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Master in Economics

Inward investment attraction and the quality of multinationals' activities:
the contrasting cases of Ireland and Portugal

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Biographical note

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Abstract

The relevance of foreign direct investment (FDI) (UNCTAD, 2007) is recognised by a vast body of literature. However, until recently most studies and policy-making initiatives were focused on the mere magnitude of FDI inflows (i.e. the quantity), neglecting the quality of these investments. Recent literature on subsidiaries' roles and evolution is shedding light on the asymmetric quality of multinationals' (MNEs) operations, hence helping to understand their differentiated impact on host economies.

This dissertation contributes to this literature by investigating empirically the quality of foreign subsidiaries' activities located in Ireland and Portugal. Using data from a purposely designed questionnaire survey, the following questions will be analysed. First, which characteristics of multinational subsidiaries are conducive to innovation? This study will consider the impact of age, education and R&D intensities, among other characteristics, on innovation. This question will be analysed using a probit model. Second, do foreign subsidiaries based in Ireland and Portugal differ in a systematic way with regard to these characteristics and with regard to the motivations that led to their establishment? This question will be studied using nonparametric methods.

The empirical results (first application) corroborate the hypotheses that age, education and R&D intensities of the subsidiary impact positively on innovation. The results are consistent with previous studies that emphasise the time dependent aspect of multinational subsidiaries' evolution (Young, Hood and Peters, 1994; Birkinshaw and Hood, 1997, 1998) and those that highlight the importance of human capital (Bartel and Lichtenberg, 1987; Narula and Marin, 2003) and R&D activities (Cohen and Levinthal, 1989, 1990) for technology absorption and creation. It was also found (the second empirical application) that the asset-seeking motivation played a more important role in attracting investors to Ireland than to Portugal and that subsidiaries based in Ireland tend to display greater education and R&D intensities than those based in Portugal.

Keywords: Foreign Direct Investment, Multinational Enterprises, Subsidiary Roles/Strategies, Ireland, Portugal.

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List of Abbreviations

AICEP	Agência para o Investimento e Comércio Externo de Portugal
API	Agência Portuguesa para o Investimento
BERD	Business Expenditure on R&D
CH	Switzerland
DE	Germany
DK	Denmark
EC	European Community
ERDF	European Regional Development Fund
EFTA	European Free Trade Association
EPO	European Patent Office
ESF	European Social Fund
ESPRIT	European Strategic Programme for Research and Development in Information Technology
EU	European Union
EUR	Euro
FDI	Foreign Direct Investment
FI	Finland
FR	France
GATT	General Agreement on Tariffs and Trade
HQ	Headquarters
ICEP	Instituto do Comércio Externo de Portugal (1982 – 1992), Investimentos, Comércio e Turismo de Portugal (1992 – 2002).
IDA	Industrial Development Agency
IE	Ireland
IFSC	International Financial Services Centre
KBV	Knowledge Based View
M&A	Mergers and Acquisitions
ML	Maximum Likelihood
MNE	Multinational Enterprise
MR	Miniature Replica

MT	Malta
NO	Norway
OECD	Organisation for Economic Cooperation and Development
OLI	Ownership, Location and Internalisation
PEDIP	Programa Específico de Desenvolvimento da Indústria Portuguesa
PM	Product Mandate
RBV	Resource Based View
RM	Rationalised Manufacturer
R&D	Research and Development
RTA	Regional Trade Agreement
SE	Sweden
SI	Slovenia
UK	United Kingdom
UNCTAD	Nations Conference on Trade and Development
US	United States
USD	US Dollar
USPTO	United States Patent and Trademark Office
WTO	World Trade Organisation

1 Introduction and Plan of the Dissertation

1.1 Context and Motivation

The study of the attraction of foreign direct investment (FDI) commands a considerable body of literature. However, until recently most of this literature has focused on the mere magnitude of FDI inflows (“quantity”), neglecting the quality of multinationals’ (MNEs) operations (Young and Hood, 1994; Pearce, 2001; Tavares, 2004). This dissertation addresses explicitly the quality of multinational activities, using Portugal and Ireland as empirical settings.

While there is substantial agreement on the potential for spillovers from MNEs to host countries, it is increasingly recognised that the occurrence and extent of these spillovers vary remarkably. Several studies show that a positive developmental impact of inward FDI on host economies is not an automatic consequence of the mere presence of foreign subsidiaries [for a comprehensive review see Görg and Greenaway (2001), Görg and Strobl (2001) Tavares and Young (2005)]. They suggest that this impact is contingent, among other aspects, on the quality of activities undertaken in the host country (Hood and Young, 1988; Young and Hood and Dunlop, 1988; Young, Hood and Peters, 1994; Narula and Marin, 2003).

Yet, potential benefits, such as technological spillovers, constitute a key motivation behind governments’ drive to attract FDI (Te Velde, 2002; Blomström and Kokko, 2003; Ghauri and Oxelheim, 2003). Indeed, governments all over the world invest considerably in attracting inward FDI by offering fiscal and financial incentives recognising the potential role inward FDI can play in the industrial upgrading of the host country (Te Velde, 2002; Oxelheim and Ghauri, 2003). Although most of these efforts have concentrated on mere attraction of FDI projects, there is an increased preoccupation with the quality of jobs created, the types of activities undertaken within the subsidiaries and linkages with the host country (UNCTAD 2001, 2005b).

In view of these considerations, the quality of multinationals' activities emerges as an important topic, both from an academic and policy making point of view. This dissertation aims to contribute to the study of this topic by exploring empirically the quality of multinationals' activities in Ireland and Portugal. More specifically, it will address the following questions. First, which characteristics of multinational subsidiaries are conducive to innovation? The characteristics explored here are human capital and R&D intensities, age, size of the subsidiary, embeddedness in the host country and decision making autonomy from the parent multinational. Second, do foreign subsidiaries based in the two host countries analysed here differ in a systematic way with regard to these characteristics and with regard to the motivations that led to their establishment?

1.2 Design of the Research

To answer these questions, the literature on the motivations underlying the establishment of foreign subsidiaries, the choice of location and the quality aspect of activities undertaken within the foreign subsidiaries will be reviewed. These topics are integrated in one analytical framework following Birkinshaw and Hood (1997, 1998) and Pearce (2001), which views the establishment of foreign subsidiaries (i.e. the attraction of FDI) and subsequent subsidiaries' evolution as parts of one single process of international production. Based on this discussion, the questions stated above are studied empirically. Two empirical applications were carried out.

The first one aims (through an econometric estimation using a probit model) to unveil the determinants of a subsidiary's ability to innovate. In line with the three key drivers underlying subsidiary evolution (Birkinshaw and Hood, 1997, 1998; Tavares, 2001), it is considered that characteristics of the subsidiary, of the parent MNE and of the external environment all impinge on the subsidiary's ability to innovate. Among all these aspects, this study is concerned mainly with subsidiaries' characteristics. In particular, it focuses on the human capital and R&D intensity, embeddedness in the host country and decision making autonomy of the subsidiary.

This analysis is complemented by a comparison (using a nonparametric methodology)

of foreign subsidiaries in Ireland and Portugal with regard to the motivations underlying the establishment of subsidiaries in such countries and subsidiaries' characteristics, notably, their human capital and R&D intensity, embeddedness in the host country and decision making autonomy. This second empirical application was deemed appropriate for two reasons. First, given that these characteristics constitute potential determinants of innovative capabilities it is interesting to investigate whether there are any significant differences between foreign subsidiaries based in Ireland and Portugal concerning these characteristics. Second, apart from their relevance as determinants of innovation, these characteristics may be conducive to regional and host country development (Hood and Young, 1988; Young and Hood and Dunlop, 1988; Young, Hood and Peters, 1994; Andersson and Forsgren, 1996; Barrios *et al.*, 2001; Narula and Marin, 2003; Tavares, 2001; Tavares and Young, 2004; Tavares and Teixeira, 2005).

As mentioned above, the research focuses on foreign subsidiaries located in Ireland and Portugal. This empirical setting is appealing because these two countries are similar in a number of aspects: both are small, open and peripheral economies that are part of a large trade block, the European Union (EU), and both have industrialised late in comparison to other European countries (Castro, 2000; Ruane, 2001; Tavares, 2001). However, the two countries differ markedly in their policy approaches (and policy consistency) towards FDI, education and innovation. This situation is very appropriate for drawing comparisons and deriving policy implications.

In view of the topic studied, the logical unit of analysis was deemed the foreign subsidiary, which meant that the empirical research required subsidiary level data. Given the lack of available subsidiary level data for the variables of interest, a specifically designed questionnaire survey was conducted between July and November 2006. Both empirical applications presented in this dissertation are based on the data gathered through this survey.

1.3 Main Results

The empirical results support the hypotheses that age, education and R&D intensities of the subsidiary impact positively on the subsidiary's innovative capabilities. The

nonparametric analysis of the characteristics of the value-added activities of the foreign subsidiaries based in the two countries reveals that subsidiaries based in Ireland tend to display greater export intensity, human capital intensity and R&D intensity. The linkages established with local suppliers are low in both countries and they do not differ in a significant way. These results are consistent with previous studies that emphasise the time dependent aspect of multinational subsidiaries' evolution (Young, Hood and Peters, 1994; Birkinshaw and Hood, 1997, 1998) and those that highlight the importance of human capital (Bartel and Lichtenberg, 1987; Narula and Marin, 2003) and R&D activities (Cohen and Levinthal, 1989, 1990) for technology absorption and creation.

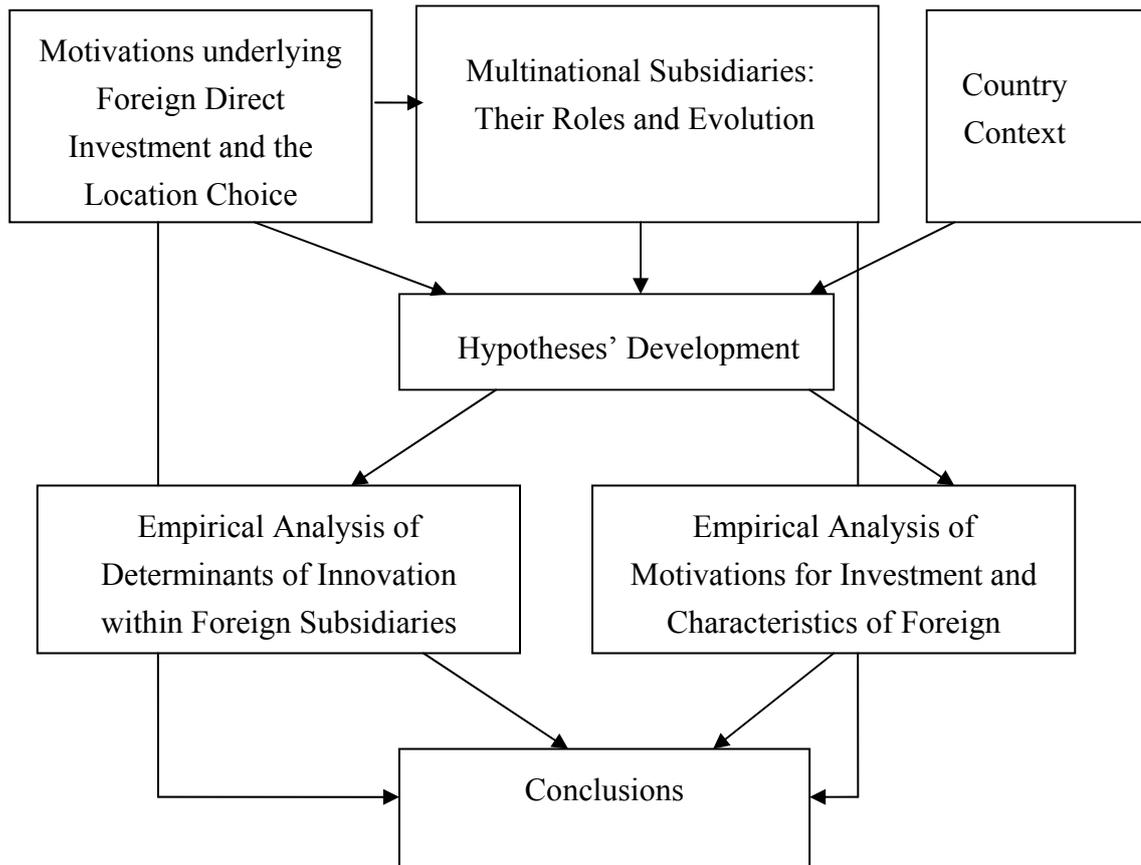
The nonparametric analysis of the motivations for investment shows that there were significant differences in the motivations that propelled MNEs to invest in the two countries. Incentives for investment, workforce skills and the availability of scientific/technological inputs played a more important role in the decision to establish subsidiaries in Ireland than in Portugal, which is consistent with research that links location endowments to the motivations for investment and the quality of multinationals' activities (Narula and Marin, 2003).

1.4 Plan of the Dissertation

The dissertation is organised as follows. It begins with a review of the literature on motivations underlying FDI and the roles and evolution of foreign subsidiaries (Chapters 2 and 3). This literature review aims to bring together and discuss various theoretical frameworks and insights, allied to leading empirical tests of such literature, that later help develop the hypotheses. Chapter 4 presents a brief description of the economies of the two countries. Special emphasis is given to the education and innovation systems of the two countries, as well as to policy approaches, which are considered to be particularly relevant for the purpose of the research. The hypotheses to be tested in the empirical applications are developed in Chapter 5. They are informed by the theoretical and descriptive chapters and by previous empirical research on these topics. The empirical investigation, including the data gathering methodology, the sample, the empirical methods and the results, are reported in Chapter 6. Chapter 7

discusses the main results of the two empirical exercises in view of the theory and the previous studies and suggests avenues for further investigation and policies that would facilitate the attraction of high value added activities and/or upgrading of the extant activities. Figure 1.1 illustrates the organisation of the dissertation:

Figure 1.1: Outline of the Dissertation



2 Motivations Underlying Foreign Direct Investment and Location Choice

2.1 Overview

This study is grounded in an analytical framework developed by Birkinshaw and Hood (1997, 1998) and Pearce (2001), among others, which views the establishment of foreign subsidiaries (i.e. the attraction of FDI) and subsequent subsidiaries' evolution as parts of one single process of international production. The MNE is conceptualised as a dynamic differentiated network (Forsgren and Johanson, 1992) that implements a global approach to competition through subsidiaries with distinct roles/strategies¹ that draw on location advantages (Dunning, 1977) of their host countries. In line with this framework, the theoretical and conceptual background of the study comprises two parts. Chapter 2 will survey the theoretical approaches that seek to explain the motivations underlying foreign production and location choice and Chapter 3 will review the theoretical literature explaining subsidiaries' roles/evolution within the MNE network.

When choosing among alternative locations, a MNE will prefer the locations whose endowments, intrinsic or created, fit better with its motivations for engaging in FDI and the type of value added activities to be undertaken by the subsidiaries. Therefore, the motivations underlying the investments can provide important insights about the characteristics of subsidiaries, and the nature of activities they carry out.

The issues of existence and growth of MNEs are explained by various theoretical approaches. Dunning (1973: 289) noticed that "*there are few branches of economic analysis which are not relevant to an understanding of the origin and the growth of multinational enterprises*". A comprehensive review of all the theories concerned with the existence and growth of MNEs is beyond the scope of this study. Instead, only the theories that are deemed to be directly relevant to our purpose will be reviewed.

¹ Although the terms strategy and role will be used interchangeably they do not have exactly the same meaning. The term strategy entails that the subsidiary actively participates in developing the strategy as opposed to being assigned certain responsibilities by the headquarters, which is the meaning of subsidiary role (Birkinshaw, 2000). It is however common in the literature that both terms are used interchangeably, what happens also in the present dissertation.

The chapter is organised as follows. It starts by discussing why MNEs may decide to exploit or augment/upgrade their ownership advantages by engaging in FDI instead of licensing or conducting arm's length operations. Afterwards, the motivations underlying location choice will be explored. The chapter ends with a few considerations on the relative importance of various motivations for the present research.

2.2 Motivations Underlying the Decision to Invest Abroad

It is widely held that firms in order to compete successfully with their rivals in a foreign market need to possess some kind of exclusive *advantage* (Bain, 1956; Hymer 1960/1976; Caves, 1971, 1982; Buckley and Casson, 1976; Dunning, 1977, 1993, 2000).

The notion of ownership advantage dates back to Hymer (1960/1976), inspired by Bain (1956). He argued that a firm, to set up value-adding activities in a foreign country must possess some advantage over its local rivals in order to outweigh the costs of foreignness. This advantage should be possessed only by the focal firm. The exclusive possession of the advantage by the MNE is explained by the fact that MNEs operate under imperfect competition, both in factor markets and final goods markets (Hymer, 1960/1976). Building on these insights, Dunning (1993) defines ownership (O) advantage as any net competitive advantage that enables MNEs to compete successfully against their rivals in relevant markets. This definition of the ownership advantage will be used in this research.

Most of the theories and frameworks tend to see FDI either in terms of exploiting the multinationals' advantages or in terms of exploring them (March, 1991). The distinction between these two types of motivations to engage in FDI is relevant for the purpose of this study because the two types of motivations lead to the establishment of different kinds of foreign subsidiaries, as will be shown later in the dissertation.

2.2.1 FDI as a Way of *Exploiting* Ownership Advantages

Often, extant FDI theories are concerned with how a firm that possesses an O-advantage will exploit this advantage in a foreign location. A firm in this situation faces three main options: engaging in FDI, exporting and licensing (Dunning, 1977). The focus of these theories is on explaining under which conditions firms would prefer engaging in FDI.

Product Life Cycle Theory

Product Life Cycle theory (Vernon, 1966; Hirsch, 1967; Wells, 1968) is one of the first theories that attempted to integrate international production, FDI, innovation and imitation in one conceptual framework and which emphasised the importance of innovative capacity as a key ownership advantage of MNEs.

It is based on the dynamic model of innovation, monopoly and imitation leading to a temporary disequilibrium called “technological gap” and developed by Posner (1961). The latter argued that any innovation introduced by a firm creates a temporary “technological gap” which generates temporary monopoly profits. As time goes by, the innovation is adopted by other firms. Imitation by rivals eventually erodes the competitive advantage of the innovating firm. Innovation, therefore, leads to a temporary market disequilibrium and monopoly. Imitation restores the market to equilibrium. The result is a cycle of innovation and imitation, monopoly and competition.

Vernon (1966) applied the “technological gap” model to the outward FDI undertaken by US multinationals in the 1960s and 1970s. He argued that the ownership advantage possessed by the leading US MNEs was their capacity to innovate, and this capacity was partly determined by US factor endowments (the US was abundant in highly skilled labour and capital) and partly by its high income market, which implied a high domestic demand for new and technologically sophisticated goods.

According to his model, innovations are created in a high income country to satisfy

domestic demand for sophisticated goods. Vernon (1966) argued that the country where the innovations will be first introduced will be a high income country with a high demand for sophisticated goods and abundant in high skilled labour and capital - at that time, the US. The firm who first introduces the innovation enjoys monopoly profits for a time. However, as demand rises, and the product becomes standardised, unskilled labour becomes an increasingly important component of the cost and any initial advantage of the innovative firm might be eroded by firms in other countries with lower labour costs. The comparative advantage for producing the good moves first to other developed countries and then to developing economies. Thus, he envisages a MNE as locating its innovative activities in its home country and its labour intensive activities in foreign subsidiaries based in other developed countries (but not as developed as the one where the innovations are introduced in the first place) and in developing countries.

Empirical evidence indicates that this theory was able to explain the patterns of international production in the three decades following the end of the World War II, when the US home market was indeed more sophisticated than other developed countries markets' (Vernon, 1966, 1979; Cantwell, 1995). However, as Vernon (1979) recognised, the paradigm has lost its explanatory power of the patterns of international production among developed countries, as the gap between them and US has narrowed both in terms of sophistication of the home market and the endowment in highly skilled human capital. He claims that the paradigm is still useful for explaining the differences in the international patterns of production between developed and developing countries.

The Product Life Cycle is the first theory of international production that suggests that MNEs carry different value added activities in distinct countries and links these to the host country's factor endowments. The differences in the value added activities undertaken in Ireland and Portugal constitute a focal point of this study. Hence, the Product Life Cycle provides relevant insights for subsequent empirical analyses.

Oligopolistic Interaction

Models included in this category (Knickerbocker, 1973; Flowers, 1976; Graham, 1978)

treat MNEs as large firms operating in oligopolistic industries. They assert that oligopolistic interaction between rival MNEs explains the decision to engage in FDI and the choice of a particular location. In an oligopolistic market, the equilibrium output and price depend on the assumptions made by a firm about how its behaviour will influence that of rivals, and how its rivals' behaviour will impact on its own position (Knickerbocker, 1973). Thus, along with location variables, the anticipated behaviour of their competitors determines the choice of location of their subsidiaries.

Building on these assumptions, Knickerbocker (1973) developed an informal model which later became known as "Follow-my-leader" framework. He argued that in an oligopolistic industry if the leader (defined as the MNE who makes the first move) engages in FDI, the other firms in the industry will also do so, and will choose the same location. The model is concerned solely with the behaviour of the followers. It relies on the Product Life Cycle theory developed by Vernon (1966, 1979) for explaining the behaviour of the leader. This is considered one of the weak points of this informal model, as the Product Life Cycle theory in its original form has been largely discredited by the developments in the international environment (Cantwell, 1995). The followers are motivated by the aim of defending market shares and minimising risks. Knickerbocker (1973) noted that by investing abroad a firm faces considerable risk, but by not investing it also faces high uncertainty. The cost of investing abroad can be, at least to some extent, predicted. But the risk that the leader may gain considerable advantage from investing abroad and may use this investment against its rivals is unpredictable. These advantages may take the form of: access to cheaper inputs, market access, acquisition of marketing and management skills, and others. Under these circumstances a firm can minimise risks by following its rivals abroad and imitating their location decisions. Barry *et al.* (2003) found evidence that "Follow my leader" motivations have played an important role in attracting MNEs to manufacturing industries in Ireland (in electronics and pharmaceuticals). Outside Ireland, this motivation is thought to have played an important role in attracting FDI in electronics in Wales and Scotland (Tavares, 2001). Hence, it follows that the "Follow-my-leader" framework provides a relevant theoretical approach to be used in the present analysis.

Eclectic Paradigm

The Eclectic Paradigm seeks to provide a general framework for determining the extent and pattern of foreign-owned production by synthesising and combining various strands of literature. However, the Eclectic Paradigm is not another theory, but a general framework (Dunning, 1993). Although it attempts to 'merge' various theories, it has never intended to provide a complete synthesis as it is not possible to encompass fully theories which are inherently so different (Cantwell and Narula, 2001).

The Eclectic Paradigm predicts that at any given moment in time the extent, geography and industrial pattern of international production will be determined by the combination of ownership (O) advantages of the firms, the location (L) advantages of the given site outside the national borders, and internalisation (I) advantages (Dunning, 1993). The O-advantage of a firm is defined, as noted previously, as any net competitive advantage that enables MNEs to compete successfully against their rivals in the relevant market. L-advantages refer to the immobile, intrinsic or created endowments of a country that firms need to use jointly with their own competitive advantages, in order to exploit their O-advantage by engaging in FDI. He distinguishes two types of ownership advantages: asset based advantages (Oa) and transaction costs advantages (Ot). The former arise from ownership of unique intangible assets. The latter arise from ownership of complementary assets. Some of these advantages stem directly from the multinational character of the firm (opportunities for production shifting, global sourcing of inputs, ability to diversify technology, etc). For the definition of the I-advantage the eclectic paradigm relies on internalisation theory, developed by Buckley and Casson (1976). According to internalisation theory, a firm enjoys an internalisation advantage if it is more efficient for the firm to explore its O-advantage within the firm rather than through market transactions (Buckley and Casson, 1976).

The Eclectic Paradigm predicts that a firm will engage in FDI if it enjoys O-advantages *vis-à-vis* firms from other countries, it perceives that it is in its best interest to use its O-advantages abroad and it is beneficial to internalise the O-advantages rather than to use

the market mechanism to transfer them to other firms. If any of these advantages is missing, the firm would prefer to engage in alternative strategies (Dunning, 1993).

Since its development (Dunning, 1977), the Eclectic Paradigm has been considered the leading analytical framework for studying FDI and MNEs' activities (Castro, 2000; Dunning, 2000; Cantwell and Narula, 2001). However, it has undergone substantial changes. Initially, this paradigm primarily addressed static and efficiency related issues (Dunning, 1977), but more recently has given attention to the dynamic competitiveness and locational strategy of firms, and particularly to the upgrading of the firms' core competencies (Dunning, 1998, 2000), which will be addressed in the following section.

2.2.2 FDI as a Way of *Augmenting* the Ownership Advantage

Traditionally, FDI had been seen mainly as a way of exploiting an *ex-ante* O-advantage (Dunning, 1998; Cantwell and Narula, 2001; Cantwell and Piscitello, 2005). Recently, the focus of attention has shifted towards investments that aim at augmenting/upgrading the firm's O-advantage (Cantwell, 1995; Kuemmerle, 1999). Theories explaining this type of investments draw on a number of theories of the firm that focus on the creation and sustainability of firm-level competitive advantage. The two dominant contemporary approaches to the analysis of sustained competitive advantage are the resource-based view (RBV) and the capabilities/knowledge-based view (KBV). The two approaches are very much interlinked and therefore will be discussed together.

Both approaches conceptualise the firm as “*a collection of productive resources the disposal of which between different uses and over time is determined by administrative decision*” (Penrose, 1959: 24). Resources and the services they render become specialised over time, and thus they become firm-specific in the sense that they are worth more to the firm than to other firms. Building on this conceptualisation, the RBV explains the roots of the sustained competitive advantage in terms of the resources possessed by the firm (Penrose, 1959; Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). According to Barney (1991: 101) “*firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc; controlled by a firm that enable the firm to conceive of all implement strategies that improve its*

efficiency and effectiveness". Peteraf (1993) synthesises the main ideas of this body of literature by identifying four conditions which underlie the sustained competitive advantage: heterogeneity of resources, *ex-post* and *ex-ante* limits to competition and imperfect resource mobility. All four conditions are interrelated.

A crucial assumption of the RBV is that resources are heterogeneous across firms (Barney, 1991; Peteraf, 1993; Teece, Pisano and Shuen, 1997). Thus, firms with various resources compete against one another. Firm resources can be a source of sustained competitive advantage if and only if they are superior other firms' resources and if they are not easily replicable (Barney, 1991). Firms who own them can earn monopoly rents (Peteraf, 1993). The *ex-post* limits to competition imply that heterogeneity should be a lasting condition, which means that after a firm has gained a competitive advantage from using its resources there must be forces that impede other firms to enjoy the same competitive advantages without owning the resources (Peteraf, 1993). The RBV emphasises two such forces: imperfect imitability and imperfect substitutability (Barney, 1991; Peteraf, 1993). Nontradeable assets that are developed and accumulated in the firms are especially difficult to imitate because they have a tacit dimension. Finally, resources should be imperfectly mobile across firms. Resources are imperfectly mobile when they are more valuable within the firm than outside it (Peteraf, 1993).

For MNEs, resource heterogeneity and immobility are particularly relevant. As MNEs operate in distinct environments, their subsidiaries possess differentiated resources reflecting the characteristics of their external environment. These distinct resources constitute potential sources of O-advantage to the MNE as a whole.

Among the firms' resources, the capabilities/KBV (Richardson, 1972; Nelson and Winter, 1982; Dierickx and Cool, 1989; Teece *et al.*, 1997) emphasises internally accumulated resources, like routines and capabilities, rather than those that can be acquired on factor markets. Industry, for Richardson (1972), is composed of numerous "activities" (R&D, manufacturing, sales, service, etc), which have to be carried out by firms with the requisite "capabilities", that is to say, "*with the appropriate knowledge, experience, and skills*" (1972: 888). Accordingly, a firm will tend to specialise in

activities for which its capabilities offer some competitive advantage. Teece *et al.* (1997) take this approach a step further by developing a dynamic approach. They argue that in a world characterised by Schumpeterian competition, where profits are driven mainly by innovation, firms can only sustain their competitive advantage through the ability to constantly adapt and reinvent it. Teece *et al.* (1997) call these abilities “dynamic capabilities”. The term “dynamic” suggests the capacity to renew the firm’s competitive advantages in order to adapt to an ever changing environment.

This approach emphasises the capability to create and transfer knowledge (Nelson and Winter, 1982; Kogut and Zander, 1992, 1993; Grant, 1996; Gupta and Govindarajan, 2000; Andersson *et al.*, 2001). Knowledge, in line with Polanyi’s (1958) thinking, is in great part tacit, thus it cannot be easily codified and transferred. According to this perspective, the costs of the transfer of knowledge stem from the efforts of codifying and teaching tacit knowledge to recipients (Kogut and Zander, 1993). Through repeated interactions, individuals in a firm develop a common understanding regarding knowledge used in production, marketing, R&D etc. which helps decrease the costs of knowledge transfer within the firm (Teece, 1977; Kogut and Zander, 1993).

Although the RBV and the capabilities/KBV apply to firms in general, their insights are particularly relevant to the study of MNEs in high tech industries. These frameworks imply that MNEs’ source of competitive advantage is their capability to create/transfer knowledge (Nelson and Winter, 1982; Kogut and Zander, 1993; Grant, 1996; Gupta and Govindarajan, 2000; Andersson *et al.*, 2001). Their knowledge results from the transfer/combination of knowledge from subsidiaries located in different contexts (Kogut and Zander 1992, 1993, Gupta and Govindarajan, 2000). The competition is viewed as Schumpeterian, where the profits are determined by innovative efforts. Innovation is the result of the accumulation of tacit capability, hence the expression technological accumulation (Cantwell and Santangelo, 2000; Kogut and Zander, 1993). Thus, in order to survive, firms must continuously upgrade their capability base.

One way of upgrading/augmenting the MNEs O-advantage is to tap into capabilities available in host countries. Capabilities are embodied in social organisations like firms,

universities, research institutes; hence, they are to some extent tied to a particular location (Nelson and Winter, 1982). Consequently, to be able to tap into these capabilities, MNEs need to be present in those locations and to interact with the firms and institutions possessing these capabilities.

The empirical analyses presented here draw considerably on the RBV and capabilities/KBV. Following these perspectives, MNEs are viewed as a portfolio of subsidiaries possessing distinct resources and capabilities. Moreover, the main aspects investigated empirically are how the foreign subsidiaries based in Ireland differ from those based in Portugal and how these differences impact on their innovative capabilities.

2.3 Motivations Underlying the Choice of Location

In this section, the focus of the analysis will shift from the motivations for a firm to invest abroad in general to the motivations for preferring a specific foreign location. The choice of location is supposed to take into consideration various aspects, both internal and external to the firm. Following Dunning (1993: 79) a firm will establish and develop value-added activities in a foreign location only if “*the global interests of the enterprise are served by creating, or utilising, its ownership advantages in a foreign location.*” The distribution of resources and capabilities is supposed to be uneven across countries, thus some countries will display L-advantages over others (Dunning, 1977). This means that location choice will depend on the interrelationship between ownership and the location specific characteristics (Cantwell and Piscitello, 2005). Drawing on these insights, this section will outline the motivations underlying international production, and the way in which these motivations influence the choice of location.

