	125
Regional	5 (50)	2 (20)	1 (10)	2 (20)	10
Trans-Regional	170 (60)	29 (10)	25 (9)	59 (21)	283
Global	3 (30)	2 (20)	1 (10)	4 (40)	10
Totals					
Domestic	86 (43)	32 (16)	59 (30)	22 (11)	199
Regional	14 (47)	5 (17)	6 (20)	5 (16)	30
Trans-Regional	355 (49)	60 (8)	83 (11)	229 (32)	727

Global	14 (39)	6 (17)	4 (11)	12 (33)	36

Notes. This table shows the industrial structure of each index. Firms are classified into one of four industrial categories. Panel A shows the number (and percentage) of firms on each G7 market index falling into each industrial category. Panel B shows the industrial structure of domestic, regional, trans-regional and global indices in each country (classified based on sales data). Figures in parentheses represent percentages of totals.

Table 4.11
Robustness Results – Industrial Analysis

	Consumer Goods and Services	Energy and Utilities	Finance and Real Estate	Industrials
	Aggregate Regional			
Wald	186.59	219.62	221.01	83.98
	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.22	5.37	0.48	0.05
	(0.64)	(0.02)	(0.49)	(0.83)
$\beta = 1$	373.10	433.02	441.64	167.98
	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.0107	3.7199	1.7486	2.9590
SR Extended Set	3.2796	5.8682	2.0735	2.9690
SR Change	0.2689	2.1483	0.3249	0.0101
SR Change (%)	8.93	57.75	18.58	0.34
	Aggregate Trans-Regional			
Wald	494.50	193.22	88.94	579.37
	(0.00)	(0.00)	(0.00)	(0.00)
$\alpha = 0$	0.07	2.22	2.25	0.72
	(0.79)	(0.14)	(0.13)	(0.40)
$\beta = 1$	989.34	384.01	175.53	1158.18
	(0.00)	(0.00)	(0.00)	(0.00)
SR Benchmark	3.0107	3.7199	1.7486	2.9590
SR Extended Set	3.1913	4.6574	3.4392	3.2074
SR Change	0.1806	0.9375	1.6907	0.2484
SR Change (%)	6.00	25.20	96.69	8.39
	Aggregate Global			
Wald	442.03	193.38	1.29	219.77
	(0.00)	(0.00)	(0.27)	(0.00)
$\alpha = 0$	1.29	2.49	2.29	3.31
	(0.26)	(0.11)	(0.13)	(0.07)
$\beta = 1$	882.65	384.01	0.30	435.77
	(0.00)	(0.00)	(0.58)	(0.00)
SR Benchmark	3.0107	3.7199	1.7486	2.9590
SR Extended Set	3.5867	4.7726	3.6537	4.6010
SR Change	0.5760	1.0527	1.9051	1.6420
SR Change (%)	19.13	28.30	108.95	55.49

Notes. This table categorises firms into four broad industry sectors – Consumer Goods and Services, Energy and Utilities, Finance and Real Estate and Industrials. The aggregate domestic sales index is used as the benchmark portfolio and the remaining aggregate indices are used as the extended sets in each industry. Firms are classified based on sales data and short sales are allowed. Results are based on firms in all G7 countries combined and are presented from the point of view of US investors.

4.5.3 Short sales constraints

In this analysis, unlimited short selling is allowed on all indices. The robustness of this result is tested by re-running tests when short sales are not permitted. When short selling constraints are introduced, similar OLS regressions are used, but with inequality constraints. These tests follow the approach of De Roon, Nijman and Werker (2001). In the case of short selling constraints, the power of the spanning test may be low in small samples. 8.5 years of daily data are used in order to minimise these small sample problems. As Table 4.12 shows, the elimination of short sales does not impact significantly on results. Panel A shows that the aggregate global sales index remains the best performing index when short sales constraints are introduced. It is the only index with a non-zero increase in the Sharpe ratio. When short sales are allowed, the global subsidiary index is the best performing index. When short sales are not allowed, however, the regional subsidiary index is the only index with a non-zero increase in Sharpe ratio in all countries. This changes the earlier conclusion in that firms with global subsidiaries are the best performing only when short sales are permitted.

4.6 Summary and conclusions

This chapter uses firm-level rather than market-level data to provide a deeper analysis than has appeared in the literature to date, on the types of firms that provide diversification benefits within the G7 countries. Results confirm that there are benefits to international diversification and also find that there are benefits to domestic diversification. Previous studies focus on international portfolio diversification, without giving any consideration to the benefits of diversifying domestically. They use market indices or a sample of arbitrarily defined domestic firms to represent the domestic market. Results in this chapter show that domestic market indices are not truly domestic in that they contain firms with varying degrees of multinationality. They are therefore, not a suitable benchmark for international portfolio analysis. My categorisation of firms and use of firm-level data allows for the benefits of domestic diversification to be investigated. Results show that there are benefits to domestic diversification in all G7 countries. These domestic benefits provide an alternative justification for a home biased attitude to international investing. They introduce a new

Table 4.12
Robustness Results with Short Sales Constraints

	Canada	France	Germany	Italy	Japan	UK	US
			Panel A: Sales Classifications				
			Regional (R) firms				
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Change	0	0	0	0	0	0	0
SR Change (%)	0	0	0	0	0	0	0
			Trans-regional (T) firm				
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Change	0	0	0	0	0	0	0
SR Change (%)	0	0	0	0	0	0	0
			Global (G) firm				
SR Benchmark	1.174	2.201	2.184	2.219	3.898	1.647	3.099
SR Extended Set	2.871	3.854	3.838	3.871	5.043	3.372	4.471
SR Change	1.697	1.653	1.654	1.652	1.145	1.725	1.372
SR Change (%)	144.51	75.12	75.75	74.46	29.40	104.70	44.26
			Panel B: Subsidiary Classifications				
			Regional (R) firms				
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	1.6714	2.8342	2.8143	2.8555	4.6838	2.221127	3.9984
SR Change	0.0955	0.1173	0.1162	0.1184	0.1223	0.091823	0.2036
SR Change (%)	6.06	4.32	4.31	4.33	2.68	4.31	5.37
			Trans-regional (T) firm				
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Change	0	0	0	0	0	0	0
SR Change (%)	0	0	0	0	0	0	0
			Global (G) firm				
SR Benchmark	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Extended Set	1.5760	2.7169	2.6981	2.7371	4.5615	2.1293	3.7948
SR Change	0	0	0	0	0	0	0
SR Change (%)	0	0	0	0	0	0	0

Notes. This Table shows the results from the Sharpe ratio tests when the aggregate domestic index is used as the benchmark portfolio and the remaining aggregate indices are used as the extended sets. Firms are classified based on sales data in Panel A and subsidiary data in Panel B. Short sales are not allowed. Results are presented from the point of view of investors in each of the G7 countries. The table details the increases in the Sharpe ratios of the optimal portfolios.

dimension to optimal portfolio analysis and provide a new avenue for future research in this area.

I further analyse the types of firms that provide diversification benefits. Results show that foreign-based domestic firms yield approximately equal diversification benefits to foreign-based internationalised firms in all G7 countries. Results also show that firms with increasing levels of internationalisation provide greater diversification benefits and that global firms provide the greatest benefits to diversification. This result is shown to be robust to the size and industrial classification of firms and to the introduction of short sales constraints. It demonstrates that when differences in firm-level internationalisation are considered, investors can exhibit home bias while reaping the benefits from international diversification. This analysis provides further support for the use of my matrix of multinationality outlined in Chapter 2.

Chapter 5

The International Exposure of Firms in Ireland

5.1 Introduction

Private equity portfolios can provide both direct and indirect international exposure. Investors gain direct exposure by investing in firms and assets in foreign markets, and they can indirectly gain exposure by investing in domestic assets that represent claims on foreign assets (such as country funds, American Deposit Receipts (ADRs) and multinational companies (MNCs)). This chapter again focuses on the international exposure provided by investing in MNCs. It investigates if the share prices of MNCs are influenced by the international location of their operations. In other words, if a firm has activities and investments in specified geographical regions throughout the world, will its share price be influenced by those regions? Evidence on this topic is sparse. Some results show that MNCs are influenced by foreign factors (Agmon and Lessard (1977), Cai and Warnock (2004)). Others find that firms are more influenced by the markets on which they are quoted than by the geographical dispersion of their operations (see, for example, Chan, Hahmad and Lau (2003), Grammig, Melvin and Schlag (2003)). These conflicting results may be partly due to inconsistencies in how researchers have classified firms in their empirical studies. This issue is of central importance to small open economies like Ireland that have many foreign headquartered firms.

In this chapter, I use the classification system outlined in Chapter 2 and applied in Chapters 3 and 4 to classify two samples of firms – the 66 firms quoted on the Irish stock market and the 100 largest firms in Ireland. I examine the relationship between the geographical breakdown of Irish firms' operations and the international factors to which they are exposed. I use two international market models – the traditional model based on domestic and world factors and an extended model that includes the 6 regions of the world as defined in my taxonomy of multinationality. Using daily firm-level data from 1 January 1999 to 31 December 2007, results show that the geographical distribution of firms' operations is not reflected in the share price of Irish firms, and that firms based in

Ireland are more influenced by the location of their headquarters than by the geographical breakdown of their activities.

My analysis makes several contributions to the literature. *First,* I provide a taxonomic classification of firms in Ireland using the classification system outlined in Chapter 2. This provides a deeper analysis than has appeared in the literature to date of the types of firm that provide international exposure to investors in Ireland. *Second,* the influence of the geographical distribution of operations on share prices has yet to be investigated for firms in Ireland. Previous research in this area focuses almost exclusively on the US market, and Ireland provides an ideal case to study a sample of firms with different international exposures and influences. *Third,* my analysis is extended beyond firms quoted on the Irish stock market to include the 100 largest firms in Ireland. This permits a comparison between firms quoted on the Irish market and firms located but not listed in Ireland. I also investigate the influence of the domestic market index (the *ISEQ* index) on both samples of firm. *Fourth,* following the existing literature, I use an international market model with a domestic and foreign (world) factor. I extend this traditional model and further disaggregate the foreign factor into the six geographical regions defined in my system. This provides a more detailed investigation into the international exposures of firms than has appeared in the literature to date.

Amongst my main findings are the following. *First*, when the two samples of firms – the 66 firms quoted on the Irish stock market and the 100 largest firms in Ireland – are compared, the large firms tend to be older and more geographically dispersed than the quoted firms. *Second,* the domestic market index, the *ISEQ* index, although influential on quoted Irish firms, influences only half of the largest firms in Ireland. This implies that the *ISEQ* index may not be a good barometer of the Irish corporate sector. This has far-reaching implications for all empirical research using the *ISEQ* index. *Third,* the world market portfolio does not influence quoted firms, but does influence the largest firms in Ireland, particularly those with foreign headquarters.

The remainder of this chapter is structured as follows. Section 5.2 categorises the two samples of Irish firms using the taxonomic classification system presented in Chapter 2. Section 5.3 outlines the dataset and describes the testing methodology. Empirical

findings are presented in Section 5.4. Finally, section 5.5 summarizes the main argument and draws together my conclusions.

5.2 A Taxonomy of the Irish Corporate Sector

In this section, I use the classification system outlined in Chapter 2 to classify two samples of Irish firms in 2005 – firms quoted on the Irish Stock Market (66 firms) and the 100 largest firms in Ireland, ranked by *The Irish Times*. *The Irish Times* list ranks firms operating in Ireland using annual sales. It uses global turnover for Irish firms and turnover under the control of managers based in Ireland for multinationals[1]. For brevity, I will refer to these two samples as the *ISEQ66* and *IT100* firms. Twenty-three *IT100* firms are quoted on the Irish stock market and, as a result, appear in both samples. The data set therefore contains 143 firms. Data on each firms' type, industry, age, size and location is obtained from Datastream, company websites and various internet sources. The Worldscope databank provides a geographical breakdown of firm's sales, assets, operating income, depreciation and capital expenditure. This data is taken from company accounts for the year end 31 December 2005 or as close to this date as possible. A geographical breakdown of each firm's subsidiaries is obtained from 'Who Owns Whom' 2005/06 by Dunn and Bradstreet Ltd.

The *first* criterion is firm type. All firms quoted on the Irish stock market are categorised as private listed firms. The *IT100* firms include six public firms (ESB, Bord Gais, An Post, CIE, Dublin Airport Authority and An Post National Lottery Company), 68 private listed firms and 26 private unlisted firms. The private listed firms include Allergan Pharmaceuticals, Analog Devices, Creative Labs Ireland, CRH, DCC, Dell, Hewlett Packard Ireland, Intel, Kerry, McInerney Holdings and Toyota Ireland. The private unlisted firms include BWG Group, Dunnes Stores, Gala, The Irish Dairy Board, Maxol Group, Musgrave, O'Flaherty Holdings and Quinn Group.

The *second* criterion is the firm's industry. Firms are classified using the Industry Classification Benchmark (ICB) system. The *ISEQ66* firms are spread over 10 industries: *basic materials* (5 firms), *consumer goods* (10 firms), *consumer services* (8 firms),

[1] *The Irish Times* List excludes financial firms. It ranks firms based on information from published accounts, individual firms and Company Registration Office filings.

financials (10 firms), *health care* (6 firms), *industrials* (12 firms), *oil and gas* (6 firms), *technology* (7 firms), *telecommunications* (1 firm) and *utilities* (1 firm). The *IT100* firms span 9 industries: *consumer goods* (17 firms), *consumer services* (28 firms), *financials* (1 firm)[2], *health care* (13 firms), *industrials* (13 firms), *oil and gas* (2 firms), *technology* (19 firms), *telecommunications* (5 firms) and *utilities* (2 firms). The majority of *ISEQ66* firms are classified as industrials while the *IT100* firms are more focussed on consumer goods and services and technology. The majority of firms in both samples are in manufacturing industries such as consumer goods and services, industrials and technology. This likely reflects the success of IDA Ireland's policy in attracting FDI in manufacturing to Ireland[3].

The *third* criterion is age. *ISEQ66* firms have incorporation dates ranging from 1783 (Waterford Wedgewood) to 2006 (Blackrock International), with an average incorporation date of 1964. Almost half the firms (49 percent – 26 firms) were incorporated between 1976 and 2000. The *IT100* firms have incorporation dates ranging from 1783 (Waterford Wedgewood) to 2000 (Tradesports, Stonehouse Marketing and Betdaq). The average incorporation date is 1938, suggesting that the largest firms in Ireland tend to be older than the quoted firms. This is likely because many are subsidiaries of large, well-established foreign firms.

The *fourth* criterion is size. Size is measured using 2005 sales data. The *ISEQ66* firms have sales levels ranging from €14.45 billion (CRH) to €0 (AGI Therapeutics, Glencar, Kenmare, Ormonde and Ovoca Gold). The average sales level for the 54 firms with available data is €1.34 billion. Sales figures for the *IT100* firms range from €14.45 billion (CRH) to €0.40 billion (John Player and Sons), with an average of €1.55 billion. These averages are relatively similar. *ISEQ66* firms are ranked using global sales figures, however, while the *IT100* firms are ranked on the basis of Irish sales. For comparison purposes, I rank the *IT100* firms using global sales figures. Data are available for 97 firms. When global sales are used, sales figures range from €244.92 billion (Topaz

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[2] *The Irish Times* list excludes financial firms but the ICB category 'Financials' includes insurance firms. The Quinn Group is therefore, classified under Financials.

[3] According to its website, IDA Ireland's strategy is based on a policy of attracting investors who are seeking locations for advanced manufacturing or office based activities which depend on highly skilled processes or are involved in high value added activities, such as ICT, knowledge based industries and biotechnology.

Energy, a subsidiary of Shell) to €0.41 billion (Elan Corporation). The average level of sales is €18.14 billion, much larger than the original figure.

The *fifth* criterion is location. Fifty-eight *ISEQ66* firms are headquartered in Ireland and 8 in the UK. The *IT100* firms have headquarters in 11 countries. The majority of firms (52) are headquartered in Ireland, 30 in the US and 8 in the UK. Firms are headquartered in 3 of the 6 geographical regions within my classification system – Europe (68 firms), North America (30 firms) and Asia (2 firms). These data reflect Ireland's strong position as an open economy. Almost half of the 100 largest firms in Ireland (48 percent) are headquartered outside Ireland. These data also suggest a dependency of the Irish economy on US firms, with 30 of the largest 100 firms and 5 of the largest 10 firms headquartered in the US. When the *IT100* firms are ranked based on Irish turnover, 9 of the top 25 firms are headquartered in the US. When the same firms are ranked based on global turnover, 14 out of the top 25 firms are headquartered in the US. The top 25 firms (based on global turnover) are all headquartered outside Ireland with the exception of CRH (ranked 25th). Irish firms make up 28 of the bottom 30 firms on this list (based on global turnover). This emphasises the dependency of the Irish economy on foreign, particularly US multinationals. It re-emphasises Ireland's strong position as a destination for foreign FDI and implies that domestic Irish firms have less economic impact than MNCs located in Ireland.

The *sixth* criterion is multinationality. Table 5.1 uses 6 variables to classify firms in terms of their multinationality – 5 accounting variables (sales, assets, income, capital expenditure and depreciation) and 1 non-accounting variable (subsidiaries). The classifications of the *ISEQ66* firms are presented in Panel A and the *IT100* firms in Panel B. Four *ISEQ66* firms are classified as domestic in their sales – CPL Resources, Newcourt Group, Oglesby & Butler and South Wharf. Two of these firms, CPL Resources and Oglesby & Butler, are domestic in the other 4 accounting variables[4]. These 4 firms are also domestic in their subsidiaries. No firm is classified as global in any variable. Six firms are classified as *T4* in their sales – Independent, Iona Technologies, Kerry, Kingspan, Trinity Biotech and Waterford Wedgewood. Firms classified as *T4* in the 4 remaining accounting variables are made up of these 6 firms with

[4] The other two firms do not provide a geographical analysis of the other variables in their accounts.

Table 5.1
The Multinationality of Irish Firms

	Sales	*Assets*	*Income*	*Capital Expenditure*	*Depreciation*	*Subsidiaries*
			Panel A: *ISEQ66* Firms			
D	4 (10)	2 (6)	2 (10)	2 (11)	2 (14)	11 (23)
R1	13 (32.5)	9 (30)	6 (32)	7 (39)	6 (44)	19 (40)
T2	12 (30)	8 (27)	5 (26)	4 (22)	2 (14)	10 (21)
T3	5 (12.5)	5 (17)	3 (16)	3 (17)	2 (14)	6 (12)
T4	6 (15)	6 (20)	3 (16)	2 (11)	2 (14)	1 (2)
T5	0	0	0	0	0	1 (2)
Total	40	30	19	18	14	48
			Panel B: *IT100* Firms			
D		2 (4)	5 (14)			4 (6)
R1	8 (12)	4 (7)	3 (8)	3 (18)	3 (20)	18 (25)
T2	21 (32)	20 (36)	18 (49)	5 (29)	4 (27)	11 (15)
T3	16 (24)	13 (24)	2 (5)	3 (18)	2 (13)	5 (7)
T4	13 (20)	9 (16)	6 (16)	5 (29)	3 (20)	7 (10)
T5	7 (11)	6 (11)	2 (5)	1 (6)	3 (20)	15 (21)
G	1 (1)	1 (2)	1 (3)	0	0	11 (16)
Total	66	55	37	17	15	71

Notes. This table details the number of firms in each category of multinationality for each of 6 variables in 2005 – 5 accounting variables and 1 non-accounting variable (subsidiaries). Panel A presents details for the *ISEQ66* firms and Panel B for the *IT100* firms in Ireland. The Total figures are the number of firms with available data. Figures in parenthesis are percentages.

less firms implying lack of reported data for that specific variable. Twenty-nine firms have information on more than 1 of the 5 accounting variables but only 2 of these firms do not classify all variables within the same category. This suggests that the geographical dispersion of accounting data is a function of the detail provided in the accounts. The majority of firms are classified as *R1* in all variables. Nineteen firms have subsidiaries only in Europe and are therefore classified as *R1*. Fourteen of these firms have subsidiaries in one other country – 11 have subsidiaries only in the UK – 4 have subsidiaries in 2 European countries and 1 firm, Greencore, has subsidiaries in 6 countries. Eleven firms are domestic in their subsidiaries[5]. At the other end of the spectrum, no firm has subsidiaries on a global scale. Kerry (classified as *T5*) and Waterford Wedgewood (classified as *T4*) are the most geographically dispersed firms in their subsidiaries. Only 1 firm, Independent News and Media, has subsidiaries in Africa. Two firms have subsidiaries in South America (CRH and Kerry). Four firms have subsidiaries in Oceania – Aminex, Datalex, Kerry and Waterford Wedgewood. Eight firms have subsidiaries in Asia, 15 have subsidiaries in North America and 24 have subsidiaries in Europe. In total, 32 firms have subsidiaries in the UK and, therefore, only 6 non-domestic firms do not have subsidiaries in the UK.

The *IT100* firms are classified in Panel B of Table 5.1. Most firms are classified as *T2* in their accounting variables. Only 1 firm (Associated British Foods) is global in its accounting data. No firm is domestic in its sales. Two firms have all domestic assets – Intel and EMC. Five firms are classified as domestic in their income – Analog Devices, IBM, Intel, Johnson & Johnson, and NCR. All firms with domestic variables are US firms and therefore, a domestic variable represents an activity that takes place entirely in the US market. Accounting data is available for 67 firms – 52 firms (78 percent) have the same classification for all variables, again implying that the geographical dispersion of accounting data is a function of the detail provided in the accounts. This point is emphasised by the fact that only 1 firm is classified as global using accounting data but 11 firms are classified as global using non-accounting data (subsidiaries). These 11 firms are headquartered in the US (8 firms), the UK (1 firm), Germany (1 firm) and Japan (1

[5] These firms are: Calyx Group, CPL Resources (6 subsidiaries), Donegal Creameries (7 subsidiaries), Eircom (1 subsidiary), Kenmare (1 subsidiary), Newcourt Group (2 subsidiaries), Norkom Group, Oglesby and Butler (5 subsidiaries), Petroceltic Intl, South Wharf (6 subsidiaries) and Thirdforce (3 subsidiaries).

firm). Four firms are classified as domestic in their subsidiaries – all 4 are headquartered in Ireland.

The multinationality of firms in Ireland is compared to the multinationality of firms in other countries in Table 5.2. In Chapter 3, all firms quoted on the following indices in the G7 countries are classified: the *FTSE* 100, the TSX 60, the SBF 120, the HDAX 110, the MIB-SGI 174, the Nikkei 225 and the S&P 500. In terms of the sales classifications, the *ISEQ* index has less domestic firms and more regional firms than the average G7 country. The *ISEQ* has more regional firms than any of the G7 indices, the lowest percentage of trans-regional firms of all indices and no global firms. Looking at the subsidiary classifications, the *ISEQ* has more firms classified as domestic and regional, and less firms classified as trans-regional compared to the average G7 market index. It is the only index with no global firms. These results imply that firms on the *ISEQ* index tend to be more regionally focussed and are less geographically dispersed than firms on the G7 market indices. This is not surprising given Ireland's size, and it lends credibility to my classification scheme.