Dunning (1993), inspired by Behrman (1972), distinguishes four main motivations to invest abroad: resource-seeking, market-seeking, efficiency-seeking and strategic asset-seeking. The following analysis of the motivations for investment will be based in this typology. However, a few alterations and contributions will be made.

First, in Dunning (1993), the resource-seeking rationale comprises motivations as different as: natural/physical resource seeking, cheap unskilled or semi-skilled labour

seeking and technology and high/specific skill seeking. Due to the heterogeneity of the motives included, this rationale loses much of explanatory power as well as its insight for policy-makers. Following Tavares (2001), the resource-seeking motive will be interpreted in the narrower sense of locally-bound natural resources. Cheap labour motives will be integrated within the cost efficiency rationale. Technology and high/specific skill searching rationale will be integrated in strategic asset-seeking.

Another amendment will be the inclusion of incentives as a separate category. This treatment of FDI incentives as a separate category is motivated by the different role this motivation plays in the location decision in comparison with the motivations included in Dunning's (1993) taxonomy. It has been argued (Oman, 2000; Cantwell and Mudambi, 2000; Blomström and Kokko, 2003) that incentives for investment can be regarded as complementary to the above mentioned motivations, to which they refer as "fundamentals". They argue that the decision of investing in a specific location is taken in two rounds. First, a short list of countries appropriate for the envisaged investment is established. This list is based largely on "fundamentals". However, when choosing among the short-listed countries, incentives for investment may play an important role. In view of these considerations, it was deemed appropriate to treat incentives for investment as a separate category. A similar taxonomy was applied by Tavares (2001).

2.3.1 Natural Resource-Seeking

MNEs may choose a certain location because they seek to exploit locally-bound natural resources. MNEs which engage in this kind of FDI aim to minimise costs and to secure control over their supply sources. According to Dunning (1993), this kind of FDI is most common in extractive industries and certain agricultural products. In the service sector this kind of FDI is likely to appear in tourism, oil drilling, and construction. All these industries require for the production and commercialisation of their products some complementary capabilities like distribution channels and market access that multinational firms are "*especially well equipped to provide*" (Dunning, 1993: 57).

2.3.2 Market-Seeking

MNEs may invest in a certain country because they want to supply goods or services to the local market (Dunning, 1993). The single most relevant reason for market-seeking FDI is the existence of trade barriers (Dunning, 1993). Many empirical studies on the determinants of FDI corroborate this view (Bandera and White, 1968; Schmitz and Bieri, 1972; Root and Ahmed, 1979; Lunn, 1980; Kravis and Lipsey, 1982; Schneider and Frey, 1985; Culem, 1988; Wheeler and Mody, 1992; Lansbury *et al.*, 1996).

Due to high trade barriers among nation states “local” markets used to designate strictly domestic markets. Recently, economic integration, involving the reduction of trade barriers, has enlarged the concept of “local” as to encompass the whole economically integrated market of which the focal country is member (Görg and Ruane, 1999; Tavares, 2001). A perfect example of this change is the completion of the Single European Market which reduced and in some cases eliminated altogether trade barriers among member countries. Görg and Ruane (1999) found empirical evidence that, for MNEs in some industries, the EU market as a whole was a more relevant determinant of the influx of FDI from non-EU countries than the domestic market.

Apart from circumventing trade barriers, Dunning (1993) identifies four other reasons which may induce MNEs to engage in market-seeking FDI.

First, if the suppliers or customers of a particular firm have established production facilities abroad, the firm might consider following them in order not to lose them to local rivals (Dunning, 1993). For instance, many Japanese auto component suppliers followed their customers (Japanese auto assemblers) abroad, when the later established subsidiaries in the US and EU. Another example is given by the accounting and auditing firms that followed their customers abroad in order to meet their needs (Dunning, 1993).

The second reason is that tastes, needs, resources and business environments vary across countries. The products and services, their marketing and advertising need to be adapted to local tastes and needs. Also for successfully supplying intermediate goods,

MNEs need to get accustomed to the local business environment and culture and legal requirements. The knowledge of particular circumstances of time, place, of people and of culture is generally locally embedded (Hayek, 1945), and thus it would be unavailable to the firm unless it established a local subsidiary.

A third reason is that, for some products, the costs of producing and transporting them to the relevant market are less when they are produced close to that market than when they are produced at a remote location. Under these circumstances, a firm will choose a location that has the lowest transport costs to the sales market, other things being equal. This motivation is highly industry specific (Görg and Ruane, 1999). The same authors note that for industries in which transport costs are relatively low, like for instance microelectronic components, MNEs may well prefer to locate in peripheral countries where other L-advantages like cheaper labour and investment incentives more than outweigh transport costs. Whether transport costs or production costs would dominate the final decision is highly industry-specific (Dunning, 1993; Görg and Ruane, 1999).

The fourth and increasingly important reason for market-seeking FDI is that a MNE might consider necessary to be present in the same locations as its rivals (Dunning, 1993). This is typical for sectors where few large MNEs dominate the global market. These investments may be aggressive or defensive (Dunning, 1993; Ietto-Gillies, 2005).

Aggressive investments are those aiming to take advantage of expanding/new markets. Examples include investments induced by the Single Market Programme and the opening up of the Central and Eastern European countries to international trade and FDI (through the European Agreements in the 1990s and the 2004 EU Enlargement).

Defensive investments are those aiming at protecting extant market share. Two models studied these types of investments in the context of an oligopolistic industry: “Follow-my-leader” (Knickerbocker, 1973) and “Exchange of threats” (Graham, 1978). According to the first model, as explained in the previous section, if one MNE decides to engage in FDI, other firms in the industry will also engage in FDI and will choose the same location (Knickerbocker, 1973). The “Exchange of threats” framework predicts

that if one MNE sees her market invaded, it will respond by entering the invader's market. Knickerbocker's thesis has been supported by empirical research on manufacturing FDI undertaken by US MNEs in Europe (Knickerbocker, 1973). Barry and Bradley (1997) found that the "Follow-my-leader" motive has played an important role in determining MNEs in electronics, pharmaceutical and chemical sectors to choose Ireland over alternative locations. They quote surveys of executives of the newly arriving foreign firms. These surveys indicate that the presence of key market players strongly influenced the location choice in favour of Ireland.

2.3.3 Efficiency-Seeking

The main motivation for efficiency-seeking FDI is to rationalise the structure of investments in such a way that the investing company can gain from the common governance of the geographically dispersed activities (Dunning, 1993). Dunning (1993) distinguishes between two kinds of efficiency seeking FDI. The first aims at obtaining traditional factor endowments at the cheapest possible cost. One such endowment strongly emphasised in the literature is the supply of cheap, unskilled or semi-skilled labour. This kind of FDI has been traditionally undertaken by manufacturing and service MNEs from high-income countries, which set up or acquire subsidiaries in low-income countries. Most of the activities undertaken within this kind of subsidiaries are resumed to assembly or other low-skill content activities.

The impact of labour costs on FDI attraction has been analysed in the literature, leading to mixed results: some studies found them insignificant (Owen, 1982; Lucas, 1993, among others), while others found them significant (Saunders, 1982; Schneider and Frey, 1985; Culem, 1988; Kumar, 1994). It has been suggested that relative labour costs are more relevant for the location choice than the absolute ones (O'Sullivan, 1993). Riedel (1975) and O'Sullivan (1993) found empirical evidence that relative wages were among the main determinants of FDI in Taiwan and Ireland, respectively. Lansbury *et al.* (1996) and Resmini (2000) corroborate the relevance of relative wages for attracting inward FDI to Eastern Europe.

The second type of efficiency-seeking FDI aims at rationalising the MNEs' corporate

network (Dunning, 1993). One way of increasing the network's overall efficiency is by locating foreign subsidiaries close to other firms in the same industry. By clustering, firms may benefit from agglomeration economies. Various theoretical studies put forward agglomeration economies as an important determinant in attracting inward FDI (Venables, 1996). Empirical evidence has corroborated this hypothesis (Wheeler and Mody, 1992; Head *et al.*, 1995; Barrell and Pain, 1999; Barry, Görg and Strobl, 2003).

Still, it has been pointed out that firms may choose to agglomerate spatially even in the absence of efficiency reasons for doing so (Barry, Görg and Strobl, 2003). According to "Follow-my-leader" arguments (Knickerbocker, 1973), clusters may emerge simply because MNEs tend to imitate each others' location decisions.

The distinction between the two types of rationales that lead firms to cluster is especially salient in the light of their policy implications. If agglomeration economies as defined in terms of increased efficiency are dominant, then policy-makers should emphasise supply side policies such as investing in education and infrastructure. If "spurious agglomeration economies" dominate, then the policy should give prominence to attracting "flagship" projects (Rugman and D'Cruz, 2000; Barry *et al.*, 2003).

2.3.4 Strategic Asset-Seeking

Investments included in this category aim at acquiring local technological and/or scientific competences (Dunning, 1993). MNEs may do so by acquiring foreign firms which already possess such competences, or by locating their subsidiaries in locations where these competences are plentiful.

Studies on strategic asset seeking investments draw considerably on the RBV, capabilities/KBV of the firm. In line with these perspectives, they suggest that the MNEs' competitive advantage lies increasingly in their ability to create new capabilities and source for knowledge internationally (Cantwell, 1995; Kuemmerle, 1999; Cantwell and Santangelo, 2000; Cantwell and Piscitello, 2005). MNEs are conceptualised as implementing global strategies, which include establishing foreign subsidiaries that undertake R&D activities aiming at tapping into capabilities available in host countries.

The technological accumulation paradigm (Cantwell and Santangelo, 2000) suggests that firms in each country tend to embark on a path of technological accumulation that has certain unique characteristics and in time moulds profile of regional technological specialisation (Cantwell and Narula, 2001; Cantwell and Piscitello, 2005). Accordingly, specific nations or even specific regions within nations might be particularly advantageous for strategic asset-seeking investments because of potential spillovers from the existing cluster of innovative activities. From the host countries' point of view, this type of investments is particularly beneficial because it contributes to further develop extant capabilities.

A number of empirical studies, based on USPTO patents awarded to MNEs, support the relevance of local innovative activities for the location of foreign subsidiaries. Their findings indicate that MNEs' innovatory activities tend to be increasingly dispersed (Cantwell, 1995; Cantwell and Santangelo, 2000). They also suggest that MNEs tend to locate their innovative activities close to clusters and that the existence of these clusters played a significant role in the location choice (Almeida, 1996; Audretsch and Feldman, 1996; Cantwell and Iammarino, 1998, 2000; Cantwell and Janne, 2000).

2.3.5 Incentives for Investment

Until recently the study of the motivations of MNEs to choose a particular location was focused overwhelmingly on the determinants detailed above, also referred to as "fundamentals" (Dunning, 1993; Globerman and Shapiro, 1999). Indeed, it was thought that "fundamentals" play a dominant role and incentives only a marginal one (Cantwell and Mudambi, 2000; Blomström and Kokko, 2003; Bellak, 2004).

Oman (2000) argued that "fundamentals" and incentives are complementary motivations. He argued that the decision of investing in a specific location is taken in two rounds. First, a short list of countries appropriate for the envisaged investment is established. This list is based largely on "fundamentals". However, when choosing among the short-listed countries an attractive incentive package may well tilt the balance in the favour of the country who offers it. The governments of the short listed

countries are aware of this and try to outbid each other. Taking advantage of the competition among governments, investors often seek out investment incentives, provoking the so called “locational tournaments” (Mytelka, 2000) by playing the governments of the short listed countries against each other.

It follows thus, that in the competition for FDI among countries endowed with similar “fundamentals”, incentives may play an important role. In this vein, globalisation and regionalisation have increased the relevance of incentives in the competition for FDI (Guisinger, 1985; Blomström and Kokko, 2003; Oxelheim and Ghauri, 2003). This occurs because both phenomena reduce the importance of national market size through the decline and/or elimination of trade barriers. In Regional Trade Agreements (RTAs) that involve deep integration like the EU, the differences in the “fundamentals” are further reduced by monetary union and common regulation. Moreover, the EU’s Regional Policy is meant exactly to diminish discrepancies among regions. The Structural Funds and the Cohesion Funds enable least-favoured zones within the EU to offer incentives to potential investors. Over the last two decades regionalisation and globalisation gained momentum as many developing countries abandoned isolationist policies and developed countries moved towards greater reliance on markets.

Countries use a variety of incentives to attract FDI, mainly fiscal and financial. In OECD countries, among fiscal incentives, the most widely used are reductions in the corporate income tax base rate, followed by, in descending order, accelerated depreciation, specific deductions for corporate tax purposes, and reductions in other taxes (Oman, 2000). In developing countries the next most widely used, after reduced base income-tax rates, are tax holidays and import-duty exemptions (Oman, 2000). The reduction of corporate tax is a widely used policy instrument, especially since the 1980s. While these changes in taxes were generally applied to all firms, part of the reasoning behind reduction was to make the investment climate more attractive to MNEs. Indeed, Devereux and Griffith (1998), Hines (1999), Desai, Foley and Hines (2002), Devereux, Griffith and Klem (2002) suggest that corporate taxes have a significant impact on FDI location. In addition to corporate taxes, indirect taxes also may potentially influence location decisions (Hines and Desai, 2001). Although most of

these studies focus on US outward FDI, Desai *et al.* (2002) argue that results can be generalised, as the US foreign tax credit system is likely to make US investors less sensitive to tax rates differences than are investors from most other countries. It is noteworthy that tax effects on FDI are thought to be particularly strong in Europe (Hines and Desai, 2001; Desai *et al.*, 2002).

Financial incentives are widely used in OECD countries by national and sub-national governments and their size has increased over the last three decades (Oxelheim and Ghauri, 2003). The bulk of the incentives are concentrated in a few sectors: automotive, electronics, chemicals and semiconductors. Some striking examples of financial incentives offered are provided by Oxelheim and Ghauri (2003): the US paid Mercedes-Benz \$170.000 per job to establish a production unit in Alabama, Portugal paid \$255.000 per job for the establishment of a joint production site of Ford and Volkswagen, Hungary paid \$300.000 per job created to General Motors. In the chemicals sector Germany paid the largest ever reported subsidy per job created: \$800.000 per job to Dow. In the electronics industry, the US paid \$500.000 per job to Shintech (Oxelheim and Ghauri, 2003). These examples constitute only anecdotal evidence and unfortunately (due to secrecy) there is little systematic evidence. However, they are indicative of the use and size of financial incentives.

2.3.6 An Overall Comment on the Relevance of Different Motivations for Investment

Various considerations bear on multinationals' decision to invest abroad and to choose a specific foreign location. Over the years the importance attached by MNEs to different motivations varied in response to changes in the economic and political environment. Traditionally, FDI was predominantly market-seeking and natural resource-seeking (Dunning, 1993). However, over the last two decades these motivations lost importance relative to efficiency and strategic asset-seeking FDI². Two developments have contributed mostly to this shift: the rising importance of knowledge as compared to that of other productive factors, and trade liberalisation (Dunning, 1998; Pearce, 1999).

² Nonetheless, it should be noted that recently natural resource-seeking (due to the scarcity of several types of energies and raw materials) came back as a relevant motivation (UNCTAD, 2007)

Indeed, knowledge has emerged as the key wealth-creating asset (Dunning, 1998; Pearce, 1999; Cantwell and Santangelo, 2000, Cantwell and Janne, 2000; Kogut and Zander, 1993; Cantwell and Piscitello, 2005). The rising importance of knowledge in the economy in conjunction with the dispersal of knowledge sources around the world have resulted in a rapid growth in strategic asset-seeking investments. FDI is increasingly motivated by the desire to tap into the capabilities available in host countries thus benefiting from localised knowledge spillovers (Cantwell and Iammarino, 1998, 2000; Cantwell and Janne, 2000; Cantwell and Piscitello, 2005). The reduction of both transport costs and trade barriers has led to significant growth in efficiency-seeking FDI (Hood and Young, 1988; Papanastassiou and Pearce, 1999; Tavares, 2001). Also, the proliferation of incentive-based policies to attract FDI and the increase of the size of incentives over time (Oxelheim and Ghauri, 2003) show there is a growing perception that incentives are playing an important role.

In conclusion, given these developments, natural resource-seeking and market-seeking FDI lost prominence relatively to efficiency-seeking and strategic asset seeking FDI. Also, investment incentives have become increasingly important. In its turn, this change in the relative importance attached by the MNEs to different motivations has affected the choice of location of multinational subsidiaries and the nature of these subsidiaries.

2.4 Concluding Remarks

This chapter reviewed the theories and frameworks that seek to explain the motivations underlying foreign production and the location choice of their investments. These issues are relevant for the present research as the motivation for investment in conjunction with the characteristics of the location of the investment, which are themselves interlinked as it has been established in this chapter, determine the kind of foreign subsidiaries set up, and their characteristics (Narula and Marin, 2003). Therefore, these theories inform the empirical analysis of the motivations that underlie the establishment of foreign subsidiaries in Ireland and Portugal, and the conceptual discussion on the type of the multinational subsidiaries undertaken in the following chapter, and the empirical analysis of the characteristics of the foreign subsidiaries.

More precisely, the subsequent empirical analysis of the motivations for investment, adopts the taxonomy of motivations for investment developed in this chapter. The theories and frameworks reviewed together with the characteristics of the two countries outlined in Chapter 4 will inform the development of hypotheses (Chapter 5) related to the importance of asset-seeking as a motivation for investment in Ireland and Portugal.

In addition, this chapter laid the conceptual background for the discussion on the multinational subsidiaries, their roles and evolution, and their potential developmental impact, which will be presented in the following chapter.

3 Multinational Subsidiaries: Their Roles and Evolution

3.1 Overview

This chapter is concerned with the processes that occur after the initial FDI in the host country. Traditionally, both theory and public policy have focused on the attraction of inward flows, usually overlooking what happens afterwards (Tavares, 2004). Recently, it has become increasingly clear that what really matters from the host countries' point of view is the quality of the activities undertaken by the subsidiary and its position inside the MNE's network, rather than the mere attraction of FDI inflows.

From this perspective, FDI flows provide a relevant but narrow description of the process of establishing affiliates in a foreign country. Financial flows from MNEs towards affiliates constitute only a part, and often not the most significant part (from the host country standpoint) of the total transfers. The transfers, the host countries are most interested in, are transfers of technology, know-how, skills. FDI inflows do not reflect these. The nature of subsidiary's activity and the relationship with headquarters (HQ) and with other subsidiaries impacts on the flows and exchanges within MNEs. As the main justification for attracting FDI tends to be exactly these transfers, which are supposed to have some public good characteristics, a study of what happens at the subsidiary level is necessary for devising a more systemic, consistent and efficient policy. Thus, from a strategic and from a policy making perspective, the literature on the characteristics and behaviour of MNEs' subsidiaries is paramount. Given these considerations, an analysis of the qualitative aspects of MNEs' activities is needed for a more accurate account of the process and is a crucial aspect in this dissertation.

The next section will be devoted to an explanation of the key concepts that underpin modern conceptualisations of the MNE, and the study of multinational subsidiaries, which allow for a consideration of strategic heterogeneity. After the concepts have thus been established, the scope typology, in which this study is grounded, will be discussed.

3.2 Conceptualisations of the Multinational Corporation

Following Birkinshaw (1997), a foreign subsidiary is defined as an operational unit controlled by the MNE's HQ and situated outside the home country. There are two distinct views on the HQ-subidiaries' relationship: hierarchy and heterarchy.

A hierarchy supposes that all important decisions are taken by HQ while subsidiaries are given only the right to take operational decisions. Traditionally, the relationship between HQ and subsidiaries used to be portrayed as a hierarchy and the focus of the studies who adopted this perspective was on how HQ controls subsidiaries (for instance, Doz and Prahalad, 1981; Hedlund, 1981; Egelhoff, 1984).

The concept of a heterarchical MNE was proposed by Hedlund (1986), and defined as a MNE with multiple heterogeneous centres, which shift over time (Hedlund, 1986). It entails also that various governance modes are employed and that subsidiaries are given various degrees of decision making autonomy. A strength of the concept of heterarchy is that it subsumes (rather than displaces) the concept of hierarchy (Birkinshaw, 1994; Pearce, 1999). This is in line with Hedlund's (1986) insight that an effective global scanning will lead to a range of opportunities, some best exploited in hierarchies, some better exploited in a more decentralised framework. Over the last decades, the portrayal of the MNE as a differentiated network has gained currency (Bartlett and Ghoshal, 1986; Hedlund, 1986; Ghoshal and Nohria, 1989; Gupta and Govindarajan, 2000). In line with these studies, in this dissertation the MNE will be conceptualised as a differentiated network comprising subsidiaries with distinct roles and characteristics.

3.3 Subsidiary Roles/Strategies

The roots of the study of subsidiary roles can be traced back to the seminal work of White and Poynter (1984). In this pioneering paper they argued that subsidiaries play differentiated roles inside the multinational network. They considered that subsidiary roles can be characterised by three main aspects: market scope, product scope and value-added scope. Based on these three aspects they developed a typology, that became known as the "scope typology" (Papanastassiou and Pearce, 1999). Their work

on subsidiary roles has been continued by many other scholars, some of whom developed their own typologies, as will be discussed later.

The most widely used typologies are: the “scope” typology (White and Poynter, 1984, D’Cruz, 1986; Papanastassiou and Pearce, 1999; Tavares, 2001), the integration-responsiveness framework proposed by Prahalad and Doz (1987), and further developed by Jarillo and Martinez (1990), and Taggart (1997b), the autonomy-procedural justice typology developed by Kim and Mauborgne (1993a, 1993b) and completed by Taggart (1997a) and “knowledge-based” typologies developed by Bartlett and Ghoshal (1986) and Gupta and Govindarajan (2000). A comprehensive review of these typologies and the empirical studies testing them can be found in Papanastassiou and Pearce (1999).

The empirical analyses presented in this dissertation are grounded in the scope typology. Therefore, the scope typology will be reviewed in detail. The other typologies are briefly summarised in Table 3.1

The scope typology was first proposed by White and Poynter (1984). According to them, subsidiaries are characterised by three aspects: product scope, market scope and value-added scope. Product scope is defined as the “*latitude exercised by a subsidiary’s business with regard to product line extensions and new product areas*” (White and Poynter, 1984: 59). Market scope refers to the “*range of geographical markets available to the subsidiary*” (White and Poynter, 1984: 59). Value-added scope is defined as “*range of ways a subsidiary adds value, whether through development, manufacturing or marketing activities*” (White and Poynter, 1984: 59). Based on these three dimensions, the same authors develop typology that discerns five subsidiary roles: marketing satellite, miniature replica, rationalised manufacturer, product specialist and strategic independent³.

Using the same three dimensions, various studies proposed and applied different

³This version of the scope typology will not be explained in detail. Only the version of the scope typology that will be used in the research, which is a more parsimonious version (comprising only three roles), will be explained. The main versions of the scope typology, together with the other typologies, will be reviewed briefly in Table 3.1.

versions of this typology (D' Cruz, 1986; Delany, 1998; Papanastassiou and Pearce, 1997; Tavares, 2001). In this dissertation, will be used a variant of the scope typology developed by Tavares (2001), which distinguishes among three subsidiary roles: Miniature Replica (MR), Rationalised Manufacturer (RM) and Product Mandate (PM).

MR subsidiaries produce and market a well-established product range of the parent MNE for the host country's market. Thus, MR subsidiaries have wide product scope, but low market and value-added scope. MR subsidiaries are common in horizontally integrated MNEs who adopted a multidomestic strategy. As barriers to trade declined, this type of subsidiaries became increasingly inefficient because they are unable to take advantage economies of scale or of cost- effective international supply networks.

RM subsidiaries specialise in producing components which are further processed by other subsidiaries within the MNE, or assembly the final products. These subsidiaries are the result of efficiency-seeking FDI and they are meant to take advantage of economies of scale and cheap inputs, including labour and raw materials. As compared to MR, they have wider market scope (as they usually produce for the global market), but lower product scope. They specialise in producing a small number of products and have low value-added scope. RM subsidiaries sell their output inside the MNE, so they do not need to develop marketing capabilities or to adapt their products to local tastes, or to develop in house innovative activities. RM subsidiaries are able to capitalise on freer trade, but they fail to take advantage of internationally spread knowledge and capabilities.

PM subsidiaries are responsible for developing, producing and marketing particular products. Their defining feature in terms of the scope dimensions is that they have wide value-added scope. In order to sustain a PM strategy, subsidiaries have to develop in-house creative resources and to undertake a wide range of value added activities. In terms of the other two dimensions of the scope typology, they usually specialise in a narrow range of products, which they produce for the global or regional markets (Tavares, 2001). These subsidiaries are able to take advantage of both liberalised trade and dispersed sources of knowledge.

The scope typology detailed above represents an important framework, and it will be used in the empirical analyses of the characteristics of foreign subsidiaries (Chapter 6).

3.4 Subsidiary Evolution

Birkinshaw and Hood (1997, 1998) conceptualise subsidiary evolution as an extension of the process of internationalisation. In this vein they define subsidiary evolution as the enhancement or atrophy of subsidiary capabilities over time and the establishment or loss of corresponding charter. The same authors define the subsidiary's capabilities as the "*capacity to deploy resources, usually in combination, using organizational processes to affect the desired end*" (Birkinshaw and Hood, 1998: 781). The charter of the subsidiary is defined as "*the visible manifestation of the subsidiary's role in the MNE*" (Birkinshaw and Hood, 1998: 782). Thus defined, subsidiary evolution contends two main possible outcomes: development and decline. Subsidiary development consists of capability enhancement and charter establishment/upgrading. Subsidiary decline means capability atrophy and, eventually, charter loss.

Birkinshaw and Hood (1997) distinguish two phases in subsidiary development. First, a subsidiary has to establish its viability, i.e. to achieve satisfactory level of performance in fulfilling the tasks assigned to her by HQ. Some subsidiaries may fail at this stage. Those subsidiaries who manage to fulfil successfully their assigned tasks need to build sustainability, which means to develop distinct capabilities that would contribute to the competitive edge of the multinational.

Birkinshaw and Hood (1997; 1998) propose an analytical framework that aims to explain subsidiary evolution over time. They identify three actors that "*have the vested interest and the power*" (Birkinshaw and Hood, 1997: 341) to influence subsidiary evolution: parent company/HQ, subsidiary management and host-country policy makers. The conceptual model of subsidiary evolution developed here will draw on the Birkinshaw and Hood framework, but the content of each driver will be enlarged as to encompass other relevant influences following Tavares (2001). Accordingly, it is considered that the drivers of the subsidiary evolution are: the internal environment, the subsidiary itself, and the external environment.

3.4.1 The Internal Environment Driver

It is well established that the parent company can exercise considerable influence over subsidiary evolution by means of legitimate authority and control of critical resources (Birkinshaw and Hood, 1997). The intellectual roots of this perspective can be found in the Product Life Cycle theory (Vernon, 1966; 1979) and the Internationalisation Process model (Johanson and Vahlne, 1977). Both theories are implicitly grounded in the conceptualisation of the MNE subsidiary as a mere instrument of HQ, and consider the main influence on subsidiary evolution to be the parent company.

According to this perspective, the HQ sets some critical parameters within which the subsidiary must work. HQ evaluates the subsidiaries, but also various key elements of the global competitive environment, including the behaviour of competitors, emergence of new markets, technological trends, and political and economic factors. Based on the results of these evaluations, HQ takes decisions regarding the future of the subsidiary.

It has been established that in the first stages of subsidiary's life (including the initial investment) and in case of divestments, HQ are indeed the main influence (Birkinshaw and Hood, 1997; Tavares, 2001). However over the rest of the subsidiary's life, the view that HQ represent the main influence on its evolution has been nuanced by Birkinshaw and Hood (1997), according to whom HQ can exercise considerable influence over the subsidiary evolution in conjunction with other drivers.

3.4.2 Subsidiary Driver

There is a wide agreement that MNEs' subsidiaries have a say on their own evolution (Burgelman, 1983; Birkinshaw, 1997; Birkinshaw and Hood, 1997, 1998; Tavares, 2001). According to this perspective, subsidiaries do not adhere slavishly to HQ's assignments. Instead they take initiatives in order to pursue their own interest, which may even diverge from the interests of the parent multinational. White and Poynter (1984) pointed out that the primary objective of a subsidiary is to justify its own existence as opposed to merely improving the overall efficiency of the MNE.

This view draws on the network model (White and Poynter, 1984; Hedlund, 1986; Bartlett and Ghoshal, 1989) and on the RBV of the firm (Penrose, 1959, Barney, 1991). Both perspectives recognise that resource development can occur in any subsidiary, not necessarily in HQ. Accordingly, the capabilities of each subsidiary are supposed to be distinct (at least to some extent) from the capabilities of HQ and of sister subsidiaries. Hence, a subsidiary can exercise considerable influence over its evolution through the control of critical capabilities (Birkinshaw and Hood, 1997).

The link between subsidiary initiative and subsidiary development has been corroborated by many empirical studies. Birkinshaw and Hood (1997) show that PM mandates are earned through entrepreneurial effort and initiative rather than being handed by the MNE. For Birkinshaw, Hood and Jonsson (1998) subsidiary initiative is positively associated with an enhanced role within the MNE. Pearce (1999) has shown that R&D labs tend to evolve towards higher value-added R&D through their own initiative.

For Birkinshaw, Hood and Jonsson (1998) there is a mutually reinforcing relationship between subsidiary initiative and subsidiary's specialised resources. The relationship is reciprocal in that specialised resources provide the opportunity for initiative, which in turn enhances the subsidiary's resources. Both subsidiary initiative and subsidiary capabilities stem from the effort of the subsidiary management. The influence of subsidiary managers and their entrepreneurial drive for subsidiary development has been highlighted, among other studies, by Young, Hood and Peters (1994), Birkinshaw (1997), Birkinshaw, Hood and Jonsson (1998), and Tavares (2001).

3.4.3 External Environment Driver

The importance of the local environment for the development of subsidiaries' capabilities has long been acknowledged (White and Poynter, 1984; Bartlett and Ghoshal, 1986; Andersson and Forsgren, 1996, 2000; Anderson, Forsgren and Holm, 2001). The external environment of a subsidiary is composed by its immediate business network, but also by the micro-regional, national and macro-regional environments. All this overlapping environments influence the subsidiary evolution (Tavares, 2001).

The link between characteristics of the host country and the subsidiary role within the multinational was first put into evidence by Bartlett and Ghoshal (1986). Birkinshaw and Hood (1997, 1998) also emphasise the relevance of host country environment for subsidiary evolution, both directly and indirectly. Direct means refer to FDI incentives including subsidies, tax concessions, specific infrastructure investment and others. These incentives are commonly given in the early stages of subsidiary growth, although some countries/regions (e.g. Ireland and Scotland) implemented also “after care” programmes (Hood and Young, 1994). An after-care programme may comprise offering generous, long lasting direct support for multinational subsidiaries. Their explicit aim is to achieve further value added development in subsidiaries (Hood and Young, 1988). Indirect means refer to macro-economic policies and investment in infrastructure and education that help create and maintain a competitive local business environment.