The *IT100* firms, however, are more geographically dispersed than the *ISEQ66* firms. They have less domestic and regional firms and more trans-regional and global firms than the *ISEQ66* firms, in both sales and subsidiaries. When the *IT100* firms are compared to the largest firms worldwide (using the *Fortune 500* firms in 2005), Irish firms again tend to be more regional in their focus, in both sales and subsidiaries. Irish firms are categorised using my matrix of multinationality in Panel C of Table 5.2. In both samples, the majority of firms are classified as trans-regional in both their trading (sales) and investments (subsidiaries). *ISEQ*66 firms tend to be less multinational and are spread across 7 categories in the system. The *IT100* firms tend to be more multinational and are concentrated in 4 categories. The classifications in Panel C confirm the regional nature of Irish firms.

To further investigate the multinationality of Irish firms, the multinationality of the *IT100* firms is analysed within each of the first 5 categories in my classification system. The small number of firms within each category prevents this analysis being performed on the *ISEQ66* firms. The *IT100* firms include 26 private unlisted firms and 6 public firms.

Table 5.2
Taxonomic Classification of Firms

	ISEQ66	*IT100*	*G7 Firms*	*Fortune 500*
		Panel A: Sales		
D	**4 (10)**		**16**	**53 (14)**
R	**13 (32)**	**8 (12)**	**5**	**8 (2)**
T2	12 (30)	21 (32)	23	76 (20)
T3	5 (13)	16 (24)	19	70 (19)
T4	6 (15)	13 (20)	19	78 (21)
T5		7 (11)	14	61 (16)
T	**23 (58)**	**57 (87)**	**75**	**285 (76)**
G		**1 (1)**	**4**	**28 (8)**
Total	40	66	100	374
		Panel B: Subsidiaries		
D	**11 (23)**	**4 (6)**	**15**	**47 (10)**
R	**19 (40)**	**18 (25)**	**13**	**28 (6)**
T2	10 (21)	11(15)	17	55 (12)
T3	6 (12)	5 (7)	18	72 (16)
T4	1 (2)	7 (10)	14	64 (14)
T5	1 (2)	15 (21)	9	86 (19)
T	**18 (37)**	**38 (53)**	**58**	**277 (61)**
G		**11 (16)**	**14**	**103 (23)**
Total	48	71	100	455
		Panel C: Taxonomic Classification		
		Domestic Firms		
DT-DI	2 (6)		107 (11)	27 (8)
		Regional and Trans-regional Firms		
RT-DI	1 (3)		14 (1)	2 (1)
TT-DI	1 (3)		17 (2)	3 (1)
DT-RI			28 (3)	5 (2)
RT-RI	7 (19)	4 (7)	14 (1)	4 (1)
TT-RI	7 (19)	7 (13)	17 (2)	3 (1)
DT-TI			73 (7)	20 (6)
RT-TI	2 (6)		41 (4)	2 (1)
TT-TI	16 (44)	32 (58)	538 (53)	171 (49)
		Global Firms		
GT-DI			2 (0)	
GT-RI				
GT-TI			53 (5)	12 (3)
DT-GI			4 (0)	
RT-GI			4 (0)	
TT-GI		12 (22)	87 (9)	89 (25)
GT-GI			16 (2)	13 (4)
Total	36	55	1,015	351

Notes. This Table categorises 4 samples of firms using my classification system – the *ISEQ66* sample of quoted Irish firms, the *IT100* sample of the largest Irish firms, G7 firms and the *Fortune 500* firms. In Panels A and B, the left column lists the scale of the breadth of multinationality. The 4 main categories: domestic, regional, trans-regional and global appear in bold. Sub categories, where applicable, are also listed. Panel A shows the number of firms falling into each category in terms of their sales data and Panel B shows the subsidiary data classifications. Panel C classifies firms using my matrix of multinationality. Figures in parentheses are the percentage of firms in each category. The total figures represent the number of firms with available data.

Little data is available on the multinationality of these firms[6]. The 68 private listed firms are segregated into 2 groups – firms quoted on the Irish stock market (23 firms) and firms quoted only on foreign markets (45 firms). The majority of firms quoted on the Irish stock market are classified as *T2* (42 percent) in their sales and *R1* (43 percent) in their subsidiaries. Most foreign quoted firms are classified as *T3* (42 percent) in their sales and *T4* (38 percent) in their subsidiaries, suggesting that firms quoted on foreign markets are more geographically diverse than firms quoted on the Irish market. The data show few differences in the multinationality of firms between industries and exhibit little evidence of a relationship between age and multinationality. When firms are categorised based on size, the lack of data on smaller firms, particularly firms with sales under €0.5 billion becomes apparent. Larger Irish firms tend to be more geographically dispersed than smaller firms, most notably in their subsidiary data – all 12 global firms have sales above €5 billion. Finally, firms are segregated into 4 categories based on location – firms headquartered in Ireland (51 firms), the US (30 firms), the UK (9 firms) and other foreign markets (10 firms). The sales data show that the majority of Irish firms are classified as *T2* (40 percent), most US firms as *T3* and *T4* (both 38 percent), most UK firms as *T3* (50 percent) and the majority of other foreign firms as *T2* (43 percent). The majority of UK firms (40 percent) and other foreign firms (50 percent) are classified as global in their subsidiaries, most US firms are classified as *T4* (46 percent), but the majority of Irish firms are classified as *R1* (49 percent). This again suggests that Irish owned firms are geographically less dispersed than foreign owned firms located in Ireland. It also emphasises the importance of looking beyond the home *ISEQ* market index to get a true indication of the international exposure of the Irish corporate sector.

5.3 Data and Methodology

The previous section presented an in-depth analysis on the multinationality of Irish firms in order to provide the background for my investigation into the international factors influencing the Irish corporate sector. The literature investigating the factors that influence share prices is vast. A subset of this literature involves the development and use of international asset pricing models (IAPMs). These models investigate if share

[6] No accounting information is available on the geographical dispersion of the 6 public firms. Subsidiary data are available for 3 firms – 2 are classified as *R1* and 1 is classified as *T2*. Sales data are available for only 2 of the 26 private unlisted firms – both are classified as *T2*. No further accounting information is available for these 26 firms. Subsidiary data are available for 12 private unlisted firms – 2 are classified as domestic, 6 as *R1* and 4 as *T2*.

prices are influenced by a single world factor or if national (or other) factors also play a role. If share prices are determined by a single world factor, share price correlations should be higher, thereby reducing the benefits of international diversification. This may also imply that international capital markets are integrated. Hunter and Coggin (1990) suggest that world factors should lead to the stability of international correlations, but their results do not support this prediction. One of the first studies in this area was by Solnik (1974a). He derives an IAPM where the risk premium on any share above its domestic risk free rate is proportional to its international market risk (defined as the risk premium of the world market above a world bond rate).

$$\overline{R}_{j,t} - R_{j,t} = \beta_j\left(\overline{R}_{m,t} - R_{m,t}\right) + \varepsilon_t \qquad (5.1)$$

where $\overline{R}_{j,t}$ and $\overline{R}_{m,t}$ are the (realised) returns on share j and the world market portfolio respectively. $R_{j,t}$ is the interest rate on share j, in local currency, $R_{m,t}$ is the average interest rate in the world (with the same weights as the world market portfolio), β_j is the international systematic risk of share j, and ε_t is an error term, assumed to be a normal random variable with $E(\varepsilon_t) = 0$. He then empirically tests this relationship between a share's price and its level of international market risk (Solnik 1974b) using data from March 1966 to April 1971. His results support the IAPM suggesting that the international pricing of risk does exist. Further empirical investigation (with the same data set) by Solnik (1974c) on the international structure of share price returns, using three different pricing models (a single index model, a nationalistic model and a multi-index model[7]) led to the conclusion that domestic factors strongly influence returns, but returns also depend on international events – shares are priced according to both national and international risk levels. Lessard (1974) shows that share price returns should be specified using a multi-factor model where returns depend on national and world factors. He specifies his model using the following equation:

[7] The single index model assumes a share's return is a linear function of the return on the world market portfolio. The nationalistic model assumes that a share's return depends on a national factor, which, in turn, depends on a world factor. Finally, the multinational index model assumes that a share's return is influenced by both world and national factors.

$$\overline{R}_{j,t} = \alpha_j + \beta_j \overline{R}_{m,t} + \gamma_j \overline{R}_{i,t} + \varepsilon_t \qquad (5.2)$$

where α_j, β_j and γ_j are stable parameters for share j, $\overline{R}_{i,t}$ is a national factor and other variables are as defined previously.

The literature on investing in MNCs has been detailed in section 2.2 and section 4.2. Several papers investigating the benefits of investing in MNCs examine the relationship between share price behaviour and the extent of international involvement of the firm using international pricing models similar to equation 5.2. (See, for example, Hughes, Logue and Sweeney (1975), Agmon and Lessard (1977) and, more recently, Cai and Warnock (2004)). These papers estimate an international market model with 2 components, a domestic factor and a foreign factor. I investigate the domestic and international factors influencing firms in Ireland. I first estimate an international market model similar to equation (5.2) with two components – a domestic factor and a foreign factor (the world market portfolio). I use daily firm-level data from 1 January 1999 to 31 December 2007. Firms with missing data are excluded from the analysis, leaving a sample of 37 quoted firms and 53 large firms[8].

There is no consensus within the literature on the appropriate world market portfolio to use. Agmon and Lessard (1977) use a 'rest of the world' index as their foreign factor, defined to be orthogonal to the US (domestic) market index[9], while Cai and Warnock (2004) use a foreign index with industry specific trade weights. These foreign factors, however, may not adequately capture the international exposure of each firm. A foreign factor based on market capitalisations, for example, is inappropriate for a particular firm if the distribution of its foreign operations across countries differs greatly from the distribution of world equity market capitalization. In the *FTSE* world index, for example, Latin America has a weighting of approximately 3 percent and Middle East and Africa has a weighting of approximately 2 percent. These indices would not likely uncover the

[8] In order to be included in the analysis, firms must have data available on their geographical classification in either sales or subsidiaries and returns for the entire sample period. Many firms did not have this full set of data available and therefore, the sample sizes are small.

[9] The world index is obtained by regressing the Capital International World index (a market-value weighted index of the major shares listed on 18 national stock markets) on the NYSE index and the residuals from this regression are used as the 'rest of the world' stock market index. This method, however, is inappropriate as it generates regressor problems.

foreign exposure of firms with substantial exposure to either of these regions. To overcome this, I use a market value weighted index composed of countries from the 6 geographical regions in my classification system. I will refer to this index as the *6-region* world index[10]. I also use the *FTSE* world index based on 49 countries as an alternative measure of the world market index and to test the robustness of my *6-region* index.

The second set of tests avoid using a world market portfolio, and instead use an index to represent each of the 6 geographical regions in my system. The following *FTSE* indices are available – Europe (euros), Asia Pacific (yen), North America (US dollars), Middle East and Africa (US dollars). The Datastream index for Australasia (US dollars) is used. No index is available in Datastream to represent South America. Indices are in local currencies if available. These indices are useful but do not adequately capture the entire geography of world markets. To overcome this limitation, I create individual indices to represent each region. These indices are market value weighted indices of the largest economies in each region. There are several ways to measure the size of economies. I use the World Bank Atlas method, which calculates the World Bank's official estimate of the size of economies each year, based on Gross National Income (GNI)[11]. The Atlas method measures GNI in US dollars but smoothes exchange rate fluctuations by using a 3-year moving average, price-adjusted conversion factor. The *World Development Indicators* database, compiled by the World Bank, ranks each country using total GNI. Using this ranking, the largest countries in each of the 6 regions are as follows:

Ranking	*Africa*	*Asia*	*Europe*	*North America*	*Oceania*	*South America*
1	South Africa	Japan	Germany	US	Australia	Brazil
2	Egypt	China	UK	Canada	New Zealand	Argentina
3	Algeria	India	France	Mexico	Papua New Guinea	Venezuela
4	Nigeria	Korea	Italy	Guatemala	Fiji	Colombia
5	Morocco	Russia	Spain	Dominican Rep.	Samoa	Chile

The following formula is used to calculate a daily market value weighted index to represent each of the six regions:

[10] Details on the calculation of this index are provided below.
[11] GNI figures include all production in the domestic economy (Gross Domestic Product (GDP)) plus the net flows of factor income (such as rents, profits, and labour income) from abroad.

$$IndexValue = \frac{\sum_{j=1}^{n} MV_{jt}}{\sum_{j=1}^{n} MV_{jb}} \times 100 \qquad (5.3)$$

where MV_{jt} is the market value of firm j at time t, MV_{jb} is the market value of firm j at the base year and n is the number of firms in the index. Market index data is not available for some countries – Algeria, Dominican Republic, Fiji, Guatemala, Nigeria, Papua New Guinea, Russia, Samoa and Venezuela. The regional indices are therefore, created based on the following number of countries – Africa (3), Asia (4), Europe (5), North America (3), Oceania (2) and South America (4) and the *6-region* world index is a market value weighted index of these 21 countries. For clarity, I will refer to these 6 regional indices as the *6-region* regional indices and the world index as the *6-region* world index. I use only available data for the 5 largest countries rather than using other, smaller countries to represent the regions as the remaining countries in some regions (particularly North America and Oceania) are small and unlikely to be significant in the representation of the region. All indices are calculated in local currencies and converted to euros. The following regression is estimated for each firm[12]:

$$\overline{R}_{j,t} = \alpha_j + \beta_j \overline{R}_{IR,t} + \sum_{k=1}^{6} \beta_j \overline{R}_{k,t} + \varepsilon_t \qquad (5.4)$$

where $\overline{R}_{j,t}$ is the return on each individual share, $\overline{R}_{IR,t}$ is the return on the *ISEQ* index and $\overline{R}_{k,t}$ is the return on the index for each region 1 to 6 within my classification system. I use an index for each region of the world rather than only the regions where sales and subsidiaries exist for each firm. This method is adopted as accounting (sales) data do not report all regions of the world, and it allows a comparison to be made as to whether the existence of sales and/or subsidiaries in a region implies that a firm is influenced by that region.

[12] Equation (5.4) was originally estimated with a domestic market index included for non-Irish firms. This method, however, led to problems of multi-collinearity, particularly for US firms. Equation (5.4), therefore, omits domestic market indices.

5.4 Empirical Results

5.4.1 Preliminary Analysis

Preliminary statistics on both samples of firms are presented in Table 5.3. Panel A lists the results for the *ISEQ66* firms and Panel B for the *IT100* firms. The first 3 rows of each panel present the average return, standard deviation and return to standard deviation ratio for each category of firm. Regional firms have the highest returns, and the best return: risk ratios in both samples (using both sales and subsidiary categorisations). The table also reports the average correlation of firms in each category with the *ISEQ* index and the 2 world indices. In the sample of *ISEQ66* firms, firms with trans-regional sales are the most highly correlated with both the *ISEQ* and world indices, firms with domestic sales are more highly correlated with world indices than with the *ISEQ* index, and firms with regional and trans-regional sales are more highly correlated with the *ISEQ* index than with world indices. The subsidiary data produce similar results. These results may be influenced by the fact that the *ISEQ* index contains more regional and trans-regional firms than domestic firms. The *ISEQ66* firms used in this analysis contain only 1 firm with domestic sales and only 3 firms with domestic subsidiaries which may also influence results. In the sample of *IT100* firms, regional firms (in both sales and subsidiaries) are the most highly correlated with the *ISEQ* index. Trans-regional sales indices and global subsidiary indices have the highest correlations with world indices. These results suggest that firms with greater breadths and depths of multinationality are more highly correlated with world factors in the sample of large (*IT100*) firms but not in the sample of quoted (*ISEQ66*) firms.

Preliminary statistics for the geographical indices used in the analysis are presented in Table 5.4. The table shows summary statistics for indices at world, regional, domestic and individual firm levels. The 2 world indices used in the analysis are the *FTSE* world index and the *6-region* world index. The *FTSE* world index is a market value weighted index of 49 countries – 3 from Africa, 17 from Asia, 19 from Europe, 3 from North America, 2 from Oceania and 5 from South America. My *6-region* world index is a market value weighted index of 21 countries – 3 from Africa, 4 from Asia, 5 from Europe, 3 from North America, 2 from Oceania and 4 from South America. The *6-region* world index has less weighting in Europe and Asia. The return per unit of risk for the *FTSE* world index is 0.891, compared to 1.229 for the *6-region* world index. The

Table 5.3
Preliminary Statistics for Irish Firms

	Sales Classifications				*Subsidiary Classifications*			
	Domestic	Regional	Trans-regional	Global	Domestic	Regional	Trans-regional	Global
			Panel A: *ISEQ66* Firms					
Return	-0.054	0.037	0.011		0.024	0.045	0.000	
Risk (S.D.)	4.267	3.195	2.437		3.643	2.912	2.957	
Return/Risk	-1.266	1.167	0.447		0.651	1.532	0.014	
Correlations:								
ISEQ	0.002	0.184	0.321		0.038	0.203	0.348	
FTSE world	0.025	0.086	0.166		0.042	0.104	0.177	
6-region	0.026	0.075	0.143		0.036	0.088	0.153	
			Panel B: *IT100* Firms					
Return		0.069	0.002	0.017		0.053	0.013	0.003
Risk (S.D.)		2.154	3.256	1.702		1.781	2.627	2.036
Return/Risk		3.208	0.071	1.005		2.966	0.491	0.133
Correlations:								
ISEQ		0.327	0.204	0.191		0.268	0.216	0.188
FTSE world		0.189	0.365	0.293		0.150	0.370	0.479
6-region		0.161	0.362	0.288		0.126	0.368	0.479

Notes. This table details preliminary statistics for the two samples of firms. Panel A lists statistics for the *ISEQ66* firms and Panel B for the *IT100* firms. The first 3 rows in each panel contain the average return, standard deviation (S.D.) and return: standard deviation ratio for each category of firm. Subsequent rows report the average correlation of firms in each category with the *ISEQ* index and the 2 world indices. In the sample of *ISEQ66* firms, the number of firms in each category is as follows: domestic sales (1), regional sales (11), trans-regional sales (17), domestic subsidiaries (3), regional subsidiaries (15), trans-regional subsidiaries (13). In the sample of *IT100* firms, the number of firms in each category is as follows: regional sales (3), trans-regional sales (46), global sales (1), regional subsidiaries (7), trans-regional subsidiaries (28) and global subsidiaries (11). Empty columns imply that there are no firms in that category.

Table 5.4
Preliminary Statistics for Geographical Indices

	Mean	*Standard Deviation*	*Maximum*	*Minimum*	*Return:Risk Ratio*
		World Indices			
FTSE World Index	0.009	1.021	5.380	-4.647	0.891
6-Region World Index	0.014	1.131	5.980	-5.210	1.229
		***FTSE* Regional Indices**			
FTSE Europe	0.013	1.103	5.733	-7.047	1.170
FTSE North America	0.001	1.283	6.343	-6.208	0.078
FTSE Asia Pacific	0.022	1.207	4.637	-7.116	1.856
FTSE Middle East & Africa	0.064	1.290	6.676	-8.729	4.971
Datastream Australasia	0.049	1.017	6.472	-6.666	4.777
		***6-Region* Regional Indices**			
6-Region Europe	0.017	1.198	6.175	-10.489	1.402
6-Region North America	0.006	1.293	6.342	-6.230	0.456
6-Region Asia	0.144	1.999	16.648	-11.732	7.183
6-Region Africa	0.058	1.821	39.011	-22.554	3.207
6-Region Oceania	0.051	1.131	9.825	-7.617	4.534
6-Region South America	0.078	1.948	16.597	-11.086	3.985
		Selected Domestic Indices			
ISEQ	0.014	1.071	4.775	-6.125	1.307
S&P 500	-0.002	1.299	6.396	-6.068	-0.139
FTSE 100	0.002	1.218	6.836	-6.354	0.189
		Individual Firms			
Average *ISEQ66* Firm	0.021	3.280	1.938	-1.938	0.652
Average *IT100* Firm	0.010	3.109	6.388	-8.419	0.306

Notes. This table presents preliminary statistics on the geographical indices used in the analysis. The first 2 rows detail the 2 world indices – the *FTSE* world index and the *6-Region* world index. The table then details return and risk characteristics for each regional index, selected domestic indices and average firm-level data for the samples of quoted and largest firms in Ireland. All figures are multiplied by 100 for presentation purposes.

correlation between the two world indices is 0.97. The *6-region* world index therefore, performs better than the *FTSE* world index but the high correlation between the two indices suggests that they capture similar phenomenon. Table 5.4 next compares the *FTSE* regional indices to the *6-region* regional indices. When 2 indices are available for a region, they both tend to have similar returns. The only exception is the Asian indices. The *FTSE* Asian index return is substantially lower than the *6-region* Asian index. The standard deviation of returns are again similar for most pairs of indices with 2 exceptions – the *6-region* Asian index has significantly higher standard deviation than the *FTSE* Asian index and the *6-region* African index has a substantially higher risk than the *FTSE* Middle East and Africa index. The table also includes preliminary statistics on the *ISEQ* index with the *FTSE 100* and the *S&P 500* included for comparison purposes. The *ISEQ* index out-performs both indices in the sample period. Finally, the table shows that, on average, the sample of quoted (*ISEQ66*) firms and the sample of large (*IT100*) firms had similar risk levels but quoted firms tend to have higher returns.

5.4.2 Empirical Results

The first set of tests is based on equation (5.2). The returns from each firm are regressed on the *ISEQ* index and a world index. The results for the *ISEQ66* firms are presented in Table 5.5. Results show that the *ISEQ* index is influential (at the 5 percent significance level) on 28 out of 31 *ISEQ66* firms for which data is available. It is not significantly influential on Aminex (classified as *X-T3* in its sales and subsidiaries), Donegal Creameries (classified as *T2-D*) and Oglesby and Butler (classified as *D-D*)[13]. The results from the *IT100* firms are presented in Table 5.6. Data is available for 50 *IT100* firms – 24 are headquartered in the US, 15 in Ireland, 6 in the UK, 2 in Germany and 1 in each of Spain, Netherlands and Japan. The *ISEQ* index is influential on 26 firms – all 15 Irish firms, 10 US firms and 1 German firm. The *ISEQ* index is only significantly influencing half of the largest firms in Ireland.

This has major implications for research as the domestic market index, used to represent Irish firms and the Irish economy in many empirical studies, may not be adequately capturing the activity in the Irish market. The *ISEQ* index is influencing quoted firms but

[13] The second set of tests detailed below, show that these 3 firms are not significantly influenced by any other region using either the *FTSE* or the *6-region* regional indices.

Table 5.5
International Market Model Results for *ISEQ66* Firms

	ISEQ	6-Region World
Abbey	0.245	-0.026
	(0.04)	(0.04)
AIB	1.113	0.044
	(0.03)	(0.03)
Aminex	0.060	-0.073
	(0.11)	(0.11)
Anglo Irish Bank	0.877	0.062
	(0.03)	(0.03)
Bank of Ireland	1.172	0.002
	(0.03)	(0.03)
CRH	0.941	-0.053
	(0.03)	(0.03)
DCC	0.401	-0.003
	(0.03)	(0.03)
Diageo	-0.001	0.002
	(0.02)	(0.02)
Donegal Creameries	0.065	0.032
	(0.05)	(0.05)
Dragon Oil	0.321	0.160
	(0.07)	(0.07)
Elan	2.520	-0.381
	(0.11)	(0.11)
FBD	0.221	-0.045
	(0.13)	(0.12)
Fyffes	0.363	0.014
	(0.05)	(0.05)
Glanbia	0.384	-0.080
	(0.06)	(0.05)
Glencar	0.346	0.214
	(0.22)	(0.21)
Grafton	0.540	-0.001
	(0.04)	(0.03)
Greencore	0.304	-0.018
	(0.04)	(0.03)
IAWS	0.277	0.027
	(0.03)	(0.03)
IFG	0.388	0.143
	(0.07)	(0.07)
Irish Life & Permanent	0.842	-0.002
	(0.03)	(0.03)
Indep. News & Media	0.678	-0.010
	(0.04)	(0.04)
Iona Technologies	1.010	0.471
	(0.12)	(0.11)
Irish Continental	0.298	-0.072
	(0.04)	(0.04)
Kenmare	0.265	0.092
	(0.09)	(0.09)
Kerry	0.315	0.004
	(0.02)	(0.02)
Kingspan	0.628	0.007
	(0.05)	(0.04)
McInerney	0.417	0.014
	(0.05)	(0.04)

Oglesby & Butler	-0.045	0.117
	(0.09)	(0.09)
Ovoca Gold	0.184	0.208
	(0.18)	(0.17)
Providence	0.497	-0.304
	(0.23)	(0.22)
Qualceram	0.212	-0.097
	(0.07)	(0.06)
Readymix	0.183	0.002
	(0.05)	(0.05)
Ryanair	0.979	0.138
	(0.05)	(0.04)
Tullow	0.377	-0.051
	(0.06)	(0.06)
United Drug	0.253	0.012
	(0.03)	(0.03)
UTV	0.148	-0.102
	(0.05)	(0.04)
Waterford	0.589	0.084
	(0.08)	(0.08)
Average Betas	0.496	0.014

Notes. This Table shows the results from Equation 5.2 for *ISEQ66* firms. It reports the coefficient for the *ISEQ* index and the *6-Region* world index for each firm. Figures in parentheses are the standard errors for each coefficient. The final row reports the average beta for all firms.

Table 5.6
International Market Model Results for *IT100* Firms

	ISEQ	6-Region World
Allergan	0.010	0.799
	(0.04)	(0.04)
Amdocs	-0.079	1.409
	(0.07)	(0.06)
Analog Devices	-0.435	2.032
	(0.06)	(0.06)
Apple	-0.477	1.592
	(0.07)	(0.06)
Associated British Foods	0.130	0.380
	(0.03)	(0.03)
Bayer	0.317	0.652
	(0.04)	(0.04)
Bristol-Myers Squibb	-0.070	0.905
	(0.04)	(0.04)
BT	0.305	0.766
	(0.05)	(0.04)
Celesio	0.210	0.226
	(0.04)	(0.04)
Coca-Cola	-0.136	0.655
	(0.03)	(0.03)
Conoco Phillips	0.000	0.727
	(0.03)	(0.03)
CRH	0.941	-0.053
	(0.03)	(0.03)
DCC	0.401	-0.003
	(0.03)	(0.03)
Dell Products	-0.359	1.622
	(0.05)	(0.05)
Diageo	0.208	0.341
	(0.03)	(0.03)
Eli Lilly	-0.023	0.766
	(0.04)	(0.04)
EMC	-0.316	1.935
	(0.06)	(0.06)
ExxonMobil	-0.100	0.835
	(0.03)	(0.03)
Forest Labs	-0.027	0.811
	(0.05)	(0.04)
Fyffes	0.363	0.014
	(0.05)	(0.05)
Glanbia	0.384	-0.080
	(0.06)	(0.05)
Glaxo SmithKline	0.238	0.547
	(0.03)	(0.03)
Grafton	0.540	-0.001
	(0.04)	(0.04)
Greencore Group	0.304	-0.018
	(0.04)	(0.03)
HP	-0.224	1.551
	(0.05)	(0.05)
IAWS	0.277	0.027
	(0.03)	(0.03)
IBM	-0.227	1.233
	(0.03)	(0.03)

Imperial Tobacco	0.129	0.311
	(0.03)	(0.03)
Independent	0.678	-0.010
	(0.04)	(0.04)
Intel	-0.391	1.887
	(0.05)	(0.05)
J&J	-0.132	0.712
	(0.03)	(0.03)
Kerry Group	0.315	0.004
	(0.02)	(0.02)
Kingspan Group	0.628	0.007
	(0.05)	(0.04)
McInerney Holdings	0.417	0.014
	(0.05)	(0.04)
Microsoft	-0.278	1.413
	(0.04)	(0.03)
NCR	-0.151	1.210
	(0.05)	(0.04)
Oracle	-0.505	1.928
	(0.06)	(0.06)
Pepsi Cola	-0.144	0.624
	(0.03)	(0.03)
Pfizer	-0.007	0.864
	(0.04)	(0.03)
Ryanair	0.979	0.138
	(0.05)	(0.04)
Symantec	-0.374	1.473
	(0.07)	(0.06)
Telefonica	0.390	0.679
	(0.04)	(0.03)
Tesco	0.241	0.363
	(0.04)	(0.03)
Topaz Energy	0.459	0.038
	(0.91)	(0.86)
Toyota	0.245	0.224
	(0.04)	(0.04)
United Drug	0.253	0.012
	(0.03)	(0.03)
Vodafone	0.440	0.838
	(0.05)	(0.04)
Waterford	0.589	0.084
	(0.08)	(0.08)
Wyeth Biopharma	-0.095	0.818
	(0.04)	(0.04)
Xilinx	-0.697	2.238
	(0.06)	(0.06)
Average Beta	-0.037	0.955

Notes. This Table shows the results from Equation 5.2 for *IT100* firms. It reports the coefficient for the *ISEQ* index and the *6-Region* world index for each firm. Figures in parentheses are the standard errors for each coefficient. The final row reports the average beta for all firms.

not large firms in Ireland. However, only 23 of the 100 largest firms in Ireland are quoted on the stock market. In addition, the *ISEQ* index, like any other market index, is not a domestic factor in the pure sense of the word. 10 percent of firms on the *ISEQ* index are classified as domestic in their sales and 23 percent as domestic in their subsidiaries. Furthermore, the *ISEQ* index may not be adequately capturing the true multinationality of the Irish corporate sector. Table 5.2 showed that the largest firms in Ireland (the *IT100* firms) are more geographically dispersed than quoted firms in Ireland (the *ISEQ66* firms). This implies that the *ISEQ* index is unlikely to be a good measure of the domestic economy and economic activity within the domestic market. These results suggest that Ireland's strong position as an open economy and in attracting FDI has resulted in the *ISEQ* index becoming a marginalised measure of the Irish corporate sector.

Tables 5.5 and 5.6 also report the influence of world indices on Irish firms. The *6-region* world index is significantly influential on 5 out of 31 *ISEQ66* firms – Anglo Irish Bank (*T2-T2*), Dragon Oil (*T1-R1*), Elan (*T3-T3*), Iona (*T4-T3*), and Ryanair (*R1-R1*)[14]. The *ISEQ66* firms most influenced by world factors are not the firms with greater breadth or depths of multinationality. These firms have little in common in terms of the other criteria within the classification system – they are not in similar industries or age categories, for example. They do, however, tend to be small in size (figures in brackets report 2005 sales figures) – Anglo Irish Bank (€2.36 bn), Dragon Oil (€0.20 bn), Elan (€0.40 bn), Iona (€0.05 bn) and Ryanair (€1.34 bn). The average sales level for *ISEQ66* firms is €1.34 billion. The *6-region* world index is significantly influential on 36 of the 50 largest firms in Ireland[15]. These 36 firms tend to have greater breadths of multinationality in both their sales and subsidiaries[16]. The *6-region* world index is not influential on 14 firms – 13 of these firms are headquartered in Ireland and quoted on the Irish stock market. This implies that the location of the firm's headquarters influences Irish firms' world exposure. World factors are not significantly influential on the majority of quoted Irish firms. This is as expected as Ireland is a small economy, not a world player. The world index, however, is significantly influential on most large firms

[14] The *FTSE* world index is significantly influential on 6 out of 31 quoted firms – Dragon Oil (*T1-R1*), Elan (*T3-T3*), Iona (*T4-T3*), Irish Continental (*R1-R1*), Providence (*R1-R1*) and Ryanair (*R1-R1*).
[15] The *FTSE* world index is significantly influential on the same 36 firms.
[16] The 36 firms influenced by world factors include (in terms of their sales) the 1 global firm, all 6 *T5* firms, 8 *T4* firms, 11 *T3* firms, 9 *T2* firms and 1 *R1* firm. With the subsidiary classifications, these 36 firms include all 12 global firms, 11 out of 12 firms classified as *T5*, 5 out of 6 *T4* firms, 3 out of 5 *T3* firms, 2 *T2* firms and 1 *R1* firm (data is not available for 3 firms).

in Ireland. Ireland attains its international exposure through foreign owned rather than domestic owned firms. Although Ireland is a small open economy, world factors are indirectly influencing firms in Ireland.

Tables 5.5 and 5.6 show that the *ISEQ* index is more influential than the *6-region* world index on all *ISEQ66* firms with 3 exceptions – Diageo, Oglesby and Butler and Ovoca. The average firm beta for the *ISEQ* index is 0.5 while the average firm beta for the *6-region* world index is 0.1. The opposite situation exists for *IT100* firms. The *6-region* world index is more influential on all *IT100* firms, with the exception of Topaz Energy, Toyota and Tullow Oil[17]. The average firm betas are -0.04 for the *ISEQ* index and 0.96 for the *6-region* world index, again confirming that *IT100* firms are more influenced by world rather than Irish factors.

The world market portfolio provides a general measure of international exposure. I provide a more in-depth investigation into the international exposure of firms by regressing each firm's return on the 6 regions from my classification system in equation (5.4). The results for the *ISEQ66* firms are presented in Table 5.7. The *ISEQ* index has the greatest influence on *ISEQ66* firms, followed by the Oceania index. Other regions are less influential. The dominant influence of the *ISEQ* index is highlighted by the fact that the beta on the *ISEQ* index is greater than the sum of the 6 regional betas for 31 of the 37 firms. The results for *IT100* firms are presented in Table 5.8. The influence of the *ISEQ* index on *IT100* firms is significantly weaker. The average betas show that North America and Europe have a greater influence on *IT100* firms than the *ISEQ* index. North America has the greatest influence with an average beta of 0.52. Other regions are less influential.

The regression results from equation (5.4) are compared to the taxonomic classification of firms in Table 5.9. Panel A details results for the *ISEQ66* firms and Panel B for the *IT100* firms. The table first lists the number of firms with sales and subsidiaries in each region. It also details the number of firms influenced by each regional index at the 5

[17] The *FTSE* world indices produce similar results. When the *FTSE* world index is used, the *ISEQ* index is more influential on all firms, with the exception of Oglesby and Butler and Ovoca. The *FTSE* world index is more influential than the *ISEQ* index on all *IT100* firms with 2 exceptions – Topaz Energy and Tullow Oil.

Table 5.7
***6-Region* Regression Results for *ISEQ66* Firms**

	ISEQ	Europe	North America	Asia	South America	Oceania	Africa	Sum 6 Regional Betas
Abbey	0.162	0.023	-0.104	-0.009	0.040	0.108	0.066	0.124
	(0.05)	(0.05)	(0.04)	(0.02)	(0.03)	(0.04)	(0.02)	
AIB	1.114	0.041	0.016	-0.015	0.014	-0.044	0.007	0.019
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Aminex	-0.077	0.199	-0.209	0.063	0.002	0.037	-0.001	0.091
	(0.13)	(0.14)	(0.11)	(0.06)	(0.07)	(0.11)	(0.07)	
Anglo Irish Bank	0.785	0.151	-0.058	0.017	0.017	0.049	0.007	0.183
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Bank of Ireland	1.187	0.050	0.000	-0.021	0.004	-0.069	-0.023	-0.058
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
CRH	0.896	0.032	-0.083	0.005	-0.001	0.041	0.025	0.020
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
DCC	0.368	-0.012	-0.024	-0.008	0.009	0.112	0.008	0.085
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Diageo	0.003	-0.005	0.013	0.024	-0.014	-0.003	-0.015	-0.001
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	
Donegal Creameries	0.087	-0.027	0.061	-0.013	-0.042	-0.021	0.055	0.013
	(0.05)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Dragon Oil	0.286	-0.069	0.102	0.085	0.011	0.180	-0.015	0.293
	(0.08)	(0.09)	(0.07)	(0.04)	(0.05)	(0.08)	(0.05)	
Elan	2.823	-0.314	0.063	-0.157	-0.109	-0.236	-0.093	-0.846
	(0.13)	(0.14)	(0.11)	(0.06)	(0.07)	(0.12)	(0.07)	
FBD	0.312	-0.312	0.030	0.104	0.082	-0.213	0.106	-0.203
	(0.15)	(0.15)	(0.12)	(0.07)	(0.08)	(0.13)	(0.08)	
Fyffes	0.300	0.016	-0.057	0.065	0.036	0.036	0.013	0.1110
	(0.06)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Glanbia	0.394	-0.021	-0.071	-0.017	0.047	-0.000	-0.048	-0.110
	(0.06)	(0.07)	(0.05)	(0.03)	(0.03)	(0.06)	(0.03)	
Glencar	0.192	0.479	-0.065	-0.146	0.010	0.052	0.032	0.362
	(0.26)	(0.27)	(0.22)	(0.13)	(0.14)	(0.23)	(0.14)	
Grafton	0.460	0.101	-0.107	-0.012	0.059	0.080	-0.012	0.110
	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
Greencore	0.267	-0.022	-0.047	0.046	0.022	0.040	0.013	0.052
	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
IAWS	0.250	0.019	-0.009	0.004	0.004	0.033	0.025	0.075
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
IFG	0.417	-0.043	0.159	0.035	-0.049	0.041	-0.000	0.143
	(0.08)	(0.09)	(0.07)	(0.04)	(0.04)	(0.07)	(0.04)	
Irish Life & Permanent	0.811	-0.014	-0.026	-0.020	0.014	0.080	0.041	0.074
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Independent	0.597	0.083	-0.115	0.012	0.075	0.051	-0.015	0.091
	(0.05)	(0.05)	(0.04)	(0.02)	(0.03)	(0.05)	(0.03)	
Iona Technologies	0.823	0.444	0.177	0.190	-0.112	0.031	-0.012	0.717
	(0.13)	(0.14)	(0.11)	(0.07)	(0.07)	(0.12)	(0.07)	
Irish Continental	0.262	-0.022	-0.063	0.046	-0.027	0.039	0.032	0.006
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	

Kenmare	0.149	0.112	-0.137	-0.025	0.172	0.104	0.009	0.235
	(0.11)	(0.11)	(0.09)	(0.05)	(0.06)	(0.10)	(0.06)	
Kerry	0.273	0.006	-0.043	0.043	0.025	0.040	0.000	0.072
	(0.03)	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	
Kingspan	0.541	0.037	-0.083	0.038	0.038	0.124	0.008	0.162
	(0.05)	(0.05)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
McInerney	0.408	-0.075	0.018	0.045	-0.007	0.054	0.033	0.067
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Oglesby & Butler	-0.041	0.031	0.114	0.029	-0.056	0.019	-0.005	0.131
	(0.10)	(0.11)	(0.09)	(0.05)	(0.06)	(0.09)	(0.06)	
Ovoca Gold	0.247	-0.078	0.297	0.052	-0.110	0.191	-0.119	0.233
	(0.20)	(0.21)	(0.17)	(0.10)	(0.11)	(0.18)	(0.11)	
Providence	0.451	-0.063	-0.359	-0.280	0.162	-0.047	0.303	-0.283
	(0.27)	(0.28)	(0.22)	(0.13)	(0.14)	(0.24)	(0.14)	
Qualceram	0.201	-0.210	-0.048	0.103	0.009	0.051	0.076	-0.020
	(0.07)	(0.08)	(0.06)	(0.04)	(0.04)	(0.07)	(0.04)	
Readymix	0.137	0.011	-0.033	0.056	-0.009	0.051	0.011	0.087
	(0.06)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Ryanair	0.849	0.267	-0.030	0.044	-0.013	0.085	-0.042	0.312
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Tullow	0.246	-0.097	-0.146	0.073	0.073	0.311	0.044	0.257
	(0.07)	(0.08)	(0.06)	(0.04)	(0.04)	(0.06)	(0.04)	
United Drug	0.226	-0.037	-0.015	0.022	0.019	0.062	0.029	0.080
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
UTV	0.184	-0.098	-0.022	-0.052	0.008	0.070	-0.023	-0.117
	(0.05)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Waterford	0.577	-0.092	0.064	0.050	0.019	0.031	0.067	0.138
	(0.09)	(0.10)	(0.08)	(0.05)	(0.05)	(0.08)	(0.05)	
Average betas	0.464	0.013	-0.023	0.013	0.011	0.042	0.016	0.073

Notes. This Table details the results from Equation 5.4. It reports the coefficient for the ISEQ index and each of 6 regional indices. Figures in parentheses are the standard errors for each coefficient. The right-hand column reports the sum of the betas for the 6 regions. The final row reports the average beta for all firms.

Table 5.8
6-Region Regression Results for *IT100* Firms

	ISEQ	Europe	North America	Asia	South America	Oceania	Africa	Sum 6 Regional Betas
Allergan	0.157	-0.036	0.737	-0.008	-0.035	-0.022	0.001	0.636
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
Amdocs	0.006	0.134	1.054	0.043	0.077	0.032	-0.018	1.322
	(0.08)	(0.08)	(0.06)	(0.04)	(0.04)	(0.07)	(0.04)	
Analog	-0.185	0.137	1.654	0.053	0.031	-0.139	-0.057	1.680
Devices	(0.07)	(0.07)	(0.06)	(0.03)	(0.04)	(0.06)	(0.04)	
Apple	-0.171	-0.317	1.460	0.028	0.089	0.130	-0.070	1.318
	(0.07)	(0.08)	(0.06)	(0.04)	(0.04)	(0.07)	(0.04)	
Associated	-0.039	0.541	0.041	-0.045	0.006	-0.002	-0.015	0.527
British Foods	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Bayer	0.031	0.869	0.078	-0.010	0.029	-0.051	-0.024	0.892
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
BristolMyers	0.071	0.031	0.788	-0.025	-0.003	0.015	-0.065	0.741
Squibb	(0.05)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
BT	-0.086	1.206	0.051	0.031	-0.044	-0.064	-0.075	1.104
	(0.05)	(0.05)	(0.04)	(0.02)	(0.03)	(0.04)	(0.03)	
Celesio	0.136	0.170	0.064	-0.055	0.039	0.127	-0.000	0.344
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
Coca-Cola	-0.005	-0.067	0.619	-0.021	-0.026	0.013	0.006	0.524
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Conoco	0.052	-0.016	0.547	-0.012	0.094	0.044	0.034	0.691
Phillips	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
CRH	0.896	0.032	-0.083	0.005	-0.001	0.041	0.025	0.020
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
DCC	0.368	-0.012	-0.024	-0.008	0.009	0.112	0.008	0.085
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Dell	-0.095	-0.062	1.427	0.021	-0.013	-0.027	-0.021	1.325
	(0.06)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Diageo	0.053	0.552	0.032	-0.067	-0.018	-0.020	-0.019	0.462
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Eli Lilly	0.163	-0.066	0.759	-0.071	-0.045	0.033	-0.043	0.567
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
EMC	-0.040	-0.018	1.665	0.026	-0.031	-0.002	0.000	1.641
	(0.07)	(0.08)	(0.06)	(0.03)	(0.04)	(0.06)	(0.04)	
ExxonMobil	-0.018	0.072	0.665	-0.031	0.031	0.011	-0.006	0.742
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Forest Labs	0.130	-0.096	0.729	-0.071	0.041	0.042	0.005	0.650
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Fyffes	0.300	0.016	-0.057	0.065	0.036	0.036	0.013	0.111
	(0.06)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
Glanbia	0.394	-0.021	-0.071	-0.017	0.047	-0.000	-0.048	-0.110
	(0.06)	(0.07)	(0.05)	(0.03)	(0.03)	(0.06)	(0.03)	
Glaxo	-0.002	0.811	0.077	-0.081	-0.018	0.018	-0.046	0.759
SmithKline	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Grafton	0.459	0.101	-0.106	-0.012	0.059	0.080	-0.012	0.109
	(0.04)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
Greencore	0.267	-0.022	-0.047	0.046	0.022	0.040	0.013	0.052
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)	
HP	-0.025	-0.025	1.337	0.041	-0.033	0.069	-0.009	1.379
	(0.06)	(0.06)	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	
IAWS	0.250	0.019	-0.009	0.004	0.004	0.033	0.025	0.075
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	

IBM	-0.058	0.022	1.046	-0.008	0.004	0.003	-0.023	1.045
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)	
Imperial	0.031	0.409	0.073	-0.091	0.012	0.023	-0.040	0.385
Tobacco	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)	
Independent	0.597	0.083	-0.115	0.012	0.075	0.051	-0.015	0.091
	(0.05)	(0.05)	(0.04)	(0.02)	(0.03)	(0.05)	(0.03)	
Intel	-0.081	-0.103	1.669	0.071	-0.019	-0.040	-0.035	1.543
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
J&J	-0.010	0.036	0.635	-0.024	-0.019	-0.005	-0.060	0.563
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Kerry	0.273	0.006	-0.043	0.043	0.025	0.040	0.000	0.072
	(0.03)	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	
Kingspan	0.541	0.037	-0.083	0.038	0.038	0.124	0.008	0.162
	(0.05)	(0.05)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
McInerney	0.408	-0.075	0.018	0.045	-0.007	0.054	0.033	0.067
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Microsoft	-0.015	-0.143	1.279	0.033	0.009	-0.036	-0.025	1.117
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)	
NCR	-0.006	0.043	1.020	0.047	-0.035	-0.022	-0.001	1.053
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Oracle	-0.170	-0.120	1.728	0.032	-0.026	-0.029	-0.029	1.557
	(0.07)	(0.07)	(0.05)	(0.03)	(0.04)	(0.06)	(0.04)	
Pepsi Cola	-0.011	0.003	0.564	-0.047	0.010	-0.079	-0.022	0.429
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Pfizer	0.150	-0.013	0.785	-0.034	-0.023	0.008	-0.035	0.688
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)	
Ryanair	0.849	0.267	-0.030	0.044	-0.013	0.085	-0.042	0.312
	(0.05)	(0.06)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	
Symantec	-0.162	-0.047	1.262	0.038	0.018	-0.018	-0.014	1.2383
	(0.08)	(0.08)	(0.06)	(0.04)	(0.04)	(0.07)	(0.04)	
Telefonica	-0.063	1.195	-0.112	0.041	0.065	-0.075	-0.034	1.080
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Tesco	0.067	0.561	0.029	-0.081	0.006	0.064	-0.047	0.533
	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Topaz	0.774	-0.251	0.237	-0.379	0.103	-0.152	-0.026	-0.467
	(1.05)	(1.11)	(0.87)	(0.51)	(0.56)	(0.93)	(0.56)	
Toyota	0.090	-0.066	0.057	0.214	0.034	0.288	0.054	0.581
	(0.05)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
United Drug	0.226	-0.037	-0.015	0.022	0.019	0.062	0.029	0.080
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	
Vodafone	-0.072	1.482	-0.067	0.045	-0.005	-0.126	-0.060	1.269
	(0.05)	(0.05)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	
Waterford	0.577	-0.092	0.064	0.050	0.019	0.031	0.067	0.138
	(0.09)	(0.10)	(0.08)	(0.05)	(0.05)	(0.08)	(0.05)	
Wyeth	0.105	-0.096	0.799	-0.025	-0.028	-0.044	-0.027	0.580
	(0.05)	(0.05)	(0.04)	(0.02)	(0.03)	(0.04)	(0.03)	
Xilinx	-0.324	-0.100	1.974	0.023	0.000	0.001	-0.075	1.823
	(0.07)	(0.08)	(0.06)	(0.04)	(0.04)	(0.06)	(0.04)	
Avg Betas	0.136	0.139	0.523	-0.001	0.012	0.015	-0.016	0.672

Notes. This Table details the results from Equation 5.4. It reports the coefficient for the ISEQ index and each of 6 regional indices. Figures in parentheses are the standard errors for each coefficient. The right-hand column reports the sum of the betas for the 6 regions. The final row reports the average beta for all firms.