Tavares (2001) noted that, along with host-country policies, there are other exogenous factors impacting on subsidiary evolution, like the macro-regional environment (for instance the EU) and the micro-regional/subnational environment. Moreover, industrial and institutional contexts also affect the evolution of the subsidiary (Birkinshaw *et al.*, 1998; Tavares, 2001). The industry context includes inter-firm competition and the degree of oligopolistic interaction (Knickerbocker, 1973; Flowers, 1976; Graham, 1978). The institutional context comprises all institutions at global, macro-regional, national and micro-regional levels that influence subsidiary evolution. Particularly important are inward investment institutions (Young and Hood, 1994).

Another strand of literature highlights the influence of the business network of the subsidiary in its host country (Andersson and Forsgren, 1996, 2000; Andersson, Forsgren and Holm, 2001). The underlying idea is that a subsidiary is embedded in a network of specific business relationships and that at least some of the firm-specific competences are rooted in the interactions with this network (Andersson and Forsgren, 1996, 2000). When applied to the study of MNEs’ subsidiaries, embeddedness refers to the scope and the extent to which a subsidiary manages to forge relationships with customers, suppliers, competitors, local institutions (Andersson *et al.*, 2001). These interactions serve not only to accomplish business exchanges, but also knowledge

exchange. The ability of a subsidiary to establish relationships with other counterparts is an important means of tapping into new sources of knowledge. From the host country point of view, these relationships constitute potential channels of technology spillovers from the MNEs to local firms (Blomström and Kokko, 1998; Görg and Strobl, 2001).

3.4.4 The Interaction between the Three Drivers

An in-depth analysis of subsidiary evolution requires considering the interplay between the three drivers (Birkinshaw and Hood, 1997, 1998; Birkinshaw, Hood and Jonsson, 1998; Tavares, 2001). By combining the insights of the three perspectives the subsidiary can be envisaged as embedded in its corporate network and in its external environment network. The existing capabilities of the subsidiary enable it to assimilate knowledge from the environment and to use it in order to create new capabilities and thus to enhance the competitive advantage of the MNE as a whole.

However, a fruitful interaction between the subsidiary and its external *milieu* depends on the subsidiary's ability to perceive opportunities in its surrounding environment (Penrose, 1959; 1980) and its autonomy to pursue them. Cohen and Levinthal (1989, 1990) labelled the ability to recognise the value of new, external information, assimilate it and apply it "absorptive capacity". According to them, absorptive capacity develops over time, is path dependent and therefore builds on prior knowledge of the other organisation's capacity. The more a subsidiary knows about a domain, the greater the likelihood of an effective scanning of its environment (Andersson, Forsgren and Holm, 2001). Thus, the effectiveness of the interaction between the subsidiary and its external environment depends on extant capabilities and knowledge of the subsidiary. A number of studies on subsidiary roles have stressed the importance of capabilities of subsidiary for its ability to tap into host country's competence (Bartlett and Ghoshal, 1986; Jarillo and Martinez, 1990; Taggart, 1997b; Gupta and Govindarajan, 2000).

Regarding the autonomy of a subsidiary to pursue opportunities it perceives in its surrounding environment, it is important to note that the parent MNE may restrict the scope and extent of the interactions with relevant external actors. Indeed, many subsidiaries have limited autonomy, thus little opportunity to choose and to deepen the

relationship with business partners, and limited R&D capacity (Young, Hood and Peters, 1994). All these constraints impede the subsidiary from developing new knowledge in cooperation with their business partners and the MNE to take full advantage of tapping into dispersed knowledge sources.

Many studies on subsidiaries have referred to their autonomy within the MNE and most linked it to the subsidiaries' status in the eyes of HQ. White and Poynter (1984) noted that WPM status is associated with increased autonomy. Prahalad and Doz (1987) and Jarillo and Martinez (1990) noticed that responsiveness entails that the subsidiary takes autonomously decisions in order to respond to unexpected challenges or opportunities. Birkinshaw and Morrison (1995) found empirical evidence of a link between the WPM and high subsidiary autonomy. Ghoshal and Bartlett (1988) suggested a strong relationship between subsidiary's autonomy and its innovative capabilities.

In conclusion, all three drivers are interlinked and they all impact on the subsidiary's development, intended as creating and accumulating specialised capabilities. This analytical framework will be adopted in the empirical analysis of the innovative capabilities of foreign subsidiaries developed later in this dissertation.

3.5 Concluding Remarks

In this chapter, theories and frameworks related to MNEs' subsidiaries, their roles, evolution and potential developmental impact, were reviewed. This literature review helped establish the importance of innovative capabilities of the foreign subsidiaries for their own evolution within the MNE network as well as for the development of the capabilities of the host country/region, which motivates the focus of one of the two empirical analyses on these capabilities. Furthermore, in this chapter it was developed the analytical framework within which the determinants of the innovative capabilities of the foreign subsidiaries will be analysed empirically. This framework comprises the three drivers of the subsidiary evolution. It also reviews the literature that links these capabilities to certain subsidiaries' characteristics, thus informing the hypotheses related to the determinants of innovation that will be developed in Chapter 5.

Appendix to Chapter 3

Table 3.1: Typologies of Subsidiary Roles

Typology	Key Dimensions	Study	Subsidiary Types
Scope	Market Scope	White and	Market Satellite, Miniature Replica
	Product Scope	Poynter	Rationalised manufacturer, Product
	Value-Added Scope	(1984)	Specialist Strategic Independent
		D'Cruz	Branch Plant, Globally Rationalised Business, World Product Mandate
		Hood and Young	Miniature Replica, Rationalised Manufacturer, Product Specialist, Strategic Independent
		(1988)	
		Young, Hood and Dunlop	Miniature Replica (UK), Miniature Replica (EU), Rationalised manufacturer, Product Specialist, Strategic Independent
		(1988)	
		Hood, Young and Lal (1994)	Miniature Replica, Rationalised manufacturer, Product Specialist
		Delany (1998)	Miniature Replica, Rationalised Operator, Product Specialist, Enhanced Mandate, Strategic Independent
	Papanastassiou and Pearce (1999)	Truncated Miniature Replica, Rationalised Product, World Product Mandate, Regional Product Mandate	
	Tavares and Pearce (2001)	Truncated Miniature Replica, Rationalised Product Subsidiary, Product Mandate	
	Tavares (2001)	Autarkic Subsidiary, Rationalised Subsidiary, Product Mandate	
Integration- Responsiveness	Integration, Local Responsiveness	Jarillo and Martinez (1990)	Active, Receptive, Autonomous
		Taggart (1997b)	Active, Receptive, Autonomous, Quiescent
Knowledge - Based	Subsidiary Competence	Bartlett and Ghoshal (1986)	Strategic Leader, Contributor, Implementer, Black Hole
	Host Country Strategic Importance		
	Inflows of Knowledge	Gupta and Govindarajan (1994, 2000)	Integrated Player, Global Innovator, Implementer, Local Implementer
	Outflows of Knowledge		
Autonomy- Procedural Justice	Autonomy Procedural Justice	Taggart (1997a)	Partner, Collaborator, Vassal, Militant

4 Country Context

4.1 Overview

Host country conditions play a relevant role in influencing the quality of activities MNEs undertake locally. This chapter aims to highlight host countries' attributes, which, in light of extant literature, may have impacted on the attraction and quality of MNEs' activities in the two countries. It presents the key economic features and evolutions in Ireland and Portugal over the last 20 years, with special emphasis on education, R&D and innovation indicators and relevant economic policies pursued by both countries.

4.2 A Brief Economic Overview of Ireland and Portugal

4.2.1 General Economic Performance

In historical terms, the economic growth performance of the two economies is truly impressive. Since they became members of the EU, they have managed to transform themselves from stagnant and backward peripheries in modern and prosperous European economies. The figures recording this transition are remarkable (more so for Ireland). In 1987, Irish GDP per capita was 69% of the EU average (adjusted to EU 15); by 2003, it had reached 134,3% (EU 25) (Eurostat, 2005). Portugal's GDP per capita, which had been only 53 % of the EU average in 1985, had risen to 77,8 % of the EU average (EU 25) in 2003 (Eurostat, 2005). This transformation was made possible by high growth rates, well above the EU average. Interestingly, the growth path of the two economies was quite similar until 1994, when the Irish economy started growing at a faster pace, (OECD, 2004). Since 1994, Ireland not only outperformed Portugal in terms of GDP per capita growth, but it outperformed all other OECD countries over the period 1995-2000 (OECD, 2004). This growth raised dramatically Irish living standards to equal and eventually surpass those of most EU countries. Ireland converged and even moved ahead the EU average in a number of areas including GDP per capita (as can be inferred from Table 4.1). Table 4.1 presents some key economic indicators for Ireland and Portugal. To put their performance in perspective, the table presents also data for the EU 15 and EU 25.

Table 4.1 Economic Indicators: Ireland, Portugal and the EU

Indicator	Unit	Year	Ireland	Portugal	EU 15	EU 25
GDP per capita pps		% 2003	134,3	77,8	109,7	100,0
Growth rate of GDP at constant prices (1995)		% 2003	4,4	-1,2	1,0	1,1
Budget deficit as % of GDP		% 2003	0,2	-2,9	-2,9	-3,0
Public debt		% 2003	31,5	57,7	64,0	63,0
Inflation		% 2003	4,0	3,3	2,0	1,9
Total employment growth		% 2003	2,0	-0,4	0,3	0,3
Total unemployment rate		% 2003	4,6	6,3	7,9	9,0
Labour Productivity per person employed		% 2002	127,3	71,4	107,0	100,0
Imports	‘000 million euros	2004	164,1	64,4		
Exports	‘000 million euros	2004	163,2	54		
Net balance	‘000 million euros	2004	-0,9	-10,4		
Balance of the current account	% of GDP	2004	-0,6	-7,2		

Source: Eurostat (2005).

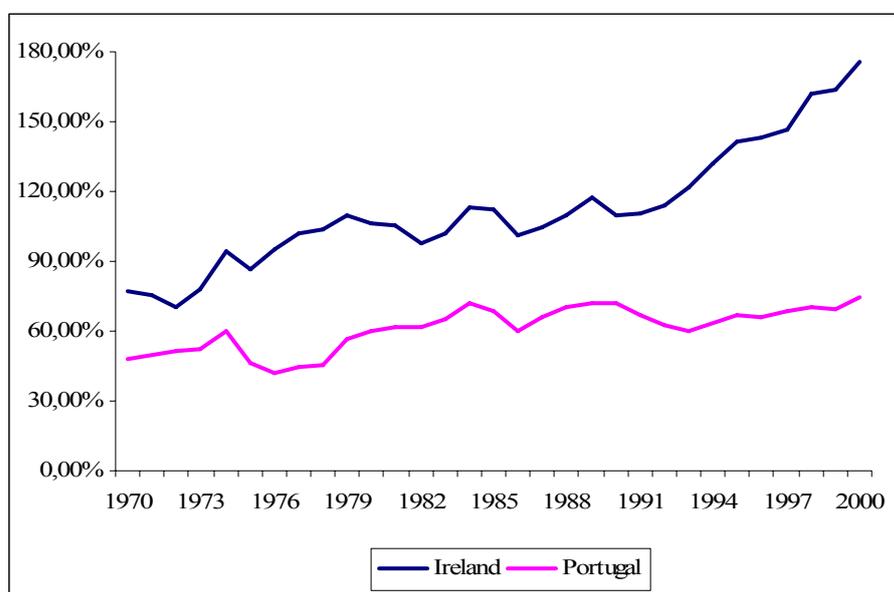
The strong economic growth fuelled employment creation, which resulted in a sharp drop in unemployment from more than 17% in 1987 to 4,6% in 2003 (Eurostat, 2005). Ireland’s public debt was dramatically cut. In 2003, such debt was the second lowest in EU 15, after Luxembourg. Inflation is the only indicator in which Ireland compares negatively to the EU average (4% against 2% in 2003, Table 4.1). Actually, inflation and wages have been rising ahead of the rest of EU-15 states since 1999 (Forfás, 2003a). Although Ireland does not intend to compete internationally on the basis of low prices and wages, there is a growing concern that the growth in wages ahead of other EU countries might daunt Ireland’s competitiveness (Forfás, 2003a).

Since the early 1990s until the beginning of the 2000s, the Portuguese economy was thriving, with annual GDP growth between 3–4 %, low unemployment and low inflation (IMF, 2005). This strong performance allowed Portugal to catch up to a certain extent with the EU average in terms of GDP per capita. However, this period of strong growth came to a halt in 2001, when the economy was hit by the EU recession and by the end of a four-year consumption boom fuelled by low interest rates (EIU, 2005). Since 2001, Portugal actually diverged from the EU average (Eurostat, 2005). In turn, the negative growth in GDP resulted in negative employment growth. Portugal used to

have unemployment rates well below the EU average. Since 2001 unemployment rates have risen steadily reaching 6,5 % in 2003 (see Table 4.1). Additionally, Portugal's inflation rate has grown ahead of the EU average since 2000. The concern over inflation is aggravated by the household indebtedness which tripled over the last decade reaching more than 100 % of the disposable income in 2003 (IMF, 2005).

External trade played an important role in the two economies. In terms of the degree of openness, as measured by the ratio of external trade (imports + exports) to GDP, both countries have been very open since the early 1960s. However, Ireland has always been more open than Portugal (Figure 4.1). Even in the early 1970s, the ratio of external trade to GDP represented 77,5% in Ireland, and 48,1% in Portugal (Penn World Tables, 2005). These ratios have grown steadily ever since, as trade barriers were lowered by EU accession and by GATT and WTO negotiations. Since 1994, the ratio of external trade to GDP in Ireland has risen very sharply. In only six years it grew from 135 % to 175 %, almost as much as it grew in the previous 20 years. Interestingly, 1994 is also the year when GDP started growing faster. This corroborates the view that the growth experienced by Ireland in the 1990s was primary export-led and FDI-led (Ruane, 2001).

Figure 4.1: Trade Openness: Ireland and Portugal



Source: Penn World Tables (2005).

4.2.2 Education Indicators

According to Romer (1990) and Lucas (1988) human capital accumulation plays a

central role in enhancing and sustaining economic growth, by raising productivity and increasing a country's ability to develop and absorb new technology. Human capital is accumulated through schooling, training and experience (Becker, 1962). Table 4.2 and Table 4.3 summarise the main indicators related to human capital in Ireland and Portugal.

Table 4.2: Educational Attainment by Age Group (%)

Age Group	Secondary Education			Tertiary Education		
	Ireland	Portugal	OECD	Ireland	Portugal	OECD
25 - 34	67	29	72	29	11	25
35 - 44	56	20	65	22	9	23
45 - 54	41	14	57	16	8	19
55 - 64	31	12	44	11	7	14

Source: OECD (2000).

Table 4.3: Other Education Indicators

Indicator	Year	Ireland	Portugal	EU 25	European Leaders	
1 Public expenditure as a % of GDP	2001	4,4	5,8	5,1	8,5 (DK)	7,7(SE)
2 Students in tertiary education as % of people aged 20 – 29	2002	26,2	24,3	24,1	45,0(FI)	34,5(SE)
3 Population with tertiary education % aged 25-64	2002	26,5	11,0	21,2	33,2(FI)	31,9(DK)
4 Science and Engineering graduates as % of all graduates	2002	45,1	32,8	n.a	55,5(FI)	52,2(SE)
5 Science and Engineering graduates as % of people aged 20-29	2002	20,5	7,4	11,5	20,5(IE)	20,2(FR)
6 Life-long learning	2002	9,7	3,7	9,0	34,2(SE)	24,8(CH)
7 Human Resources in Science and Technology as % of labour force	2003	16,1	8,4	15,0	23,8(NO)	22,3(FI)

Sources: 1, 2, 4, 7 European Communities (2005), 3, 5, 6 European Communities (2004).

Acronyms: CH (Switzerland), DK (Denmark), FI (Finland), FR (France), IE (Ireland), NO (Norway), SE (Sweden).

Both Ireland and Portugal began investing in education belatedly in comparison to the rest of the EU, who started investing immediately after the Second World War (Barry, 2003). Ireland started to invest in education in the early 1960s, while in Portugal major investment in education did not take place until joining the EU in 1986, although some improvements were made in 1960s and after 1974 (Neves, 1994). According to Mankiw, Romer and Weil (1992) from 1960 till 1985, Ireland was the OECD country

with highest per capita investment in human capital. This heavy investment helped bridge the gap with the OECD average in terms of educational attainment in the case of Ireland especially at the tertiary level (as shown in Table 4.2). The postponement of the investment in education in Portugal had serious repercussions on the population's educational attainment levels, as can be inferred from Table 4.2.

In Ireland, the main focus of the government education policy for a long time has been increasing the percentage of people with tertiary level education and especially the percentage of science and technology graduates. The main motivation of this policy is to increase the availability of skilled labour in high-technology sectors of the economy. The policy has been successful as Ireland moved ahead the OECD average in terms of attainment of tertiary level education and it has outperformed all other EU countries with the exception of Finland and Sweden on the proportion of science graduates in total graduates. Furthermore, the quality of the education system is perceived as high. It was ranked among the top 4 countries in Europe for the quality of the education received, by the IMD World Competitiveness Report (IMD, 2006).

Major investment in education in Portugal only occurred after Portugal joined the EU in 1986. This explains poor performances in terms of attainment at upper secondary and tertiary level (Table 4.2) for older age groups. Since 1985, public expenditure on education in Portugal has risen from 4% of GDP to an estimated 5,4% of GDP in 2000, which is above the EU 25 average. There are concerns that this growth has often taken place with little control over quality and efficiency of spending, and many children repeat one or more years of school according to EIU (2005). Another recurrent problem is early school drop out. According to Eurostat (2005), 39,4% of the people aged between 18 and 24 drop out of secondary school before finishing it. For comparison, the EU 25 average is 15,7% and the value of this indicator in Ireland is 12,9%.

Another Eurostat indicator measuring the underperformance of the education system is the percentage of people between 25-64 whose highest educational attainment level was lower secondary or less. In Portugal, the value of this indicator is 79,4%, in Ireland 39,7% and the EU 15 average is 34,9%. Recent progress has been made in improving the educational attainment at upper secondary and tertiary levels (as can be inferred also from Table 4.2), but Portugal continues to lag behind the EU average. Moreover,

relatively fewer students specialise in fields like science and engineering than in other EU countries (see Table 4.3). Another field in which Portugal lags seriously behind the EU average is life long learning. The importance of this indicator cannot be overestimated especially in the context of the erosion of the traditional competitive advantages. In 2002, only 3,7% of the adult population participated in any kind of life long learning initiative. For comparison, the EU average is 9,0%.

4.2.3 R&D, Technology and Innovation Related Indicators

The importance of innovative activities for the absorption and creation of new knowledge has been widely accepted (Cohen and Levinthal, 1989, 1990). In Ireland and Portugal, both public and business sector investment in R&D increased substantially in recent years, still they are below the levels observable in other advanced economies and even the EU average in some cases. Table 4.4 and Table 4.5 present the main R&D and innovation related indicators for Ireland and Portugal.

Table 4.4: R&D and Innovation Indicators

Indicator	Year	Ireland	Portugal	EU 25	European Leaders	
1 R&D Expenditures as a % of GDP	2003	1,1	0,9	1,9	4,3(SE)	3,5(FI)
2 % of R&D Expenditures financed by Business	2002	66,0	31,5	55,4	71,9(SE)	70,8(FI)
3 R&D Personnel as % of Persons employed	2002	0,9	0,8	1,4	3,0(FI)	2,6(SE)
4 Patent Application to EPO per million inhabitants	2002	89,9	4,3	133,6	311,5(SE)	310,9(FI)
5 High Tech Patent Application to EPO per million inhabitants	2002	26,8	0,8	26,0	120,2(FI)	90,3(NL)
6 Patent Application to USPTO per million inhabitants	2002	32,4	1,3	59,9	187,4(SE)	158,6(FI)
7 High Tech Patent Application to USPTO per million inhabitants	2002	8,1	0,1	9,4	51,4(FI)	38,1(SE)

Source: European Communities (2005).

Acronyms: CH (Switzerland), DK (Denmark), FI (Finland), FR (France), IE (Ireland), NL (Netherlands), NO (Norway), SE (Sweden).

Table 4.5: Technological Indicators

Indicator	Year	Ireland	Portugal	EU 25	European Leaders	
1 Labour Productivity in high-tech manufacturing (thousands EUR/person)	2002	156	34	63	156 (IE)	127(FI)
2 Labour Productivity in manufacturing (thousands EUR/person)	2002	149	20	45	149 (IE)	69(FI)
3 % of value added by high-tech manufacturing to value added by manufacturing	2002	23,0	6,0	13,0	28,0(MT)	24,0(FI)
4 % of value added by medium high-tech manufacturing to value added by manufacturing	2002	42,0	18,0	31,0	44,0(DE)	42,0(IE)
5 High tech exports as a % of total exports	2002	29,9	7,4	17,8	55,0(MT)	29,9(IE)
6 Employment in med/high tech manufacturing (%)	2002	6,3	3,1	6,6	11,0(DE)	8,9(SI)
7 Employment in med/high tech services (%)	2002	3,9	1,4	3,2	4,9(SE)	4,7(FI)

Source: European Communities (2005).

Acronyms: CH (Switzerland), DE (Germany), DK (Denmark), FI (Finland), FR (France), IE (Ireland), MT (Malta), NO (Norway), SE (Sweden), SI (Slovenia).

From Table 4.4 it emerges that the proportion of R&D undertaken by business is twice as high in Ireland as in Portugal. Higher human capital accumulation and investment in R&D have a direct effect on raising productivity and increasing the capacity of absorbing and creating new technology (Cohen and Levinthal, 1989, 1990; Coe and Helpman, 1995; Barro and Pain, 1997; Glass and Saggi, 1998; Tavares and Teixeira, 2005). Portugal's productivity in manufacturing and high technology manufacturing is the lowest in EU 15 far behind other cohesion countries like Spain and Ireland⁴. Ireland's productivity in manufacturing and high technology manufacturing is highest in the EU 25, despite better educational and R&D performances by the Northern European countries (see Table 4.5).

⁴ For Greece, statistics were unavailable

A related group of indicators look at the ratio of the value added by high technology manufacturing and services to the value added by the entire manufacturing sector. In Ireland, the contribution of high technology manufacturing to the total value added by manufacturing is almost four times higher than Portugal (23% to 6%). Portugal is also well below the EU average, which is 13% (Table 4.5). This distribution of value added by manufacturing points towards an overspecialisation in low technology activities in Portugal. This conclusion is further supported by the share of exports of high technology goods in total exports: 29,9% in Ireland, 7,4% in Portugal, while the EU average is 17,8%. Furthermore, the employment in high technology manufacturing as percentage of total employment is twice as high in Ireland as in Portugal, and even higher for high technology services. However, to put these indicators in perspective, even in Ireland, employment in high technology manufacturing and services is much lower than in Nordic countries. Taking into account that skills are acquired not only through formal education, but also through work activities and on the job training, the low percentage of employment in high technology manufacturing and services casts serious doubts on the future availability of human capital.

4.3 Policy Approaches: Ireland and Portugal

Ireland and Portugal have differed considerably in their policy approaches towards FDI and in general economic policies as well as in the way these policies were implemented. There is substantial agreement that much of the success achieved by Ireland in attracting FDI inflows and reaping the benefits of these inflows is the result of FDI related policies and general growth enhancing policies. This section will outline the evolution of FDI-related policies, as well as general economic policies in both countries.

4.3.1 General Economic and FDI Related Policies Pursued by Ireland

The state known today as the Republic of Ireland was for centuries a British dominion and became independent in 1922. Since gaining its independence, two distinct attitudes towards international trade and FDI can be discerned: inward orientation, from 1922 till 1959, and outward orientation, which has dominated the Irish policy since 1959 to date.

Inward Orientation: 1922 – 1959

After a short period of openness towards international trade and investment in the 1920s, Ireland embraced a protectionist stance towards trade and FDI (Ruane, 2001). Protectionism was adopted in response to the economic war with the UK and the popular philosophy at that time of making Ireland self-sufficient (Ruane, 2001). Ireland remained protectionist till the late 1950s, for almost one decade longer than the rest of Western Europe. The foreign ownership of firms was prevented by the “Control of Manufactures Act” (1932) and high trade barriers were imposed to protect Ireland’s “infant industry”. Despite these high barriers, Ireland failed to develop a viable manufacturing sector and remained mainly an agricultural economy (Görg and Ruane, 1999). After some initial success in increasing employment and exports, employment growth stalled and imports increased more rapidly than exports leading to a balance of payments crisis (Barry, 2003). By the end of the 1950s economic growth was sluggish (around 2% while the rest of Western Europe was growing at a buoyant 6%), unemployment chronic, emigration high and public accounts in disarray.

Outward Orientation: 1959 – To date

The harsh economic situation in the late 1950s prompted a decisive reversal in economic policies. Recognising that protectionist policies played an important role in Irish underperformance, the economy was opened up to trade and FDI. In 1959, the Shannon Free Airport Development Company (the first Customs Free Industrial Zone in the 20th Century) was established by the State (Forfás, 2000). In 1966, the Anglo-Irish Free Trade Agreement was signed, aimed at liberalising trade with the UK, then Ireland’s main trading partner. In 1973, Ireland embraced free trade with Europe by joining the (then called) European Community (EC). Entering the EC had a major impact on Ireland’s economic development by granting market access for Irish exports.

Furthermore, Ireland adopted an outright export-led, FDI-led development strategy (Ruane, 2001). In 1959, the “Control of Manufactures Act” was abolished and replaced by policies focused on aggressively targeting FDI. Ever since, the pursuit of FDI inflows, especially from the US, as a way to increase domestic competitiveness, has been a mainstay of Irish industrial policy (O’Gráda and O’Rourke, 1994). The move towards openness was accompanied by setting the corporate tax on profits derived from manufactured exports to zero. In 1982, the zero taxes were deemed incompatible with

the Treaty of Rome. They were replaced by an automatic tax of 10% on all manufacturing activities. Since 2003, a tax of 12,5% has been applied on all corporate income.

The IDA (Industrial Development Authority) had an important role in drawing and implementing the FDI-based development strategy. The IDA was founded in 1949 and in 1952 its sphere of activity was extended to include FDI promotion FDI in Ireland (Forfás, 2003). One of its defining features has been explicit sectoral targeting. Its *modus operandi*, described by MacSharry and White (2000), has been: identifying sectors with high international growth and comparing them to Ireland's resources and development aims. Given Ireland's exiguous internal market and its geographical position with associated high transport costs, it was decided to promote Ireland as a production and export base for weightless components, like electronics and pharmaceutical products, and later for services (MacSharry and White, 2000; Barry, 2004). Once identified the sectors, the IDA singled out the strongest players in those sectors and approached them in order to persuade to invest in Ireland. It was expected that the presence of some "flagship projects" would lead to the creation of industrial agglomerations (Barry, Görg and Strobl, 2003; Barry, 2004). After some firms in a given sector opened subsidiaries in Ireland the IDA also gets to know better the sector, its current needs, and its future requirements. Based on the needs of the targeted sectors, the IDA helped shape Ireland's factor endowments, thus enhancing its location advantages (Barry, 2004).

One of IDA's most fruitful initiatives was to push forward a massive investment in education, which led to the creation of a pool of science graduates needed to attract/upgrade MNEs' high-tech intensive activities. Before the late 1950s, the proportion of Irish workforce with upper secondary and university level qualification lagged behind that in the rest of Europe (Barry *et al.*, 2001). By the early 1990s, this gap has diminished considerably thanks to heavy investment in education. According to Mankiw, *et al.*, (1992) from 1960 till 1985 Ireland was the OECD country with the highest rate of investment in human capital. Although the entire education system benefited from the investment, from the outset there was a clear focus on tertiary education and on technical and scientific specialisations (Barry, 2003). For Barry (2004), the availability of highly qualified labour has been a major factor in attracting

FDI inflows in sectors like electronics, pharmaceuticals, software and financial services.

Generous financial and fiscal incentives have been made available for multinationals willing to invest in Ireland. IDA has provided financial assistance for achieving some well-defined objectives, and repayment has been required in case the MNE failed to fulfil its obligations. In the early days, priority was given to greenfield investments and to exporters (Tavares, 2001). Since 1982, the priority has shifted towards attracting high value added foreign direct investment that would create high value added jobs (IDA, 2004).

The combination of zero corporate taxes, English speaking, technically skilled and relatively cheap workforce, credible and proactive institutions and EU membership proved a strong lure for MNEs, especially US manufacturers. GDP grew at an average rate of almost 4,5% per year over the period 1960-1973 and exports, as a proportion of manufacturing output, increased from 5% in 1958 to 30% in 1973 (Forfás, 2000).

However, this promising start was hampered in the 1970s by the two oil shocks and the following international crisis. Inappropriate fiscal and monetary policies adopted in response to these shocks led to an escalating public debt crisis by the end of the 1970s (Barry, 2003). Through the 1980s governments tried to close the deficit via high taxation. The attempt proved unsuccessful. To make things worse, a side effect of this policy was that workers responded to tax increases by raising wage demands (Barry, *et al.*, 2001). By the end of the 1980s Ireland found itself trapped in a mixture of high unemployment (it hit 17% in 1987 in spite of high emigration rate), slow growth, high inflation, heavy taxation and growing public debt (it reached 125% of GDP in 1987) (Forfás, 2000).

But once again, Ireland's economic fortune saw a dramatic turnaround. In the late 1980s, Ireland was subjected to a number of "*beneficial shocks*", which induced a "*virtuous cycle*" for the economy (Barry, 2004). These "*beneficial shocks*" were: the resolving of the fiscal crisis, the doubling of the structural funds, the US prolonged boom and the Single Market. These "shocks" will be now reviewed.

The crisis in 1987 prompted a new stabilisation attempt, successful, which relied on

public expenditure cuts rather than on further tax increases. The crisis also allowed for a social partnership among all economic agents. A unique feature of this partnership is that it ensured wage moderation by promising a lower tax burden, which generated increases in real rather than in nominal wages. This contrasted with social partnership in other EU countries, which offered wage moderation via the promise of high welfare spending, with an associated high tax burden, widely considered as unsustainable (Barry, *et al.*, 2001). The tax cuts assured macro stabilisation and competitiveness gains. The timing of the public expenditure cuts auspiciously coincided with the EU decision in 1989 to double the Structural Funds. The doubling of the Structural Funds allowed to modernise considerably the Irish incipient infrastructure, and to further investment in human capital, despite the public expenditure cuts.

Since the beginning of the 1980s, the EU has been an attractive location for US MNEs, mainly due to its size and prospect of further enlargements (Görg and Ruane, 1999). The Single Market, which removed many non-tariff barriers among EU members, had a positive effect on US FDI into the EU (Görg and Ruane, 1999). From the late 1980s, US FDI into the EU increased significantly (almost doubled) and Ireland captured a growing share of these flows. Most of the investment occurred in electronics and tradable services sectors, which are both characterised by very low transport costs.

All these beneficial shocks and the interplay among them resulted in a sweeping transformation of the Irish economy from one of the worst performing economies in the EU to one of the best-performing (as shown earlier). In view of the achievements of recent years, the focus of FDI related policies shifted from inducing more FDI inflows towards the increasing quality of MNEs' activities (IDA, 2004). Accordingly, the availability of grants is no longer linked to export behaviour, but to the quality of multinationals' activities and to the quality of employment created (IDA, 2004, 2006). Furthermore, grants have become less important and pro-business policies in fields like education, incentives and taxation meant to attract and upgrade the R&D activities gained prominence (IDA, 2004, 2006).

4.3.2 General Economic and FDI Related Policies Pursued by Portugal

Portugal became a Republic in 1910. During the next decades the political events and

regimes had a strong influence on policies towards FDI as well as on the general economic policies adopted. Following the most important political changes, four main periods can be distinguished: the establishment of the *Estado Novo*, which covers the period 1926 -1960; the “liberalisation” of the *Estado Novo* induced by EFTA accession, which lasted from 1960 till 1974; the Carnation Revolution and the subsequent decade (1974-1985), the EU accession and membership (1985 – to date).

In the years following the establishment of the Republic, the country was plagued by political and social turmoil with dramatic economic effects. Under this situation, the military *coup* in 1926, which put an end to political instability, was widely welcomed.

The Establishment of the *Estado Novo*: 1928-1959

In 1928, the military government invited António de Oliveira Salazar for Minister of Finance. For the next forty years Salazar's political and economic doctrines shaped economic policy in Portugal and the legacy of his regime is still felt today. Salazar's priority was to solve the financial crisis which he successfully managed through tough austerity measures. In a few years, Salazar achieved a favourable balance of trade and a budget surplus, which increased the reputation of his policies, strengthened his grip on power (Lopes, 1996). In 1933, Salazar became Prime Minister and laid the foundations for his *Estado Novo*, the “New State”. The political system established was “corporatist”, characterised by predominantly private ownership of the means of production and overwhelming state control. This control manifested itself mainly through price control and extensive state regulation (Lopes, 1996).

Industrial protectionism was introduced by law in 1931 and it aimed to restrict the competition from external and internal sources. A system of industrial licensing⁵ (*Condicionamento Industrial*) required state authorisation for setting up a new firm and for changing the capacity of an existing firm. This system of internal and external protectionism affected the flexibility and the innovation potential of the economy (Tavares, 2001). All these regulations led to the emergence of a dual economy. A few export oriented sectors, among which textiles and clothing, were exempted from these protectionist rules. Some other sectors were sheltered from external competition through

⁵ It was very similar in philosophy and in timing to the “Control of Manufactures Act” in Ireland

tariffs and quotas and from internal competition through “industrial conditioning”.

International trade and FDI were envisaged with suspicion, in line with prevailing economic thinking and with the government’s nationalist stance. In the early 1940s, the government adopted a growth model based on import substitution and on discrimination in favour of domestic investors (Castro, 2000). In 1943, the Law of Nationalisation of Capital, which limited and, in some sectors, forbade FDI, came into force. These protectionist approaches towards international trade and FDI together with the all-pervasive state intervention in the economy resulted in very low levels of FDI inflows.

One of the most criticised features of the regime was its policy (or lack of policy) on education. Before 1960 a very low proportion of the population had access to secondary and even to primary education (Lopes, 1996). Illiteracy rate was as high as 40% (Neves, 1994). The compulsory education was 3 years till 1956. Access to tertiary education was restricted, as there were only 4 universities.

A Moderate Outward-Orientation: 1959 - 1973

By the end of 1950s it became evident that the protectionist policies adopted inhibited economic growth (Corkill, 1999). As a consequence, the government embraced a moderate outward-looking policy. In 1959, Portugal became a founding member of the European Free Trade Association (EFTA) and in the following year it adhered to General Agreement on Tariffs and Trade (GATT). In 1972, Portugal signed a free trade agreement with the (then) EC. The main consequence of Portugal’s accession to EFTA, and to other international organisations, was the commitment to reduce trade barriers. However, due to its economic backwardness, Portugal was allowed a long period of adjustment. According to Castro (2000), tariff barriers were lifted only for the manufacturing products which were not produced in Portugal at that time. This partial liberalisation further strengthened the dual nature of the economy. Another positive development was that the industrial licensing system was abolished in most sectors.

EFTA membership had an important contribution to Portugal’s economic development

(Neves, 1994). During the 1960s, Portugal had an average economic growth rate of 6,9% (Lopes, 1996). The growth rate of Portuguese merchandise exports during the period 1959-1973 was over 11% per annum (Lopes, 1996). Over the same period, exports diversified considerably (Lopes, 1996). In 1965, a law which automatically authorised foreign investors to establish operations in Portugal in various sectors came into force. It also reinforced the guarantees offered to foreign investors (Castro, 2000). Yet, a coherent FDI policy did not exist. The new laws and the perceived liberalisation resulted in a tenfold increase of FDI inflows over 1965-1973 in comparison with the previous decade (from an extremely low base however). Inflows represented only 0,8% of the GDP, but they accounted for 20% of the gross fixed capital formation and 37 % of the exports (Lopes, 1996). Most of the FDI inflows were attracted by labour intensive industries – clothing, textiles and footwear and electrical equipment (Lopes, 1996).

Since the mid-1960s public education was made available for all children between the ages of six and twelve. The government enacted laws to promote educational opportunities, but implementation lagged behind. However, more elementary and secondary schools were opened, and new universities were established.

The Carnation Revolution and the Subsequent Decade: 1974 - 1985

This phase of growth was brought to an end in 1974. In April 1974, the “Carnation Revolution” overthrew the *Estado Novo*. The period 1974-76 was marked by political instability and economic disarray. The revolution coincided with the first oil shock that drastically increased the value of imports, and with the subsequent international crisis which resulted in stagnant demand for Portuguese exports. During 1974-76, a socialist leaning faction gained the upper hand in government (Neves, 1994) and swiftly nationalised the economy and redistributed national income from property owners and professionals to industrial and agricultural workers, which implied steep wage rises and pervasive price regulation (Lopes, 1996). The result of these policies was a sharp fall in output, a decline of Portugal's competitiveness in foreign markets and a huge balance-of-payments deficit. In 1976, a democratic regime was installed. Faced with the emerging debt crisis, the Portuguese government pursued IMF austerity programmes in 1977-78 and 1983-85. These programmes achieved external stabilisation, but had

dramatic consequences on growth, unemployment and inflation (Castro, 2000).

During this period, FDI was explicitly exempted from nationalisation. However, many foreign-controlled enterprises closed their operations because of costly labour settlements, poor labour discipline, all-pervasive state intervention in the economy and negative business climate (Lopes, 1996). In 1977, the *Instituto do Investimento Estrangeiro* (Foreign Investment Institute), a new institution in charge of inward investment was created in the attempt to boost inward FDI. Its main attribution was the provision of financial incentives for potential investors. Preference was given to large projects expected to create a significant number of jobs.

The EU Membership: 1985 - To Date

Portugal became a member of the EU in 1986. The opening of the economy, together with the deepening of EU integration have been crucial factors in Portugal's development ever since. In the lead-up to accession, important structural reforms were adopted, including: the elimination of the collectivist principles, sweeping privatisation and the elimination of the remaining trade barriers. The Structural Funds made available by the EU had an important contribution at the modernisation of the economy. EU accession and the imminent Single Market Programme induced unprecedented inflows of FDI. FDI increased at an extraordinary pace after Portugal's EU accession. The main source of FDI inflows were other EU countries which were lured by political stability and a welcoming investment climate that included investment subsidies (largely sponsored by the EU), the lowest wages in the EU, and programmes of economic deregulation and privatisation, as well as strong national economic and export growth.

Another important change was the reform of the education system. The importance given to education can be inferred from Portugal's public expenditure on education which has risen over the period and amounted to 5,9 % of GDP in 2000, above the OECD average. Compulsory education was set to 9 years in 1985. In the early 1990s, immense efforts had been made in order to reduce illiteracy. These were fruitful and an 85% literacy rate was achieved among those over age 15 in 1990. However, Portugal continues to lag dramatically behind the OECD average in educational attainment at secondary and tertiary levels. Nonetheless, impressive strides have been made in recent

years. According to Tavares (2004) the quality of public tertiary education is perceived as high and there are some niches of very well skilled graduates and engineers.

At the beginning of the 2000s, the EU was hit by recession, which fully hit the Portuguese economy, highlighting its exposure. The EU is Portugal's main export market and main FDI source. During the 1990s-early 2000s, FDI performance was erratic, recording sharp increases followed by dramatic declines. The high level of divestment induced suspicion over the opportunistic behaviour of MNEs (Tavares, 2004).

In 1990, the *Instituto de Investimento Estrangeiro* was superseded by ICEP (*Instituto de Comércio Externo Português*), which besides FDI was also in charge of international trade and tourism. The bitter-sweet experience of the 1990s led to the emergence of a new, more proactive and more selective approach towards FDI. In 2002, API (Portuguese Investment Agency) replaced ICEP. This agency dealt with FDI and large domestic projects. It had a greater autonomy from the government and a sizeable budget allocated for inward FDI promotion (Tavares, 2004). Its main attribution was to provide financial incentives to the most promising investment projects. These incentives were mainly funded by European Regional Development Fund (ERDF) and European Social Fund (ESF). The agency also simplified bureaucracy by creating a one-stop-shop for potential investors. In 2006, the institution was restructured again. The new institution is called Agência para o Investimento e Comércio Externo de Portugal (AICEP) and it is responsible for promoting foreign and domestic investment, outward Portuguese investment and exports in goods and services.

4.4 Characterisation of Inward FDI

This section will document the performance of the two economies in attracting FDI, both in terms of the magnitude of FDI inflows and of the quality of MNEs' activities.

4.4.1 FDI in Ireland

Over the last 15 years Ireland's performance in attracting FDI has been impressive both historically and in international terms.

The historic evolution of the inflows of FDI into Ireland is illustrated in Figure 4.1. As, it can be seen in the figure, FDI inflows increased sharply in 1995 and this trend accelerated during the following years. In 2001, FDI inflows fell following global trends, but after 2001 they recovered significantly, against the trend. The inflows generated a more than five-fold increase in FDI stocks between 1987 and 2006 and totalled 179,041 million USD in 2006 (UNCTAD, 2007).

When put in international context, Irish performance appears even more impressive. Since the late 1980s, US inflows to the EU almost doubled. Over the same period, FDI inflows to Ireland almost quadrupled, enabling it to increase its share of EU inflows, which grew from 1,75 % in 1991 to 8,64 % in 2003 (UNCTAD, 2005), which is remarkable for a country that accounts for only 1% of the EU GDP.

In Ireland, the predominant entry mode has taken the form of greenfield investments or the expansion/upgrading of already existing affiliates in Ireland (Barry *et al.*, 2003).

Most of the MNEs that invested in Ireland came from the US, which accounts for 46,3% of all foreign affiliates in Ireland. German MNEs accounted for 13,5 %, the UK accounted for 11,8%, while, in total, the EU accounted for 39,2% (UNCTAD, 2005). The predominance of US MNEs is in part the result of an explicit policy choice (Forfás, 2000). The IDA identified the US as the most promising source country in the 1970s and has targeted US companies ever since. This choice was justified by the cultural and linguistic proximity between the two countries and by the technological lead of the US firms (Forfás, 2000). The prevalence of US FDI could be considered a weakness in terms of exposure (the effects of downturn in 2001 on the Irish FDI illustrate the risks involved by this exposure).

Foreign owned firms account for a large part of the Ireland's economy. Only 16% percent of the firms in Ireland are foreign owned, but they accounted for 65% of the output in 1995 (Barry *et al.*, 1999) and for 47,3% of the employment, 74,9% of the sales and 91% of the exports in 1999 in the manufacturing sector (UNCTAD, 2002). Since the foreign-owned firms account for such a large part of the economy, their activities have economy-wide implications.

In terms of sectoral distribution, more than half of FDI inflows went to high-tech sectors like electronics, pharmaceuticals and financial services sector (Barry, 2004). In the electronics sector, some of the major companies like Intel, Microsoft, Dell, Hewlett Packard, Lotus and Oracle have operations there. Since 1980 some 40% of all U.S. new inward investment in European electronics has located in Ireland and this trend is continuing (Forfás, 2000). Ireland also hosts 9 of the top 10 pharmaceutical companies in the world. They include Pfizer, Merck, Johnson and Johnson, among others (Barry, 2004). In the 1990s, the IDA targeted successfully FDI inflows in financial and legal services, which led to the establishment of the International Financial Services Centre (IFSC) in Dublin. Nowadays, the IFSC is one of the leading locations worldwide for international banking, investment funds, corporate treasury and insurance activities. More than half the world's top 20 insurance companies and to more than half the world's largest banks have established subsidiaries in Dublin (Forfás, 2000).

Inward FDI also had a considerable impact on Irish exports, in terms of magnitude, composition and destination (Barry et al, 1999). In 1999, foreign affiliates accounted for 91% of Irish manufacturing exports (UNCTAD, 2002). They are more export intensive than local firms. In 1995, Irish firms exported on average 36% of output while foreign affiliates exported 89% and US-owned affiliates exported 95% of their output (Barry *et al.*, 1999).

In terms of destination of exports, inward FDI is considered in large part responsible for ending Ireland's dependence on UK as an export destination (Barry and Bradley, 1997; Barry *et al.*, 1999). In 1960, UK accounted for 75% of all Irish exports and the rest of EU for 6%, while in 1999 UK accounted for only 22% and the rest of the EU for 43% (Forfás, 2000). As mentioned above it is widely held that the exports of foreign subsidiaries are in large part responsible for this change, as they account for a large part of the exports and their main export destination is the EU, excluding UK (Barry and Bradley, 1997; Barry *et al.*, 1999). For instance, in 1995, Irish firms sent 42,1% of their exports to the UK and only 32,2% to the rest of the EU, while foreign-owned firms sent respectively 22,5% and 50,9% (Barry *et al.*, 1999).

MNEs operations have also influenced the composition of exports. As noted before,

foreign affiliates are over-represented in high-tech sectors like computers, software and pharmaceuticals. In 1999, Ireland became the largest exporter of software products in the world in terms of absolute value and volume of exports (Forfás, 2000). The same year Ireland produced more than two thirds of the computers and more than 40% of all PC packaged software, including 60% of business applications software, sold in Europe (Forfás, 2000).

In Ireland, the foreign-owned affiliates have higher skill levels and pay higher average wages than local firms, contributing this way to the creation of better employment opportunities (Barry and Bradley, 1997; Barry *et al.*, 1999). According to these authors, that is due to the concentration of foreign affiliates in relatively high-tech sectors – that employ higher proportions of skilled labour than does manufacturing sector on average.

Another important aspect of MNEs' operations in Ireland refers to R&D activities. Over the period 1993-2003 the overall Business Expenditure on R&D (BERD) rose from 343 millions euro to 1076 millions euro, that is more than threefold. In this period, R&D undertaken both by foreign and domestic firms increased rapidly, but R&D undertaken by foreign firms grew faster (Forfás, 2003b). BERD performed by foreign owned firms increased by 241%, while BERD increased by 169%. In 2003, foreign owned firms accounted for 72,1% of overall R&D performed by business sector. This high proportion is also explained by the fact that foreign owned firms are overrepresented in high-tech sectors, which account for 84% of all BERD undertaken (Forfás, 2003b).

In conclusion, Ireland has been extremely successful in attracting FDI. Currently, foreign-owned affiliates account for a large share of output, exports and employment. There is substantial agreement that inward FDI had a positive impact on Irish economy, by contributed to the development of high-tech sectors, increases and diversification of exports, skill intensity and business R&D expenditure (Barry and Bradley, 1997; Barry *et al.*, 1999, Barry, 2004).

4.4.2 FDI in Portugal

Portugal's performance in attracting FDI over the last 15 years has been more erratic

than Ireland's. From 1987 until 1991, FDI inflows increased rapidly due to EU accession and the lead up to the Single Market. After 1991, net FDI inflows declined due to high divestment (Tavares, 2004). This trend reversed in 1996, when inflows rose, to fall again in 1999 to levels as low as before EU accession (Tavares, 2004). In 2000, inflows increased again following global trends. In 2002, they registered a sharp decrease (almost 70%) and this trend has continued in the following years. In 2006, the inward FDI stocks amounted to 85,520 millions of USD (UNCTAD, 2007).

The underperformance after 2001 is usually blamed on world economic downturn and on high levels of divestment. This volatility is partially accounted for the heavy weight of a few large projects in the total FDI inflows of any year. Actually, for such a small economy one large investment/divestment can reverse the trend. The largest ever FDI in Portugal was the set up of the Ford-VW joint-venture AutoEuropa. The initial value of the project was 2,5 billion Euros, and has since then been increased by sequential investments. Also, right from the outset it triggered other FDI projects (Tavares and Young, 2004) creating a cluster in the automotive sector in the region of Palmela.

In Portugal, in the 1980s, the favoured mode of entry was acquisition of Portuguese companies (Corkill, 1999). Recently, however, mergers and acquisitions (M&As) have accounted for a modest proportion of the investments. Greenfield investments are also quite modest. The vast majority of investments (more than half of the FDI inflows) have taken the form of expansion of already existing activities (Castro, 2000; Tavares, 2001).

The EU has been by far the main source of FDI into Portugal. It accounted for 80,7% of FDI stocks in 1996 (Banco de Portugal, 1998). Among the EU countries the main investors in Portugal in 1996 were: Spain with 17,4 %, France with 14,7 %, UK with 12,2 % and Germany with 10,8 %. Outside the EU, the main investors were the US which accounted for 5,8 % and Switzerland which accounted for 5,4 % (Banco de Portugal, 1998). As Castro (2000) and Tavares (2001) note, the EU share in FDI stocks in Portugal is overstated because many investments from non-EU countries are made through their EU subsidiaries. Half of the US investments in Portugal were made through other EU subsidiaries, the most common platform being Spain (Castro, 2000). According to the same author, many French and UK firms also used the "Spanish route".

Portugal lacked a deliberate sectoral targeting policy. There was an “indiscriminate welcome” to FDI, with an emphasis on large employment-creating projects, without concern for the quality and sustainability of the project (Tavares, 2001). This passive attitude together with the advertisement of Portugal as cheap labour location inside the EU led to a concentration of FDI in low value-added activities. However, it has been noted (Neves, 1994; Tavares, 2001) that the sectoral distribution of FDI inflows has undergone a positive evolution from being concentrated in labour-intensive activities in the 1960s towards more capital intensive sectors.

In 1996, FDI in manufacturing sectors accounted for more than 34 % of FDI stocks (Banco de Portugal, 1998). Among manufacturing industries, the sectors that have drawn the highest shares of FDI were: transport equipment (19%), which includes automobiles and automobile components, electric machinery (17%), chemicals (4,6 %), paper (4,7%) and textiles and leather (4,5%) (Banco de Portugal, 1998). A striking feature of FDI stocks in Portugal revealed by the breakdown by sector is the high share of FDI in real estate. Actually, real estate accounts for 24% of all FDI stocks and wholesale/retailing for 17% (Banco de Portugal, 1998).

FDI projects attracted have generated some industrial agglomeration. An example of FDI project generating clustering effects is AutoEuropa. From the outset, it brought 22 other FDI projects, and since then, it attracted many more domestic and foreign investment to its cluster (Tavares and Young, 2004).

In Portugal foreign owned affiliates are also more export oriented than local firms, with exports comprising 44% of total sales for foreign owned firms as against 12% for local firms (UNCTAD, 1999). The EU has been Portugal’s main export market ever since accession in 1986. Nowadays, it accounts for about 80% of all Portuguese exports. Within the EU the main export destinations of Portuguese exports are Germany, Spain, France and the UK. Given the share of exports going to EU the analysis of the evolution of Portuguese exports to EU is particularly important. Cabral (2004) estimates that between 1997 and 2003 Portugal lost 10,5 % of its EU market share. The same author suggests that the main cause for this loss was the overspecialisation in labour intensive products like: textiles, clothes, leather, wood and cork, in which Portugal is losing its competitive advantage. However, since the beginning of the 1990s, these sectors have

continuously lost their weight in total Portuguese exports at the expense of capital intensive sectors like transport equipment and machinery (Cabral, 2004). The same author concludes that FDI inflows had a strong influence on the development and growth of these sectors via adding productive capacity and thus, helped upgrade Portugal's competitive advantage towards more capital intensive goods.

In terms of wages, Cabral (1995) found that average wages paid by foreign subsidiaries in Portugal are substantially higher than those paid by local firms. Among technology based firms, Tavares and Teixeira (2005) found that foreign-owned firms display higher skills and education intensities than domestic firms.

In Portugal, most of the R&D is financed by government or by EU Programmes like PEDIP and ESPRIT. There is only a very limited interface between public and private sector R&D, as well as between universities and firms (Corkill, 1999). The ratio of BERD to GDP was 0,32%, well below the EU average of 1,27% (European Communities, 2005). Foreign subsidiaries in Portugal are not more likely to undertake R&D activities than are domestic firms (Farinha and Mata, 1996). However, they found that the presence of foreign affiliates in a sector increases the probability of R&D activities by domestic firms, which they interpret as an effect of increased competition in the domestic industry. In the same vein, Corkill (1999) found that most of the technologies are imported and there is very little in-house research, design and development. However, Portugal can claim some success in attracting high technology companies. Siemens (now Nokia-Siemens) has several centres of excellence in Portugal. Grundig set up in Braga a world-wide audio equipment R&D unit. The Bosch group has a worldwide centre of excellence for gas water-heaters in Aveiro.

In Portugal, FDI had an overall positive effect (Farinha and Mata, 1996). According to these authors, FDI added productive capacity and helped increase productivity. It also had a positive impact on the productivity of local firms (Flores, Fontoura and Santos, 2002; Proença, Fontoura and Crespo, 2002). Simões (1985) also stresses the role of MNEs as a vehicle for technology transfer. Cabral (2004) and Gonçalves and Guimarães (1996) argue that FDI contributed to changing Portugal's comparative advantage from labour intensive towards capital intensive goods. Tavares and Teixeira (2005) found evidence that among technology based firms, foreign subsidiaries

contribute more to the development of human capital than domestic firms. In conclusion, the effect of FDI on Portugal's productivity, exports, structural composition and output was on balance seen as positive, but the results could have been much better.

4.5 Concluding Remarks

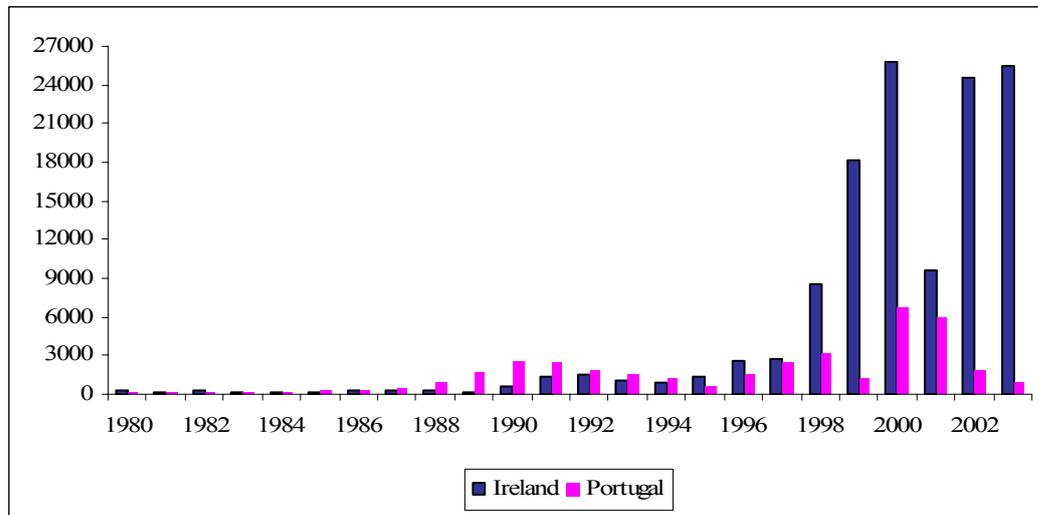
In this chapter, were presented the key economic features and evolutions in Ireland and Portugal over the last 20 years, with special emphasis on the aspects that are most relevant for focus of the present research. Given that the literature links the motivation underlying FDI and the quality of multinationals' activities to the host country attributes (Narula and Marin, 2003), it was considered useful to present a brief description of the two countries analysed. The main aspects considered here were education, R&D and innovation indicators and economic policies related to these areas as well as international trade and FDI.

It emerges that the two countries Ireland and Portugal have adopted quite different FDI and general growth enhancing policies and that they differ with regard to their achievements in terms of education, R&D and innovation. These conditions have impinged on inward FDI attracted. Both countries were successful in attracting FDI inflows, especially in view of their peripheral geographic position and the exiguity of their internal market. However, Ireland performed far better than Portugal, both in terms of magnitude of inward FDI flows attracted and in terms of the quality of MNEs' operations.

The differences between two countries constitute a crucial aspect of the empirical analyses presented in this dissertation, especially as regards the second application. The differences in host country endowments reviewed in this chapter will inform the hypotheses put forward concerning the motivations that led to establishment of foreign subsidiaries in the two countries and with regard to their characteristics.

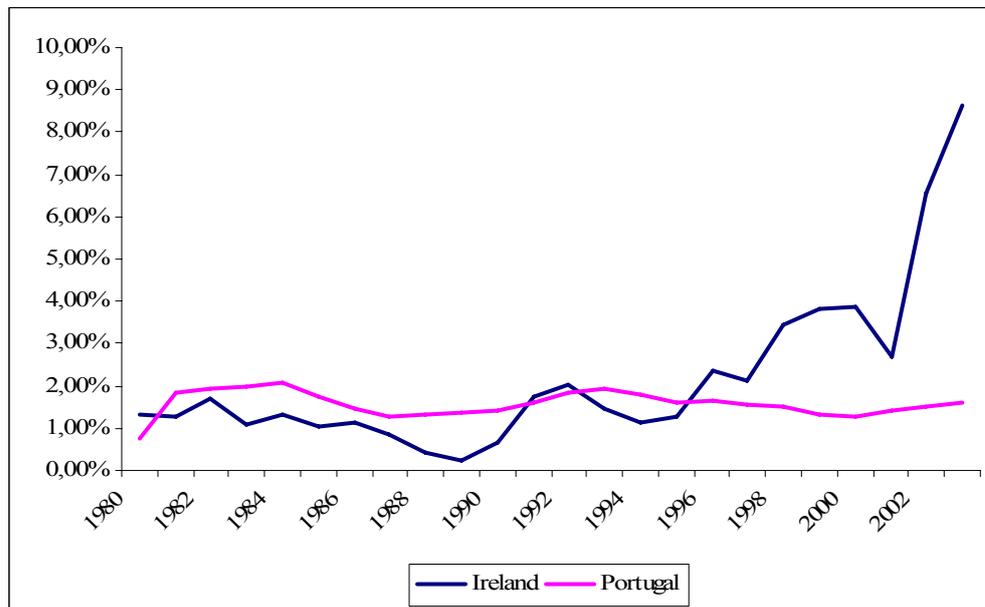
Appendix to Chapter 4

Figure 4.2: FDI Inflows into Ireland and Portugal 1980 – 2003



Source: UNCTAD (2005).

Figure 4.3: Shares of Ireland and Portugal of EU FDI Inflows



Source: Own calculations based on UNCTAD (2005).

5 Hypotheses' Development

5.1 Overview

This chapter presents the main hypotheses to be tested in the two empirical applications that will be presented subsequently in this dissertation.

The first empirical application aims to identify which subsidiaries' characteristics constitute determinants of innovation in such subsidiaries. The characteristics analysed are: age, human capital intensity, R&D intensity, embeddedness and decision making autonomy. The second application investigates whether there are significant differences between foreign subsidiaries based in Ireland and Portugal with regard to these characteristics. The two empirical applications are related because the same characteristics of foreign subsidiaries will be analysed in both cases.

The second application includes also an enquiry into MNEs' motivations to establish subsidiaries in Ireland and Portugal. This analysis was deemed appropriate for the purpose of this study, as it is widely recognised in the literature that the motivations for investment together with host country conditions can provide important insights into the type of subsidiary established, the value added activities undertaken by the subsidiary and, hence, its human capital intensity, R&D intensity, local sourcing patterns and decision making autonomy. In addition, the results of this analysis will help inform public policy suggestions aimed at attracting multinationals' activities which are consistent with the economic development goals of the host countries.

All hypotheses were based on the theories and conceptual frameworks reviewed in Chapters 2 and 3 and by the relevant host countries' conditions outlined in Chapter 4.

5.2 *Determinants of Innovative Capabilities of Foreign Subsidiaries*

A focal point of this study is the capability creation within multinational subsidiaries. Recent research on subsidiary evolution (Hood and Young, 1988; Birkinshaw and Hood, 1997; 1998; Tavares, 2001) and on economic growth (Romer, 1990; Grossman and Helpman, 1991) highlights the importance of technology creation and diffusion.

Moreover, promoting an innovation-driven manufacturing industry has become crucial for the competitiveness of many host countries, especially in the developed world (Sapir, 2004). In view of these considerations, it was decided to focus the analysis on the innovative capabilities of the foreign subsidiaries.

In line with the three drivers underlying subsidiary evolution (Chapter 3), it is considered that characteristics of the subsidiary, of the parent MNE and of the external environment all impinge on the subsidiary's ability to innovate. Among all these aspects, this study is concerned mainly with subsidiaries' characteristics. Based on the literature reviewed in previous chapters, the following hypotheses are advanced on how characteristics of the subsidiary influence its innovative capabilities.

➤ ***Age***

The literature on subsidiary evolution suggests that as a subsidiary matures, it can evolve away from limited roles like serving the domestic market of the host country or manufacturing a small range of inputs for the MNE group towards more complex and innovative activities (Hood and Young, 1988; Birkinshaw and Hood, 1997, 1998; Cantwell and Mudambi, 2000). In the same vein, the KBV approach suggests that through repeated interactions, individuals in a firm develop a common understanding regarding knowledge used in production, marketing, R&D, which is seen as crucial for the transfer and creation of new knowledge. The age of the subsidiary can be interpreted as experience, and thus, it should have a positive influence on knowledge creation within foreign subsidiaries. In view of these considerations, it is expected that:

Hypothesis 1: Older foreign subsidiaries are more likely to innovate than younger ones.