Table 5.9
Regional Influences on Firms in Ireland

	Sales in each Region	Subsidiaries in each Region	Influenced by *6-region* Regional Index	Influenced by *FTSE* Regional Index
		Panel A: *ISEQ66* Firms		
Europe	29	31	7 (0, 0, 7)	10 (0, 0, 10)
North America	9	10	4 (0, 0, 1)	6 (0, 0, 2)
Asia	4	8	9 (1, 2, 1)	5 (0, 1, 1)
Oceania	1	3	9 (0, 0, 0)	7 (0, 0, 0)
Africa	1	1	3 (0, 0, 0)	5 (0, 0, 0)
South America	4	2	3 (0, 0, 0)	
Totals	*29*	*31*		
		Panel B: *IT100* Firms		
Europe	*45*	*46*	15 (0, 1, 14)	20 (3, 0, 17)
North America	*36*	*37*	31(1, 3, 25)	32 (2, 3, 26)
Asia	*23*	*33*	16 (1, 5, 5)	13 (1, 4, 5)
Oceania	*2*	*22*	11 (0, 3, 0)	11 (0, 5, 0)
Africa	*7*	*16*	7 (0, 2, 3)	12 (0, 3, 2)
South America	*16*	*28*	5 (0, 1, 2)	
Totals	*50*	*46*		

Notes. This table presents the results from Equation 5.4. Panel A presents results for *ISEQ66* firms and Panel B for *IT100* firms. The first 2 columns list the number of firms with sales and subsidiaries in each region. The second 2 columns list the number of firms significantly influenced by the regional index at the 5 percent significance level. The numbers in brackets represent the number of firm with sales, subsidiaries and both sales and subsidiaries in the region. For example, 9 quoted firms have sales in North America and 10 have subsidiaries there. 6 firms are influenced by the *FTSE* North American index. None of these 6 firms have only sales in North America, no firm has only subsidiaries in North America and 2 of these 6 firms have both sales and subsidiaries in North America.

percent significance level. The figures in brackets represent the number of firms influenced by the regional index that have only sales, only subsidiaries and both sales and subsidiaries in the region. Looking first at the *ISEQ66* firms, all firms have sales and subsidiaries in Europe but only 7 are significantly influenced by the *6-region* European index and only 10 by the *FTSE* Europe index. Nine firms have sales in North America and 10 firms have subsidiaries there. Four firms are significantly influenced by the *6-region* North American index but only one of these firms has sales and subsidiaries there. Six firms are significantly influenced by the *FTSE* North American index, two of which have both sales and subsidiaries there. The results are even more striking for Oceania, Africa and South America. None of the firms influenced by these regional indices have sales or subsidiaries there. These results suggest that the geographical location of sales and subsidiaries is not reflected in the share price of *ISEQ66* firms. Previous results show that 28 out of 31 quoted Irish firms are significantly influenced by the *ISEQ* index. These results suggest that quoted firms in Ireland are more influenced by the domestic market than the markets where they do business.

This result is confirmed for the *IT100* firms in Panel B of Table 5.9. North America is the exception in that most firms with sales and subsidiaries in North America are influenced by that region. This relationship is less evident in other regions. 45 firms have sales in Europe and 46 firms have subsidiaries there. Only 15 firms are significantly influenced by the *6-Region* European index – 14 of these 15 firms have both sales and subsidiaries in Europe and another 1 firm has subsidiaries there. Results for Oceania, Africa and South America are similar. In Oceania, for example, 11 firms are influenced by the *6-region* Oceania index but only 3 of these firms have subsidiaries there. 11 firms are influenced by the *FTSE* Australasia index but only 5 have subsidiaries there. Although the results are not as strong as for the *ISEQ66* firms, I confirm that the *IT100* firms are not influenced by the geographical location of their sales and subsidiaries. They are also not strongly influenced by the *ISEQ* index. They are, however, influenced by their home region. Within the sample of 50 *IT100* firms– 24 are headquartered in the US, 15 in Ireland, 6 in the UK, 2 in Germany and 1 in each of Spain, Netherlands and Japan. Both the *6-region* North American and the *FTSE* North American index are influential on all 24 US firms, both the *6-region* European and the *FTSE* European index are influential on all 6 UK firms, both German firms, the Spanish firm but not the Netherlands firm (this

firm is not significantly influenced by any region). The Japanese firm is significantly influenced by both Asian indices. The *ISEQ* index is influential on all 15 Irish firms. The *6-region* European and the *FTSE* European indices are not influential on 11 out of 15 Irish firms. In conclusion, results do not find support for the hypothesis that firms are influenced by the geographical location of their sales and subsidiaries but rather international exposure comes indirectly through the world market portfolio. These results are confirmed using both the *6-region* and the *FTSE* regional indices and for both samples of firms.

5.5 Summary and Conclusions

This chapter provides a taxonomic classification of 2 samples of firms in Ireland – the 66 firms quoted on the Irish stock market (*ISEQ66* firms) and the 100 largest firms in Ireland (*IT100* firms). Results show that the largest firms tend to be older and more geographically dispersed than quoted firms. The *ISEQ* index is influential on quoted Irish firms but on only half of the largest firms in Ireland. The world market index does not influence quoted firms, but does influence the largest firms, particularly those with foreign headquarters. Results show that the geographical location of firms' sales and subsidiaries is not reflected in the share price of firms. *IT100* firms are exposed to international influences. This exposure is obtained through the world market index rather than the regions where firms do business.

The results from this analysis imply that the *ISEQ* index is not a suitable barometer of domestic activity in the Irish economy. There are several reasons for this. Only 23 of the 100 largest firms in Ireland are quoted on the Irish stock market, the *ISEQ* index is influencing *ISEQ66* firms but only half of the *IT100* firms, and like other market indices, it is not a truly domestic factor in that it contains firms with various degrees of multinationality. Ireland is an open economy that attracts substantial amounts of FDI – 48 of the 100 largest firms have foreign headquarters – only 3 of these firms (Diageo, Tesco and Tullow Oil) are quoted on the Irish stock market. 26 of the 100 largest firms are private unlisted firms, suggesting that many large firms in Ireland tend not to be quoted on the stock market. As a result, the *ISEQ* index is an inadequate measure of domestic economic activity in Ireland. This has major implications for all empirical research using the *ISEQ* index. It emphasises the importance of looking beyond the

domestic market index to get a true indication of the international exposure of the Irish corporate sector.

Chapter 6
Conclusions, Limitations and Future Work

6.1 Introduction

The Multinational Corporation (MNC) is one of the most important concepts in IB and IF. MNCs are traditionally thought of as successful companies that have grown over time into large corporations that conduct their business across several countries. More recently, the high-tech boom of the 1990s and the growth of the world wide web have led to the emergence of born global or international new venture (INV) corporations that are possibly small in size, young in age, and that use available technologies to conduct their business on a global scale. The MNC as an entity is in a process of evolution that makes it difficult to define and classify. There is no commonly and widely agreed definition of what constitutes an MNC and no classification system for the many types of MNCs that exist.

The primary contribution of this thesis has been to develop a classification system that can be used to categorise firms for empirical analysis. This classification system forms the basis of a unique dataset used in this thesis. Three samples of firms are classified using the system – the *Fortune 500* list in 2005, the *G7 1289* firms and two samples of Irish firms (the *ISEQ66* firms and the *IT100* firms). The classification system has been used to provide an alternative perspective on three literatures in IB and IF. The first investigates whether firms are regional or global in their activities, the second focuses on explaining the home bias puzzle in international portfolio analysis, and the final question investigates if the geographical distribution of a firm's operations is reflected in the share price of firms.

This chapter provides some concluding comments on each topic and suggests some fertile paths for future research. It is structured as follows. Section 6.2 outlines the primary results and main findings from the thesis on a chapter by chapter basis. Section 6.3 discusses the limitations of the thesis and outlines possible avenues for future

research. Finally, section 6.4 provides a summary of the thesis's main findings and conclusions.

6.2 Main Findings and Literature Contributions

Chapter 2 highlighted the problem of ambiguity regarding the classification of MNCs in empirical samples. It documented the vast array of definitions used in papers using MNC samples in the *Journal of International Business Studies* (*JIBS*) between 1970 and 2007, and in three sample literatures in the area of international marketing, international business and international finance. These examples were used to highlight the wide range of differing definitions used and to motivate the development of a taxonomic classification system for firms. It then proceeded to detail the taxonomic classification system based on six high-level descriptors; *type* (public, private listed, private unlisted), *industry* (SIC codes), *age* (years, based on the date of incorporation), *size* (sales), *location* (country of headquarters), and the *degree of internationalisation* (the matrix of multinationality based on both the breadth and depth of operations across countries and regions). Finally, the chapter outlined the usefulness of the proposed taxonomy for theory building in IB.

The classification system was applied to the regionalisation/globalisation debate in Chapter 3. The question of whether firms are regional or global in their activities remains unanswered within the literature. I outlined the current debate, focussing on the work of Rugman and co-authors. Using mostly sales data, they argue that the world's largest firms (the *Fortune 500* list) are regional rather than global. This chapter added to the debate with an extended dataset (I use the *Fortune 500* and the *G7 1289* firms) and a new perspective (the matrix of multinationality). Both samples were categorised using the matrix of multinationality and shown to contain firms with varying degrees of multinationality, from purely domestic firms to fully global corporations. These results challenge the conclusions of Rugman and other regionalists. This challenge was mounted on the basis of an in-depth analysis of the regionalist's methodologies and a direct comparison between the two systems – the matrix of multinationality and the system used by Rugman and Verbeke (2004). I show that my classification system represents an improvement on the system used by Rugman and his co-authors because it encompasses

the entire geography of the world and therefore is more inclusive than the triad regions. It avoids using arbitrary percentage thresholds, and avoids relying solely on accounting data which fail to adequately capture the breadth of multinationality. I conclude that the conclusions drawn by Rugman in relation to global and regional strategy warrant further scrutinisation. Robustness tests using various geographical regions confirm that the six regions used within my classification system are the most appropriate.

The second application of my classification system was in the area of IF. The literature to date has not found a universally accepted explanation for the existence of a home biased attitude to international investing. In Chapter 4, I use the *G7 1289* dataset to investigate if investors can indirectly gain exposure to foreign markets by investing in MNCs, thereby justifying a home biased attitude. Using daily data from 1 January 1999 to 30 June 2007, and applying mean variance spanning and Sharpe ratio tests, I show that there are benefits to both domestic and international portfolio diversification. Results show that domestic market indices are not truly domestic in that they contain firms with varying degrees of multinationality. My categorisation of firms and use of firm-level data allows for the benefits of domestic diversification to be investigated. This topic has been neglected in previous studies. Results prove that domestic diversification benefits exist in all G7 countries. I further analyse the types of firms that provide diversification benefits. Foreign-based domestic firms yield approximately equal diversification benefits to foreign-based internationalised firms in all G7 countries. Results also reveal that firms with greater global reach provide greater diversification benefits and that global firms provide the greatest benefits to diversification. This result is shown to be robust to the size and industrial classification of firms and to the introduction of short sales constraints. I demonstrate that a home biased attitude may be justified as investors can gain international exposure by investing in domestically quoted firms.

The third and final application of the classification system was again in the area of IF. In Chapter 5, I investigate if the geographical distribution of operations is reflected in the share price of firms in Ireland. I provide a taxonomic classification of two samples of Irish firms – the 66 firms quoted on the Irish stock market (the *ISEQ66* firms) and the 100 largest firms in Ireland (the *IT100* firms). The *IT100* firms tend to be older, larger and more geographically dispersed than the *ISEQ66* firms. I use daily data from 1

January 1999 to 31 December 2007 and two international market models to investigate the international factors influencing Irish firms. The first model is the traditional two-factor market model with a domestic and a world factor. In the second model, I extend the traditional model to include a factor for each of the six geographical regions in my classification system. My analysis, therefore, uses a more comprehensive model and a more detailed dataset than previous studies. Results show that the *ISEQ* index is influential on quoted Irish firms but on only half of the largest firms in Ireland. The *ISEQ* index, therefore, may not be a suitable indicator of the Irish corporate sector. The world market portfolio does not influence *ISEQ66* firms but does influence *IT100* firms, particularly those with foreign headquarters. This implies that Ireland attains its international exposure through foreign owned rather than domestic owned firms. The geographical distribution of operations is not reflected in the share price of Irish firms, and firms based in Ireland that are headquartered abroad, are more influenced by the location of their headquarters than by the geographical distribution of their operations.

Overall, this thesis provides novel ways for IB and IF scholars to look at and analyse firm-level international exposures. It provides a classification system that allows for a more-indepth analysis of firms in general and MNCs in particular. This allows for a deeper analysis of many subject matters using a sample of MNCs in their empirical analysis. Three such literatures are used in this thesis that contain topics that remain to be resolved. This thesis uses the classification system to shed new light on the importance of empirical MNC samples and to provide a new perspective on each of these issues.

6.3 Limitations in Thesis and Future Work

In Chapter 2, I proposed a matrix of multinationality that can be used to classify firms in terms of their international involvement. This taxonomy can be used to provide clarity and a new perspective on numerous literatures involving empirical samples of MNCs. Section 2.2.1 identified three such literatures with unresolved issues concerning MNCs – whether standardised or localised marketing strategies work better for MNCs, if the extent of internationalisation affects the value of MNCs and if MNCs provide the benefits of international diversification. The system was used to provide a detailed analysis on the third question in Chapter 4. Future research can use the taxonomy to

provide a more detailed investigating into the remaining two questions in addition to further issues involving empirical samples of MNCs across a wide variety of subjects.

My analysis is limited in that it classifies firms at one point in time. In future research, the classification system can be used with longitudinal data to categorise firms over time. This will provide insightful new evidence on the evolution of firms and changing patterns of internationalisation. This will add to the regionalisation/globalisation debate in Chapter 3 as it introduces a time dimension into the analysis. When the taxonomy is applied to the *Fortune 500* firms in Chapter 3, results show that few firms have full regional penetration, and most are trans-regional. This is consistent with a pattern of internationalisation in which firms tend to move from being domestic, to operating in a small number of countries in their home region, and then on to other regions without first spreading more fully across their home region. Many firms, therefore, seem to skip broad regionalisation and proceed to trans-regionalisation. These patterns of internationalisation can be investigated further.

In the past, being large and multinational were synonymous, but now, with the emergence of born globals, being large is no longer a requirement for being multinational. My system can be used to investigate if large firms tend to be more multinational and how this relationship between size and multinationality has evolved. This will add a new dimension to the born global literature. This is related to the previous point in that it again investigates changing patterns of internationalisation over time. The previous case looks at how existing firms internationalise, while this case looks at how the internationalisation process has created new types of firms such as born globals. In both cases, my existing datasets can be extended to provide a more robust categorisation of firms and a more in-depth investigation into these issues than has appeared in the literature to date.

In Chapter 4, I investigate if investors can indirectly gain exposure to foreign markets by investing in MNCs, thereby justifying a home biased attitude to international investing. A possible extension to this analysis explores if the gains from international diversification can be achieved domestically for investors in each of the G7 countries. This involves extending the work of Errunza, Hogan and Hung (1999), who show that the gains from

international diversification for a US investor can be achieved without purchasing foreign shares. US investors can instead invest in domestic assets that represent claims on foreign assets such as MNCs, country funds and ADRs. Their MNC sample contains 30 US firms from the *Fortune* list. This analysis can be extended by using the G7 countries and a more robust sample of MNCs. The methodology used in this chapter also allows for the introduction of short sales constraints – Errunza, Hogan and Hung (1999) do not include short sales constraints in their analysis.

In Chapter 5, I show that the *ISEQ* index is not a good barometer of domestic economic activity in Ireland. Similarly, world indices do not adequately capture the entire geography of the world. I conclude that market indices may not be adequately capturing the phenomenon they are designed to measure. My classification system highlights this short-coming and goes some way to addressing the issue by using more geographically inclusive indices in the analysis. Future research can investigate how accurately market indices in other countries, such as the G7 countries, represent the domestic economy. This will have far reaching implications for the vast amount of research, across many areas in IB and IF that use market indices in their empirical analysis.

Firms located in Ireland tend not to be quoted on the Irish stock market – only 23 of the 100 largest firms in Ireland are quoted on the Irish stock market. Future research can investigate why this is the case. Firms located but not quoted in Ireland mainly fall into two categories – MNCs located in Ireland and indigenous Irish firms. The reason firms in Ireland tend not to be quoted on the Irish stock market may be related to Ireland's strong position in attracting FDI. Alternatively, it may be due to inefficiencies in the stock market, such as lack of liquidity, market size or high costs. Future research involves comparing Ireland's situation with other countries. Initially, a comparison with the UK and other G7 countries will provide some insights. This can be extended to a comparison with Singapore, another country with a strong reputation in attracting FDI.

The crux of this thesis is based on my taxonomy of multinationality. The thesis represents an initial attempt to address the need for a classification system for firms in empirical analysis. Given the wide variety of firms that exist, it is unlikely that

widespread agreement will ever be reached on defining the term MNC. Future research, however, may lead to the refinement and enhancement of this system.

6.4 Summary and Conclusions

In this chapter, I have drawn together the main conclusions from the thesis, their limitations and the resulting possibilities for future research. The primary conclusion to emerge from the analysis is that there is a strong need for a classification system for firms. This will lead to more accurate and robust empirical findings across a broad array of subjects. In Chapter 2, I proposed a taxonomic classification system that represents an initial attempt to tackle this problem. My system is used to create a unique dataset providing a more robust categorisation of firms than has appeared in the literature to date.

I highlighted three sample literatures in IB and IF where conflicting results existed that can be attributed in significant measure to inconsistent MNC sample creation. In Chapter 3, I studied the regionalisation/globalisation debate. In Chapter 4, I studied the home bias puzzle in international portfolio analysis. In Chapter 5, I studied the extent to which the geographical distribution of a firm's operations is reflected in the share price of firms. The overall contribution of the thesis has been to use my classification system to provide an alternative perspective on these three literatures. The matrix of multinationality and the resulting dataset provide a more in-depth analysis on these three topics in an attempt to resolve the conflicting results in these areas. The primary result to emerge from this thesis is that empirical samples of MNCs are inconsistent and at times unsuitable for the investigation been undertaken. This has caused confusion in interpreting empirical results. This issue is not confined to the topics discussed in this thesis. It applies to all subjects that use a sample of MNCs in their empirical analysis.

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APPENDICES

Appendix 1
Journal of International Business Studies (JIBS) Papers

In order to highlight the necessity for a multinational classification system for firms, I compile a list of all papers published in the *Journal of International Business Studies* (*JIBS*) from 1970-2007 that use a sample of MNCs in their analysis. This list of 133 papers are detailed in this Appendix.

1. Financial Management

Galan, Gonzalez-Benito and Zuñiga-Vincente (2007)

MNCs: They use a sample of the 585 large Spanish firms that have carried out FDI obtained from the Dun & Bradstreet international database. They received 103 usable responses to a questionnaire.

Results: Results show that the importance home country firm managers give to diverse location factors depends to a certain extent on the stage that each group of host countries has reached in the investment development path (IDP).

Citations: 0

Goerzen and Makino (2007)

MNCs: They use a sample of foreign subsidiaries of the 5 largest Japanese trading firms: Mitsubishi, Sumitomo, Mitsui, Marubeni, and Itochu. They used the year 2000 volume of *Kaigai Shinshutsu Kigyou Soran – Kaisha-betsu*, published by Toyo Keizai to compile the list of foreign market entries of the largest Japanese trading firms.

Results: They find that the initial investments of service MNCs are closely related to their core businesses and are less location-specific, but that subsequent investments are less related to firms' core services and are more location-specific.

Citations: 0

Eden, Juarez Valdez and Li (2005)

MNCs: The sample contains 24 Japanese MNCs with US affiliates over the 1990s. Firms must have had an ADR listed on the NYSE and NASDAQ stock markets for a minimum of 255 days between 1989 and 1999.

Results: They assess the impact of the US transfer pricing penalty on the stock market valuation of Japanese MNCs. They find that the penalty caused a drop in their cumulative market value of $56.1 billion, representing 12.6% of their 1997 market value.

Citations: N/A

Contractor, Kundu, and Hsu, (2003)

MNCs: The sample contains 103 firms from 11 service industries, taken from *Directory of the World's Largest Service Companies,* published by the United Nations Centre on Trans-national Corporations (this

publication uses different measures of size for each industry), and Moody's Investors Service in 1990. No further details are provided.

Results: A new unified three-stage theory of international expansion is proposed and an empirical test of this theory is provided.

Citations: 15

Evans, and Mavondo, (2002)

MNCs: The sample contains 102 randomly selected non-food retailers that operate stores in at least 3 foreign countries.

Results: Psychic distance, as a summary construct, explains a significant proportion of the variance in financial performance and strategic effectiveness. However, disaggregation of the construct substantially increases its explanatory power.

Citations: 9

Birkinshaw, Toulan and Arnold, (2001)

MNCs: The sample contains 16 MNCs that have a size of more than $5 billion, presence in 10 or more countries, an active global account management programme in place and are not in direct competition with other firms in the sample.

Results: Global account management structures allow the MNC to increase its information processing capacity as well as its bargaining power vis-à-vis the global customer.

Citations: 7

Rangan (1998)

MNCs: He looks at two samples of MNC affiliates in manufacturing industries – the Canadian, European and Japanese affiliates of MNCs headquartered in the US and the US affiliates of MNCs headquartered in Canada, Europe and Japan between 1977 and 1993. No further details provided.

Results: Between 1977 and 1993, MNCs systematically exploit currency shifts but their operational responses are relatively modest.

Citations: 15

Chen, Cheng, He, and Kim (1997)

MNCs: The sample consists of 2,219 firms from the 1993 Industrial Compustat Tape from 1984-1993. All firms have total assets above $10 million. Firms with positive foreign pre-tax income are classified as MNCs and those with zero or missing foreign pre-tax income are classified as domestic.

Results: They investigate the effect of international activities on capital structure. Results show that the debt-equity ratio is negatively related to both bankruptcy costs and growth options, and MNCs have lower debt-equity ratios than domestic firms (after controlling for bankruptcy costs and growth options). Within the MNC sample, the debt-equity ratio is positively related to the degree of internationalization.

Citations: 4

Burgman (1996)

MNCs: Firms are classified as domestic if the foreign tax ratio is less than or equal to 1%. They compile 2 MNC samples – one with foreign tax ratios greater than or equal to 10% and the other with ratios greater than or equal to 25%. All firms have sales revenues above $250 million.

Results: Results show that specific international factors such as political risk and exchange rate risk are relevant to the MNCs capital structure decision, that MNCs have higher agency costs than domestic firms and that international diversification does not lower earnings volatility for MNCs.