➤ ***Human Capital Intensity***

The importance of human capital for the absorption and creation of new technology has long been established (Nelson and Phelps, 1966). Since then, various studies have argued that human capital is essential to the international dissemination of technological knowledge (Romer, 1990; Glass and Saggi, 1998; UNCTAD, 2000; Michie, 2001; Narula and Marin, 2003; Tavares and Teixeira, 2005). In addition, a few studies found empirical evidence of the importance of human capital to the absorption and creation of new knowledge (Bartel and Lichtenberg, 1987; Borensztein *et al.*, 1998). In view of

these theoretical insights and empirical results, it is expected that:

Hypothesis 2: Foreign subsidiaries having high human capital intensity are more likely to innovate than subsidiaries having low human capital intensity.

➤ ***R&D Intensity***

Insights from different branches of economic literature suggest a positive relationship between R&D intensity and innovation. According to Cohen and Levinthal (1989, 1990), internal R&D contributes to innovation in two ways: directly, by creating new knowledge and indirectly by enhancing the ability to effectively scan its environment and to absorb technology from outside. The capabilities view of the firm suggests that performing in house R&D should increase the capabilities of the subsidiary including its innovative ability (Richardson, 1972; Nelson and Winter, 1982; Dierickx and Cool, 1989; Teece, Pisano and Shuen, 1997). Also, according to the new growth theory (Romer, 1990), innovation feeds on knowledge that results from cumulative R&D experience.

Hypothesis 3: Foreign subsidiaries having high R&D intensity are more likely to innovate than subsidiaries having low R&D intensity

➤ ***Embeddedness***

It has been acknowledged that a subsidiary is embedded in a network of business relationships and that at least some of the subsidiary-specific capabilities are rooted in these interactions (Andersson and Forsgren, 1996; 2000; Andersson *et al.*, 2001). This business network comprises customers, suppliers, competitors, local institutions. In addition to the business network, a few studies have highlighted the importance of links with universities and other research institutions (Mohnen and Hoareau, 2003; Tavares and Teixeira, 2005). The external environment of the subsidiary contains potential sources of knowledge, which can be accessed only through interactions with this environment (Andersson, Forsgren and Holm, 2001). Consequently, it is expected that:

Hypothesis 4: Highly embedded multinational subsidiaries are more likely to innovate than less embedded subsidiaries

➤ *Decision Making Autonomy*

Another important factor in determining the extent to which foreign subsidiaries are able to engage in innovative activities is their decision-making autonomy from the parent (Young, Hood and Dunlop, 1988; Young *et al.*, 1994; Crone and Roper, 2001). Many studies on MNEs' subsidiaries have linked their decision making autonomy to WPM status (White and Poynter, 1984; Birkinshaw and Morrison, 1995), and to their innovative capabilities (Bartlett and Ghoshal, 1986; Ghoshal and Bartlett, 1988).

Hypothesis 5: Foreign subsidiaries enjoying high decision-making autonomy from their parent MNE are more likely to innovate than those enjoying less autonomy.

This research is primarily concerned with the impact of the above mentioned variables on the subsidiaries' innovative capabilities. However, in addition to these variables, this first empirical application will also consider other variables, which previous research found to have an impact on to the innovative capabilities of foreign subsidiary.

5.3 A Comparison between Foreign Subsidiaries Based in Ireland and Portugal

5.3.1 Motivations for Investment

The motivations underlying the establishment of subsidiaries together with host country conditions influence the type of subsidiaries set up. Thus, analysing the motivations for investment is relevant for the analysis of the characteristics of subsidiaries. Motivations related to all types of investments, with the exception of natural resource-seeking investments, which was deemed not relevant in the context of the two host countries analysed, will be investigated. This study is mainly concerned with asset-seeking investments. Two such motivations related to this type of investment will be analysed: the workforce skills and the availability of scientific/technological inputs.

Theoretical literature on FDI suggests that human capital may be a key FDI determinant (Dunning, 1977, 1988; Lucas, 1990; Zhang and Markusen, 1999). These conjectures have been corroborated by various empirical studies, among which Noorbakhsh, Paloni and Youssef (2001), Nunnenkamp and Spatz (2002) and Tavares and Teixeira (2005).

The relevance of the availability of technological and scientific inputs for FDI attraction has also been confirmed by other studies, including Almeida (1996), Audretsch and Feldman (1996), Cantwell and Iammarino, 1998, 2000), Cantwell and Janne (2000), Chung and Alcacer (2002), and Cantwell and Piscitello (2005).

It is widely held that MNEs adapt their investment decisions to host country factor endowments. In Chapter 4, it was shown that Ireland is better endowed with skilled human capital and technological and scientific inputs than Portugal. Ireland scores better on most indicators related to workforce skills, innovation, R&D and technology. In Ireland, a higher proportion of population attained tertiary level education and among total graduates, science and technology graduates comprise a higher proportion than in Portugal (Tables 4.2 and 4.3). There are more patent applications per million inhabitants in Ireland than in Portugal (Table 4.4). In Ireland activities with high tech content account for a larger proportion of economic activity, measured by the share of value added, exports and employment, while in Portugal they account for a very low proportion (Tables 4.5 and 4.6). In view of these considerations, it is expected that:

Hypothesis 6: Workforce's skills and qualifications and the availability of scientific and technological inputs played a more important role in attracting FDI in the case of Ireland than in the case of Portugal.

5.3.2 Characteristics of Foreign Subsidiaries

This study is mainly concerned with the following subsidiaries' characteristics: human capital intensity, R&D intensity, embeddedness and autonomy. Two motivations justify carrying out a comparison between foreign subsidiaries in Ireland and in Portugal. These characteristics have relevant implications for host country development, as will be explained. Secondly, the literature reviewed previously suggests these characteristics are potential determinants of capability creation within foreign subsidiaries (as noted in Section 5.2). It would be interesting to see whether there are systematic differences between the subsidiaries based in the two host countries. Before advancing the hypotheses regarding these characteristics, a few observations related to the importance of these characteristics for the development of the host country are pertinent.

Human capital intensity of subsidiaries is increasingly recognised as an important aspect in view of its potential developmental implications (Slaughter, 2002; Bruno, Crinò and Falzoni, 2004; Narula and Marin, 2003; Tavares and Teixeira, 2005). The role of human capital development in the dissemination of the technological knowledge from MNEs to the host country has been widely acknowledged (Glass and Saggi, 1998; UNCTAD, 2000; Michie, 2001; Narula and Marin, 2003). MNEs are thought to affect both the demand and supply for skilled workers (Slaughter, 2002). They influence the demand by raising the skill premium (Slaughter, 2002; Blomström and Kokko, 2002, Bruno *et al.*, 2004). They impact on the supply of skilled workers by enhancing their human capital through training and on the job learning (Michie, 2001; Miyamoto, 2003).

From a regional development point of view, a high R&D intensity is a quite desirable characteristic of subsidiaries. According to Cohen and Levinthal (1989) R&D carried out inside the firm has a double function of creating new technology and enhancing the capabilities of the firm to absorb technology from outside. Hence, R&D activities tend to be associated with transfer and diffusion of technology (Mansfield and Romeo, 1980; Coe and Helpman, 1995; Barrel and Pain, 1997; Neven and Siotis, 1996; Glass and Saggi, 1998), highly skilled workforce (Tavares and Teixeira, 2005) subsidiary roles and development (Young and Hood, 1988; Pearce, 1999).

Embeddedness of foreign subsidiaries is an aspect deemed important for subsidiary and host country development (Andersson and Forsgren, 1996; Birkinshaw and Hood, 1997, 1998; Tavares, 2001). Generally, embeddedness materialises in linkages with suppliers, customers, other business partners, universities/research organisations (Andersson and Forsgren, 1996; Tavares, 2001; Mohnen and Hoareau, 2003; Tavares and Young, 2006). In this study, only linkages with local suppliers will be addressed, because of the complexity and difficulty of obtaining accurate data for other type of linkages.

Decision making autonomy is considered a critical attribute of the subsidiary, capable of influencing its innovative potential and further development (Birkinshaw and Morrison, 1995; Pearce, 1999; Tavares and Young, 2004). Also, it has been argued that decision making autonomy influences the scope and the extent to which a subsidiary is able to pursue linkages with suppliers and customers, and collaborations with local universities in other research institutions (Young, Hood and Peters, 1994).

It has been argued before that the specific characteristics of a location and the motivations underlying FDI can provide relevant insights about the type of value added activities undertaken and their characteristics. Ireland seems relatively better endowed with skilled workforce, high tech activities and other technological inputs (see Chapter 4: Tables 4.2, 4.3, 4.4 and 4.5). These insights lead to the following hypotheses.

Hypothesis 7: Foreign subsidiaries based in Ireland tend to be more human capital intensive than foreign subsidiaries based in Portugal

Hypothesis 8: Foreign subsidiaries based in Ireland tend to be more R&D intensive than foreign subsidiaries based in Portugal

Hypothesis 9: Foreign subsidiaries based in Ireland tend to be more embedded in the host country than foreign subsidiaries based in Portugal

Hypothesis 10: Foreign subsidiaries based in Ireland tend to enjoy higher decision making autonomy than foreign subsidiaries based in Portugal

It is important to mention that though these characteristics will be the focus of the nonparametric analysis, other characteristics, namely export intensity and value added scope of subsidiaries will also be studied. Analysing them can bring complementary information to help understand better the type of subsidiaries set up in the two countries. The following chapter will present the empirical tests of the hypotheses just put forward, and will discuss the findings of the empirical core of the dissertation.

6 Empirical Analysis of the Quality of Multinationals' Activities in Ireland and Portugal

6.1 Overview

This chapter presents the methodology and the results of the empirical analyses of the characteristics of value added activities undertaken in foreign subsidiaries in Ireland and Portugal. All empirical analyses are based on a questionnaire survey conducted between July-November 2006 on the population of foreign subsidiaries in these two countries.

The first application aims to unveil which of the characteristics of the foreign subsidiaries are significant determinants of the innovative capabilities of foreign subsidiaries located in the two host countries. All related hypotheses (1 to 5) will be tested using econometric methods. The second application aims to test whether foreign subsidiaries in the Ireland and Portugal differ in a systematic way with regard to their human capital, R&D and export intensity, their local sourcing patterns, their decision making autonomy and the motivations underlying the establishment of subsidiaries in the two host countries. The subsidiaries' characteristics and the motivations for investment are analysed using non parametric statistical methods.

The chapter is organised as follows. It starts with a description of the data gathering methodology, followed by a brief data description. Then, it reports the econometric analysis of the innovative capabilities of the subsidiaries and the nonparametric analyses of the motivations underlying the establishment of subsidiaries in the two countries and the characteristics of the activities undertaken within these subsidiaries. The chapter ends with an interpretation of the results of the two empirical applications.

6.2 Data Gathering Methodology

This section will outline the data gathering methodology, the motivation for choosing this methodology and the resulting sample. The choice of the data gathering methodology was conditioned by the objective of this research, which is to investigate the characteristics of the value added activities undertaken within foreign subsidiaries based in Ireland and Portugal. The study of these characteristics requires data at

subsidiary level. Given the lack of published data at subsidiary level, the only way to proceed was to survey directly the population of firms concerned. This method permits to obtain a large sample that is necessary for statistical inference (Taggart, 1999). In addition, it enables comparisons with similar studies and replicability. Indeed, many previous studies on MNEs, subsidiaries relied on this data gathering method (Young, *et. al.*, 1988; Morrison and Roth, 1992; Birkinshaw, Hood, Jonsson, 1998; Birkinshaw and Hood, 2000; Egelhoff *et. al.*, 2000; Crone and Roper, 2001; Tavares, 2001; Tavares and Teixeira, 2005, Tavares and Young, 2006). In view of these considerations, surveying directly the population of foreign subsidiaries in Ireland and Portugal was chosen as the most appropriate method to gather data on the variables of interest.

6.2.1 Description of the Questionnaire

Information was collected for a series of variables which were considered to be important for the hypotheses detailed in Chapter 5. The survey can be found in Appendix to this chapter and a summary of the main aspects covered follows.

1. *Background information of the subsidiary*: year of establishment, sector of activity, number of employees, sales and nationality of the parent MNE.
2. *Motivations for investing in Ireland/Portugal at the time investment was made and presently*. The main motivations explored were: serving the local market, serving the EU market, labour costs, incentives for investment, the presence of important clusters or competitors, workforce's skills and the availability of technological/scientific inputs.
3. *Subsidiary's market scope*: subsidiary's export intensity, markets supplied and their importance.
4. *Linkages with local suppliers*: percentage of inputs bought from local suppliers and from domestically owned firms
5. *Internal linkages*: percentage of output exported to the parent MNE.
6. *Subsidiary's resources*: human capital intensity, R&D facilities, financial resources spent of R&D, human resources allocated to R&D activities, types of activities undertaken within the subsidiary.
7. *Subsidiary's autonomy*: perceived decision-making autonomy.
8. *Innovation*: introduction of innovation, the type of innovation (product and/or

process innovation), applications for patents.

In the construction of the questionnaire, there was a preoccupation to keep it short (one page) and easy to fill out in order to facilitate a higher response rate. Most of the questions involve choosing among already provided options. Open questions were used for the background information of the subsidiary, and when the response involved specifying a number or a percentage. In order to double check the accuracy of the answers, different questions on the same topic were included. The questionnaire was revised by two researchers with considerable experience in questionnaire design and administration. They judged it appropriate and made relevant suggestions.

6.2.2 Population and Sample

Given the aim of this research, the relevant population represents foreign subsidiaries based in Ireland and Portugal. However, many of the concepts used in the empirical analyses were developed for and apply mainly to subsidiaries conducting manufacturing activities (Young, Hood and Dunlop, 1988; Birkinshaw, Hood, Jonsson, 1998; Birkinshaw and Hood, 2000). Therefore, subsidiaries conducting only commercial activities or those active only in the service sector were excluded from the study. Consequently, the population for this study comprises all the subsidiaries belonging to foreign companies in Ireland and Portugal that conduct manufacturing activities.

A number of sources were used to identify the population. The database containing the list subsidiaries of foreign MNEs in Ireland was obtained from the IDA, and is available free on the website of this institution. All the companies were checked and all firms that do not have industrial activities in Ireland were excluded from the dataset. For Portugal, a list of foreign subsidiaries compiled by A.T. Tavares was used. In order to get up to date contacts (email address and fax), a variety of public and private sources were consulted including API, Kompass, Portugal Virtual, ICEP and the websites of the subsidiaries and/or parent company, when the subsidiary did not have its own website. The information from different sources was cross checked. Unfortunately, many of the subsidiaries were listed with wrong email or fax contacts. Other common problems include subsidiaries being listed as industrial firms, when in fact they conduct only commercial activities and subsidiaries being listed as foreign when in fact they are

nationally owned. In these situations, the subsidiaries were deleted from the database.

The questionnaire was written in Portuguese then translated into English and back translated as recommended by Birkinshaw, Hood and Jonsson (1998). It was sent by email, where the email address of the subsidiary was available, and by fax in the remaining cases. It was accompanied by a cover letter explaining the objectives of the study and guaranteeing confidentiality and anonymity. The letter was directed to the Managing Director of each subsidiary. The questionnaire was first sent at the end of July, 2006. The questionnaire was re-sent after the 1st of September. A final reminder was sent in November 2006 to the firms who did not answer.

The participation in the survey was voluntary and it was expected that the response rate would be low. A total 808 of questionnaires were sent in both countries and 72 replies (44 for Portugal and 28 for Ireland) were received. This corresponds to a response rate of 13% for Portugal and 6% for Ireland. After all our best efforts, the overall response rate was of 9%. Response rates to this kind of survey tend to be quite low. According to Harzing (1997), the typical response rates to international surveys aiming at industrial population without pre-contact or telephone follow up, like the present situation, vary between 6% and 16%. Three replies received were excluded because there were doubts about their validity. Thus, 69 replies were used in the subsequent analyses.

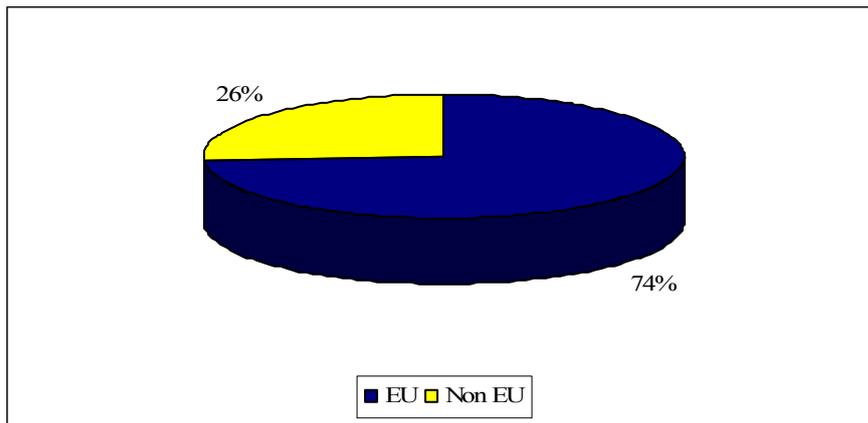
6.3 Data Description

This section will present a brief description of the main patterns of the sample, which informed the subsequent statistical and econometric analysis.

6.3.1 Nationality of the Parent MNEs

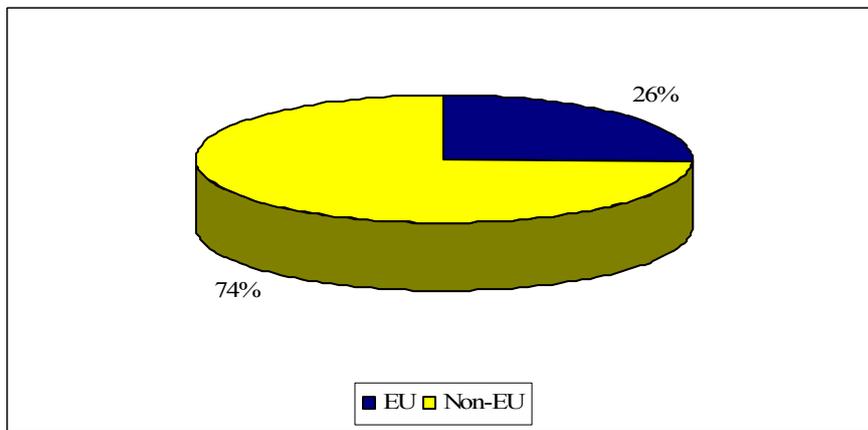
Respondents were asked to specify the nationality of the parent multinational. As the main distinction will be made among EU and non-EU investors, the data were aggregated along this dimension. The two host countries show contrasting patterns. In Ireland, investors from outside the EU (mainly from the US) are prevalent, while in Portugal investors from other EU countries predominate, as shown in Figure 6.1 and Figure 6.2. By coincidence, the proportions are almost equal.

Figure 6.1: Nationality of Parent MNEs: Ireland



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.2: Nationality of Parent MNEs: Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

6.3.2 Age of Foreign Subsidiaries

Age here is measured as the number of years since set up in the host country. The oldest subsidiary in sample was set up in 1914 in Portugal and the youngest in 2005 in Ireland. The main characteristics of the sample with regard to age are presented in Table 6.1.

Table 6.1: Age of Subsidiaries (Years)

	All sample	Ireland	Portugal
Average age	23	20	25
Median age	18	20	18
Age of the oldest subsidiary in the sample	93	43	93
Age of the younger subsidiary in the sample	2	2	11

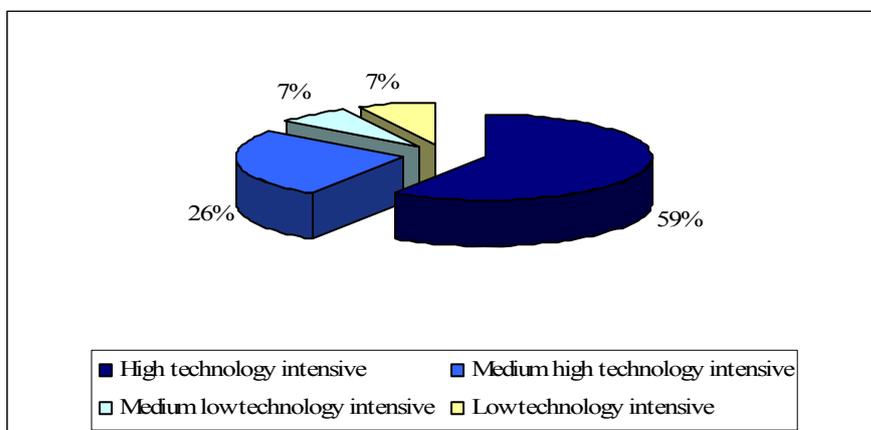
Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

The lower average age of foreign subsidiaries in Ireland may be an indication of Ireland's success in attracting FDI in the 1990s. In fact, more than a half of the Irish subsidiaries in the sample were established in the 1990s and the beginning of 2000s.

6.3.3 Sectoral Patterns of Foreign Subsidiaries

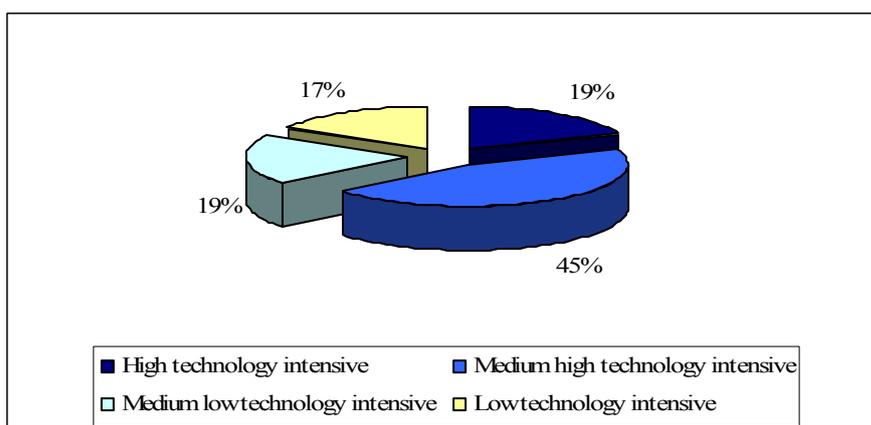
In analysing the sectoral patterns of the subsidiaries, the OECD sector classification for technological intensity was used (OECD, 1997). This taxonomy distinguishes four main groups of sectors: high technology intensive, medium high technology intensive, medium low technology intensive and low technology intensive sectors.

Figure 6.3: Sectoral Composition of the Sample in Ireland



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.4: Sectoral Composition of the Sample in Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

In Ireland, more than 50% of the subsidiaries sampled were in high technology intensive sectors. This reflects the Irish specialisation in high tech industries, as

documented in Chapter 4. It is worth noting that medium low and low technology intensive sectors comprise together only 14% of the sample. In terms of specific industries, important concentrations were found in pharmaceuticals (26%), medical, precision and optical instruments (19%) and electrical machinery and apparatus (15%).

In contrast to Ireland, Portugal shows a higher concentration in sector in medium high tech sectors (45%), although the high tech sector also represents a relevant proportion (19%). Unlike Ireland, medium low and low tech sectors are a large proportion of the sample (together they represent 36%). In terms of specific industries, the main concentrations were found in electrical machinery and apparatus (14%), motor vehicles, trailers and semi trailers (14%) and textiles, leather and footwear (12%) sectors.

6.3.4 Size of Foreign Subsidiaries

The size of foreign subsidiaries is measured by the number of employees. In the survey, respondents were asked to indicate the sales of the subsidiaries and the number of employees. Given that respondents often declined to state the level of the sales of the subsidiary and the fact that sales are subject to more short term variability due to fluctuations in the demand, the level of employment was preferred as a measure for the subsidiary's size. Table 6.2 presents the main descriptive statistics of the sample.

Table 6.2: Size of the Subsidiaries

	All sample	Ireland	Portugal
Average size	274	355	226
Median size	119	137	111
The smallest subsidiary in the sample	6	8	6
The largest subsidiary in the sample	2500	2500	2283

Sources: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

To understand better the characteristics of the sample with regard to size, subsidiaries were classified by size. Four categories were used: micro (less than 10 employees), small (between 10-50 employees), medium (between 50-500 employees) and large (more than 500 employees). Table 6.3 presents the subsidiaries' distribution by size categories. In both countries the most common category is medium size (56% in Ireland and 62% in Portugal). However, large subsidiaries are more prevalent in Ireland than in Portugal (24% and 14%), consistent with the larger average size of Irish subsidiaries.

Table 6.3: Subsidiaries by Size Categories

	All sample	Ireland	Portugal
Micro	6%	4%	7%
Small	16%	16%	17%
Medium	60%	56%	62%
Large	18%	24%	14%
Total	100%	100%	100%

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

6.3.5 Motivations Underlying the Establishment of Subsidiaries

Following the typology developed in Chapter 2, the following motivations for investment were considered: market-seeking (serving local market, serving the EU market, presence of competitors), efficiency-seeking (labour costs, presence of important clusters in the same or related industries), incentives for investment and asset-seeking (skills and qualifications of labour force and the availability of scientific/technological inputs). Respondents were asked to rate the importance of each motivations for the decision to establish a subsidiary in the respective host country and to stay on a scale from 1 (not important at all) to 5 (extremely important). Thus, a higher score indicates an increased importance of the given motivation for the decision to invest in the given host country.

Table 6.4: Motivations for Investment in Ireland and Portugal

Motivation for investment	Ireland		Portugal	
	Originally	Presently	Originally	Presently
Serving the local market	1,4	1,5	3,5	3,1
Serving the EU market	3,7	3,8	2,5	3,2
Labour costs	3,3	2,8	3,3	2,9
Presence of important clusters in the same/related sectors	2,6	2,5	2,6	2,4
Presence of competitors	2,1	2,1	2,5	2,5
Incentives to set up the company (fiscal and/or financial)	4,1	3,0	2,2	2,0
Skills/qualification of the workforce	3,9	3,9	2,8	3,5
Availability of scientific/technological inputs	3,3	3,4	2,4	2,8

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006). The importance of a motivation is measured on a scale from 1 to 5, where 1 means the motivation was not important at all and 5 means the motivation was extremely important

Data are segregated by host country in order to allow a comparison of the importance of various motivations in the two host countries⁶, which will be presented in Section 6.5.

In Ireland, most respondents in the sample indicated the incentives to set up the company as their main motivation for investing there. This motivation is particularly strong for US firms and for firms in electrical machinery and apparatus, medical, precision and optical instruments and pharmaceuticals. This reflects an explicit policy to attract MNEs in these sectors (Görg and Ruane, 1999) and a preference for MNEs from US (Forfás, 2000). Though respondents were not asked to indicate other motivations than those included in the survey, some explicitly stated that low corporate tax rate was their main motivation for choosing Ireland. Presently, incentives play only a secondary role, as can be inferred from Table 6.4. Workforce's skills and qualifications, serving the EU market and the availability of scientific/technological inputs were considered now more important than investment incentives.

The second most important motivation reported was the level of skills/qualifications of the workforce. Again, this motivation seems more relevant for firms from outside the EU and for firms in electrical machinery and apparatus, medical, precision and optical instruments and pharmaceuticals, which require a highly qualified workforce. Furthermore, workforce's skills/qualifications were considered the main motivation for continuing to invest in Ireland. The availability of scientific/technological inputs appears to be important for firms in medical, precision and optical instruments and pharmaceuticals. It is also noteworthy that the relevance of this motivation has risen since subsidiaries were set up. Serving the EU market was considered extremely important by respondents, both at the time subsidiaries were set up and presently. In contrast, serving the local market is perceived as the least relevant motivation for investment.

Low labour costs were also indicated as an important consideration for the decision to invest in Ireland. Looking at this motivation in conjunction with workforce's skills and

⁶ The comments on the importance of the motivations for investment in the two countries is based on the information summarised in Table 6.4, complemented with other information gathered from the survey, notably the sector of activity of the subsidiary and the nationality of the parent multinational.

qualifications, it becomes clear that Ireland is perceived as a relatively low cost location for high value added activities. Most of the respondents stated that in present this motivation has lost some of its importance for them.

The presence of important clusters in the same or related sectors and the presence of competitors appear to play only a secondary role in explaining the establishment of the foreign subsidiaries in Ireland. Similar results were obtained by Tavares (2001). However, Barry and Bradley (1997) and Barry *et al.* (2003) found evidence that this motivation played a significant role in MNEs' decision to locate subsidiaries in Ireland.

Most of the subsidiaries in the sample indicated serving the local market as their main motivation for establishing subsidiaries in Portugal.

The level of labour costs was indicated as an important motivation to set up companies in Portugal. Unsurprisingly, this motivation is very important for firms in medium low tech and low tech sectors, especially textiles, clothing and footwear, but is also considered an important motivation for firms in sectors like motor vehicles, semi trailers and trailers as well as electric machinery and apparatus. However, it is important to notice that the same firms indicated workforce's skills as an important motivation, which can be interpreted as indicative of a preoccupation also with quality, not only cost effectiveness. Like in the case of Ireland, the importance of this motivation has declined and presently, it is considered less important than workforce's skills and serving the EU and Portuguese market by the respondents.

Skills and qualifications of the workforce appear to play an increasingly important role in the decision to invest in Portugal. Although initially it was considered less important than serving the Portuguese market and labour costs by the respondents, presently it appears to be the most important motivation for continuing to invest in Portugal. In sectoral terms, it appears to play a particularly important role in high and medium high tech sectors. However, as mentioned above, this motivation is also important for firms in textiles, clothing and footwear industry, which indicates investors' preoccupation with quality.

Serving the EU market appears to be presently, although not originally, an important

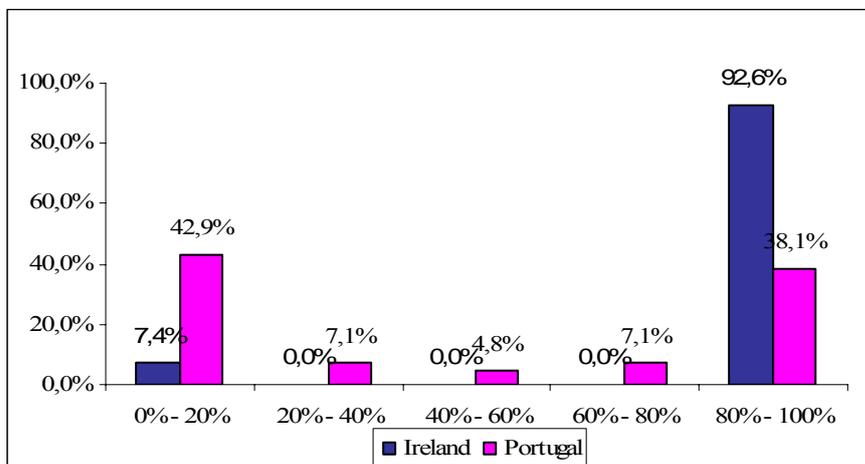
consideration for the firms that established subsidiaries in Portugal. This motivation seems to be particularly strong for firms from outside EU. In sectoral terms, this motivation is particularly important for firms in electrical machinery and apparatus, motor vehicles and textiles, clothing and footwear industries.

The remaining motivations appear to have played only a negligible role. Unlike in the case of Ireland, incentives for investment do not seem to have played an important role in decision to set up subsidiaries in Portugal. Also, the presence of clusters and competitors do not seem to play important roles in the decision to establish subsidiaries in Portugal and neither does the availability of scientific/technological inputs. However, the latter motivation plays an increasingly important role in a few sectors, especially in electrical machinery and apparatus it.