Citations: 11

Saudagaran and Biddle (1995)

MNCs: The sample contains 459 internationally traded MNCs, with a least 1 foreign listing on 1 of 9 major stock exchanges (in 8 countries) at year-end 1992.

Results: They find strong evidence that foreign listing locations are significantly influenced by financial disclosure levels and the level of exports to a given foreign country.

Citations: 6

Al-Eryani, Alam, and Akhter, (1990)

MNCs: They use a sample of 791 US MNCs from the Fortune 500 largest and the Fortune 500 second largest US firms. These firms are then classified according to the location of their foreign owned affiliates (in developed and less developed countries). A questionnaire was sent to the 791 firms in 1987 – 164 usable responses were received.

Results: Results show that legal constraints and firm size are significant determinants in the selection of international transfer pricing strategies by US MNCs.

Citations: 5

Lee and Kwok (1988)

MNCs: All firms have assets over $10 million. Domestic firms have an average foreign tax ratio of less than 1% during the period 1964-83 – 421 firms. Two MNC samples are created. The first contains firms with a foreign tax ratio above 25% - 231 firms. The second contains firms with a foreign tax ratio above 10% - 413 firms.

Results: They examine the capital structures of US MNCs versus US domestic firms. They find that MNCs do not have lower bankruptcy costs and that they tend to have lower debt ratios than domestic firms.

Citations: 13

Lecraw (1984)

MNCs: The sample contains 153 subsidiaries of MNCs that operate in 6 manufacturing industries in the 5 countries of the ASEAN region – Thailand, Malaysia, Singapore, Indonesia and the Philippines. All MNCs are based in the US, Europe, Japan and several LDCs.

Results: The relationship between percent equity ownership and subsidiary success from the MNC viewpoint is J shaped. High and low levels of equity ownership are associated with high levels of success. Control of critical operational variables by the MNC is directly related to success.

Citations: 75

Grosse (1983)

MNCs: He held interviews with 28 MNCs (mainly US based) during 1978 and 1981. Firms were chosen from 8 industries, using the largest firms in each industry, based on sales.

Results: The Andean Foreign Investment Code has had a significant influence on the activities of MNCs in the countries where it exists – Bolivia, Columbia, Ecuador, Peru and Venezuela.

Citations: 2

Wicks Kelly and Philippatos (1982)

MNCs: They conduct a survey (questionnaire and interviews) of 225 US manufacturing firms from the Fortune 500 list in 1978.

Results: They find that investment is motivated by profit, the majority of MNCs use project-by-project analysis and MNCs are more concerned with business risk than currency and political risk.

Citations: N/A

O Burns (1980)

MNCs: A questionnaire is sent to 210 firms from the Fortune 500 list in 1977 – 62 usable responses are obtained.

Results: 14 variables influencing the transfer pricing decisions of MNCs are analysed. Some variables have greater influence than others for some types of firms. Transfer pricing decisions are influenced by external pressures.

Citations: N/A

Errunza (1979)

MNCs: The MNC sample contains 69 large firms, representing important industry groups. They are chosen based on data availability and the willingness of management to provide the necessary information. No further details are provided.

Results: Country environment factors have dominated the finance sourcing structures of MNCs in Costa Rica, Honduras and Nicaragua. The most important factors include perceived exchange risk and domestic credit conditions.

Citations: N/A

Weinstein (1977)

MNCs: US advertising agencies are classified as multinational if total billings exceed $25m and overseas billings exceed $10m.

Results: He finds that the overseas investment behaviour of US multinational advertising agencies does not differ significantly from the investment behaviour of multinational manufacturing firms.

Citations: 13

Stobaugh (1970)

MNCs: He uses a sample of 39 MNCs selected from a list of 187 MNCs compiled by Curhan and Vernon, who define MNCs as firms that are listed on the Fortune 500 list in 1965 and have 25% or more of manufacturing located in 6 foreign markets.

Results: The financial manager of a multinational enterprise has a more complex undertaking than his domestic counterpart.

Citations: 2

2. Multinationality and Performance

Johnston and Menguc (2007)

MNCs: They use a sample of 313 Australian subsidiaries of foreign-owned firms obtained from *Who Owns Whom* (Dun & Bradstreet, 1994, 1999). They sent a questionnaire to 910 subsidiaries and receive 313 usable responses. Subsidiaries are mainly owned by US, UK, European and Japanese MNCs.

Results: They investigate the relationship between subsidiary size and subsidiary autonomy in multinational corporations (MNCs) and conclude that a quadratic inverted U-shaped model is the best fit to their data.

Citations: 0

Kotabe, Srinivasan and Aulakh (2002)

MNCs: The sample contains 49 US firms in 12 industries from 1987-1993.They measure multinationality as the ratio of foreign income to total income.

Results: They study the relationship between a firm's multinationality and its market performance. They find that the impact of multinationality on both financial and operational performance is moderated by firm's R&D and marketing capabilities.

Citations: 10

Brouthers, Werner and Matulich (2000)

MNCs: They use a sample of 67 US, Japanese and EU firms within 4 industries from the Fortune Global 500 list. A survey was sent to these firms and 57 usable replies were obtained.

Results: They develop a cross nationality contingency framework, identifying 3 'regional stereotypes' of price-quality relationships, fueled by history and consumer perceptions, which appear to result in superior MNC performance. Findings indicate that the stereotype influences have diminished over time. However, triad MNCs that use these product strategies still, on average, demonstrate superior performance.

Citations: 6

Gomes and Ramaswamy (1999)

MNCs: Firms in the MNC sample had at least 10% of sales overseas. The firms are not widely diversified – all had more than 70% of sales originating from 1 single business activity. The sample contains 95 firms from 4 industries.

Results: Results show that increasing levels of multinationality bring significant performance benefits up to a certain optimum level beyond which benefits start to decelerate, while costs accelerate.

Citations: 32

Mishra and Gobeli (1998)

MNCs: They use a sample of 105 manufacturing MNCs obtained from the Directory of Multinationals, 1989 (Stafford, Purkis and Stopford), also chosen based on the availability of other data sources on each firm.

Results: Results show that greater multinationality corresponds to a higher valuation of the firm if technology investment is high, and the impact is even greater if management incentives alignment is also high. However, greater multinationality alone does not correlate to a significantly greater value, which differs from the tenets of imperfect capital markets theory.

Citations: 9

Grant (1987)

MNCs: The sample contains 304 quoted, British-owned manufacturing firms taken from The Times 500 list of Britain's largest companies. Ratios for each firm's overseas production are calculated from 1968 to 1984.

Results: Profitability is positively related to a firm's degree of multinationality. Increases in overseas production are strongly associated with increases in sales and profitability.

Citations: 53

Douglas and Craig (1983)

MNCs: The MNC sample contains 801 US based MNCs that serve a market in 1 of 3 geographical areas – the US, Western Europe and Other foreign markets.

Results: They find a positive relationship between market share and ROI (Return on Investment) in Western European and Other Foreign Markets

Citations: 18

Lecraw (1983)

MNCs: He interviewed managers in 153 subsidiaries of MNCs spread across 6 industries and 5 ASEAN countries. Industries with substantial FDI are selected and MNCs are chosen within these industries. No further details are provided.

Results: A firm's profitability increases as their market share, advertising and R&D intensity increases and as the market shares of the two largest firms in the industry and tariffs increases.

Citations: 17

3. International Finance

Flores and Aguilera (2007)

MNCs: They use the largest 100 US MNCs ranked by Fortune magazine in 1980 and 2000.

Results: They find that the extent of MNCs' activities is more extensive than assumed by regionalists' arguments and well beyond Ohmae's Triad, but still less widespread than claimed by the globalists.

Citations: 1

Doukas and Kan (2006)

MNCs: They classify a firm as an MNC if it has at least 1 foreign subsidiary and its ratio of foreign to total sales is more than 10%. A non-MNC firm does not have any foreign subsidiaries and its ratio of foreign to total sales is less than 10%.

Results: They find that increased foreign involvement increases bondholder value while it decreases shareholder value. Overall, they conclude that global diversification does not destroy firm value.

Citations: N/A

Faff and Marshall (2005)

MNCs: They use a sample of 123 large UK, US and Asia Pacific MNCs. – defined as firms having at least one overseas subsidiary over which it has financial and management control.

Results: They explore some of the potential determinants of foreign exchange (FX) exposure and firm value. They find some evidence that MNCs with greater foreign operations have a larger magnitude of FX exposure.

Citations: N/A

Rugman and Verbeke (2004)

MNCs: They conduct an empirical analysis of firms on the Fortune Global 500 list in 2001.

Results: For 320 firms with geographic sales data in 2001, on average, 80.3% of their total sales are in the home region of the triad.

Citations: 17

Reeb, Kwok and Baek (1998)

MNCs: They begin with a sample of 3903 US public firms. Two MNC samples are created. The first contains all firms with a positive foreign sales ratio – 880 MNCs. The second contains all firms with a positive foreign asset ratio – 844 MNCs.

Results: Results suggest a significant positive relationship between the level of systematic risk of a firm and the degree of that firm's internationalization. They suggest that this may be due to an increase in the standard deviation of the cash flows from internationalization, which offsets the lower correlation associated with diversification.

Citations: 17

Allen and Pantzalis (1996)

MNCs: They use a sample of 363 US firms in 1991. An MNC is classified as a firm with at least one foreign subsidiary. Domestic firms have no investment in foreign subsidiaries.

Results: The returns to multinationality are maximized for firms that have breadth (operations in many countries) but not depth (the concentration of foreign subsidiaries in a few countries) in their networks.

Citations: 17

Pantzalis, Simkins and Laux (2001)

MNCs: All MNCs are listed on either the NYSE or the ASE in 1991. They have at least 1 majority owned foreign subsidiary and are included on the Fortune 500 list in 1993. The sample contains 220 MNCs.

Results: This paper examines the effect of operational hedges on the exchange rate exposure of US MNCs. Operational hedges are significant determinants of exchange rate risk.

Citations: 6

Kim and Lyn (1986)

MNCs: The sample contains 154 firms with available data on foreign sales and foreign affiliates. No further details given.

Results: There is a positive and significant relationship between excess market value of MNCs and the degree of international involvement as measured by the percentage of foreign to total sales.

Citations: 15

Michel and Shaked (1986)

MNCs: An MNC is defined as a firm that derives at least 20% of total sales abroad, and has direct capital investment in at least 6 countries outside the US. Domestic firms have less than 10% of sales, profits and assets abroad. They use only US based Fortune 500 firms in the manufacturing industry (58 MNCs and 43 domestic firms).

Results: Domestic firms have significantly superior risk-adjusted performance, are less capitalized and have higher total and systematic risk than MNCs. Differences in performance are not due to the fact that MNCs are larger than domestic firms

Citations: 14

Shaked (1986)

MNCs: An MNC is defined as a firm that derives at least 20% of total sales abroad, and has direct capital investment in at least 6 countries outside the US. Domestic firms have less than 10% of sales, profits and assets abroad. He uses only US based Fortune 500 firms in the manufacturing industry (58 MNCs and 43 domestic firms).

Results: Results show that the mean insolvency-probability of domestic firms is significantly higher than that of the MNCs. MNCs are significantly more capitalized, and the standard deviation of their equity as well as their average systematic risk are also significantly lower.

Citations: 15

Mikhail and Shawky (1979)

MNCs: They use a random sample of 30 US based MNCs from the Fortune 500 list in 1964. These firms also held more than 25% of equity in manufacturing firms located in 6 or more foreign countries at the end of 1963.

Results: MNCs outperform the domestic market, in terms of higher returns for similar risk levels.

Citations: 10

Rugman (1976)

MNCs: The foreign operations of firms on the Fortune 500 list in 1965 are analysed.

Results: International diversification provides risk reduction opportunities to the MNC that are not available to a domestic firm.

Citations: 38

4. Financial Reporting/Accounting

Meek, Roberts and Gray (1995)

MNCs: The sample contains MNCs from the UK (64), US (116) and Continental Europe (46). All firms had at least 10% of sales from non-domestic sources and all have sales in excess of US$500 million.

Results: They examine factors influencing the voluntary disclosure of 3 types of information (strategic, non-financial, financial) contained in the annual reports of MNCs. While company size, country/region, listing status and, to a lesser extent, industry are the most important factors explaining voluntary disclosures overall, the importance of the factors varies by industry type.

Citations: 13

Rivera (1991)

MNCs: All firms had fiscal year ends at 31 December, no extraordinary items and were mainly manufacturing or industrial firms. Domestic US firms reported no foreign sales, no foreign assets and no foreign taxes in their 1983-86 financial statements – 52 firms. US MNCs had annual foreign sales of 10% or more of total sales and reported foreign assets and/or foreign income for the 4 years 1983-86 – 103 firms. The sample was further reduced based on data availability.

Results: Results show that the accuracy of earnings forecasts are significantly lower for purely domestic firms than for US based MNCs. Also, the level of consensus on earnings estimates submitted by financial analysts is significantly lower for US domestic than for US MNCs.

Citations: 2

Demirag (1988)

MNCs: The sample contains 105 UK based MNCs from the Times 100 list in 1980/81, that also have 1 or more manufacturing subsidiaries overseas, at least £50 million group consolidated sales and 5% or more of total sales from foreign operations, excluding direct exports by the parent company.

Results: He examines the extent of foreign currency and/or parent company currency financial measures used in evaluating foreign subsidiary operations and their managers' performance. Results show a preference towards the use of local currency measures.

Citations: 1

Gernon (1983)

MNCs: The MNC sample contains 293 US based MNCs with at least one manufacturing subsidiary abroad. They sent a questionnaire to each firm and 70 usable responses are obtained.

Results: FASB8 caused changes in corporate managerial reporting policies. MNCs need performance evaluation procedures that are developed independently of FASB external reporting standards and that advocate a local perspective relative to foreign operating environments.

Citations: N/A

Gray (1978)

MNCs: The MNC sample contains the 100 largest industrial MNCs in the EEC in 1973 based on the Fortune list. These firms are listed on stock markets and operate in two or more countries.

Results: The level of disclosure of forecasts for EEC MNCs is low and of a qualative nature.

Citations: N/A

5. International Human Relations (IHR)

Belderbos and Zou (2007)

MNCs: They use a sample of 1041 manufacturing affiliates in 1995 that were wholly or partially controlled by 412 Japanese firms in the electronics industry in 9 Asian countries or regions. The data are compiled by the Research Institute of Electronic Industry as *Asia Shinsutsu Denshi Meika* (Survey of Japanese electronic firms in Asia).

Results: They analyse employment growth in a large sample of Japanese manufacturing affiliates in nine Asian countries during the years leading up to and into the Asian financial crisis (1995–1999).

Citations: 1

Belderbos and Heijltjes (2005)

MNCs: They use a sample of 844 Japanese manufacturing affiliates operating in Asia in 1995, in the broadly defined electronics industry. These firms are owned by large, medium and small sized Japanese MNCs.

Results: They empirically examine the determinants of the decision whether or not to appoint an expatriate as the managing director of an overseas affiliate. Strategic dependence of the parent on the affiliate increases the propensity to appoint expatriates, whereas localization of the affiliate reduces it. Organisational experience in the country, both by the affiliate and by the firm, increases the probability that host country nationals will be appointed. Inter-firm relationships within vertical *keiretsu* groups impact on expatriation policies through inter-organisational knowledge exchange in host countries and the mitigation of localisation requirements owing to intra-group transactions.

Citations: 2

Ferner, Almond and Colling (2005)

MNCs: The sample consists of 6 US MNCs in the UK. Data are collected from 118 respondents in the 6 MNCs. No further details are given.

Results: They find that the process of employment policy transfer to subsidiaries in the UK is complicated by incomplete and contested 'institutionalisation' of diversity within the US itself, and by different conceptions of diversity between the US and the UK.

Citations: 5

Borkowski (1999)

MNCs: The sample of MNCs contains firms that are listed in the Directory of Corporate Affiliations, Fortune 500 or Business Week 1000, have at least 1 foreign subsidiary in the US, Japan, Canada, Germany or the UK, and are in an industry identified in prior studies as likely to use transfer pricing. A questionnaire sent to 1288 MNCs and 551 usable responses obtained.

Results: Results do not support the generally accepted theory that MNCs use different criteria to evaluate managers based on their location (home or host country).

Citations: 4

Shaffer, Harrison and Gilley (1999)

MNCs: They mailed 1090 surveys to employees in 10 large US MNCs in a variety of industries – 452 usable replies were obtained. No further details are given.

Results: They study the expatriate adjustment process. Several significant moderating effects emerge, showing different patterns of adjustment for those with different amounts of previous expatriate experience and levels of host country language fluency. Hierarchal level and assignment vector are also important moderators.

Citations: 45

Gregersen, Hite, and Black (1996)

MNCs: The sample contains 395 US based MNCs taken from US multinational client firms of a major international compensation consulting firm. Questionnaires were mailed to the 395 firms in 1991 and 58 responses were obtained.

Results: They empirically examine expatriate performance appraisal (EPA) practices for US MNCs. Results suggest that a balanced set of raters from host and home countries and more frequent appraisals relate positively to perceived accuracy of EPAs. Most respondent firms, however, did not follow these practices. The use of standardized and customized EPA evaluation forms relates negatively to perceived EPA accuracy.

Citations: 19

Rosenzweig and Nohria (1994)

MNCs: The sample contains US firms with a foreign based parent. They use only "the most abundantly represented industries and parent countries" (pp. 239). Surveys were sent to 1055 firms and useful responses came from 249.

Results: Results show that, in general affiliate HRM practices closely follow local practices. The degree of similarity to local practices is strongly influenced by the method of founding, dependence on local inputs, the presence of expatriates, and the extent of communication with the parent.

Citations: 83

Ball and McCulloch (1993)

MNCs: The sample consists of 150 firms from Forbes 100 Largest Multinational Firms and Fortune's 50 American Biggest Exporters. A questionnaire was sent to each firm and 76 usable replies were obtained.

Results: Results indicate that employees learn the international aspects of business on the job.

Citations: 4

Banai and Reisel (1993)

MNCs: They study 6 UK multinational banks taken from the Fortune 100 largest banks in the world in 1984. They survey 215 people in the 6 banks.

Results: They find no support for the widespread belief that expatriate managers are more loyal to the firm than host-country nationals. Age predicted firm commitment more accurately than nationality or role (job).

Citations: 7

Martinez and Ricks (1989)

MNCs: The sample consists of US based MNCs with at least one production affiliate in Mexico.

Results: The resource dependence of the affiliate is the factor most closely related to parent influence over the affiliates human resource decisions. The importance of an affiliate to the parent company, the nationality of the affiliate managers and the type of ownership arrangement also affect parent influence but to lesser extents than resource dependencies.

Citations: 9

Root and Mennis (1976)

MNCs: The sample contains 46 firms – 42 from the Fortune 500 list. Interviews are held with each firm.

Results: The relationship between business, government and unions is studied. They find perceptual gaps among the 3 groups that may make union/MNC and union/government discussions difficult.

Citations: N/A

Daniels (1974)

MNCs: The sample contains 18 firms from the Fortune 500 list in 1973. Interviews are held with each firm.

Results: Foreign managers with US MNCs believe that US nationals receive better treatment and opportunity in terms of cross-national transfers than foreign managers

Citations: 2

Alpander (1973)

MNCs: The sample contains the top 150 US firms on the Fortune 500 list.

Results: He looks at the recruitment patterns of firms when hiring managers. US MNCs do not fully utilise foreign MBA markets – they do not hire enough foreign MBA students in the markets in which they operate.

Citations: 4

6. International Management

Singh (2007)

MNCs: Their sample contains firms that issued patents between 1986 and 1995 from 30 countries. MNCs are classified as firms with foreign subsidiaries identified using Stopford's *Directory of Multinationals*, *Who Owns Whom* directories and company websites.

Results: They find significant knowledge inflows from foreign MNCs to host country organisations, and also significant outflows back from the host country to foreign MNCs.

Citations: 1

Frost and Zhou (2005)

MNCs: The sample of MNCs contains 104 firms in the automotive and pharmaceutical industries. Firms must own a minimum of 30 patents in technical fields, and own at least 10 patents issued to foreign subsidiaries in the period 1975-1995.

Results: This paper studies the management of distributed innovation in multinational firms. R&D co-practice (joint technical activities between units) increases levels of absorptive capacity and social capital among participating units, thus increasing the likelihood that they will share knowledge at future time periods.

Citations: N/A

Björkman, Barner-Rasmussen and Li (2004)

MNCs: They interviewed a sample of 134 Finnish and Chinese Western owned MNC subsidiaries. They targeted the 150 largest foreign owned subsidiaries in Finland and 300 foreign owned subsidiaries in China, whose contact information was available to them.

Results: Results show that MNCs can influence inter-unit knowledge transfer by specifying the objectives of the subsidiary and by utilizing corporate socialization mechanisms.

Citations: 5

Blumentritt and Nigh (2002)

MNCs: The sample contains 337 foreign subsidiaries of large US based MNCs in the chemical and pharmaceutical industries from the Directory of Corporate Affiliations. They received 91 usable responses from 22 MNCs in 37 different countries.

Results: Subsidiary strategic integration and the economic integration of the host country significantly influence integration of subsidiary political activities.

Citations: 6

Edwards, Ahmad and Moss (2002)

MNCs: They use a sample of 527 subsidiaries of foreign MNCs operating in Malaysia. 71 usable responses are obtained. No further details are provided.

Results: Results show that the autonomy conferred on local management in Malaysian subsidiaries is limited. In general, the more integrated the subsidiaries in the global activities of the parent, the less their autonomy, which implies limits to their contribution to the Malaysian economy.

Citations: 1

Lau and Ngo (2001)

MNCs: They sent a questionnaire to 1700 firms in Hong Kong. All firms had annual sales greater than $7 million and more than 50 employees. 292 usable responses were received.

Results: In HK, Western MNCs (US and European) are more receptive to organizational development interventions than Asian firms (local and Japanese). Organisational development interventions have similar effects regardless of the firm's country origins.

Citations: 7

Athanassiou and Nigh (2000)

MNCs: The sample of US based MNCs have at least one foreign subsidiary. Sales range from $50 to $800 million. 197 firms are contacted and 39 usable responses obtained.

Results: They investigate the effects of several dimensions of internationalization on the behaviour of MNCs top management teams.

Citations: 16

Harzing (2000)

MNCs: Questionaires are sent to 122 MNCs. Usable responses are obtained from 37 MNCs with 166 subsidiaries. No further details given.

Results: She tests a 3-fold typology of MNCs – global, multi-domestic and trans-national. Subsidiaries in the 3 types of MNCs are shown to differ significantly in aspects of interdependence and local responsiveness.

Citations: 19

Birkinshaw (1996)

MNCs: Interviews are held with 6 Canadian subsidiaries of US MNCs. Subsidiaries have sales of over $200 million in 1992, participate in a global industry and have some evidence of world mandates.

Results: A subsidiary mandate is a business, or element of a business where the subsidiary participates and for which it has responsibilities beyond its national market. They find that there is a risk in having a full-scope world product mandate, because it is possible to become marginal to the corporate strategy. A subsidiaries growth depends on its distinctive capabilities and, for a mandate to be effective, it must be built on those capabilities.

Citations: 39

Kobrin (1994)

MNCs: The MNC sample contains 131 Fortune 500 firms (in 1989), with international sales (non-US) of at least 17% and 6 or more manufacturing subsidiaries abroad. They originally used 20% foreign sales but

there was a "natural break" in the data at 17% (Footnote 13). Usable responses were obtained from 68 of these firms.