6.3.6 Export Intensity of Foreign Subsidiaries

Export intensity was measured as the percentage of output exported. Figure 6.5 reveals the export patterns of the foreign subsidiaries located in the two countries.

Figure 6.5: Export Intensity of Foreign Subsidiaries in Ireland and Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.5 shows that in both countries foreign subsidiaries are concentrated in the two extreme intervals, and this pattern is stronger for Ireland. This can indicate very specific subsidiary roles with some having definite miniature replica roles (focused on the local market) and others being export platforms (exporting more that 80% of their output). From the data, it appears that the first role is more prevalent among foreign subsidiaries

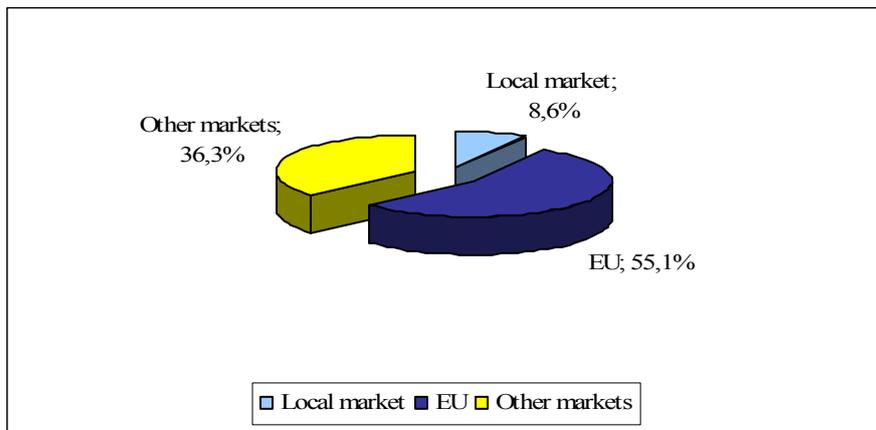
located in Portugal while the second is more prevalent among those located in Ireland.

The data also suggest that subsidiaries in Ireland are more export intensive than in Portugal. The average percentage of output exported by a foreign subsidiary in Ireland was 91%, while the value of the same indicator for Portugal was 49% and more than 90% of subsidiaries in Ireland export more than 80% of their output abroad. In Portugal 42,9% of the subsidiaries export less than 20% of their output and only 38% export more than 80% of their output.

6.3.7 Markets Supplied by Foreign Subsidiaries

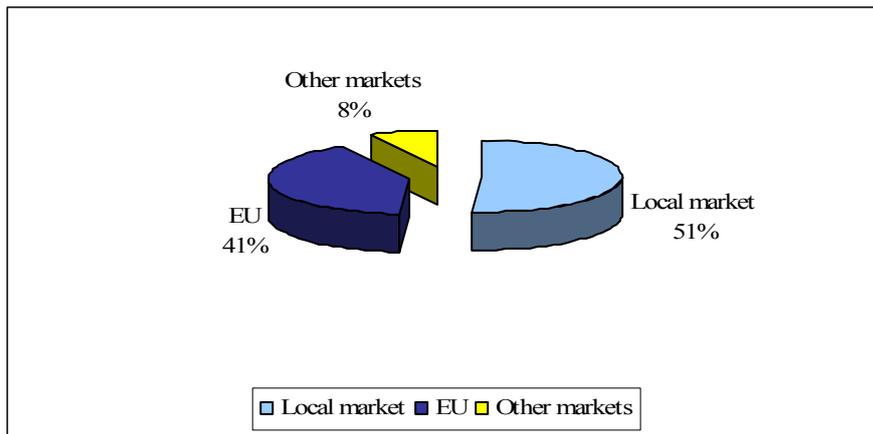
The survey distinguished among 3 mutually exclusive markets: the host country, the EU market (except the host country) and other markets. Respondents were asked to state the percentage of their output sold in each of these markets. Again, the subsidiaries in the two countries reveal markedly different patterns as it emerges from Figure 6.6 and Figure 6.7.

Figure 6.6: Markets Supplied by Foreign Subsidiaries Based in Ireland



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.7: Markets Supplied by Foreign Subsidiaries Based in Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

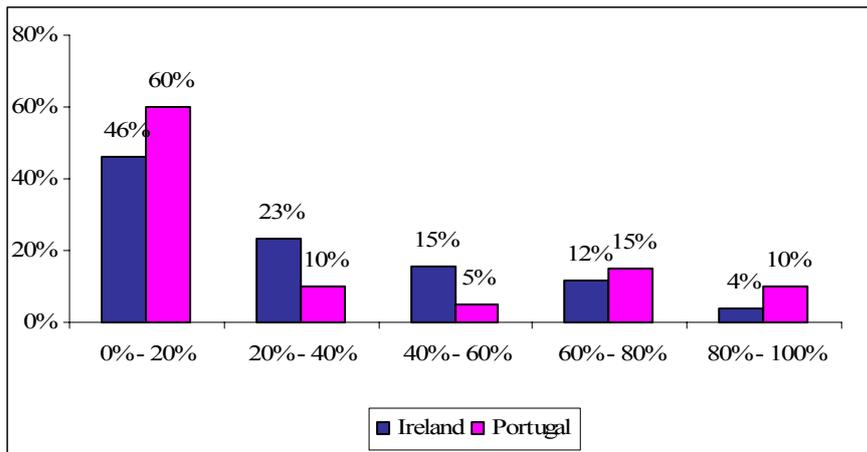
The EU emerges as the most important market for Irish subsidiaries, followed by other markets. The local (Irish) market appears to be relatively unimportant for foreign subsidiaries based in Ireland. When cross tabulating the nationality of parent MNEs with the markets supplied, it emerges that EU firms are relatively more local market oriented than their non EU counterparts.

In contrast to the situation in Ireland, in Portugal respondents stress the importance of the local market. The EU market comes up as the second most important market, while other markets are relatively unimportant. This is consistent with the results regarding the motivation for investment in Portugal.

6.3.8 Local Sourcing by Foreign Subsidiaries

Local linkages were measured as the percentage of inputs bought from local suppliers. An effort was made to obtain information also about the nationality of the suppliers, as the local suppliers can be themselves foreign subsidiaries or commercial representations of MNEs. Unfortunately, very few respondents were able to provide this information. Therefore, the characteristics of the sample with regard to this aspect are not reported here. The patterns of local sourcing in the two countries are reported in Figure 6.8.

Figure 6.8: Percentage of Inputs Bought from Local Suppliers in Ireland and Portugal



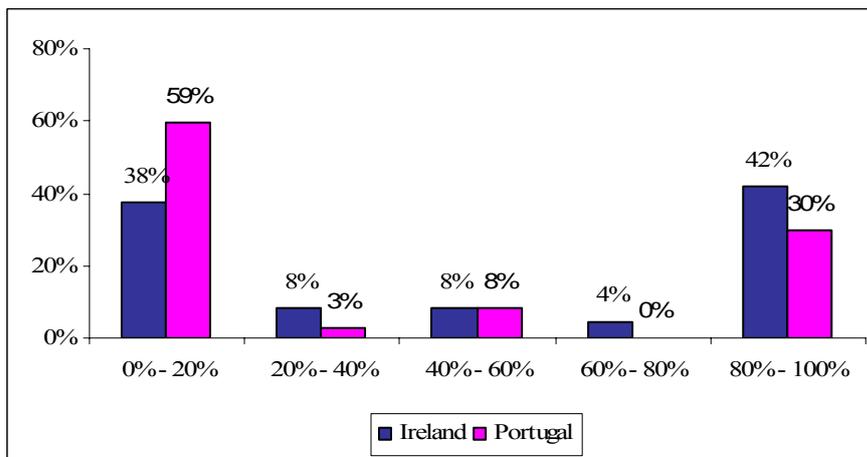
Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.8 shows that subsidiaries in both countries source locally a very low percentage of their inputs. In Ireland 46% of the respondents source locally less than 20% of their inputs, while in Portugal this figure is 60%. These findings are not surprising, given the small local markets of the two countries and their not so sophisticated and diversified local industrial fabric.

6.3.9 Linkages with Parent MNEs

Internal linkages were measured as the percentage of output exported to other foreign subsidiaries part of the same MNE group. The main patterns are reported in Figure 6.9.

Figure 6.9: Internal Linkages of Foreign Subsidiaries in Ireland and Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

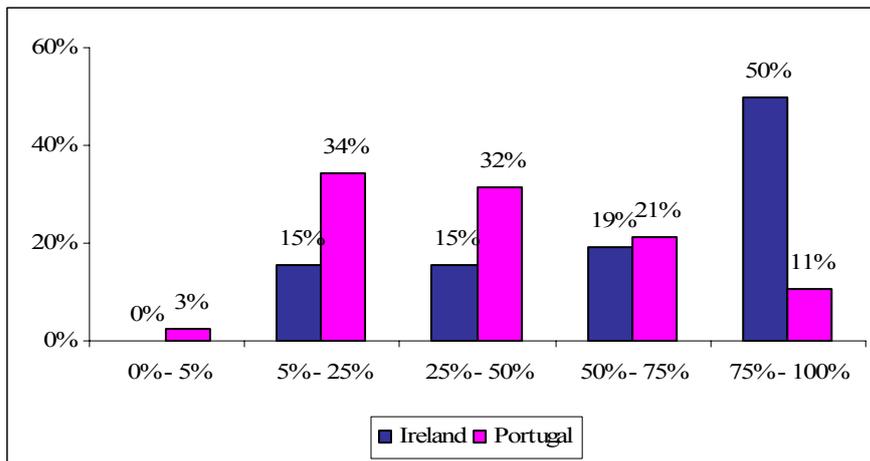
The similarity between patterns of internal linkages and those of export intensity

(Figure 6.5) are glaring. In both cases, subsidiaries are concentrated in the two most extreme intervals. Like in the case of export intensity, this can be interpreted as evidence of specific subsidiary roles. Very high internal linkages are usually interpreted as indicative of a rationalised manufacturer role. The high concentration of subsidiaries in both countries with high internal linkages and high export intensity suggest that the rationalised manufacturer role is indeed frequent subsidiary role in both countries.

6.3.10 Human Capital Intensity of Foreign Subsidiaries

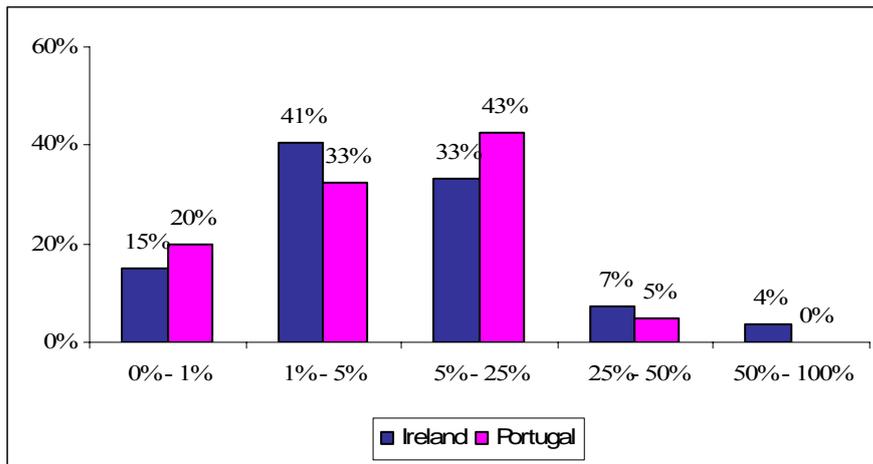
The human capital intensity of foreign subsidiaries in Ireland and Portugal was measured using two indicators following Tavares and Teixeira (2005). The first one represents the percentage of staff with 12 or more years of formal education. This indicator has been widely used in the literature as a proxy for human capital (Becker, 1962; Wößmann, 2003). The second indicator used represents the percentage of staff having an engineering degree. This indicator measures more precisely the technical skills of the workforce employed by the foreign subsidiaries and it has also been used previously (Wood and Ridaó-Cano, 1999). Figure 6.10 and Figure 6.11 present the patterns of foreign subsidiaries in the sample with regard to these two indicators.

Figure 6.10: Education Intensity of Foreign Subsidiaries in Ireland and Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.11: Skills Intensity in Foreign Subsidiaries in Ireland and Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

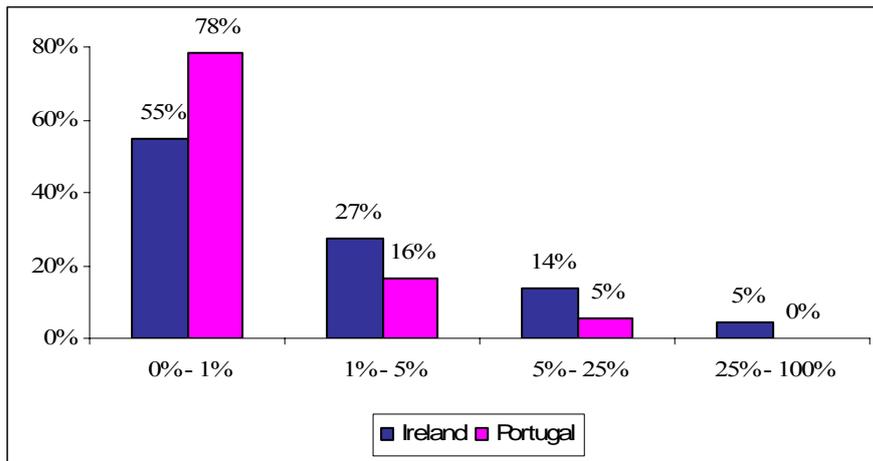
Figure 6.10 shows that Irish subsidiaries differ markedly in their education intensity from the Portuguese ones. More than half of Irish subsidiaries in the sample have reported that more than 75% of their workforce has over 12 years of formal education. The corresponding value for Portuguese subsidiaries is 11%. Another interesting pattern emerging from Figure 6.10 is the greater heterogeneity among Portuguese subsidiaries, as compared with Irish subsidiaries which are concentrated in highest interval.

In terms of technical skills intensity, subsidiaries in both countries show similar patterns. This is a surprise given the Irish educational policy focus on technical skills.

6.3.11 Innovative Activities Undertaken by Foreign Subsidiaries

A number of indicators are used in the literature to measure technological capabilities of subsidiaries and each has its advantages and disadvantages (Evangelista *et al*, 1998; Almeida and Fernandes, 2006). Thus, information has been gathered about a range of indicators. One of the most used indicators of technological capabilities is the R&D intensity of subsidiaries. The main patterns of R&D activities of subsidiaries in the two host countries are illustrated in Figure 6.12 and Table 6.5.

Figure 6.12: R&D Intensity of Foreign Subsidiaries in Ireland and Portugal



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Table 6.5: R&D Patterns of Foreign Subsidiaries in Ireland and Portugal

	All sample	Ireland	Portugal
Average R&D intensity	2%	4%	1%
Percentage of subsidiaries having their own R&D laboratory	22%	26%	20%
Average number of people employed in R&D	4	5	3

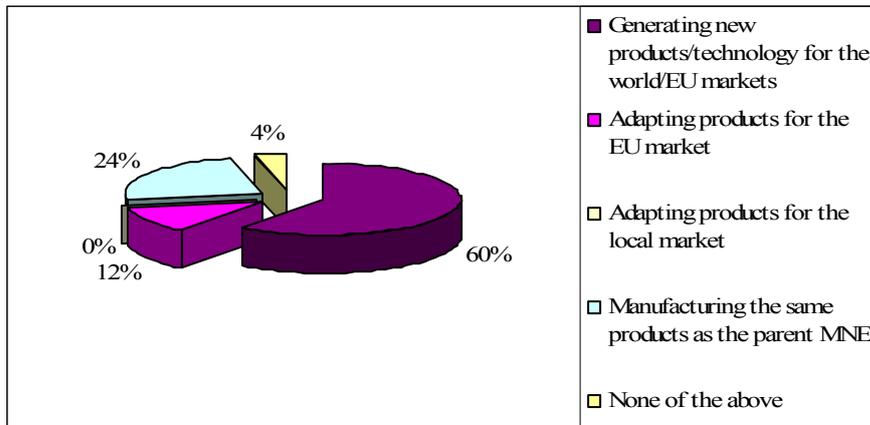
Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

In both countries, most subsidiaries spend less than 1% on R&D. This percentage is higher in Portugal (78%) than in Ireland (55%). On average, Irish subsidiaries spend more on R&D than the Portuguese ones (4% versus 1%), employ more people in R&D activities (5 versus 3) and also are more likely to have their own R&D laboratory.

The type of value added activities undertaken is another key aspect of the subsidiary, impinging on its role within the MNE network and its potential for further development (White and Poynter, 1984; Birkinshaw and Hood, 1997, 1998). In this analysis the sophistication of the subsidiaries' value added activities was measured on an ordinal scale based on the question 14 in the survey. Respondents were asked which type of value added activities were undertaken within their company. They had to choose between: generating new products/technologies for the EU/world markets, adapting products for the EU market, adapting products for the domestic market and producing the same products as their parent MNE. Given that the main interest was too see which is the most sophisticated activity undertaken within the subsidiary, the results were aggregated along this dimension. The breakdown of the activities undertaken by

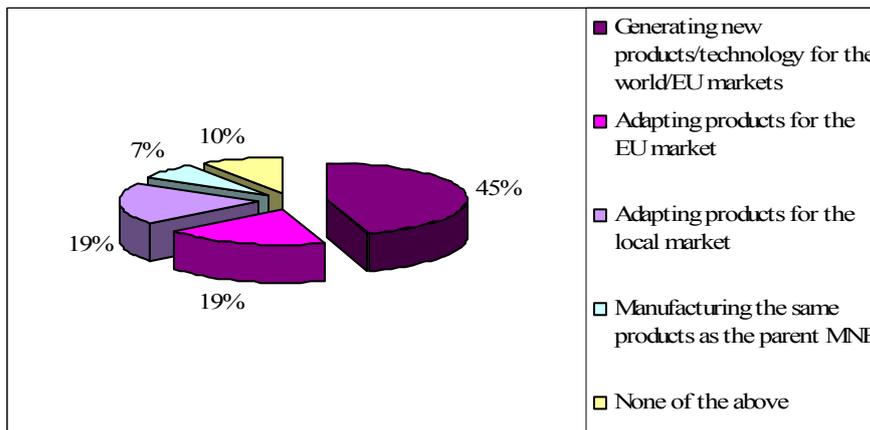
foreign subsidiaries in the two countries is illustrated below.

Figure 6.13: Value Added Activities Undertaken within Irish Subsidiaries



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Figure 6.14: Value Added Activities Undertaken within Portuguese Subsidiaries



Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Another aspect of innovative activities undertaken by foreign subsidiaries particularly relevant to this study is the frequency of innovation among foreign subsidiaries. This indicator is measured as the proportion of firms that introduced in the preceding three years products or processes which are new in the context of the subsidiary. Respondents were asked to indicate whether they have introduced new products or processes. The results for this measure are presented in Table 6.6.

Table 6.6: Frequency of Innovation

	All sample	Ireland	Portugal
Frequency of innovation	69%	74%	66%

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

From these results it appears that innovation is very frequent among the sampled foreign subsidiaries. In both countries, more than a 50% of the foreign subsidiaries reported to have introduced new products or processes.

The distribution of the type of innovation among product, process and product and process innovation is shown in Table 6.7.

Table 6.7: Type of Innovation

Type of innovation	All sample	Ireland	Portugal
Only product innovation	19%	15%	22%
Only process innovation	6%	7%	5%
Product and process innovation	44%	52%	39%
Total	69%	74%	66%

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Another widely used indicator of technological capability in the literature is the number of patents applied for. However, it is worth noting that number of patents applied for, as an indicator of technological capability, is limited by variations in firms' and industries' propensity to patent (Evangelista *et al*, 1998).

Table 6.8: Patent Applications

	All sample	Ireland	Portugal
Proportion of firms that applied for patents	13%	14%	13%

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

6.3.12 Decision Making Autonomy of Foreign Subsidiaries

Subsidiaries' decision making autonomy was measured on an ordinal scale that takes values from 1 till 5, where 1 means that the decisions are taken totally by the parent MNE and 5 means that the decision are taken completely by the foreign subsidiary. Thus, a lower score implies less autonomy from the headquarters and conversely a higher score implies more autonomy. Table 6.9 presents the average autonomy enjoyed

by subsidiaries in both countries and Table 6.10 the distribution by level of autonomy.

Table 6.9: Decision Making Autonomy

	All sample	Ireland	Portugal
Average decision making autonomy	2,9	2,8	2,9

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006).

Table 6.10: Distribution of Decision Making Autonomy

	All sample	Ireland	Portugal
Decisions are taken totally by the parent MNE	9%	0%	14%
Decisions are taken predominantly by the parent MNE	22%	30%	17%
Decisions are taken equally by the subsidiary and by the parent MNE	48%	59%	40%
Decisions are taken predominantly by the subsidiary	19%	11%	24%
Decisions are taken exclusively by the subsidiary	3%	0%	5%
Total	100%	100%	100%

Source: Own calculations based on data gathered through questionnaire survey (July – November, 2006)

Most subsidiaries in both countries report that the decisions are taken equally by the parent and by the subsidiary. Again, subsidiaries in Portugal are more heterogeneous than their Irish counterparts. While in Portugal 14% of the subsidiaries indicated that they are completely dependent on the parent and 5% completely independent, in Ireland none of the subsidiaries reported such extreme levels of dependence/independence.

6.4 Econometric Analysis of the Determinants of Innovation within Foreign Subsidiaries in Ireland and Portugal

This section presents the econometric analysis of the determinants of innovation within foreign subsidiaries in Ireland and Portugal. It seeks to test Hypotheses 1 to 5 developed in Chapter 5 using the data gathered through the survey, and described in Section 6.3.

6.4.1 Econometric Methodology

The choice of the econometric methodology used in the analysis of the determinants of the innovative capabilities of foreign subsidiaries is conditioned by the nature of the dependent variable. In the present analysis, the dependent variable is innovation and it is defined as a dichotomous variable that takes the value 1 if the subsidiary has introduced

new products and/or processes and 0 otherwise. In these situations, the most appropriate choice is a qualitative response model (Greene, 2003). These models estimate the probability of an event and are applicable to cross section data. Given that the aim of this research is to estimate the likelihood that a foreign subsidiary based in Ireland and Portugal will innovate and it is based on cross section microeconomic data, a qualitative response model was deemed adequate. Among the various qualitative response models that exist, the most appropriate when the dependent variable is dichotomous are the probit or logit models (Greene, 2003). Given that there is no convenient specification test for distinguishing between probit and logit models (McFadden, 1984), it was decided to choose the probit model as it provided a better fit for the data.

6.4.2 Description of Variables and Structure of the Model

The dependent variable is *INNOV*, which is a binary variable that determined whether a firm innovated or not over the last three years. It gathers its values from questions 12 and 13 in the survey. These questions ask whether the company introduced any technologically new or significantly improved products (question 12) or processes (question 13) that were new to the firm. In view of these considerations, it was decided to use a dependent variable *INNOV*, taking the value 1 when the subsidiary introduced a new product and/or process that are new in the context of the subsidiary. An unobserved latent variable *INNOV** corresponds to the binary variable *INNOV*, as it follows:

$$INNOV_i = \begin{cases} 0, & \text{if } INNOV_i^* \leq 0 \\ 1, & \text{if } INNOV_i^* > 0 \end{cases}$$

The unobserved latent variable *INNOV** is defined as:

$$INNOV_i^* = \beta X_i + \varepsilon_i$$

X_i is a matrix of explanatory variables, β are the coefficients to be estimated and ε_i is a random error term.

The aim of this empirical application is to test the following hypotheses, described more in detail in Chapter 5:

Hypothesis 1: Older foreign subsidiaries are more likely to innovate than younger ones.

Hypothesis 2: Foreign subsidiaries having high human capital intensity are more likely to innovate than subsidiaries having low human capital intensity.

Hypothesis 3: Foreign subsidiaries having high R&D intensity are more likely to innovate than subsidiaries having low R&D intensity.

Hypothesis 4: Highly embedded multinational subsidiaries are more likely to innovate than less embedded subsidiaries.

Hypothesis 5: Foreign subsidiaries enjoying high decision-making autonomy from their parent MNE are more likely to innovate than those enjoying less decision-making autonomy.

In addition to these variables, a number of control variables were introduced. These are characteristics of the subsidiary, or of its external and internal environments that previous research has found to be relevant to their innovative capabilities.

It is assumed that large firms are more likely to innovate. Indeed, many studies have found empirical evidence that the size of the subsidiary influences positively its ability to innovate (Evangelista *et al.*, 1998; Bóia, 2003, Mohnen and Hoareau, 2003).

Another characteristic that might impinge on the innovative capabilities of the subsidiaries is export intensity. In relation to export intensity, both the theory and empirical evidence lead to ambiguous expectations. Some studies suggest that export intensity should impact positively on a subsidiary's innovative capabilities, as exports entail exposure to tougher competition in world markets and to innovation taking place abroad. In the same line of thinking, the literature on subsidiary roles suggests that subsidiaries engaged in developing new products have a wide market scope (Young, Hood and Dunlop, 1988; Papanastassiou and Pearce, 1999; Cantwell and Mudambi, 2000; Pearce, 1999, Tavares, 2001). However, other studies point out that high export intensity may constitute evidence of rationalisation which implies limited value added

scope and innovative capabilities. Some empirical studies lend support to this view, for instance Cantwell and Mudambi (2000) and Tavares and Teixeira (2005).

Apart from subsidiaries' characteristics, the internal and external environment of foreign subsidiaries also impacts on subsidiaries' innovative capabilities. As documented in Chapter 4, the two host countries differ significantly in their workforce's skills, R&D expenditure, share of high technology industries in the economy and their policy approaches towards FDI. All these aspects might influence the subsidiaries' innovation capabilities. To account for the differences in the subsidiaries' external environment, a dummy variable was introduced. In addition, a dummy variable will control for the nationality of the parent multinational. Table 6.11 presents the explanatory variables used in the estimation, their definitions and their expected signs.

Table 6.11: Explanatory Variables

Variable	Type	Definition	Expected Sign
Age	C	Logarithm of the number of years since the establishment of the subsidiary in the host country	+
Human capital intensity	C	Percentage of employees having at least 12 years of formal schooling	+
R&D intensity	C	Subsidiary's R&D expenditures as percentage of sales	+
Autonomy	D	The perceived decision making autonomy of the subsidiary	+
Local Linkages	C	Percentage of inputs bought from local suppliers	+
Size	C	Logarithm of the number of employees of the subsidiary	+
Export Intensity	C	Percentage of output exported	?
Home	B	A dummy variable that takes value 1 the parent MNE is from an EU country and 0 otherwise	-
Host	B	A dummy variable that takes value 1 if the subsidiary is established in Portugal and 0 otherwise	-

6.4.3 Estimation of the Model

Binary choice models are best estimated using the Maximum Likelihood (ML) method (Greene, 2003). The estimations were done using EVIEWS 5 (Quantitative Micro Software, 2004). The main results of the estimation are summarised in Table 6.13.

For this analysis only questionnaires for which all relevant variables were complete

were used. Given the small number of observations for the two countries, it was decided to pool the data for both countries. As mentioned above, a host country dummy variable was introduced in the model in order to account for any heterogeneity of the host country not captured by the other explanatory variables included in the model.

The correlation matrix is presented in Table 6.12 and the results of the econometric estimation of the determinants of innovation are reported in Table 6.13.

Table 6.12: Correlation Matrix

	Age	Size	Education intensity	R&D intensity	Export intensity	Local sourcing	Autonomy	Host country	Nationality of parent MNE
Age	1								
Size	0.391	1							
Education intensity	-0.226	-0.022	1						
R&D intensity	0.053	0.143	0.179	1					
Export intensity	0.017	0.476	-0.044	0.165	1				
Local sourcing	0.067	0.323	-0.049	0.090	0.111	1			
Autonomy	0.319	0.340	-0.010	0.189	0.061	0.078	1		
Host country	0.214	-0.261	-0.490	-0.269	-0.449	-0.079	-0.02	1	
Nationality of parent MNE	0.207	-0.259	-0.373	-0.089	-0.336	-0.166	0.218	0.463	1

Table 6.13: ML Estimations of the Determinants of the Innovation in Foreign Subsidiaries

	Model 1	Model 2	Model 3	Model 4	Model 5
Age	1,568**	1,550**	1,623**	1,626**	1,660**
Education Intensity	2,702**	2,631**	2,745**	2,698**	2,787**
R&D Intensity	37,555*	37,410*	37,998*	39,168*	39,623*
Local Sourcing			0,536		0,355
Decision making autonomy				0,528	0,504
Size	0,530**	0,553**	0,513*	0,510	0,486
Export intensity		-0,161	-0,088	-0,308	-0,251
Host country	0,882	0,825	0,824	1,079	1,068
Home country	-1,289**	-1,317**	-1,220*	-1,652**	-1,566**
Constant	-7,929***	-7,794***	-8,161***	-9,179***	-9,336***
Number of observations	53	53	53	53	53
Innovative	35	35	35	35	35
Non innovative	18	18	18	18	18
% correct	83,02	83,02	83,02	83,02	84,91
LR statistic	29.933	29.994	30.387	32.573	32,737
Probability (LR statistic)	0,000	0,000	0,000	0,000	0,000
McFadden R ²	0.440	0,442	0.447	0.479	0,482

***significant at 1%; **significant at 5%;*significant at 10%.

6.4.4 Discussion of the Results

This section contains an interpretation of the estimation results. The interpretation will focus on the goodness of fit, the sign of the coefficients and their statistical significance. The comments in this section refer to the best fit model, which was deemed to be model 5. This model specification was preferred because it is parsimonious, but at the same time comprehensive in the sense that it tests most characteristics that *a priori* were identified as having the potential to influence the subsidiaries' innovative capabilities.

The null hypothesis that all slope coefficients are simultaneously equal to zero can be tested in the case of binary choice models using the likelihood ratio (LR) statistic. This statistic follows the χ^2 distribution with degrees of freedom equal to the number of explanatory variables, excluding the intercept term. In the present case, the LR statistic is 32,737 with 9 degrees of freedom. Its *p* value is 0,000141. Hence, based on the LR statistic it is concluded that together all explanatory variables have a significant impact on the innovative capabilities of foreign subsidiaries based in Ireland and Portugal.

The remaining part of the section focuses on interpreting the sign of the coefficients and their statistical significance in relation with the hypotheses developed in Chapter 5. A positive sign of a coefficient indicates that the propensity of the subsidiary to innovate increases with the level of presence of the explanatory variable concerned, assuming the other variables are held constant. A negative sign of the coefficient suggests that the propensity of the subsidiary to innovate decreases with the level or presence of the variable concerned, assuming the other variables are held constant. The statistical significance of individual parameters in a probit model can be tested using *z* statistic. However, EViews 5 calculates automatically the *p-values* of the coefficients.

➤ **Age of Foreign Subsidiaries**

In all models, age came out positively signed and statistically significant at 5%. Thus, it can be concluded that the results of the estimations corroborate Hypothesis 1. This result is in line with the subsidiary evolution literature. This literature suggests that the development of the subsidiary, interpreted as the growth and enhancement of subsidiary resources is a gradual process (Young *et al.*, 1994; Birkinshaw and Hood, 1997; 1998).

➤ **Human Capital Intensity**

As expected, foreign subsidiaries' human capital intensity emerges as a significant determinant of these subsidiaries' innovation. The variable is positively signed and statistically significant at 10% level in all models. Thus, it can be concluded that the evidence supports Hypothesis 2, stating that human capital intensity impacts positively on the innovativeness of subsidiaries. These results corroborated previous studies that suggested that human capital plays an important role in the creation and dissemination of technological knowledge (Phelps and Nelson, 1966; Glass and Saggi, 1998; UNCTAD, 2000; Michie, 2001; Narula and Marin, 2003).

➤ **R&D Intensity**

In all models presented, R&D intensity is positively signed and statistically significant at 10%, which corroborates the hypothesis that subsidiaries with high R&D intensities are more likely to innovate. This finding is in line with the Cohen and Levinthal (1989, 1990) insight that R&D carried out inside the firms helps create new technology. They also suggested that R&D activities help enhance the capabilities of the firm to absorb

technology from outside. Unfortunately, it was not possible to test this indirect effect because the interaction term of R&D intensity with education intensity was highly correlated with education intensity.

➤ **Local Linkages**

There was an expectation that a subsidiary's embeddedness in the host country will impact positively on its innovative capabilities, as stated in Hypothesis 4. In this study, embeddedness of the subsidiary in the host country was proxied by local sourcing. Local sourcing emerged as positively signed but insignificant in all estimations. Thus, the results do not support Hypothesis 4. This result comes as a surprise in view of the body of literature that links embeddedness of the subsidiary in its external environment and its innovative capabilities (Bartlett and Ghoshal, 1986; Andersson and Forsgren, 1996; 2000; Andersson *et al.*, 2001). A possible explanation for this result may be that in this study, the proxy local sourcing was defined as the percentage of inputs bought from local suppliers. In hindsight, this definition is narrow and not very appropriate for the purpose of the study – although it was the one we could get data on. It is very possible that the embeddedness of foreign subsidiaries that conduct innovative activities in their host country materialises in links with universities, research institutions, and research collaborations with other firms in the same country, but not necessarily in links with local suppliers. A result in a similar vein was found by Tavares and Young (2006), who in a study on how subsidiary roles influence patterns of local sourcing found that PM subsidiaries source little locally. In future research, it would be useful to explore different dimensions of the linkages between subsidiaries and host countries including aspects like collaborations with universities/research institutions and local firms.

➤ **Decision Making Autonomy**

As stated in Hypothesis 5, there was an expectation that subsidiaries enjoying higher levels of autonomy will be more likely to innovate than subsidiaries with reduced autonomy. Contrary to expectations, decision making autonomy did not emerge as a significant determinant of innovation. The sign of the variable is positive, but the variable is not significant in any of the models. This result is unexpected given the extensive literature that found a relation between subsidiaries' autonomy and innovation (Ghoshal and Bartlett, 1988), or creative subsidiary role like (Bartlett and Ghoshal, 1986; Birkinshaw and Morrison, 1995). One explanation may be that this indicator fails

to distinguish among an autarkic type of autonomy and an autonomy based on interdependence. MR subsidiaries tend to display high levels of autarkic autonomy, but low innovative capabilities, as they produce the same products as the parent MNE for the host country. On the contrary, PM subsidiaries tend to display high levels of autonomy and well developed innovative capabilities. However, their autonomy is not autarkic, but is based on interdependence. It would be interesting in a future study to distinguish among the decision making autonomy of the subsidiaries in different fields of activity, like for instance, innovation, manufacturing and marketing.

➤ **Export Intensity**

The expectations regarding this variable were ambiguous. On the one hand, exporters should be more likely to innovate than non exporting firms as they have more market opportunities, scale economies and are more aware of innovations occurring abroad. On the other hand, many studies have linked export intensity of a subsidiary to evidence of rationalisation (White and Poynter, 1984; Roth and Morrison, 1992; Taggart, 1997a, 1997b). The results of these estimations land more support to the second supposition.

➤ **Size**

Size was expected to have a positive effect on the innovative capabilities of the subsidiaries. This variable emerged as positive in all the models estimated. However, its significance appears to be very sensitive to the specification of the model.

➤ **Host Country**

There was an expectation that subsidiaries in Ireland would be more likely to innovate than those in Portugal, given Ireland's investment in education and highly skilled workforce. Our results do not corroborate this expectation. A possible explanation is that these features of the Irish economy were captured by the human capital intensity and R&D intensity variables. In the nonparametric analysis of foreign subsidiaries' characteristics, it will be shown that subsidiaries based in Ireland are more human capital and R&D intensive than those in Portugal. Given that host country dummy variables control for differences in the external environment not captured by the other variables in the model, these results may be interpreted as once it is controlled for age, size, education intensity, R&D intensity and nationality of the parent MNE, the host country does not have a significant effect on the subsidiaries' innovative capabilities.

➤ **Nationality of the Parent Multinational**

In all estimations the sign of this variable is negative and significant at 10% (in model 5 it is significant at 5%), thus confirming the expectation that foreign subsidiaries whose parent is from outside the EU would be more likely to innovate than subsidiaries whose parent is from the EU. This is consistent with the results of various studies that have shown that strategic asset-seeking FDI is more prevalent among US and Japanese MNEs than among intra-EU FDI (Hood and Young, 1988; Young, Hood and Dunlop, 1988; Papanastassiou and Pearce, 1999; Neven and Siotis, 1996).

In conclusion, the results of the econometric analyses corroborate the hypotheses that age, human capital intensity and R&D intensity impact positively on subsidiaries' innovative capabilities. Contrary to the expectations, the hypotheses that local linkages of the foreign subsidiary with its host country environment and the subsidiary's decision making autonomy have an effect on the innovative capability of foreign subsidiaries are not confirmed based on the results of this analysis.

6.5 Nonparametric Analysis of the Motivations for Investment and the Characteristics of Foreign Subsidiaries Operating in Ireland and Portugal

This section provides a comparison of the characteristics of value added activities undertaken within foreign subsidiaries in Ireland and Portugal and of the motivations underlying investment in the two countries.

The methodology was chosen having in mind the objective of the analysis, which is to compare foreign subsidiaries based in Ireland to those based in Portugal and to see if there are significant differences in the variables of interest, as well as in the available data. For the purpose of this analysis, the *t test* for two independent samples would have been appropriate. However, this test assumes normal distribution of the variables and at least interval measurement scale (Gibbons, 1985). For most variables of interest in this study, these assumptions do not hold. Under these circumstances, nonparametric tests are more adequate (Gibbons, 1985; Pestana and Gageiro, 2003). Mann Whitney is a nonparametric test, which tests for differences between two independent samples. It

tests whether the two samples are drawn from identical populations. For this test, only independence and continuous distributions need to be assumed (Gibbons, 1985). Both assumptions hold for all the variables investigated. In view of these considerations, it was deemed that the Mann Whitney test is the most appropriate given the purpose of the study and the available data. The statistical analyses were done using SPSS version 15.0 (SPSS, Inc., 2006).

6.5.1 Motivations for Investment

In this section, the motivations that lead MNEs to invest/continue to operate in Ireland and in Portugal will be compared. Two related aspects are analysed: the motivations to set up subsidiaries in Ireland and in Portugal and the motivation to continue carrying out value added activities in the two countries. Given the widespread concerns of scholars and policy makers over the sustainability of FDI projects, the second aspect complements the analysis in a meaningful way. The analysis follows the taxonomy developed in Chapter 2. Respondents were asked to rate the relevance of each motivation for the decision to invest in Ireland and in Portugal, on a scale taking values from 1 (not important at all) to 5 (extremely important). The analysis of the motivations for investment reveals that there were significant differences in the motivations that led MNEs to invest in the two countries. The results of the Mann Whitney test are presented in the tables below. Next, each motivation will be analysed in depth.

Table 6.14: Motivations to Set up Foreign Subsidiaries in Ireland and Portugal

Motivations for investment	Chi-Square	<i>p-value</i>
Serving local market***	-4,633	0,000
Serving the EU market**	-2,946	0,003
Labour costs	-0,140	0,889
Presence of important clusters in the same/related sectors	-0,026	0,979
Presence of competitors	-1,334	0,182
Incentives to set up the company (fiscal and/or financial)***	-4,981	0,000
Skills/qualifications of the workforce***	-4,051	0,000
Availability of scientific/technological inputs**	-3,023	0,003

***significant at 1%, **significant at 5%, *significant at 10%.

Table 6.15: Motivations to Continue Investing in Ireland and Portugal

Motivations for investment (presently)	Chi-square	Probability
Serving local market***	-4,380	0,000
Serving the EU market	-1,129	0,259
Labour costs	-0,486	0,627
Presence of important clusters in the same/related sectors	-0,349	0,727
Presence of competitors	-1,385	0,166
Incentives to set up the company (fiscal and/or financial)**	-3,082	0,002
Skills/qualifications of the workforce	-1,199	0,231
Availability of scientific/technological inputs**	-1,973	0,048

***significant at 1%, **significant at 5%, *significant at 10%.

Serving the domestic market is significantly more important as a motivation for investment in Portugal than in Ireland. In fact, it was considered one of the main motivations for investing in Portugal while Ireland it represented the least important motivation. These findings are consistent with previous research on determinants of FDI in Portugal (Matos, 1973; Taveira, 1984; Fontoura, 1995; Castro, 2000; Tavares, 2001).

Serving the EU market was clearly a more important motivation for setting up subsidiaries in Ireland than in Portugal. Most of the studies on attraction of inward FDI in Ireland stressed the importance of the EU as an export market (O' Sullivan, 1993; Barry, *et al.* 1999; Tavares, 2001; Barry, 2004). However, the importance of the EU market for foreign subsidiaries based in Portugal has been increasing and presently there are no significant differences in the importance attached to serving the EU market by the foreign subsidiaries in the two countries.

Low labour costs are potentially an important motivation for investment, particularly for firms seeking to produce labour intensive products for export (Dunning, 1993; Kumar, 1994). Foreign investors in both countries considered low labour costs to be a relevant motivation for investment and the Mann Whitney test reveals that the difference in the importance attached to this motivation by subsidiaries based in the two countries is not statistically significant. Although most respondents considered it a very important motivation at the time the subsidiaries were set up, the importance of this motivation is decreasing in both countries, as it can be inferred from Table 6.15.

The presence of competitors and of clusters in the same or related industries seems to have played only a secondary role in the decision to set up subsidiaries in both countries and there are no significant differences between the two. Similar results were obtained by Tavares (2001). However, this result is surprising in the case of Ireland. Previous studies (Barry and Bradley, 1997; Barry, Görg and Strobl, 2003) found that the decision of MNEs to set up subsidiaries in Ireland has been strongly influenced by the presence of key competitors, especially in sectors like electronics and pharmaceuticals.

Fiscal and financial incentives have been identified in the literature as a particularly important motivation for investment within RTAs like the EU (Guisinger, 1985; Blomström and Kokko, 2003; Oxelheim and Ghauri, 2003). The results of the Mann Whitney test show that the fiscal and financial incentives played a significantly more important role in attracting FDI projects in Ireland than in Portugal. Both countries offer financial and fiscal incentives to attract desirable FDI projects. However, the corporate tax rate is much lower in Ireland than in Portugal and Irish policy related to the attraction of MNEs' operations has long been hailed as very effective and consistent (Barry, 2004; Blomström and Kokko, 2003) while Portuguese policy has been criticised for being frequently inconsistent and ineffective (Tavares, 2004). In both countries the importance of this motivation has decreased since the establishment of the subsidiaries.

Workforce skills have been traditionally linked to the capacity of a country to absorb and to develop new technology (Nelson and Phelps, 1966) and have been considered an important determinant of inward FDI (Dunning, 1977; Hanson, 1996; Michie, 2001; Noorkbakhsh *et al*, 2001; Tavares and Teixeira, 2005). Although the level of workforce' skills was considered an important motivation in both countries, its importance was more pronounced in Ireland than in Portugal. This result corroborates the view that a technically skilled workforce has been one of the major factors behind Ireland's success in attracting FDI (Barry *et al*, 2001; Barry, 2004). The importance of this motivation is increasing over time in both countries. The increase in the importance attached to workforce skills was particularly prominent in Portugal.

A related motivation for investment analysed is the availability of scientific and technological inputs. The availability of such inputs tends to play an important role in attracting strategic asset-seeking FDI (Cantwell, 1995; Kuemmerle, 1999; Cantwell and

Iammarino, 1998, 2000; Cantwell and Janne, 2000; Cantwell and Piscitello, 2005). The analysis shows that this motivation was considerably stronger in Ireland than in Portugal. Like the level of skills of the workforce, its relevance tends to increase over time in both countries. However, in Portugal it remains low as compared to Ireland.

In conclusion, there are considerable differences between the motivations that lead MNEs to establish foreign subsidiaries in the two countries. Incentives for investment, workforce's skills and qualifications and the availability of scientific and technological inputs were significantly more important for the decision to invest in Ireland than in Portugal. However, the level of workforce skills is becoming increasingly important in Portugal. In terms of markets served, the domestic market is considerably more important in Portugal than in Ireland. Serving the EU market has always been of paramount importance for MNEs in Ireland, while in Portugal it played a less important role at the time the subsidiary was set up, but its importance is rising.

6.5.2 Characteristics of Multinationals' Activities in Ireland and Portugal

This section will present a comparison of the characteristics of MNEs' activities in Ireland and Portugal along the following dimensions: export intensity of subsidiaries, linkages forged with local suppliers, human capital and R&D intensity of subsidiaries, value added scope and decision making autonomy. In view of the theoretical literature presented in the preceding chapters, these characteristics are important for host country development. The results of the Mann Whitney tests are presented in the table below.

Table 6.16: Characteristics of Activities of Foreign Subsidiaries Based in Ireland and Portugal

Patterns of value added activities	Chi-Square	Probability
Export intensity**	-4,386	0,000
Local sourcing	-1,198	0,231
Human capital intensity:		
Education intensity**	-3,558	0,000
Technical skills intensity	-0,282	0,778
R&D intensity*	-2,046	0,041
Decision making autonomy	-0,553	0,581
Value added scope	-0,441	0,659

***significant at 1%, **significant at 5%, %, *significant at 10%.

The results of the Mann Whitney test show that subsidiaries based in Ireland display much higher export intensity than those based in Portugal. Given that both countries are small, open economies, part of a wider EU market, it would be expected that both attracted considerable export oriented FDI. However, as the analysis of motivations for investment has shown, serving the local market was one of the main motivations to set up subsidiaries in Portugal, while in Ireland it was considered insignificant. This finding is also in line with the empirical studies on the determinants of inward FDI in Portugal, which found local market to be an important determinant of inward FDI and with the empirical studies on Ireland, which found that Ireland has been extremely successful in attracting export-platform FDI (Barry, Bradley and O'Malley, 1999; Barry, 2004).

Embeddedness of subsidiaries in host countries is another extremely important issue for subsidiary and host country development (Andersson and Forsgren, 1996; Birkinshaw and Hood, 1997, 1998; Tavares, 2001). Local embeddedness takes place through local sourcing and linkages with the local/national system of innovation (Tavares, 2001; Tavares and Young, 2006). In this application only the first aspect will be addressed.

The level of local sourcing is measured as the percentage of inputs bought from suppliers based in the host country, which includes domestic firms and other foreign subsidiaries based in the host country. An attempt was made to obtain data on the percentage of inputs bought from domestic-owned firms. In the survey, respondents were asked to state this percentage; however, few valid replies were received to this question. Thus, it was decided to use the percentage of inputs bought from local suppliers regardless of their ownership. Yet, foreign suppliers based in Ireland/Portugal also contribute to the development of the local economy through employment and their own sourcing (Barkley and McNamara, 1994; Görg and Ruane, 2000). In both countries the level of local sourcing of inputs is low and the Mann Whitney test shows that the patterns of local sourcing of the subsidiaries based in the two countries do not differ in any significant way. This is line with other studies on linkages in Ireland and Portugal (Görg and Ruane, 2000; Ruane, 2001; Tavares and Young, 2006).

The human capital intensity of subsidiaries in Ireland and Portugal was studied using two indicators: education intensity and technical skills intensity, as explained previously. Education intensity has been widely used in the literature as a proxy for

human capital (Becker, 1962; Bóia, 2003; Wößmann, 2003; Tavares and Teixeira, 2005). The second indicator used represents the percentage of staff having an engineering degree. This indicator measures more precisely the technical skills of the workforce employed by foreign subsidiaries and it has also been used previously by Wood and Ridaó-Cano (1999) and Tavares and Teixeira (2005). The Mann Whitney test reveals that Irish subsidiaries display significantly higher education intensity than their Portuguese counterparts. Two developments in Ireland appear to have contributed to its success in attracting subsidiaries with high human capital intensity. First, upgrading the education of the workforce, especially at tertiary level, has been a focus of the Irish development strategy (Barry, 2004). Secondly, there has been an explicit policy focus on attracting high value added MNEs' activities. This finding confirms the results of the analysis of motivations for FDI which found that workforce's skills and qualifications were significantly more important for MNEs in Ireland than in Portugal.

Despite the fact that on average subsidiaries in Ireland seem to employ more staff with engineering degree than foreign subsidiaries in Portugal, the difference is not statistically significant. This result contradicts our expectations. Ireland has invested more and for a longer time than Portugal in upgrading its human capital and improving the technical skills of the workforce has been an explicit focus of this endeavour. A possible explanation could be that respondents were asked only about the staff with an engineering degree, excluding other scientific qualifications which could be more prevalent in sectors like pharmaceutical and healthcare.

The R&D intensity of the subsidiary is measured by the ratio of R&D expenses over subsidiary's output. This indicator has been used by Cantwell and Mudambi (2000), Mohnen and Hoareau (2003), and Tavares and Teixeira (2005). The nonparametric analysis reveals that foreign subsidiaries in Ireland tend to display higher R&D intensity than those in Portugal. This result is in line with the previous analysis of motivations for investment which found that workforce skills and availability of scientific/technological inputs played a more important role in Ireland than in Portugal, and with the analysis of human capital intensity. Furthermore, it corroborates the established view that locations endowed with a well developed scientific and educational base are best positioned to attract R&D investments from foreign firms (Cantwell and Janne, 2000; Cantwell and Mudambi, 2000; Cantwell and Santangelo, 2000; Cantwell and Piscitello, 2005).

Decision making autonomy of a foreign subsidiary is considered a critical attribute of the subsidiary, capable of influencing subsidiary's innovative potential and its further development (Birkinshaw and Morrison, 1995; Pearce, 1999; Tavares and Young, 2004). The nonparametric analysis fails to find significant differences in the decision making autonomy of the foreign subsidiaries in Ireland and Portugal. These results are not surprising in view of the variety of subsidiaries' characteristics that are associated with autonomy. Thus, it was found that greenfield investments, export propensity and being part of globally or regionally integrated MNE is associated with lower autonomy (Jarillo and Martinez, 1990; Taggart and Hood, 1999). In contrast local market orientation is usually associated with higher autonomy (Garnier, 1982; Jarillo and Martinez, 1990). In terms of subsidiary roles, RM subsidiaries are associated with very low autonomy; MR subsidiaries are associated with high autonomy, while PM role's relationship with autonomy seems to be more controversial. Some studies associated it with greater autonomy (Hedlund, 1981; Birkinshaw and Morrison, 1995; Pearce, 1999; Taggart and Hood, 1999), while others like (Bartlett and Ghoshal, 1989; Jarillo and Martinez, 1990) associate it with lower autonomy. In a related vein, Pearce (1999) noted that the kind of autonomy associated with PM is different from that associated with MR, the first being based on interdependence rather than autarky. Irish subsidiaries tend to be associated with greenfield investments, high export intensity and globally and/or regionally integrated MNEs' strategies, which would suggest lower autonomy than Portuguese subsidiaries, which are more linked to local market orientation and where greenfield investments are less prominent. In terms of subsidiary roles, both countries are associated with RM type of subsidiaries. However, MR subsidiaries are more prevalent in Portugal than in Ireland, while PM subsidiaries are more prevalent in Ireland (Tavares, 2001).

The type of value added activities undertaken is another defining feature of the subsidiary, impinging on its role within the MNE and on its potential for further development (White and Poynter, 1984; Birkinshaw and Hood, 1997, 1998). In this analysis the sophistication of subsidiaries' activities was measured on an ordinal scale based on the survey. Respondents were asked which type of value added activities were undertaken. They had to choose between: generating new products/technologies for the EU/world markets, adapting products for the EU market, adapting products for the domestic market and producing the same products as their parent MNE.

The nonparametric analysis of the value-added activities undertaken by subsidiaries in the two countries does not find any significant differences between subsidiaries based in Ireland and those based in Portugal. This result is surprising in view of previous studies and of the results of the analysis of technological capabilities as proxied by human capital intensity and R&D intensity. A possible explanation is that the sophistication of value added activities undertaken by the subsidiary is measured on an ordinal scale, which reflects the order of increased sophistication of activities, but not the differences in sophistication between two activities. Thus, this measurement accounts in the same way for the difference between producing the same products as the parent, adapting products for the local market, and the difference between adapting products for the EU market and introducing new technologies/products for the EU/world market. Therefore, the analysis of the human capital intensity and R&D intensity is more indicative of the level of sophistication of the activities than the analysis of the value added activities.

In conclusion, the analyses reveal that foreign subsidiaries in Ireland tend to display greater export intensity, human capital intensity (formal education) and R&D intensity. The linkages established with local suppliers and the decision making autonomy are low in both countries and they do not differ in any significant way.

Appendices to Chapter 6

Questionnaire Ireland

Company name: _____	
Year of establishment in Ireland: <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/>	Sales (2005): <input type="text" value=""/> €
Number of employees: <input type="text" value=""/>	Activity sector: _____
Name of parent company: _____	Nationality (of parent company): _____

1. Please rate the importance of the following motivations for investing in Ireland (1 not important at all...5 extremely important):

	Originally					Presently				
1.1. Serving Irish market	1	2	3	4	5	1	2	3	4	5
1.2. Serving EU market	1	2	3	4	5	1	2	3	4	5
1.3. Labour costs	1	2	3	4	5	1	2	3	4	5
1.4. Presence of important clusters in the same/related sectors	1	2	3	4	5	1	2	3	4	5
1.5. Presence of other competitors	1	2	3	4	5	1	2	3	4	5
1.6. Incentives to set up the company (fiscal and/or financial)	1	2	3	4	5	1	2	3	4	5
1.7. Workforce skills/qualifications	1	2	3	4	5	1	2	3	4	5
1.8. Availability of scientific/technological inputs	1	2	3	4	5	1	2	3	4	5

2. Percentage of output exported: %

3. Percentage of output sold in: Ireland % European Union % Other markets %

4. Percentage of output sold to the parent company or to other affiliates of the same parent company: %

5. Percentage of inputs: Imported % Bought in Ireland %

5.1. If known, the percentage of inputs bought from Irish owned companies: %

6. Percentage of staff with 12 years or more of formal education: %

7. Percentage of staff with an engineering degree: %

8. Does the company have its own R&D laboratory? Yes No

9. R&D expenses as a percentage of the company's sales in 2003-2005 (average): %

10. Number of persons involved in R&D in 2003-2005 (average):

11. Number of patent applications in 2003-2005 (total number)?

12. During the last three years period 2003-2005, did your company introduce any technologically new or significantly improved products (goods and services) which were new:

to the firm Yes No to the industry Yes No

13. During the last three years period 2003-2005 did your company introduce any new or significantly improved processes for producing or supplying products (goods or services) which were new:

to the firm Yes No to the industry Yes No

14. Is your company undertaken the following activities

14.1. Generating technology/new products for the EU/World market? Yes No

14.2. Adapting products for the EU market? Yes No

14.3. Adapting products for the Irish market? Yes No

14.4. Manufacturing the same products as the parent company? Yes No

15. How are decisions taken in your company/this Irish subsidiary (1 totally by the parent firm ... 3 equally by parent and by Irish subsidiary ... 5 totally taken by the Irish subsidiary?

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Questionnaire Portugal

Nome da empresa _____	
Ano de instalação em Portugal <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/>	Volume de negócios (2005) <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> €
Número de empregados <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/>	Sector de actividade _____
Nome da empresa mãe _____	Nacionalidade da empresa mãe _____

1. Por favor indique a importância das seguintes motivações para investir em Portugal (1 Nada importante 5 Extremamente importante):

	Na altura					No presente				
	1	2	3	4	5	1	2	3	4	5
1.1. Servir o mercado português	<input type="text"/>									
1.2. Servir o mercado europeu	<input type="text"/>									
1.3. Custo da mão de obra	<input type="text"/>									
1.4. Presença de <i>clusters</i> importantes no mesmo sector ou num sector relacionado	<input type="text"/>									
1.5. Presença dos concorrentes	<input type="text"/>									
1.6. Incentivos para instalação da empresa (fiscais e/ou financeiros)	<input type="text"/>									
1.7. Qualificação da mão de obra	<input type="text"/>									
1.8. Disponibilidade de recursos tecnológicos e científicos	<input type="text"/>									

2. Percentagem da produção que é exportada: %
3. Percentagem da produção vendida em: . . Portugal % União Europeia % Outros mercados %
4. Percentagem da produção vendida à empresa mãe ou a outras empresas do mesmo grupo: %
5. Percentagem dos componentes: Importados % Comprados em Portugal %
- 5.1. Se conhecida, a percentagem de componentes comprados a empresas de capital português: %
6. Percentagem do pessoal ao serviço com 12 ou mais anos de escolaridade: %
7. Percentagem do pessoal ao serviço com licenciatura em engenharia: %
8. A empresa tem laboratório de I&D próprio? . . . Sim Não
9. Despesas em I&D como percentagem do volume de negócios em 2003-2005: %
10. Pessoal ao serviço envolvido em I&D no período 2003-2005 (média):
11. Número de patentes pedidas durante o período 2003-2005 (número total):
12. Durante o período 2003-2005, a sua empresa introduziu no mercado algum produto (bem ou serviço) que seja novo ou significativamente melhorado para:
 Empresa: Sim Não Indústria: Sim Não
13. Durante o período 2003-2005, a sua empresa introduziu algum processo de produção de bens ou fornecimento de serviços que seja novo ou significativamente melhorado para:
 Empresa: Sim Não Indústria: Sim Não
14. A empresa está a desenvolver as seguintes actividades:
- 14.1. Geração de tecnologia/novos produtos para o mercado europeu/mundial? Sim Não
- 14.2. Adaptação dos produtos para o mercado europeu? Sim Não
- 14.3. Adaptação dos produtos para o mercado português? Sim Não
- 14.4. Produção dos mesmos produtos que a empresa mãe produz? Sim Não
15. Como são tomadas as decisões dentro da sua empresa/subsidiária (1 totalmente pela empresa mãe ... 3 igualmente pela empresa mãe e pela empresa subsidiária portuguesa ... 5 totalmente pela subsidiária):

247 08



7 Conclusions, Avenues for Future Research and Policy Implications

7.1 Summary of the Findings and Conclusions

The study aimed to contribute to the literature on subsidiaries' roles and evolution by investigating empirically the characteristics of foreign subsidiaries' activities located in two peripheral small open economies belonging to the EU, Ireland and Portugal.

Conceptually, this dissertation discusses the types of motivations that lead MNEs to establish foreign subsidiaries abroad, how these motivations bear on the choice of their location and ultimately on the quality of multinational activities established. The main point to note from these discussions is that there are a variety of roles that a subsidiary can perform within a multinational; some of these roles are more desirable than others from a host country perspective. The role of the subsidiary and implicitly its characteristics are influenced by the type of motivation that lies behind its establishment and the host country conditions, which are interlinked.

Given the relevance given to innovation by recent theories of subsidiary development (Hood and Young, 1988; Birkinshaw and Hood, 1997; 1998; Tavares, 2001) and of economic growth (Romer, 1990) it was decided to focus the analysis on the innovative capabilities of foreign subsidiaries. In line with the three drivers underlying subsidiary evolution, it was considered that characteristics of the subsidiary, of the parent MNE and of the external environment all impinge on the subsidiary's ability to innovate. Among these aspects, this study was concerned with subsidiaries' characteristics.

These issues are explored empirically in the context of foreign subsidiaries located in Ireland and Portugal. Two empirical applications are presented in this dissertation. The first is an enquiry into the determinants of innovation in foreign subsidiaries. The main hypotheses tested in this application are that age, education and R&D intensities, local embeddedness and decision making autonomy impact positively on the innovative capabilities of subsidiaries. The second application investigates the differences between foreign subsidiaries based in Ireland and those in Portugal as regards the motivations that led to their establishment and to their characteristics. The main hypothesis

concerning the motivations for investment was that strategic assets, like the abundance of skilled labour and the scientific/technological inputs, played a more important role in attracting FDI projects to Ireland than to Portugal. In what concerns the characteristics of the foreign subsidiaries established, it was posited that the subsidiaries in Ireland are more education and R&D intensive, more embedded in the host country and enjoy higher decision making autonomy than their Portuguese counterparts. All empirical analyses are based on a purposely designed questionnaire survey conducted between July and November 2006 on the population of foreign subsidiaries based in the two countries.

The results of analysis of the determinants of innovation revealed that age, education and R&D intensities of foreign subsidiaries are statistically significant determinants of innovation within foreign subsidiaries. This is consistent with previous studies that emphasise the time dependent aspect of multinational subsidiaries' evolution (Young, Hood and Peters, 1994; Birkinshaw and Hood, 1997, 1998) and those that emphasise the importance of human capital (Bartel and Lichtenberg, 1987; Narula and Marin, 2003) and R&D activities (Cohen and Levinthal, 1989, 1990) for technology creation and absorption.

The nonparametric analysis of the characteristics of foreign subsidiaries reveals that those based in Ireland tend to display greater education and R&D intensities. The analysis of the motivations for FDI revealed that workforce skills and the availability of scientific/technological inputs played a more important role in the decision to establish subsidiaries in Ireland than in Portugal. These results are consistent with research that links location endowments to the motivations for investment and the quality of multinationals' activities (Narula and Marin, 2003). Also, it was found that incentives for investment were considered more important for the decision to invest in Ireland than in Portugal, despite the fact that both countries offer generous incentives to foreign investors.

The results of this study have relevant implications for public policies, both FDI related and general economic policies. However, before delving into the implications for policy making, it is important to point out the limitations of this study.

7.2 Limitations of the Study and Avenues for Future Research

The present study has certain limitations that need to be taken into account when considering its contributions and implications for policy making. However, some of these limitations can be seen as fruitful avenues for future research.