Results: An index of geocentric mindset is found to correlate with geographic scope and various aspects of IHRM policy and practice; however, no relationship is found with measures of multinational strategy or organisational structure.

Citations: 30

Sohn (1994)

MNCs: They use a sample of 101 Japanese firms quoted on the Tokyo Stock Exchange, with investments in 2 of the following 4 countries - Korea, Taiwan, Singapore and the US.

Results: They study Japanese FDI decisions into Korea, Taiwan, Singapore and the US, focusing on 6 industries. Results find support for the proposition that for MNCs with social knowledge, the need to resort to ownership for control purposes is reduced.

Citations: 36

DuBois, Toyne and Oliff (1993)

MNCs: They use a case study of 16 MNCs in 4 industries. An industry directory (Duns Marketing Services, 1988) was used to find the leading firms in each industry. No other details are provided.

Results: Results show that a firm's competitive priorities, in addition to other key variables such as market orientation, experience and product characteristics, play important roles in the development of international manufacturing configuration strategies.

Citations: 17

Kim and Mauborgne (1993)

MNCs: The sample contains 19 MNCs. No further details are provided.

Results: They find evidence that the exercise of procedural justice is a powerful way to organise the MNCs strategy making process. Procedural justice is found to significantly augment MNCs ability to achieve the double ended objective of effectively conceiving and executing it worldwide strategy.

Citations: 11

Leong and Tan (1993)

MNCs: The sample consists of MNCs invited to participate at a Global Strategies Conference in 1990, organised by the Singapore Economic Development Board. 151 top executives participated at the meeting and 131 usable questionnaires are obtained.

Results: They empirically test the Bartlett and Ghoshal (1989) organisational typology and find partial support for the typology.

Citations: 19

Kim and Hwang (1992)

MNCs: They sent a questionnaire to US based manufacturing MNCs listed in the International Directory of Corporate Affiliations (IDCA) (1987-88). They compared these firms with firms listed in the IDCA 1982-83 and chose MNCs that experienced international expansion during that period – 629 firms. 96 responses were received.

Results: Results suggest that an express incorporation of global strategic variables into an analysis of the entry mode decision is warranted.

Citations: 103

Gray, Radebaugh and Roberts (1990)

MNCs: Following the UN, MNCs are classified as firms with foreign operations in two or more countries. All firms in the sample are quoted on the stock market and have revenues in excess of £100 million (UK MNCs) or $1 billion (US MNCs). Questionnaires were sent to 415 firms and 205 useful responses were obtained.

Results: They examine the cost constraints on voluntary information disclosure. While there is substantial agreement on the major cost constraints involved and the individual items giving rise to net costs, there are significantly different perceptions by UK and US financial executives to the issue of cost constraints on voluntary information disclosures.

Citations: 2

Kane and Ricks (1988)

MNCs: They use a sample of 370 US based firms listed in the 1984 Forbes 125 Largest US Multinationals or the 1984 Fortune 500 or Fortune Service 500. In the Fortune publications, however, only the firms in the top 20% (by size) were selected from each industry group.

Results: US based MNCs do not consider regulations relating to transnational data flows to be a problem.

Citations: 6

Gates and Egelhoff (1986)

MNCs: They use a sample of 50 MNCs – 24 US, 6 UK and 20 European – from the 1976 Fortune 500 list. All firms also had foreign manufacturing and at least 15% foreign sales.

Results: They study centralisation within MNCs. The influence of company-wide conditions on centralisation appears to be much clearer than the influence of subsidiary level conditions. Results indicate that parent HQ may be devoting more attention to those subsidiaries facing rapid environmental change.

Citations: 31

Cray (1984)

MNCs: The sample consists of 57 subsidiaries of 34 US MNCs. Firms are chosen from 83 firms on the Fortune 500 list with sales between $500 million and $1 billion for the base year and have at least 1 subsidiary in both France and Great Britain.

Results: They examine the integration of British and French subsidiaries into US based MNCs.

Citations: 29

Egelhoff (1984)

MNCs: They held interviews with a sample of 50 MNCs – 24 US, 6 UK and 20 European – from the 1976 Fortune 500 list. All firms also had foreign manufacturing and at least 15% foreign sales.

Results: The nationality of the MNC has a strong influence over the type of managerial control it exercises over its foreign subsidiaries. US MNCs monitor subsidiary outputs and rely more on frequently reported performance data than European MNCs.

Citations: 32

Hedlund (1984)

MNCs: They conduct an in-depth study of 4 firms. Each firm operated in a relatively mature market segment, had diversified only to a moderate degree and had more than 50% of sales outside Sweden. In addition, a questionnaire was sent to 68 firms with more than 500 employees and with at least one wholly owned foreign manufacturing subsidiary.

Results: The mother-daughter structure prevalent in Swedish MNCs is changing. Firms tend to adopt organisation structures in between a pure mother-daughter one and one divided along product or technology lines. The control style is changing in the direction of slightly more formal performance evaluation.

Citations: 6

Kennedy (1984)

MNCs: The sample consists of 94 firms with total annual sales above $1.5 billion in 1982, making them Fortune top 250 companies. Each firm also has more than 1/3 of total sales abroad or is in a global industry, defined as an industry in which firms with at least 1/3 of total sales abroad held 1/3 or more of total market share. Of the 94 companies, 61 agreed to participate in the study.

Results: There has not been a significant quantitative increase in the rate of institutionalisation of the external environment analysis by large US MNCs. Qualitative changes are, however, more prevalent. External environmental assessments have a much greater impact on decision making by top management.

Citations: 1

Masacarenhas (1984)

MNCs: The sample contains 25 US subsidiaries of 25 different firms covering a broad range of industries and headquartered outside the US. All are at least 50% owned by a non-US parent company.

Results: Results show that, although there is an extensive use of impersonal methods of coordination, with increasing interdependence there is a change in the coordination mix towards greater use of system sensitive members and personal communication. Increasing interdependence is also significantly associated with greater communication among country subsidiary managers and greater communication with a central manufacturing staff group.

Citations: 8

Leksell and Lindgren (1982)

MNCs: The sample contains 6 Swedish MNCs. Each firm has at least 4 foreign affiliates.

Results: They identify 3 main roles of the board of directors – external roles, internal roles and a legal role. They find that some of these roles occur simultaneously but different roles are emphasised by different MNCs.

Citations: 3

Fisher and Behrman (1979)

MNCs: They conduct interviews with 35 US and 16 European MNCs in 1978. Firms were chosen "largely because they were known to have had foreign R&D activities" (pp 30).

Results: They study the co-ordination of firm's foreign R&D activities. Co-ordination practices affect the nature of the performance of R&D abroad, the means of establishing R&D abroad, the communication and control systems employed, and the patterns of invention and innovation.

Citations: 5

Brandt and Hulbert (1976)

MNCs: The MNC sample consists of 63 firms with manufacturing subsidiaries in Brazil.

Results: Home offices should spend more effort on procedures for handling subsidiary reports and on the relevance of outgoing communications. Japanese MNCs have more problems with communication than European or American MNCs.

Citations: 6

7. International Business

Andersson, Forsgren and Holm (2007)

MNCs: They use a sample of 97 subsidiaries belonging to 20 international divisions located in Europe (92) and North America (5). Each subsidiary performed their own production and sales.

Results: They model MNCs as a federation in order to study the inter-organisational power in MNCs. Results show that the strength and influence of a subsidiary's local business network are determined by the extent to which the subsidiary provides technology within the MNC.

Citations: 0

Chan and Makino (2007)

MNCs: They use a sample of 898 listed and non-listed Japanese MNCs with foreign affiliates from *Kaigai Shinshutsu Kigyo Soran* (Directory of Japanese Overseas Affiliates) published by Toyo Keizai, one of Japan's largest business magazine publishers. Their sample contains 4451 subsidiaries established by 898 Japanese MNCs that operated in 39 countries across 52 industries (two-digit SIC) between 1988 and 1999.

Results: They find that MNCs are more likely to exchange ownership for legitimacy in local industries than in host countries, and in local markets with a high level of political instability than in those with a low level of political instability.

Citations: 2

Dikova and van Witteloostuijn (2007)

MNCs: They use a sample of 2798 EU firms with at least a 10% ownership stake in a branch/subsidiary located in the CEE region from the Amadeus dataset. They received 208 usable responses to a questionnaire and use 160 in the study (due to missing data for some firms).

Results: They demonstrate that a parent firm's technological intensity, international strategy and experience determine both establishment and entry mode choices.

Citations: 0

Tong and Reuer (2007)

MNCs: They use a sample of all US manufacturing firms in the SIC range 3000–3999 that had data available from Standard & Poor's Compustat database and National Register Publishing's *Directory of International Affiliations* during 1985–1996.

Results: They find that the relationship between multinationality and downside risk in MNCs is curvilinear: risk first declines and then increases as a firm's increase their portfolio of international investments.

Citations: 1

Chan, Makino and Isobe (2006)

MNCs: They use a sample of 8 large Japanese MNCs from the electronics industry. Information is obtained from the annual volumes of Kaigai Shinshutsu Kigyo Soran (Directory of Japanese Overseas Affiliates) from 1989 to 1998, which lists the population of overseas subsidiaries that have been established by both listed and non-listed Japanese MNCs.

Results: They examine the interdependent foreign market entry decisions of MNCs. They find that an MNCs market entry decisions are influenced by its own prior entry and exit decisions and those of other MNCs.

Citations: N/A

Nachum and Wymbs (2005)

MNCs: The sample contains 573 foreign MNCs that entered London or NY via M&A only, between 1981 and 2001 (in the financial and professional services industries).

Results: They find significant association between product differentiation and the preference of firms for proximity to other firms in the industry. These findings imply that the value of agglomeration varies for firms pursuing different product differentiation strategies.

Citations: N/A

Venaik, Midgley and Devinney (2005)

MNCs: They use a stratified random sample of MNC subsidiaries from the Dunn & Bradstreet database. They exclude subsidiaries in wholesale/retail trade and subsidiaries with less than 50 employees. They sent a questionnaire to 728 subsidiaries and got 163 usable responses.

Results: They study the role that learning and innovation play in determining multinational and multinational subsidiary performance. They explore the organizational paths leading to greater learning, increased innovation and improved performance. They find dual, independent paths to improved

performance - one through networking and inter-unit learning and the other through subsidiary autonomy and innovation.

Citations: 1

Knight and Cavusgil (2004)

MNCs: They sent a questionnaire to a random sample of 900 manufacturing firms in the US, founded in 1980 or later, and exporting at least 25% of total production. 203 usable surveys were returned.

Results: They investigate born globals as early adapters of internationalization. Results show that born global firms leverage a distinct mix of orientations and strategies that allow them to succeed in diverse international markets.

Citations: 22

London and Hart (2004)

MNCs: They study 24 US based manufacturing MNCs highly active in pursuing opportunities at the base of the pyramid in developing countries. No further details are provided.

Results: They study the launching of business ventures in low income markets in developing countries. Results show that the success of initiatives targeting low income markets is enhanced by recognizing that Western-style patterns of economic development may not occur in these business environments. Business strategies that focus on leveraging the strengths of the existing market outperform those that focus on overcoming weaknesses. These strategies include developing relationships with non-traditional partners, co-inventing custom solutions, and building local capacity.

Citations: 7

Uhlenbruck (2004)

MNCs: He uses subsidiaries as the unit of analysis and focuses on state owned enterprises in transition economies of CEE that were privatized. The sample contains 563 acquisitions of privatized state owned enterprises in CEE by Western firms between 1990 and 1993. He mailed a survey in 1995 to MNC executives – no further details given. They got 185 responses relating to 172 different acquisitions.

Results: Pre-acquisition experiences of both target and MNC firms are important for subsidiary growth, although cultural differences moderated the predicted effects notably.

Citations: 6

Kim, Park and Prescott (2003)

MNCs: The MNC sample contains 630 US based MNCs in specific industries. All MNCs are single business firms, with at least 1 foreign subsidiary. They received 161 usable responses.

Results: The way that multinational businesses, in integrated global industries, coordinate and control R&D, manufacturing, and marketing functions across borders has significant implications for performance. Results show that people-based and information-based modes are generally more effective than formalization-based and centralization-based modes in coordinating and controlling business functions worldwide.

Citations: 9

Luo (2003)

MNCs: The sample contains 196 manufacturing MNC subsidiaries in China, taken from the Directory of Foreign Invested Industrial Enterprises. Questionnaires were sent to 500 firms and 196 usable responses obtained.

Results: Results show that a parent firm's control flexibility, resource commitment and local responsiveness exert strong and positive influences on subsidiary performance. These influences are weaker when regulatory interference is higher, but stronger when industrial opportunity is richer.

Citations: 11

Minbaeva et al. (2003)

MNCs: The sample contains foreign owned subsidiaries in the US, Finland and Russia. Their HQs are located in 5 countries – Sweden, Germany, Japan, US and Finland. 320 subsidiaries are randomly selected from lists obtained from the foreign commercial sections of the respective embassies in the US.

Results: This paper investigates the relationship between MNC subsidiary human resource management (HRM) practices, absorptive capacity, and knowledge transfer. Results indicate that both ability and motivation (absorptive capacity) are needed to facilitate the transfer of knowledge (to subsidiaries) from other parts of the MNC.

Citations: 20

Feinberg and Majumdar (2001)

MNCs: They use data from the Reserve Bank of India (RBI) – information on the country of controlling interest is used to separate Indian firms and MNCs. The sample contains 30 MNCs and 65 Indian firms.

Results: Between 1980 and 1994, the only significant R&D spillovers in the Indian pharmaceutical industry were between MNCs and each other – domestic firms did not benefit.

Citations: 9

Pantzalis (2001)

MNCs: The sample contains 420 US based mining and manufacturing MNCs quoted on the NYSE or the AMEX. They own at least 1 foreign subsidiary.

Results: MNCs with a presence in countries with developing economies have significantly higher market values than MNCs that operate only in countries with advanced economies.

Citations: 5

Kwok and Reeb (2000)

MNCs: They use a sample of 1921 firms from 32 countries between 1992 and 1996. Firms with a foreign asset ratio greater than 1% are classified as MNCs (1007 firms) – the others are classified as domestic (914 firms).

Results: They find that the overall effect of internationalization on the risk and leverage of MNCs is expected to vary with home and target market conditions.

Citations: 6

Pan and Li (2000)

MNCs: The sample contains 1298 foreign equity joint ventures (EJV) made in China between 1981 and 1998.

Results: They find that very large firms are more likely to have a higher equity stake in their EJV, seek alignment with other foreign firms, engage in global industries, and invest in large scale EJVs than small firms. They are also less affected by the risk conditions of the host country.

Citations: 8

Kuemmerle (1999)

MNCs: The sample contains 32 of the world's largest pharmaceutical and electronics firms. They targeted the 5 largest firms in both industries and in each of the following countries – US, Japan, Germany, France and the Netherlands.

Results: Results show that relative market size and relative strength of a country's science base determine whether FDI in R&D is carried out in order to exploit existing firm specific advantages, or in order to build up new firm specific advantages.

Citations: 57

Luo and Peng (1999)

MNCs: 500 questionnaires were sent to a random sample of MNC manufacturing subunits in China in 1996 – 108 usable replies were obtained. Export-only subunits were excluded from the sample. No further details provided.

Results: The intensity and diversity of host country experience is an important predictor of MNC subunit performance.

Citations: 59

Melewar and Saunders (1999)

MNCs: The sample includes 111 UK MNCs with Malaysian subsidiaries, taken from Who Owns Whom by Dunn & Bradstreet (1991). A random sample of 40 firms is then chosen. All firms have more than 10 major overseas subsidiaries.

Results: Results suggest that market entry form and equity holding are associated with the degree of corporate visual identity standardization.

Citations: 11

Simonin (1999)

MNCs: Firms included in the MNC sample are US firms with sales above $50 million, more than 500 employees and published information in the Corptech directory. 192 firms are identified and 151 usable replies to a questionnaire are obtained.

Results: Results show that tacitness is the most significant determinant of knowledge transferability.

Citations: 38

Katrishen and Scordis (1998)

MNCs: The sample contains 93 multinational insurance firms headquartered in 15 different countries. All firms operate in at least 1 foreign country.

Results: Multinational insurers achieve economies of scale only up to a point, and rather than benefiting from scale, the most internationally diverse insurers suffer diseconomies. The benefits of extensive foreign acquisitions by insurers are questionable.

Citations: 11

Mudambi (1998)

MNCs: The sample contains MNCs involved in engineering and engineering related operations in the West Midlands region of the United Kingdom, obtained from business directories. A survey is sent to 224 MNCs – 70 usable responses are obtained.

Results: Multinational investment is significantly duration dependent – firms with a longer tenure of operations are significantly more likely to invest in any given period.

Citations: 11

Erramilli, Agarwal and Kim (1997)

MNCs: The sample contains 177 Korean MNC subsidiaries (established by 132 firms). They include only subsidiaries established between 1988 and 1990 and for which data is available.

Results: They investigate the subsidiary ownership preferences among Korean MNCs and find that the influence of 3 firm specific advantages – technological intensity, product differentiation and capital intensity – on subsidiary ownership levels is contingent upon whether the subsidiary is located in a less developed or a more developed country as compared to the home country.

Citations: 14

Vachani (1995)

MNCs: The sample contains Indian subsidiaries of US, British and other European MNCs. All MNCs (61 in total) are quoted on the Bombay Stock Exchange Directory (BSED), existed in 1973, and had foreign equity above 40% at that time.

Results: The obsolescing bargain took effect in India over a 15-year period following restrictive legislation. US firms are found to retain a smaller share of their foreign ownership over time than British and other European MNCs.

Citations: 16

Li and Guisinger (1992)

MNCs: The sample contains 168 firms in 9 service industries from publications by the UN Centre on Transnational Corporations (UNCTC 1988). This lists the number of foreign affiliates of MNCs in 5 countries (regions) – the US, Canada, Japan, Western Europe and other developed countries.

Results: They empirically test the determinants of FDI of service MNCs in the triad regions. Differences in the international behaviour of service MNCs based in different countries are uncovered and analysed.

Citations: 32

Cho (1990)

MNCs: The MNC sample contains firms quoted in the US Department of Commerce publications (US Direct Investment Abroad) and on S&Ps Industrial Compustat Annual.

Results: The technological intensity of a product has a strong positive effect on the propensity of the product to intra-firm trade. The economies of scale level has a constraining effect on the propensity. The vertical integration intensity and the international production intensity have no significant bearings on the propensity.

Citations: 12

Hipple (1990)

MNCs: The paper presents evidence from the US government benchmark surveys of direct foreign investment, published by the Bureau of Economic Analysis, in 1977 and 1982. Firms are as categorised in this publication – based on several variables.

Results: Intra-firm shipments comprise a significant share of international trade and contribute to the deficit pressures on the US trade balance.

Citations: 3

Kim and Lyn (1990)

MNCs: Firms included in the MNC sample are on the Forbes 100 list, quoted on either the NYSE or ASE (American Stock Exchange) and have financial data on S&P Compustat Industrial Tape. The sample contains 54 foreign owned and 54 US owned firms.

Results: Foreign MNCs operating in the US are less profitable than US owned firms. They spend more in R&D but less in advertising. They also have higher debt levels and higher liquidity. The performance of foreign owned MNCs differ by country of origin.

Citations: 3

Franko (1989)

MNCs: They use data on foreign affiliates and subsidiaries of the 187 largest US manufacturing MNCs gathered by the Harvard Multinational Enterprise Project. This project classifies a firm as an MNC if it is on the Fortune 500 list and has manufacturing affiliates in at least 6 foreign countries in 1963.

Results: The firms most willing to accept minority or 50-50 joint ventures tend to be smaller, 'second rank oligopolists' in their industries. There is no evidence of a systematic tendency across industries of a negative relationship between MNC acceptance of minority positions and company under-performance.

Citations: 14

Cieslik and Sosnowski (1985)

MNCs: The sample of MNCs consists of firms from the Fortune 500 list of US and non-US industrial firms in 1980.

Results: Findings strongly support the importance of MNCs as trading partners in key areas in the acquisition of high technology and equipment and in industrial cooperation. The popular view, however, that Poland's East-West trade flow is dominated by a few large MNCs was found to be over-emphasised.

Citations: N/A

Kumar and Kim (1984)

MNCs: They interview members of the parent companies of 18 out of the 21 manufacturing overseas subsidiaries and joint ventures formed by Korean firms.

Results: Both ownership-specific and location-specific factors explain the internationalisation of Korean firms. Korean firms provide operating technologies to their subsidiaries and tend to scale down the production capacity in foreign plants.

Citations: 9

Mascarenhas (1982)

MNCs: He interviews members of 10 MNCs (30 interviews in each firm). MNCs are chosen based on willingness to participate and all had more international involvement than simply exporting.

Results: There are a number of methods for coping with international business uncertainty but special emphasis has been placed on the methods of control and flexibility.

Citations: 14

Davidson (1980)

MNCs: The MNC sample is based on the databank developed by the Harvard Multinational Enterprise project. No further details are given.

Results: Firms prefer to locate in countries where they are already active. Firms with extensive experience show less preference for near, similar and familiar markets. As experience increases, firms invest more in countries perceived as being more risky, and become more efficient in their location of foreign activities.

Citations: 82

Wilson (1980)

MNCs: The MNC sample is based on the Harvard Multinational Enterprise study.

Results: MNCs may expand internationally by acquiring existing firms or by forming a new subsidiary. Results show that firms with a higher percentage of investments through acquisitions had several common characteristics. The nationality of the parent is related to the propensity to acquire.

Citations: 23

Jeanet and Liander (1978)

MNCs: A sample of 14 New England based MNCs is chosen to allow for the representation of different industries and MNCs at various stages of multinational involvement. No further details are provided.

Results: As MNCs mature, the intensity of technology exports remains at a stable level. Mature MNCs will turn heavily to foreign subsidiaries as a source of new technologies.

Citations: 1

***Stobaugh** (1977)*

MNCs: He classifies firms based on the Multinational Enterprise Project of the Harvard Business School and their data on 187 US and 209 non-US firms classified as MNCs. This project classifies a firm as an MNC if it is on the Fortune 500 list and has manufacturing affiliates in at least 6 foreign countries in 1963.

Results: Foreign competitors of US firms that manufacture abroad are both larger and growing faster than their US counterparts. The foreign activities of non-US MNCs are also greater than the foreign activities of US MNCs.

Citations: N/A

Vogel (1976)

MNCs: He interviews 55 managers from 3 MNCs – the 3 MNCs have either manufacturing or marketing subsidiaries in each of 12 countries analysed.

Results: He considers if firms cluster countries in which they operate on the basis of the perceptions of the firm's marketing managers but finds that they do not.

Citations: N/A

Sanden and Vahlne (1974)

MNCs: The MNC sample contains 17 Swedish firms that manufacture in 6 countries other than the home country (this criterion was formulated by the Harvard group). The firm sample (MNC and domestic) contains the 50 largest firms in Sweden.

Results: They find that a firm's level of multinationality does not have a significant impact on its growth rate.

Citations: N/A

8. Sourcing Strategies and Structures

Swamidass and Kotabe (1993)

MNCs: They use a sample of 250 US subsidiaries of European and Japanese MNCs – 175 European and 75 Japanese - from the International Directory of Corporate Affiliations (1985). All firms are also on the Fortune International 500 list in 1985. They received 71 usable responses to a posted questionnaire.

Results: They find support for the hypothesis that international sourcing can be explained using international plant location theory.

Citations: 10

Kotabe and Murray (1990)

MNCs: They use a sample of 250 firms – 175 European and 75 Japanese – from the International Directory of Corporate Affiliations (1985). They received 71 usable responses to a posted questionnaire.

Results: They develop a taxonomy of sourcing strategies. Performance implications of various sourcing strategies are explored.

Citations: 30

Kotabe and Omura (1989)

MNCs: They create a sample of 500 subsidiaries from the International Directory of Corporate Affiliations (1985).

Results: They identify various sourcing patterns used by European and Japanese manufacturing MNCs serving the US market. Results show that the products market performance is not related to its life-cycle stage in world trade or to production location, but is positively related to the internal components sourcing and negatively related to the product adaptation.

Citations: 41

Buckley and Pearce (1979)

MNCs: They use a sample of 156 of the world's largest firms in 1972 from Fortune magazine. They sent a questionnaire to firms to obtain information of foreign sales, exports and foreign production.

Results: An MNCs sourcing policy is determined by which of the firm's production facilities will service its various final markets. Therefore, there exists an international network linking production to markets.

Citations: 16

9. Government Relations

Luo (2001)

MNCs: 500 MNC subunits located in Southern China and Beijing are randomly selected. 131 usable questionnaires are obtained. No further details are provided.

Results: Resource commitment, personal relations, political accommodation and organizational credibility are important in shaping MNC-government relations and MNC subsidiary performance.

Citations: 3

Fagre and Wells (1982)

MNCs: They use a sample of US MNCs in Latin America. No details on how the sample is created are provided.

Results: The bargains agreed between foreign investor and host country are influenced by the resources brought by the investor and the number of firms offering similar resources. The level of ownership of US MNCs in Latin America is related to the MNCs level of technology, the degree of product differentiation, the access to foreign markets and the number of MNCs in the industry.

Citations: 3

Poynter (1982)

MNCs: They use questionnaires and interviews with 104 MNC subsidiaries operating in 4 less developed countries – Tanzania, Zambia, Indonesia and Kenya. No further details are provided.

Results: Host governments do discriminate between foreign firms when intervening in the market. Policies use varying degrees of enforcement. Firms are able to influence this government intervention – it is not beyond their control.

Citations: 7

10. Culture

Husted and Allen (2006)

MNCs: They surveyed all 459 non-Mexican firms listed in the membership directory of the American Chamber of Commerce in Mexico (Amcham). Amcham includes both Mexican and non-Mexican firms that engage in international business transactions of some sort.

Results: They find that institutional pressures, rather than strategic analysis of social issues and stakeholders, are guiding decision making with respect to corporate social responsibility.

Citations: N/A

Luo (2006)

MNCs: He uses a random sample of 350 MNC units investing and operating in the east coast of China, including both wholly owned subsidiaries and majority owned joint ventures. These firms operate in the manufacturing and services sectors. Data is obtained from the CD-ROM Directory of Foreign Invested Enterprises compiled by the Ministry of Commerce in China.

Results: He analyses how MNCs manage political and social forces in a foreign emerging market (China). He finds that when perceived corruption in the business segment increases, an MNCs propensity to cooperate and be assertive with the government decreases, its focus on ethics heightens, and its philanthropic contribution diminishes.

Citations: N/A

Hennart and Larimo (1998)

MNCs: They look at US market entries through partially versus wholly owned subsidiaries. They use a sample of 401 manufacturing affiliates US entries - 266 Japanese and 135 Finnish.

Results: Results show that cultural differences between the home base of the investor and the target country (political risk) exert a powerful influence on the ownership of subsidiaries, but cultural characteristics of the home base do not.

Citations: 34

Gómez-Mejia and Palich (1997)

MNCs: They use Fortune 500 firms in January 1985 and January 1990 (sample period 1985-1994)

Results: Regression tests using nine indicators of cultural diversity reveal no significant cultural effects on firm performance.

Citations: 33

Appendix 2
Classification of Fortune 500 Firms

All firms listed on the *Fortune 500* list in 2005 are categorised using the classification system outlined in Chapter 2. This Appendix provides details of this classification for each firm.

	Firm	Type	Ind.	Age	Size	Location	Multinationality					
							Sales	*Inc*	*Ass*	*CE*	*Dep*	*Subs*
1	Exxon Mobil	PrL	5	1882	339.9	US	T2	T2	T2			G
2	Wal-Mart Stores	PrL	7	1962	315.7	US	T2	T2	T2		T2	T4
3	Royal Dutch/Shell	PrL	5	1907	306.7	Netherlands	T3			T3		
4	BP	PrL	5	1908	267.6	Britain	T3	T3	T3	T3	T3	G
5	General Motors	PrL	5	1908	192.6	US	T4		T4			G
6	Chevron	PrL	5	1879	189.5	US	T2	T2	T2		T2	T5
7	Daimlerchrysler	PrL	5	1903	186.1	Germany	T5					G
8	Toyota Motor	PrL	5	1933	185.8	Japan	T4	T4	T4			G
9	Ford Motor	PrL	5	1903	177.2	US	T3	D	T3			G
10	Conocophillips	PrL	5	1875	166.7	US	T3	T2	T3			T4
11	General Electric	PrL	10	1879	157.2	US	T5	D	D			G
12	Total	PrL	5	1924	152.4	France	T5					G
13	Ing Group	PrL	10	1743	138.2	Netherlands						T5
14	Citigroup	PrL	10	1812	131.0	US	T3					G
15	Axa	PrL	10	1817	129.8	France	T4					T5
16	Allianz	PrL	10	1890	121.4	Germany	T4					G
17	Volkswagen	PrL	5	1937	118.4	Germany	G		G	G		G
18	Fortis	PrL	10	1990	112.4	Bel/Neth	T4		T4			T4
19	Credit Agricole	PrL	10	1894	110.8	France			G			D
20	American Intl	PrL	10	1919	108.9	US	T3	T2	T3			T5
21	Assicurazioni Gen.	PrL	10	1831	101.4	Italy						T5
22	Siemens	PrL	5	1847	100.1	Germany	T5		T5			G
23	Sinopec	PrL	5	2000	98.8	China						T2
24	Nippon T&T	PrL	9	1985	94.9	Japan						T5
25	Carrefour	PrL	7	1957	94.5	France	T3	T3	T3	T3	T3	T4
26	HSBC Holdings	PrL	10	1865	93.5	Britain	T4	T4	T4	T4	T4	G
27	ENI	PrL	5	1953	92.6	Italy	T5					T5
28	Aviva	PrL	10	1797	92.6	Britain	T2	T2	T2	T2		T3
29	IBM	PrL	5	1888	91.1	US	T3	D				G
30	McKesson	PrL	6	1833	88.1	US	T2	T2	T2			T3
31	Honda Motor	PrL	5	1948	87.5	Japan	T4	T4	T4			G
32	State Grid	PrL	3	2000	87.0	China						D
33	Hewlett-Packard	PrL	5	1939	86.7	US	T2	T2	T2			T5
34	BNP Paribus	PrL	10	1966	85.7	France	T4					G
35	PDVSA	PrL	5	1975	85.6	Venezuela						
36	UBS	PrL	10	1854	84.7	Switzerland	T4		T4	T4		G
37	Bank of Amer. Corp	PrL	10	1784	84.0	US	T5	T5	T5			T5
38	Hitachi	PrL	5	1910	83.6	Japan	T4	T4	T4			G
39	China Nat'l Petrol	Pub	5	1988	83.6	China						T2
40	Pemex	Pub	5	1938	83.4	Mexico						
41	Nissan Motor	PrL	5	1932	83.3	Japan	T4	T4	T4			T5
42	Berkshire Hathaway	PrL	10	1965	81.7	US						T5

43	Home Depot	PrL	7	1978	81.5	US	R1	R1				T2
44	Valero Energy	PrL	5	1980	81.4	US	T2	T2	T2			R1
45	JP Morgan Chs&Co	PrL	10	1799	79.9	US	G	G				G
46	Samsung Electronics	PrL	5	1969	78.7	South Korea						T5
47	Matsushita Elect. Ind.	PrL	5	1918	78.6	Japan	T5	T5	T5			G
48	Deutsche Bank	PrL	10	1870	76.2	Germany	T5	T5	T5			G
49	HBOS	PrL	10	1695	75.8	Britain	T2	T2	T2	T2		
50	Verizon	PrL	9	1885	75.1	US	T2	T2	T2			T2
51	Cardinal Health	PrL	6	1971	74.9	US	T2	T2	T2			T5
52	Prudential	PrL	10	1848	74.7	Britain	T3		T3	T3		T5
53	Nestle	PrL	5	1866	74.7	Switzerland	G	G	G	G	G	G
54	Deutsche Telekom	PrL	9	1871	74.1	Germany	T3		T3	T3		T5
55	Dexia Group	PrL	10	1860	72.8	Belgium		T3	T3	T2		T4
56	Metro	PrL	7	1964	72.8	Germany	T3	T3	T3	T3	T3	T3
57	Credit Suisse	PrL	10	1856	72.2	Switzerland	T3	T3	T3			T5
58	Bank of Scotland	PrL	10	1727	71.2	Britain	T3	T3	T3			T4
59	Tesco	PrL	7	1924	71.1	Britain	T2	T2	T2			T2
60	Peugeot	PrL	5	1882	69.9	France	T3			T3		T5
61	US Postal Service	Pub	8	1775	69.9	US						
62	Altria Group	PrL	5	1860	69.1	US	T3	D	T3			G
63	Zurich Financial	PrL	10	1872	67.2	Switzerland	T3		T3	T3		G
64	E.ON	PrL	3	1929	66.3	Germany	T3		T3			T5
65	Sony	PrL	5	1946	66.0	Japan	T4	T4	T4			G
66	Vodafone	PrL	9	1983	65.3	Britain	T3	T3	T3	T3	T3	T5
67	Societe Generale	PrL	10	1864	64.4	France	G					
68	Electricite De France	Pub	3	1946	63.4	France						T4
69	Nippon Life Ins.	PrL	10	1937	61.2	Japan						T2
70	Statoil	PrL	5	1972	61.0	Norway	T3		T3			R1
71	France Telecom	PrL	9	1988	60.9	France	T2					G
72	LG	PrL	5	1947	60.6	South Korea	T4	T4	T4			T5
73	Kroger	PrL	7	1883	60.6	US	D	D	D	D	D	D
74	Munich Re Group	PrL	10	1880	60.3	Germany						
75	Deutsche Post	PrL	8	1490	60.0	Germany	T5		T5	T5		G
76	State Farm Ins. Cos	PrU	10	1922	59.2	US						D
77	Marathon Oil	PrL	5	1887	59.0	US	T3		T3			T2
78	BMW	PrL	5	1913	58.0	Germany	T5		T5	T5		G
79	Fiat	PrL	5	1899	57.8	Italy	T4					
80	Hyundai Motor	PrL	5	1967	57.4	South Korea						T3
81	Procter & Gamble	PrL	5	1837	56.7	US	T2	T2	T2			G
82	ABN Amro Holding	PrL	10	1824	56.6	Netherlands	T4		T4	T4		T5
83	Royal Ahold	PrL	7	1887	56.4	Netherlands						
84	Repsol YPF	PrL	5	1986	56.4	Spain	T3	T3	T3	T3		T4
85	Legal and General	PrL	10	1836	56.4	Britain	T2		T2	R1		T2
86	Petrobras	PrL	5	1953	56.3	Brazil	T2					
87	Toshiba	PrL	5	1904	56.0	Japan	T4	T4	T4			T5
88	Dell	PrL	5	1984	55.9	US	T4	T4	T4		T4	T5
89	Lloyds TSB Group	PrL	10	1765	55.4	Britain	D	D	D	D	D	T4
90	Thyssenkrupp	PrL	5	1860	55.3	Germany	T3					
91	Boeing	PrL	8	1916	54.8	US	G					T4
92	Amerisourcebergen	PrL	6	1907	54.6	US	D	D	D	D	D	D
93	Santander	PrL	10	1857	53.8	Spain	T2	T2	T2		T2	
94	BASF	PrL	5	1865	53.1	Germany	T5	T5	T5	T5	T5	G
95	Costco Wholesale	PrL	6	1983	52.9	US	T2	T2	T2	T2	T2	T3

96	Suez	PrL	3	1858	52.7	France	T5		T5	T5		T5
97	Target	PrL	7	1962	52.6	US	D	D	D	D	D	T2
98	Morgan Stanley	PrL	10	1935	52.5	US	T4	T4	T4			T4
99	Robert Bosch	PrL	5	1886	52.2	Germany						
100	Renault	PrL	5	1899	51.4	France	T2			T2		G
101	Pfizer	PrL	5	1849	51.4	US	T3	T2	T3			G
102	Gazprom	PrL	2	1989	50.8	Russia	D	D	D	D	D	T2
103	Barclays	PrL	10	1896	50.6	UK	T4		T4	T4		G
104	Johnson & Johnson	PrL	5	1886	50.5	US	T5	D	T5			G
105	RWE	PrL	4	1990	50.3	Germany	T4		T4	T4		G
106	Unilever	PrL	5	1930	49.6	Britain/Neth	T4	T4	T4	T4	T4	G
107	Sears Holdings	PrL	7	1886	49.1	US						
108	Telefónica	PrL	9	1924	48.8	Spain	T2		T2	T2		T4
109	CNP Assurances	PrL	10	1857	48.5	France	T2					T2
110	Merrill Lynch	PrL	10	1914	47.8	US	G	G				T5
111	SK	PrL	2	1962	47.1	South Korea	T4		T4			T5
112	MetLife	PrL	10	1914	47.0	US	T2					T4
113	Tokyo Electric Pwr	PrL	3	1951	46.4	Japan						T2
114	Dow Chemical	PrL	5	1897	46.3	US	T3		T3			G
115	Lukoil	PrL	2	1991	46.3	Russia	T3					T3
116	UnitedHealth Group	PrL	16	1977	45.4	US	D	D	D	D	D	T4
117	Wellpoint	PrL	16	1900	45.1	US	D	D	D	D	D	D
118	Nippon Oil	PrL	2	1888	45.1	Japan	T4	T4	T4			T4
119	Dai-ichi Life Ins	PrL	10	1902	44.6	Japan						T3
120	Petronas	PrL	2	1974	44.3	Malaysia	D	D	D	D	D	
121	AT&T	PrL	9	1983	43.9	US	D	D	D	D	D	T4
122	Time Warner	PrL	17	1990	43.7	US	T4					G
123	Saint-Gobain	PrL	5	1665	43.6	France	T3		T3			G
124	Goldman Sachs	PrL	10	1869	43.4	US	T4	T4				T3
125	Lowe's	PrL	17	1946	43.2	US	D	D	D	D	D	D
126	United Technologies	PrL	12	1929	42.7	US	T4	T4	T4			G
127	Mitsubishi	PrL	5	1870	42.6	Japan	T4		T4			G
128	NEC	PrL	5	1899	42.6	Japan	T2	T2	T2			G
129	United Parcel Service	PrL	19	1907	42.6	US	T2	T2	T2			G
130	EADS	PrL	9	2000	42.5	Netherlands						T5
131	Nokia	PrL	9	1865	42.5	Finalnd	T4		T4	T4		G
132	Enel	PrL	3	1999	42.3	Italy	T2					T3
133	Fujitsu	PrL	9	1935	42.3	Japan	T5	T5	T5			G
134	Walgreen	PrL	7	1901	42.2	US	D	D	D	D	D	D
135	Groupe Auchan	PrL	7	1961	42.1	France						
136	Tyco International	PrL	13	1962	41.8	US	T4		T4			G
137	Arcelor	PrL	5	2002	40.5	Luxembourg	T4	T4	T4	T3		T3
138	Wells Fargo	PrL	10	1852	40.4	US						T3
139	Albertson's	PrL	7	1939	40.4	US						T2
140	Microsoft	PrL	12	1975	39.8	US	T2	T2	T2			G
141	Telecom Italia	PrL	9	1964	39.8	Italy	T4		T4	T4		T3
142	AEON	PrL	7	1973	39.5	Japan	T3	T3	T3			T4
143	GlaxoSmithKline	PrL	16	2000	39.4	Britain	T3		T3			G
144	Intel	PrL	12	1968	38.8	US	T4					T5
145	Philips Electronics	PrL	5	1891	38.6	Netherlands	T4		T4	T4	T4	G
146	Safeway	PrL	7	1915	38.4	US	R1	R1	R1			R1
147	Mitsubishi UFJ	PrL	5	2001	37.9	Japan	T5	T5	T5			T4
148	Medco Health	PrL	16	1668	37.9	US	D	D	D	D	D	D

149	Aegon	PrL	10	1983	37.7	Netherlands	T4	T4	T4		T4	T3
150	Lockheed Martin	PrL	5	1912	37.2	US	D	D	D	D	D	T5
151	CVS	PrL	7	1963	37.0	US	D	D	D	D	D	D
152	Motorola	PrL	9	1928	36.8	US	T4	T2	T4			G
153	Indian Oil	PrL	2	1964	36.5	India	D	D	D	D	D	D
154	Freddie Mac	PrL	10	1970	36.5	US	D	D	D			D
155	Mitsui	PrL	5	1947	36.3	Japan	T5	T5	T5			G
156	Caterpillar	PrL	5	1925	36.3	US	T5					G
157	Archer Daniels	PrL	1	1902	35.9	US	T3	T2	T2			G
158	Wachovia Corp.	PrL	10	1908	35.9	US	D	D	D	D	D	T2
159	Sanofi-Aventis	PrL	16	1973	35.4	France	T4	T4	T4	T4		G
160	Allstate	PrL	10	1931	35.4	US	D	D	D	D	D	D
161	Møller (A.P.)-Mærsk	PrL	8	1904	35.2	Denmark	T5		T5			G
162	BT	PrL	9	1981	34.8	Britain	T4	T4	T4			T5
163	Bayer	PrL	12	1863	34.8	Germany	T5	T5	T5	T5	T5	G
164	Seven & I Holdings	PrL	7	1927	34.7	Japan						
165	Sprint Nextel	PrL	9	1938	34.7	US	D	D	D	D	D	T2
166	Sumitomo Life Ins.	PrL	10	2002	34.6	Japan						T2
167	DZ Bank	PrL	10	2001	34.6	Germany						T4
168	Nippon Steel	PrL	4	1950	34.5	Japan	T3					T4
169	Caisse d'Épargne	PrL	10	1818	34.2	France						
170	Canon	PrL	5	1937	34.1	Japan	T5	T5	T5			G
171	Meiji Yasuda Life Ins	PrL	10	1998	33.6	Japan						T3
172	Standard Life Assur.	PrL	10	1825	33.5	Britain						T3
173	Caremark Rx	PrL	16	1993	33.0	US						D
174	Sumitomo Mitsui Financial	PrL	10	2002	32.7	Japan	T5	T5	T5			T5
175	PepsiCo	PrL	5	1965	32.6	US	T3	T2	T3			G
176	Lehman Brothers	PrL	10	1850	32.4	US	T4					T4
177	Novartis	PrL	12	1996	32.2	Switzerland	G	G	G	G	G	T5
178	Volvo	PrL	5	1927	32.2	Sweden	T5		T4	T4		
179	Franz Haniel	PrL	12	1981	32.2	Germany						T4
180	Walt Disney	PrL	17	1923	31.9	US	T5	T5	T5			T5
181	Mitsubishi Electric	PrL	5	1921	31.8	Japan	T4	T4	T4			T5
182	Prudential Financial	PrL	10	1875	31.7	US	T2	T2	T2			T5
183	Rabobank	PrL	10	1972	31.7	Netherlands						T5
184	Mizuho Financial	PrL	10	1864	31.4	Japan	T5	T5	T5			T5
185	VeoliaEnvironnement	PrL	14	1853	31.4	France	T5		T3	T3		G
186	Plains All American Pipeline	PrL	2	1993	31.2	US	R1		R1			D
187	Sunoco	PrL	2	1886	31.2	US	D	D	D	D	D	T2
188	Deutsche Bahn	PrL	8	1994	31.1	Germany						T3
189	Best Buy	PrL	7	1966	30.8	US	D	D	D	D	D	R1
190	Northrop Grumman	PrL	8	1927	30.7	US	T2	T2				T4
191	Bouygues	PrL	9	1952	30.5	France	G					G
192	Sysco	PrL	18	1969	30.3	US	D	D	D	D	D	T3
193	American Express	PrL	10	1850	30.1	US	T4	T4				G
194	Millea Holdings	PrL	13	2002	30.0	Japan						T4
195	BHP Billiton	PrL	2	2001	29.6	Australia	G		T4	T4		G
196	Anglo American	PrL	10	1917	29.4	Britain	G	G	G	G		G
197	FedEx	PrL	19	1971	29.4	US	T2		T2			T5
198	Foncière Euris	PrL	7	1887	29.3	France	G		G	G		
199	Bank of China	PrL	10	1984	29.2	China						D
200	Honeywell Intl.	PrL	8	1999	28.9	US	T3	T2	T3			G

201	Ingram Micro	PrL	12	1979	28.8	US	T4	T4	T4	T4	T4	T5
202	China Mobile	PrL	9	2000	28.8	China						R1
203	J. Sainsbury	PrL	7	1869	28.6	Britain	D	D	D			R1
204	Roche Group	PrL	12	1936	28.5	Switzerland	G		G	G		G
205	DuPont	PrL	4	1802	28.5	US						G
206	Hon Hai Precision	PrL	5	1970	28.4	Taiwan	T2	T2	T2			T3
207	Denso	PrL	5	1949	28.2	Japan	T5	T5	T5			T5
208	Mittal Steel	PrL	5	1989	28.1	Netherlands						T3
209	Swiss Reinsurance	PrL	10	1863	28.1	Switzerland	T3					
210	New York Life Ins.	PrL	10	1845	28.1	US						T3
211	Johnson Controls	PrL	5	1885	28.0	US	T3	T2	T3			T5
212	Gaz de France	PrL	3	1946	27.8	France	T2	T2	T2	T2		T4
213	UES of Russia	PrL	8	1992	27.8	Russia						T2
214	RAG	PrL	2	1969	27.8	Germany						T5
215	Marubeni	PrL	13	1858	27.7	Japan	T5	T5	T5			G
216	Coles Myer	PrL	7	1914	27.4	Australia	R1		R1	R1		R1
217	China Life Insurance	PrL	10	2003	27.4	China	D	D	D	D	D	D
218	JFE Holdings	PrL	5	2002	27.4	Japan	T2					T2
219	Delphi	PrL	5	1997	27.2	US	T5		T5	T5		G
220	Hartford Fincl. Ser.	PrL	10	1810	27.1	US	T2					T3
221	KDDI	PrL	9	1984	27.0	Japan						T4
222	Norsk Hydro	Pub	3	1905	27.0	Norway	T4		T4	T4		G
223	Vinci	PrL	4	1899	27.0	France	T3					G
224	Samsung Life Ins	PrL	10	1990	26.7	South Korea						
225	Alcoa	PrL	5	1886	26.6	US	T5	D	T5			G
226	Natl Australia Bank	PrL	10	1893	26.5	Australia	T4		T4			T2
227	Manulife Financial	PrL	10	1887	26.4	Canada	T3					T3
228	Air France-KLM	Pub	8	1933	26.1	France	G					T3
229	SNCF	PrL	8	1938	26.1	France	T2			T2		
230	Old Mutual	PrL	10	1845	26.1	Britain	T4	T4	T4			T4
231	Tyson Foods	PrL	5	1931	26.0	US	T2	T2	T2			T4
232	George Weston	PrL	5	1882	25.9	Canada						T2
233	TIAA-CREF	PrL	12	1918	25.9	US						D
234	International Paper	PrL	5	1898	25.8	US	T5	T2	T3			T5
235	Mazda Motor	PrL	5	1920	25.8	Japan	T4	T4	T4			T5
236	POSCO	PrL	4	1968	25.7	South Korea	T3					T3
237	Idemitsu Kosan	PrL	2	1911	25.4	Japan						T4
238	Centrica	PrL	3	1997	25.1	Britain	T2		T2			T2
239	Vivendi	PrL	9	2000	25.1	France	T4					G
240	Korea Electric Power	PrL	3	1961	24.8	South Korea						R1
241	Cisco Systems	PrL	5	1984	24.8	US	T4					G
242	Sharp	PrL	5	1912	24.7	Japan	T5	T5	T5			T4
243	Mitsubishi Heavy Ind.	PrL	5	1934	24.7	Japan	T4	T4	T4			T4
244	HCA	PrL	16	1968	24.5	US						T2
245	Bridgestone	PrL	5	1931	24.4	Japan	T5	T5	T5			G
246	St. Paul Travelers	PrL	10	1853	24.4	US						T3
247	Bunge	PrL	1	1818	24.3	US	T5		T4			
248	Ladbrokes	PrL	17	1886	24.3	Britain	T5		T5	T5		
249	Suzuki Motor	PrL	5	1909	24.3	Japan	T4	T4	T4			T5
250	Royal Bank Canada	PrL	10	1864	24.1	Canada	T2	T2	T2			T4
251	Woolworths	PrL	7	1924	24.0	Australia						R1
252	La Poste	Pub	20	1885	24.0	France						T3
253	AstraZeneca	PrL	5	1999	24.0	Britain	G	G	G			G

254	Landesbank	PrL	10	1999	23.9	Germany						D
255	Bank Of China	PrL	10	1912	23.9	China						T3
256	News Corp.	PrL	9	1979	23.9	US	T4	R1	T4			D
257	Nippon Mining	PrL	2	1912	23.6	Japan						T3
258	Fuji Photo Film	PrL	5	1934	23.6	Japan	T5	T5	T5			T5
259	Hutchison Whampoa	PrL	13	1863	23.5	China	G	G	G	G		T3
260	Compass Group	PrL	18	1941	23.5	Britain	T3	T3	T3			T4
261	TUI	PrL	17	2002	23.4	Germany	T3		T3	T3	T3	T5
262	Federated Dept. Stores	PrL	7	1929	23.3	US						D
263	Hess	PrL	2	1919	23.3	US	T5	D	T5			T2
264	Delhaize Group	PrL	7	1867	23.2	Belgium						
265	PTT	PrL	2	2001	23.1	Thailnad						R1
266	China Southern Power Grid	PrL	3	2002	23.1	China						D
267	Coca-Cola	PrL	5	1886	23.1	US	T5	T5	T5	T5	T5	T5
268	Weyerhaeuser	PrL	5	1990	23.0	US	T4	T2	T2			T3
269	Banco Bradesco	PrL	10	1943	22.9	Brazil						R1
270	East Japan Railway	PrL	4	1987	22.9	Japan	D	D	D	D	D	D
271	Aetna	PrL	16	1850	22.9	US	D	D	D	D	D	D
272	KBC Group	PrL	10	1998	22.9	Belgium	T2		T2	T2		
273	Magna International	PrL	8	1952	22.8	Canada	T3		T3			T4
274	Sumitomo	PrL	13	1919	22.8	Japan	T4		T4			T5
275	Massachusetts Mutual Life Ins	PrL	10	1851	22.8	US						T3
276	Kansai Electric	PrL	3	2001	22.8	Japan						D
277	China Bank	PrL	10	1954	22.8	China						
278	Adecco	PrL	12	1996	22.7	Switzerland	T4		T4			G
279	China Telecommunications	PrL	9	2002	22.7	China	D	D	D	D	D	D
280	Endesa	PrL	3	1944	22.7	Spain	T2	T2	T2		T2	T3
281	ABB	PrL	19	1988	22.6	Switzerland	T5		T5			T5
282	Lufthansa Group	PrL	8	1954	22.4	Germany	G	G	G	G		T5
283	Abbott Laboratories	PrL	12	1888	22.3	US	T4	D	T4			G
284	Danske Bank Group	PrL	10	1889	22.3	Denmark	T3		T2	T3		T2
285	Comcast	PrL	9	1963	22.3	US	D	D	D	D	D	D
286	UniCredito Italiano	PrL	10	1473	22.2	Italy	T5		T5	T5		T4
287	Bertelsmann	PrL	9	1835	22.2	Germany						T5
288	PPR	PrL	7	1962	22.1	France	G			G		G
289	Merck	PrL	12	1917	22.0	US	T4		T4			T5
290	Power Corp. Canada	PrL	6	1925	22.0	Canada	T2		T2			T3
291	William Morrison	PrL	7	1899	21.9	Britain						
292	Deere	PrL	1	1868	21.9	US	T2	T2	T2			G
293	Raytheon	PrL	5	1922	21.9	US	T2	T2	T2			T5
294	Nationwide	PrL	10	1926	21.8	US						R1
295	T&D Holdings	PrL	10	1893	21.6	Japan						
296	Baosteel Group	Pub	5	1978	21.5	China						D
297	Washington Mutual	PrL	10	1889	21.3	US	D	D	D	D	D	D
298	General Dynamics	PrL	13	1952	21.3	US	G					T2
299	Mitsubishi Chem.	PrL	5	1940	21.3	Japan						T4
300	Sanyo Electric	PrL	5	1950	21.2	Japan	T3	T3	T3			T4
301	3M	PrL	13	2002	21.2	US	G	T5	G			G
302	Liberty Mutual Ins.	PrL	10	1912	21.2	US						T4
303	Groupama	PrL	10	1999	21.1	France						R1
304	Sinochem	PrL	1	1996	21.1	China						T4
305	Karstadt Quelle	PrL	7	1920	21.0	Germany	T2	T2	T2	T2		T2

306	Halliburton	PrL	2	1919	21.0	US	T4	D	T3			G
307	SABIC	PrL	5	1976	20.9	Saudi Arabia						T3
308	Wolseley	PrL	4	1887	20.8	Britain	T3					T3
309	Publix SuperMarkets	PrL	7	1930	20.7	US	D	D	D	D	D	D
310	Rio Tinto Group	PrL	2	1873	20.7	Britain	G		G	G		T5
311	Commerzbank	PrL	10	1870	20.7	Germany	T5	T5				T4
312	AMR	PrL	8	1982	20.7	US	T4					T4
313	Alcan	PrL	4	1902	20.7	Canada	T5	T5	T5	T5		G
314	BellSouth	PrL	9	1983	20.6	US						T5
315	Tech Data	PrL	9	1974	20.5	US	T2	T2	T2	T2	T2	T3
316	Electronic Data Systems	PrL	9	1962	20.5	US	T3	T2	T3			T5
317	Poste Italiane	Pub	8	1878	20.5	Italy						
318	McDonald's	PrL	18	1940	20.5	US	T5	T5	T5	T5	T5	T5
319	L.M. Ericsson	PrL	9	1876	20.3	Sweden	T5		T5	T5		G
320	BAE Systems	PrL	5	1999	20.2	Britain	G		G	G		T4
321	Bristol-Myers Squibb	PrL	12	1887	20.2	US	T5	T4	T5			T3
322	Cepsa	PrL	2	1996	20.1	Spain	T5		T4	T4		
323	Banco Do Brasil	PrL	10	1808	20.0	Brazil						
324	Supervalu	PrL	7	1870	19.9	US	D	D	D	D	D	R1
325	Lafarge	PrL	4	1833	19.8	France						T5
326	Sara Lee	PrL	5	1939	19.7	US	T3	D	T3			G
327	Goodyear	PrL	5	1898	19.7	US	T2	T2	T2			G
328	Itochu	PrL	13	1992	19.6	Japan	T4		T5			G
329	William Hill	PrL	17	1934	19.5	Britain						R1
330	Cendant	PrL	11	1996	19.5	US						T5
331	Cathay Financial	PrL	10	2001	19.5	Taiwan						T2
332	AutoNation	PrL	7	1996	19.5	US	D	D	D	D	D	T2
333	Japan Airlines	PrL	8	1951	19.4	Japan	T5					T4
334	OMV Group	PrL	2	1956	19.4	Austria	T2	T2	T2	T2		T4
335	Michelin	PrL	5	1888	19.4	France	T3					G
336	Northwestern Mutual	PrL	10	1857	19.2	US	D	D	D	D	D	T4
337	Cosmo Oil	PrL	2	1986	19.1	Japan	T2	T2	T2			T3
338	Chubu Electric Power	PrL	3	1992	19.0	Japan						D
339	J.C. Penney	PrL	7	1902	19.0	US	D	D	D	D	D	D
340	Duke Energy	PrL	3	1904	18.9	US	T3	R1	T3			T3
341	SHV Holdings	PrL	2	1896	18.8	Netherlands						T5
342	Reliance Industries	PrL	4	1966	18.8	India	T2		T2	T2		T2
343	Wyeth	PrL	12	1860	18.8	US	T3		T3			T5
344	Aisin Seiki	PrL	5	1949	18.7	Japan	T4	T4	T4			T3
345	Mitsubishi Motors	PrL	5	1970	18.7	Japan	T4	T4	T4			T4
346	Coca-Cola Ent.	PrL	5	1986	18.7	US	T2		T2			T3
347	Banca Intesa	PrL	10	1998	18.6	Italy						T3
348	Mitsui Sumitomo Ins	PrL	10	2000	18.6	Japan						T4
349	Lyondell Chemical	PrL	5	1985	18.6	US	T2	T2	T2			T3
350	Commonwealth Bank of Australia	PrL	10	1991	18.6	Australia	T2	T2	T2			T3
351	Countrywide Fincl.	PrL	10	1969	18.5	US	D	D	D	D	D	T2
352	Corus Group	PrL	2	1999	18.4	Britain						T4
353	Gasunie	PrL	3	1963	18.3	Netherlands						
354	MAN Group	PrL	10	1994	18.2	Germany	G		T3	T3		G
355	Scottish&Sthrn Enrgy	PrL	4	1998	18.1	Britain	R1	R1	R1	R1	R1	R1
356	Sun Life	PrL	10	1865	18.1	Canada	T4		T4			T2
357	Christian Dior	PrL	7	1905	18.1	France	T4			T4		

358	Koc Holding	PrL	13	1926	18.1	Turkey						R1
359	L'Oréal	PrL	17	1909	18.1	France	T3					G
360	Dominion Resources	PrL	3	1980	18.0	US	R1	R1	R1			R1
361	CRH	PrL	4	1970	18.0	Ireland	T3	T3	T3	T3	T3	T3
362	Bayerische Landesbank	PrL	10	1884	17.9	Germany						T3
363	Otto Group	PrL	7	1949	17.9	Germany						
364	Kookmin Bank	PrL	10	1963	17.9	South Korea						T2
365	Japan Tobacco	PrL	5	1985	17.7	Japan	T3	T3	T3			T4
366	Sumitomo Electric Ind	PrL	5	1986	17.7	Japan	T4	T4	T4			G
367	Rosneft Oil	PrL	2	1993	17.7	Russia	D	D	D	D	D	T2
368	Bharat Petroleum	PrL	2	1976	17.6	India	D	D	D	D	D	D
369	UAL	PrL	8	1926	17.4	US						T4
370	Constellation Energy	PrL	3	1995	17.4	US	D	D	D	D	D	R1
371	Electrolux	PrL	5	1910	17.3	Sweden	T4		T4	T4		G
372	Emerson Electric	PrL	3	1890	17.3	US	T5	T2	T5			T5
373	Swiss Life	PrL	10	1857	17.3	Switzerland	T2		T2	T2		T2
374	Vattenfall	Pub	3	1909	17.3	Sweden						T2
375	Rite Aid	PrL	7	1968	17.3	US	D	D	D	D	D	D
376	Continental	PrL	5	1871	17.2	Germany	T4		T4	T4		T5
377	Agri. Bank of China	PrL	10	1949	17.2	China						R1
378	Hindustan Petroleum	PrL	2	1976	17.1	India	D	D	D	D	D	D
379	Accenture	PrL	12	1989	17.1	US	T4		T4			
380	Lear	PrL	5	1976	17.1	US	T3	T2	T3			T5
381	Hanwha	PrL	13	1952	17.1	South Korea	T3	T3	T3			T3
382	Sompo Japan Ins.	PrL	10	2002	17.1	Japan						T4
383	Telstra	PrL	9	1991	17.0	Australia						T3
384	Nippon Yusen	PrL	8	1875	17.0	Japan	T4	T4	T4			T5
385	Japan Post	Pub	8	2003	17.0	Japan						D
386	Visteon	PrL	5	1903	17.0	US	T5					T5
387	TNT	PrL	8	1996	17.0	Netherlands	T4		T4			D
388	Mediceo Paltac	PrL	16	1923	17.0	Japan	D	D	D	D	D	D
389	Hochtief	PrL	4	1874	17.0	Germany	G		T5			G
390	BritishAmer.Tobacco	PrL	5	1902	16.9	Britain	G	G	G		G	G
391	Ricoh	PrL	5	1936	16.9	Japan	T5	T5	T5			G
392	San Paolo IMI	PrL	10	1931	16.9	Italy						T2
393	Alstom	PrL	5	1928	16.9	France	T5					G
394	National Grid	PrL	3	1990	16.8	Britain	T2	T2	T2	T2	T2	T4
395	CFE	Pub	3	1937	16.8	Mexico						
396	EnCana	PrL	2	2002	18.8	Canada	T2	T2		T2	T2	T5
397	KT	PrL	9	1981	16.7	South Korea						T2
398	América Telecom	PrL	9	2001	16.7	Mexico						D
399	Cigna	PrL	16	1982	16.7	US	D					T2
400	Skanska	PrL	4	1877	16.7	Sweden	T3		T3			T5
401	Alliance Unichem	PrL	16	1938	16.7	Britain						R1
402	Oil & Natural Gas	Pub	2	1959	16.6	India	T2	T2	T2	T2	T2	R1
403	U.S. Bancorp	PrL	10	1890	16.6	US	D	D	D		D	D
404	WestLB	PrL	10	1969	16.5	Germany						T3
405	BCE	PrL	9	1880	16.5	Canada						T3
406	Tesoro	PrL	2	1968	16.5	US	D	D	D	D	D	T2
407	Groupe Danone	PrL	5	1919	16.5	France	T3	T3	T3	T3		G
408	Stora Enso	PrL	5	1998	16.4	Finland	T3		T3	T3	T3	T5
409	Migros	PrL	7	1925	16.4	Switzerland						t3
410	Banco Bilbao	PrL	10	1999	16.3	Spain						t3

411	Alcatel	PrL	9	1898	16.3	France	T4	T4	T4	T4		G
412	Occidental Petroleum	PrL	2	1920	16.3	US	T4		T4			T4
413	Express Scripts	PrL	16	1986	16.3	US	R1		R1			D
414	Delta Air Lines	PrL	8	1928	16.2	US						R1
415	Itaúsa-Investimentos	PrL	10	1945	16.2	Brazil						T3
416	Lagardère Groupe	PrL	5	1996	16.2	France	T5			T5		G
417	Royal Mail	Pub	20	1660	16.2	Britain						R1
418	Akzo Nobel	PrL	16	1994	16.2	Netherlands	T5		T5	T5		G
419	Manpower	PrL	12	1948	16.1	US	T5	T5	T5	T5	T5	T5
420	Staples	PrL	7	1986	16.1	US	T2		T2			T2
421	TJX	PrL	7	1956	16.1	US	T2					T2
422	Gap	PrL	7	1969	16.0	US	T4					T3
423	Australia & New Zealand Banking	PrL	10	1835	15.9	Australia	T2	T2	T2			T5
424	Edeka Zentrale	PrL	7	1898	15.9	Germany						R1
425	Kimberly-Clark	PrL	16	1872	15.9	US	T4	T4	T4			T5
426	Nippon Express	PrL	8	1937	15.8	Japan	T4	T4	T4			T4
427	Nomura Holdings	PrL	10	1925	15.8	Japan	T5	T5				T3
428	KFW Bankengruppe	Pub	10	1948	15.8	Germany						
429	Altadis	PrL	5	1999	15.8	Spain	T5		T5	T5		T4
430	Westpac Banking	PrL	10	1817	15.7	Australia	T2	T2	T2			t3
431	Xerox	PrL	19	1906	15.7	US	T3		T3			T5
432	Kajima	PrL	12	1840	15.7	Japan	T3	T3	T3			T3
433	Flextronics Intl.	PrL	5	1990	15.6	Singapore	T4	T4		T4	T4	T5
434	ConAgra Foods	PrL	1	1919	15.5	US	T2	T2				G
435	Centex	PrL	4	1969	15.5	US						T2
436	Canadian Imperial Bank of Commerce	PrL	10	1867	15.4	Canada	T2	T2	T2			T4
437	Exelon	PrL	2	2000	15.4	US	D	D	D	D	D	T2
438	Taisei	PrL	4	1873	15.4	Japan	T3					T3
439	Loews	PrL	13	1970	15.4	US						T5
440	Toronto-Dom. Bank	PrL	10	1955	15.3	Canada	T2	T2	T2			T3
441	China Railway Eng.	Pub	4	1989	15.3	China						D
442	British Airways	PrL	8	1924	15.2	Britain	G	T3				T2
443	Surgutneftegas	PrL	2	1983	15.2	Russia	D	D	D	D		D
444	Finmeccanica	PrL	8	1948	15.1	Italy	T3		T3	T3		T5
445	Samsung	PrL	5	1938	15.1	South Korea	T4	T4	T3			T4
446	Bank of Nova Scotia	PrL	10	1832	15.1	Canada	T2	T2	T2			T4
447	ACS	PrL	12	1988	15.1	Spain	T2		T2			T5
448	Anheuser-Busch	PrL	5	1875	15.0	US	T2					T3
449	Komatsu	PrL	4	1917	15.0	Japan	T5	T5	T5			T5
450	Carso Global Telecom	PrL	9	1966	15.0	Mexico	T2	T2			T2	D
451	Cemex	PrL	4	1906	14.9	Mexico	G	G	G	G	G	T5
452	Daiei	PrL	7	1957	14.9	Japan						T2
453	Bombardier	PrL	8	1942	14.9	Canada	T3		T3			T3
454	Quanta Computer	PrL	9	1988	14.9	Taiwan	T2	T2	T2			T3
455	Pulte Homes	PrL	4	1950	14.9	US	D	D	D	D	D	D
456	Henkel	PrL	5	1876	14.9	Germany	T5	T5	T5	T5	T5	G
457	Royal KPN	PrL	9	1989	14.8	Netherlands	T2		T2	R1		T3
458	Holcim	PrL	4	1912	14.8	Switzerland	T5	T5	T5		T5	
459	Sodexho Alliance	PrL	18	1966	14.8	France	T3					G
460	Nordea Bank	PrL	10	2000	14.8	Sweden	R1		R1	R1		T3
461	Kobe Steel	PrL	5	1905	14.7	Japan	T2					T5
462	Tohoku Electric	PrL	3	1955	14.7	Japan						T2

463	COFCO	Pub	1	1994	14.7	China	D	D	D	D	D	D
464	Eli Lilly	PrL	12	1876	14.6	US	T3		T3			T4
465	Computer Sciences	PrL	12	1959	14.6	US	T3	D	T3			T5
466	Iberdrola	PrL	3	1992	14.6	Spain	T3	T3	T3	T3	T3	T3
467	SK Networks	PrL	9	1953	14.6	South Korea						T4
468	CBS	PrL	17	1986	14.5	US	T2	T2	T2			
469	Schneider Electric	PrL	13	1981	14.5	France	T4	T4				G
470	China First Auto	PrL	5	1956	14.5	China						
471	Kingfisher	PrL	7	1982	14.5	Britain	T3	T3	T3			T3
472	Inbev	PrL	6	1998	14.5	Belgium	T5	T5	T5	T5	T5	
473	Humana	PrL	10	1961	14.4	US	D	D	D	D	D	T2
474	Onex	PrL	5	1983	14.4	Canada	T3		T3			T2
475	Shanghai Auto.	PrL	5	2001	14.4	China	D	D	D	D	D	T2
476	AFLAC	PrL	16	1955	14.4	US	T2	T2	T2			T2
477	Schlumberger	PrL	2	1927	14.3	US	T5	T5	T5	T5	T5	
478	Whirlpool	PrL	5	1911	14.3	US	T4	T4	T4	T4	T4	T5
479	Progressive	PrL	10	1937	14.3	US	D	D	D	D	D	T2
480	Office Depot	PrL	7	1986	14.3	US	T2	T2	T2			T3
481	Friends Provident	PrL	10	1832	14.3	Britain	T2		T2	T2		T4
482	Eastman Kodak	PrL	5	1892	14.3	US	T3	D	T3			G
483	AREVA	PrL	2	2001	14.2	France	G					
484	Scottish Power	PrL	3	1991	14.2	Britain						T2
485	ChinaRailwayConstr.	PrL	4	1949	14.1	China						R1
486	China State Constr.	PrL	4	1979	14.1	China						T2
487	GUS	PrL	7	1900	14.1	Britain						T4
488	Chubb	PrL	10	1882	14.1	US	T2					T4
489	Paccar	PrL	5	1905	14.1	US	T3		T3			T3
490	United States Steel	PrL	5	1901	14.0	US						R1
491	Isuzu Motors	PrL	5	1910	14.0	Japan	T3	T3	T3			T4
492	Apple Computer	PrL	5	1976	13.9	US	T5	T5	T5		T5	T5
493	Marks & Spencer	PrL	7	1884	13.9	Britain	T2	T2	T2			T3
494	Qwest Comm.	PrL	12	1995	13.9	US						T2
495	Lennar	PrL	11	1954	13.9	US	D	D	D	D	D	R1
496	D.R. Horton	PrL	4	1978	13.9	US	D	D	D	D	D	D
497	Asahi Glass	PrL	5	1907	13.9	Japan	T4	T4	T4			T4
498	State Bank of India	PrL	10	1806	13.8	India	T2		T2			T3
499	Sumitomo Chemical	PrL	5	1913	13.7	Japan	T2	T2	T2			T3
500	Nike	PrL	7	1972	13.7	US	G	G	G	G	G	T5

Notes. This table describes each firm on the *Fortune 500* list in 2005 using 6 criteria – type (ownership), industry, date of incorporation, size, location (country of headquarters) and multinationality. The abbreviations for *type* are Prl (private listed), Pub (public) and Pru (private unlisted). Firms are classified by *industry* using the North American Industry Classification System (NAICS) available at the 2-digit level; 3 = utilities, 5 = manufacturing, 6 = wholesale trade, 7 = retail trade, 8 = transportation and warehousing, 9 = information and 10 = finance and insurance. *Size* is measured as sales in billions of US dollars. The multinationality of firms is measured using 6 criteria – sales, income (Inc), assets (Ass), capital expenditure (CE), depreciation (dep) and subsidiaries (subs).