One important limitation of this study is its generalisability. As mentioned before, the overall response rate was 9%. Therefore, the results of these analyses should be considered as preliminary and further research is necessary. One opportunity for future research would be to extend this research to more firms, and possibly more countries. For instance, some Central and Eastern European Countries that acceded recently the EU would represent interesting cases. Also, in this dissertation, only foreign subsidiaries conducting manufacturing activities were considered. It would be interesting to extend this study to foreign subsidiaries active in the service sector (although that would imply adapting extant typologies of subsidiary strategies).

Another important avenue for future research is studying the impact of embeddedness on foreign subsidiaries' innovation. In this study, given data constraints, only a narrow dimension of embeddedness, the local sourcing of inputs, was considered. However, embeddedness comprises other dimensions and it is possible that for foreign subsidiaries engaged in innovative activities other types of linkages are more relevant. Notably, host country linkages with universities and other research entities as well as R&D collaborations with other firms constitute a promising avenue for research.

Another potentially promising avenue of enquiry is studying more specific types of decision making autonomy. For instance, Birkinshaw and Morrison (1995) distinguished between the autonomy of the subsidiary in what regards strategic and operational decisions. Taggart (1997b) distinguished between decision about marketing, advertising, R&D, production and manufacturing technology. Tavares (2001) also distinguishes among decisions regarding markets supplied, product range, technology used and broad strategic direction. The present study considered only one overall measure of decision making autonomy that did not distinguish between the areas to which the decisions refer or the type of decisions. Therefore, it could be enriched by considering more nuanced concepts of decision making autonomy.

7.3 Policy Implications

The findings of this study have relevant policy implications, both for policies aimed at attracting FDI, and to broader policies, such as those regarding education and support for R&D, innovation, science and technology.

Governments all over the world invest considerably in attracting inward FDI by offering fiscal and financial incentives recognising the potential role inward direct investment can play in the industrial upgrading of the host country (Te Velde, 2002, Oxelheim and Ghauri, 2003). Although most of these measures refer simply to attracting FDI, concerns for the quality and the sustainability of the FDI projects attracted have become increasingly central to such policies, especially in developed countries (UNCTAD, 2005b).

The results of this study lend support to public policies that emphasise the quality of FDI projects. Emphasising quality entails selectivity in the use of incentives to attract FDI projects and after care programmes for upgrading extant multinational activities. Some commonly used criteria for selecting FDI projects are: the size of the subsidiary to be established, the nationality of the parent MNE, its exports and the type of activities undertaken and quality of jobs created by the subsidiary.

As mentioned above, the size of the subsidiary is one of the most used criteria for selecting FDI projects. This is to some extent warranted, because large subsidiaries create employment, which is one the most frequent problems governments try to solve by attracting inward FDI. However, if the aim of the government is to obtain access to technology, skills and other intangible assets that can be transferred through FDI, size does not appear to be the most relevant criterion. The results of this study reveal that size impacts positively on the innovativeness of the subsidiary, however the results are not robust to various specifications. This suggests that size is not a very informative criterion to be used when choosing which FDI projects should be supported (Tavares and Young, 2006).

The nationality of the parent MNE is another widely used criterion for selecting FDI projects. For instance, it has been argued that Japanese and US firms are more desirable

from a host country development point of view (Hood and Young, 1988; Hood, Young and Lal, 1994; Neven and Siotis, 1996). The results of this study show that foreign subsidiaries originating outside the EU tend to be more innovative than those having an EU parent MNE, thus lending support to the use of this criterion.

An increasingly popular strategy emphasises the activities undertaken within the subsidiary, especially R&D, the quality of jobs created and the possibility of agglomerations/clusters creation. In recent years, the IDA has followed (successfully) such strategy (IDA, 2006). The results of this study show that education and R&D intensity are key determinants of the innovation within foreign subsidiaries, thus supporting this type of targeting.

However, not all host countries have realistic prospects to attract high-tech, high-skill intensive MNEs' activities. Young, Hood and Peters (1994) warn that these prospects are weak for peripheral regions. Yet, the results of our empirical applications show that even among peripheral host countries there are considerable differences in the quality of multinationals' activities attracted. The same scholars advise that peripheral economies have more prospects in having developmental subsidiaries through upgrading extant subsidiaries. Indeed, the importance of investing in aftercare programmes is widely acknowledged (Young and Hood, 1994; Pearce, 2001; Tavares, 2001). The results of the empirical applications presented in this dissertation show that subsidiary age may impact positively on its innovative capabilities. These findings support the case for investing in after care programmes aiming at upgrading the existing operations

FDI related policies outlined above need to be complemented by public policies that promote factor endowment and creation. The results of this study appear to support an emphasis on human capital formation and broad support for R&D, innovation, science and technology, as they show that the abundance of skilled labour and the scientific and technological inputs have played a more important role in attracting foreign investors to Ireland than to Portugal.

The contribution of human capital to economic growth through innovation is widely acknowledged, which lends support to the policies advocating investment in education. However, it is important to stress that not only the magnitude of investment matters, but

also the efficiency of allocation of resources. The case of Portugal provides an illustrative example – its expenditure on education is relatively high (above the EU 25 average), however Portugal scores below the EU 25 average in many indicators that measure achievements (Table 4.3). The findings of the two empirical applications presented show that the abundance of skilled workforce is an important motivation for investment and that education intensity it has a positive and significant impact on the innovation within foreign subsidiaries, thus lending support to the importance of investments in education for attracting or upgrading innovative multinational activities.

Policies supporting R&D, innovation, and development of science and technology are increasingly viewed as central to economic growth (Sapir, 2004). The results of the two empirical applications presented in this dissertation show that the availability of scientific/technological inputs is an important motivation for investment and that R&D intensity of foreign subsidiaries impacts on their ability to innovate. These two findings highlight the importance of technological and scientific endowments for attracting quality FDI, thus advocating policies that support the development of this kind of endowments and for firms that conduct R&D activities.

A final area in which public policy could help improve the quality of FDI projects attracted is providing more information on the skills and other scientific and technological inputs available in the host country. An illustrative example in this regard is IDA's marketing strategy of promoting Ireland as a base for R&D and other high value-added activities emphasising the technically skilled Irish workforce. This last recommendation is particularly valid for the case of Portugal, which is reasonably well endowed in human capital in certain sectors (Tavares and Teixeira, 2005), but suffers from an international image of a low-skill, low-cost location.

References

Almeida, P. (1996), “Knowledge Sourcing by Foreign Multinationals: Patent Citation Analysis in the U.S. Semiconductor Industry”, *Strategic Management Journal*, Vol. 17, N° 1, pp. 155-165.

Almeida, R. and A. M. Fernandes (2006), “Openness and Technological Innovations in Developing Countries: Evidence from Firm-Level Surveys”, *Policy Research Working Paper Series 3985*, Washington (DC): The World Bank.

Andersson, U. and M. Forsgren (1996), “Subsidiary Embeddedness and Control in the Multinational Corporation”, *International Business Review*, Vol. 5, N° 5, pp. 425–446.

Andersson, U. and M. Forsgren (2000), “In Search of the Centre of Excellence: Network Embeddedness and Subsidiary Roles in Multinational Corporations”, *Management International Review*, Vol. 40, N° 4, pp. 329-350.

Andersson, U., M. Forsgren and U. Holm (2001), “Subsidiary Embeddedness and Competence Development in MNCs: a Multi-level Analysis”, *Organization Studies*, Vol. 22, N° 6, pp. 1013-1134.

Audretsch, D. and M. Feldman (1996), “R&D Spillovers and the Geography of Innovation and Production”, *American Economic Review*, Vol. 86, N° 4, pp. 253-273.

Bain, J. (1956), *Barriers to New Competition: Their Character and Consequences in Manufacturing Industries*, Cambridge (MA): Harvard University Press.

Banco de Portugal, (1998), *Suplemento ao Boletim Estatístico: Investimento Directo do Exterior em Portugal: Estatísticas de Fluxos e Stocks para o ano 1996 e Estimativas de Stocks para 1997*. Lisbon: Banco de Portugal.

Bandera, V. N. and J. T. White (1968), “U.S. Direct Investments and Domestic Markets in Europe”, *Economia Internazionale*, Vol. 21, N° 1, pp 117-133.

Barkley, D. L. and K. T. McNamara (1994), "Local Input Linkages: A Comparison of Foreign- Owned and Domestic Manufacturers", *Regional Studies*, Vol. 28, N° 7, pp. 725-737.

Barney, J. B. (1991), "Firm Resources and Sustained Competitive Advantage", *Journal of Management*, Vol. 17, N° 1, pp. 99-120.

Barrell, R. and N. Pain (1997), "Foreign Direct Investment, Technological Change, and Economic Growth within Europe", *Economic Journal*, Vol. 107, N° 444, pp. 1770-1786.

Barrell, R. and N. Pain (1999), "Domestic Institutions, Agglomerations and Foreign Direct Investment in Europe", *European Economic Review*, Vol. 43, N° 3, pp. 925-934.

Barrios, S., H. Görg and E. Strobl (2001), "Explaining Firms' Export Behaviour: the Role of R&D and Spillovers", GEP Research Paper 01/27, Nottingham: University of Nottingham.

Barry, F. (2000), "Convergence is Not Automatic: Lessons from Ireland for Central and Eastern Europe". *World Economy*, Vol. 23, N° 10, pp. 1379-1394

Barry, F. (2003), "Economic Integration and Convergence Processes in the EU Cohesion Countries", *Journal of Common Market Studies*, Vol. 41, N° 5, pp. 897-921.

Barry, F. (2004), "Export Platform FDI: the Irish Experience", *EIB Papers*, Vol. 9, N° 2, pp. 8-37. Luxembourg: European Investment Bank

Barry, F., and J. Bradley (1997), "FDI and Trade: the Irish Host Country Experience", *Economic Journal*, Vol. 107, N° 445, pp. 1798-1811.

Barry, F., J. Bradley, and A. Hannan (2001), "The Single Market, the Structural Funds and Ireland's Recent Economic Growth", *Journal of Common Market Studies*, Vol. 39, N° 3, pp. 537-552.

Barry, F., J. Bradley, and E. O'Malley (1999), "Indigenous and Foreign Industry: Characteristics and Performance", in F. Barry (editor), *Understanding Ireland's Economic Growth*, pp. 41-68, London: Macmillan Press.

Barry, F., H. Görg and E. Strobl (2003), "Foreign Direct Investment, Agglomerations and Demonstration Effects: an Empirical Investigation", *Weltwirtschaftliches Archiv*, Vol. 139, N° 4, pp. 583-600.

Bartlett, C. A. and S. Ghoshal (1986), "Tap Your Subsidiaries for Global Reach", *Harvard Business Review*, Vol. 64, N° 6, pp. 87-94.

Bartlett, C. A and S. Ghoshal (1989), *Managing Across Borders. The Transnational Solution*, Cambridge (MA): Harvard Business School Press.

Bartel, A. and F. Lichtenberg (1987), "The Comparative Advantage of Educated Workers in Implementing New Technology", *Review of Economics and Statistics*, Vol. 68, N° 1, pp. 1-11.

Bellak, C. (2004) "How Domestic and Foreign Firms Differ and Why Does it Matter?", *Journal of Economic Surveys*, Vol. 18, N° 4, pp. 483-514.

Becker, G. (1962), "Investment in Human Capital: A Theoretical Analysis", *Journal of Political Economy*, Vol. 70, N° 5, pp. 9-44.

Behrman, J. (1972), *The Role of International Companies in Latin America Integration*. Lexington: Lexington Books.

Birkinshaw, J. (1994), "Approaching Heterarchy. A Review of the Literature on Multinational Strategy and Structure", *Advances in International Comparative Management*, Vol. 9, pp. 111-144.

Birkinshaw, J. (1997), "Entrepreneurship in Multinational Corporations: the Characteristics of Subsidiary Initiatives", *Strategic Management Journal*, Vol. 18, N° 3, pp. 207-229.

Birkinshaw, J. (2000), “Determinants and Consequences of Subsidiary Initiative in Multinational Corporations”, *Entrepreneurship Theory and Practice*, Vol. 24, N° 1, pp. 9-35

Birkinshaw, J. and N. Hood (1997), “An Empirical Study of Development Processes in Foreign Owned Subsidiaries in Canada and Scotland”, *Management International Review*, Vol. 37, N° 4, pp. 339-364.

Birkinshaw, J. and N. Hood (1998), “Multinational Subsidiaries Evolution: Capability and Charter Change in Foreign Owned Subsidiary Companies”, *Academy of Management Review*, Vol. 23, N° 4, pp. 773–795.

Birkinshaw, J. and N. Hood (2000), “Characteristics of Foreign Subsidiaries in Industry Clusters”, *Journal of International Business Studies*, Vol. 31, N°1, pp. 141–154.

Birkinshaw, J., N. Hood. and S. Jonsson (1998), “Building Firm Specific Advantages in Multinational Corporations: the Role of Subsidiary Initiative”, *Strategic Management Journal*, Vol. 19, N° 3, pp. 221–241.

Birkinshaw, J. and A. J. Morrison (1995), “Configurations of Strategy and Structure in Subsidiaries of Multinational Corporations”, *Journal of International Business Studies*, Vol. 26, N° 4, pp. 729-753.

Blomström, M. and A. Kokko (1998), “Multinational Corporations and Spillovers”. *Journal of Economic Surveys*, Vol. 12, N° 3, pp. 247–277.

Blomström, M. and A. Kokko (2002), “FDI and Human Capital: A Research Agenda”, *OECD Development Centre Working Papers 195*, Paris: Organisation for Economic Cooperation and Development.

Blomström, M. and A. Kokko, (2003), “The Economics of Foreign Direct Investment Incentives”, *EIJS Working Paper Series 168*, Stockholm: The European Institute of Japanese Studies.

Bóia, M. J. (2003), *Determinants of Innovation in Portugal. Designing, Implementing and Analysing Evidence from the Third Community Innovation survey*. Unpublished Master's Dissertation, Instituto Superior Técnico, Lisbon: Universidade Técnica de Lisboa.

Bruno G., R. Crinò, and A. Falzoni (2004), "Foreign Direct Investment, Wage Inequality and Skilled Labour Demand in EU Accession Countries", CESPRI Working Paper No. 154, Milan: Centre for Research on Innovation and Internationalization, Bocconi University.

Buckley, P. J. and M. C. Casson (1976), *The Future of Multinational Enterprise*. London: Macmillan.

Burgelman, R. A. (1983), "A Model of the Interaction of Strategic Behaviour, Corporate, Context and Concept of Strategy", *Academy of Management Review*, Vol. 8, N° 1, pp. 61 -70.

Cabral, S. (1995), "Comparative Export Behaviour of Foreign and Domestic Firms in Portugal", *Economic Bulletin*, (March), pp. 69-78, Lisbon: Banco de Portugal.

Cabral, S. (2004), "Evolução de Recente da Quota de Mercado das Exportações Portuguesas na União Europeia", *Economic Bulletin*, pp. 83 – 96, Lisbon: Banco de Portugal,.

Cantwell, J. A. (1995), "The Globalisation of Technology: What Remains of the Product Cycle Model?", *Cambridge Journal of Economics*, Vol. 19, N° 1, pp. 155-174.

Cantwell, J. A. (2000), "A Survey of Theories of International Production", in Pitelis, C. N. and R. Sugden (editors), *The Nature of the Transnational Firm*, pp. 10-56, London: Routledge.

Cantwell, J. A. and S. Iammarino (1998), "MNCs, Technological Innovation and Regional Systems in the EU: Some Evidence in the Italian Case", *International Journal*

of Economics of Business, Vol. 5, N° 3, pp. 383-408.

Cantwell, J. A. and S. Iammarino (2000), "Multinational Corporations and the Location of Technological Innovation in the UK Regions", *Regional Studies*, Vol. 34, pp. 317-332.

Cantwell, J. A. and O. E. M. Janne (2000), "The Role of Multinational Corporations and National States in the Globalisation of Innovatory Capacity: the European Perspective", *Technology Analysis and Strategic Management*, Vol. 12, N° 2, pp. 243-262.

Cantwell, J. A. and R. Mudambi (2000), "The Location of MNE R&D Activity: the Role of Investment Incentives", *Management International Review*, Vol. 40, N° 1, pp. 127-148.

Cantwell, J. A. and R. Narula (2001), "The Eclectic Paradigm in the Global Economy", *International Journal of the Economics of Business*, Vol. 8, N° 2, pp. 155-172.

Cantwell, J. A. and L. Piscitello (2005), "Recent Location of Foreign-Owned R&D Activities by Large Multinational Corporations in the European Regions: the Role of Spillovers and Externalities", *Regional Studies*, Vol. 39, N° 1, pp. 1-16.

Cantwell, J. A. and G. D. Santangelo (2000), "Capitalism, Profits and Innovation in the New Techno-Economic Paradigm", *Journal of Evolutionary Economics*, Vol. 10, N° 1-2 pp. 131-157.

Castro, F. (2000), *FDI in the European Periphery: the Competitiveness of Portugal*, Unpublished PhD thesis, Centre for International Business at the University of Leeds, Leeds: University of Leeds.

Caves, R. E. (1971), "Industrial Corporations: The Industrial Economics of Foreign Investment," *Economica*, Vol. 38, N° 149, pp. 1-27.

Caves, R. E. (1982), *Multinational Enterprise and Economic Analysis*. Cambridge, (UK): Cambridge University Press.

Chung, W. and J. Alcácer (2002), “Heterogeneous Investment Motives and Location Choice of Foreign Direct Investment in the United States”, *Management Science*, Vol. 48, N° 12, pp. 1534-1554.

Coe, D. and E. Helpman (1995), “International R&D Spillovers”, *European Economic Review*, Vol. 39, N° 5 pp. 859-887.

Cohen, W. and D. Levinthal (1989). “Innovation and Learning: the Two Faces of R&D”, *Economic Journal*, Vol. 99, N° 397, pp. 569-596.

Cohen, W and D. Levinthal (1990), “Absorptive Capacity: a New Perspective on Learning and Innovation”, *Administrative Science Quarterly*, Vol. 35, N° 1, pp. 128-152.

Corkill, D. (1999), *The Development of the Portuguese Economy. A Case of Europeanization*, London: Routledge.

Crone, M. and S. Roper (2001), “Local Learning and the Supply Chain: Knowledge Transfers from Multi-National Plants”, *Regional Studies*, Vol. 35, N° 6, pp. 535-548.

Culem, C. (1988), “The Locational Determinants of Direct Investment Among Industrialised Countries”, *European Economic Review*, Vol. 32, N° 4, pp. 885-904.

D’Cruz, J. R. (1986), “Strategic Management of Subsidiaries”, in H. Étemad and L. S. Dulude, (editors), *Managing the Multinational Subsidiary*, pp. 75-89, London: Croom Helm.

Delany, E. (1998), “Strategic Development of Multinational Subsidiaries in Ireland”, In Birkinshaw J. and N. Hood (editors), *Multinational corporate evolution and subsidiary development*, pp. 239-269, London: Macmillan.

Desai M. A, Foley, C. F. and Hines J., R., Jr. (2002), “Chains of Ownership, Regional Tax Competition and Foreign Direct Investment”, NBER Working Paper No. 9224,

Cambridge (MA): National Bureau of Economic Research.

Devereux, M. P. and R. Griffith (1998), "Taxes and the Location of Production: Evidence from a Panel of US Multinationals", *Journal of Public Economics*, Vol. 68, N° 3, pp. 335-367.

Devereux, M. P., R. Griffith, and A. Klemm (2002), "Corporate Income Tax Reforms and Tax Competition", *Economic Policy*, Vol. 17, N° 35, pp. 451-95.

Dierickx, I. and K. Cool (1989), "Asset Stock Accumulation and Sustainability of Competitive Advantage", *Management Science*, Vol. 35, N° 12, pp. 1504-1511.

Doz, Y. and C. K. Prahalad, (1981), "Headquarters Influence and Strategic Control in MNCs", *Sloan Management Review*, Vol. 23, N° 1, pp. 15-30.

Dunning, J. H. (1973), "The Determinants of International Production", *Oxford Economic Papers*, Vol. 25, N° 3, pp. 289-336.

Dunning, J. H. (1977), "Trade, Location of Economic Activity and the MNE: a Search for an Eclectic Approach", in B. Ohlin, Hesselborn, P. O. and P. M. Wijkman (editors), *The International Allocation of Economic Activity*, pp. 395-418, London: Macmillan.

Dunning, J. H. (1988), "The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions", *Journal of International Business Studies*, Vol. 19, N° 1, pp. 1-31.

Dunning, J. H. (1993), *Multinational Enterprises and the Global Economy*, Wokingham (UK): Addison Wesley.

Dunning, J. H. (1998), "Location and the Multinational Enterprise: A Neglected Factor?", *Journal of International Business Studies*, Vol. 29, N° 1, pp. 45 - 66.

Dunning, J. H. (2000), "The Eclectic Paradigm as an Envelope for Economic and Business Theories of MNE Activity", *International Business Review*, Vol. 9, N° 2, pp.

163-190.

Egelhoff, W. G. (1984), "Patterns of control in US, UK, and European Multinational Corporations", *Journal of International Business Studies*, Vol. 15, pp. 73-83.

Egelhoff, W. G., L. Gorman, and S. McCormick (2000), "How FDI Characteristics Influence Subsidiary Trade Patterns: the Case of Ireland", *Management International Review*, Vol. 40, N° 3, pp. 203-230.

European Communities (2004), *European Innovation Scoreboard 2004*, Brussels: European Commission, Enterprise & Industry Directorate General, Innovation Policy Development Unit.

European Communities (2005), *Science and Technology in Europe Statistical pocketbook*, Luxembourg: Office for the Official Publications of the European Communities.

European Communities (2005), *Structural Indicators 2005*, Luxembourg: Eurostat.

Economist Intelligence Unit (2005), *Country Profiles/Factsheet Portugal*, London: Economist Intelligence Unit.

Farinha, L. and J. Mata (1996), "The Impact of Foreign Direct Investment in the Portuguese Economy", *Banco de Portugal Working Paper N° 16-96*, Lisbon: Banco de Portugal.

Flôres, R., M. Fontoura and R. Santos (2002), "Foreign Direct Investment Spillovers: Additional Lessons from a Country Study", *Ensaios Económicos da EPGE N° 455*, Rio de Janeiro: Fundação Getúlio Vargas.

Flowers, E. B. (1976), "Oligopolistic Reactions in European and Canadian Direct Investment in the United States", *Journal of International Business Studies*, Vol. 7, pp. 43-55.

Fontoura, P. (1995), “O Efeito do IDE na Composição das Exportações da Indústria Transformadora Portuguesa”, *Economia*, Vol. 15, N° 2, pp. 123-141.

Forfás (2000). *The Evolution of Economic Policies in the Republic of Ireland -The Underlying Reasons for the High Economic Growth Rates of the 1990s*, Dublin: Forfás.

Forfás (2003a), *Statement on Inflation 2003*, Dublin: Forfás.

Forfás (2003b), *Business Expenditure on Research and Development (BERD) Ireland 2003/4*, Dublin: Forfás.

Forfás (2004), *Annual Competitiveness Report 2004*, Dublin: Forfás.

Forsgren, M. and J. Johanson (1992), “Managing Internationalization in Business Networks”, in Forsgren M. and J. Johanson (editors) ”Managing Networks in International Business”, pp. 1-16, Philadelphia: Gordon and Breach.

Garnier, G. H. (1982), “Context and Decision-Making Autonomy in the Foreign Affiliates of U.S. Multinational Corporations”, *Academy of Management Journal*, Vol. 25, N° 4, pp. 893-908.

Ghoshal, S. and C. A. Bartlett (1988), “Creation, Adoption, and Diffusion of Innovations by Subsidiaries of Multinational Corporations”, *Journal of International Business Studies*, Vol. 19, N° 3, pp. 365-388.

Ghoshal, S., and N. Nohria, (1989), “Internal Differentiation within Multinational Corporations”, *Strategic Management Journal*, Vol. 10, N° 2, pp. 323-337.

Gibbons, J. D. (1985), *Nonparametric Statistical Inference*, New York: Marcel Dekker.

Glass, A. and K. Saggi, (1998), “International Technological Transfer and the Technology Gap”, *Journal of Development Economics*, Vol. 55, N° 2, pp. 369-398.

Globerman, S. and D. Shapiro (1999), “The Impact of Government Policies on Foreign

Direct Investment: The Canadian Experience”, *Journal of International Business Studies*, Vol. 30, N° 3, pp. 513-532.

Gonçalves, O. F. and P. F. Guimarães (1996), “O Investimento Directo Estrangeiro na Indústria Transformadora Portuguesa: Uma análise sectorial e regional através do emprego para o período 1982-1992”, *Documentos APDR*, N° 5, Coimbra: Associação Portuguesa para o Desenvolvimento Regional.

Görg, H. and D. Greenaway (2001), “Foreign Direct Investment and Intra-Industry Spillovers”, <http://www.unece.org/ead/ffd2001/greenaway.pdf>, accessed on 01/03/2006.

Görg, H. and F. Ruane (1999). “US Investment in EU Member Countries: The Internal Market and Sectoral Specialization”, *Journal of Common Market Studies*, Vol. 37, N° 2, pp. 333-348.

Görg, H and F. Ruane (2000), “An Analysis of Backward Linkages in the Irish Electronics Sector”, *The Economic and Social Review*, Vol. 31, N° 3, pp. 215-235

Görg, H and E. Strobl (2001), “Multinational Companies and Productivity Spillovers: A Meta-Analysis”, *Economic Journal*, Vol. 111, N° 475, pp. 723-739.

Graham, E. M. (1978), “Transatlantic Investment by Multinational Firms: a Rivalistic Phenomenon”, *Journal of Post Keynesian Economics*, Vol. 1, pp. 82-99.

Grant, R. M. (1996), “Toward a Knowledge-Based Theory of the Firm”, *Strategic Management Journal*, Vol. 17, N° 2: pp. 109-122.

Greene, W. H. (2003), *Econometric Analysis*, New Jersey: Prentice-Hall.

Grossman, G. and E. Helpman (1991), *Innovation and Growth in the Global Economy*. Cambridge (MA): The MIT Press.

Guisinger, S. (1985), *Investment Incentives and Performance Requirements, Patterns of International Trade, Production, and Investment*, New York: Praeger.

Gupta, A. K. and V. Govindarajan (1994), "Organizing for Knowledge Flows within MNCs", *International Business Review*, Vol. 3, N° 4, pp. 443-457.

Gupta, A. K., and V. Govindarajan (2000), "Knowledge Flows within Multinational Corporations", *Strategic Management Journal*, Vol. 21, N° 4, pp. 473-496.

Hanson, J. R. Jr. (1996), "Human Capital and Direct Investment in Poor Countries", *Explorations in Economic History*, Vol. 33, N° 1, pp. 86-106.

Harzing, A. –W. K. (1997), "Response Rates in International Mail Surveys: Results of a 22 Country Study", *International Business Review*, Vol. 6, N° 6, pp. 641-665.

Hayek, A. F. (1945), "The Use of Knowledge in Society", *American Economic Review*, Vol. 35, N° 4, pp. 519-530.

Head, K., J. Ries and D. Swenson (1995) "Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States", *Journal of International Economics*, Vol. 38, N° 3, pp. 223-247.

Hedlund, G. (1981), "Autonomy of Subsidiaries and Formalization of Headquarters-Subsidiary Relationships in Swedish MNC's", in L. Otterbeck, (editor), *The Management of Headquarters-Subsidiary Relationships in Multinational Corporations*, pp. 25-78, Hampshire: Aldershot, Hants, Gower.

Hedlund, G. (1986), "The Hypermodern MNC: a Heterarchy?", *Human Resources Management*, Vol. 21, N° 1, pp. 73-90.

Hines J. R. Jr. (1999), "Lessons from Behavioral Responses to International Taxation", *National Tax Journal*, Vol. 53, N° 2, pp. 305 – 322.

Hines J. R. Jr. and M. A. Desai (2001), "Foreign Direct Investment in a World of Multiple Taxes", NBER Working Paper N° 8440, Cambridge (MA): National Bureau of Economic Research.

Hirsch, S. (1967), *Location of Industries and International Competitiveness*, Oxford: Oxford University Press.

Hood, N., and S. Young (1988), "Inward Investment and the EC: UK Evidence on Corporate Integration Strategies", in J. H. Dunning and P. Robson, (editors), *Multinationals and the European Community*, pp. 91-104, Oxford: Blackwell.

Hood, N., S. Young, and D. Lal (1994), "Strategic Evolution within Japanese Manufacturing Plants in Europe: UK Evidence", *International Business Review*, Vol. 3, N° 2, pp. 97-122.

Hymer, S. (1960/1976), *The International Operations of National Firms: A Study of Direct Foreign Investment*, Cambridge (MA): MIT Press.

IDA Ireland (2004), *Annual Report 2004*, Dublin: Industrial Development Agency Ireland.

IDA Ireland (2004), *Annual Report 2006*, Dublin: Industrial Development Agency Ireland.

IMD (2006), *IMD World Competitiveness Report 2006*, Lausanne: IMD, World Competitiveness Centre.

IMF (2005), *Country Report No. 05/375*, Washington (DC): International Monetary Fund.

Ietto-Gillies, G. (2005), *Transnational Corporations and International Production. Concepts, Theories and Effects*, Cheltenham: Edward Elgar.

Jarillo, J. and C. Martinez (1990), "Different Roles for Subsidiaries: The Case of Multinational Corporations in Spain", *Strategic Management Journal*, Vol. 11, N° 7, pp. 501-512.

Johanson, J. and J. E. Vahlne (1977), "The Internationalization Process of the Firm: a Model of Knowledge Development and Increasing Market Commitments", *Journal of International Business Studies*, Vol. 8, N° 1, pp. 23-32.

Kim, W. C. and R. A. Mauborgne (1993a), "Procedural Justice, Attitudes, and Subsidiary Top Management Compliance with Multinational's Corporate Strategic Decisions", *Academy of Management Journal*, Vol. 36, N° 3, pp. 502-526.

Kim, W. C. and R. A. Mauborgne (1993b), "Effectively Conceiving and Executing Multinationals Worldwide Strategies", *Journal of International Business Studies*, Vol. 24, N° 3, pp. 419-448.

Knickerbocker, F. T. (1973), *Oligopolistic Reaction and the Multinational Enterprise*, Cambridge (MA): Harvard University Press.

Kogut, B., and U. Zander (1992), "Knowledge of the Firm, Combination Capabilities, and the Replication of Technology", *Organization Science*, Vol. 3, N° 3, pp. 502-518.

Kogut, B., and U. Zander (1993), "Knowledge of the Firm and the Evolutionary Theory of the Multinational Corporation", *Journal of International Business Studies*, Vol. 24, No 4, pp. 625-645.

Kravis, I. B. and R. E. Lipsey (1982), "Location of Overseas Production and Production for Exports by US Multinational", *Journal of International Economics*, Vol. 25, pp. 201-223.

Kuemmerle, W. (1999), "The Drivers of Foreign Direct Investment into Research and Development – An Empirical Investigation", *Journal of International Business Studies*, Vol. 30, N° 1, pp. 1-24.

Kumar, N. (1994), "Determinants of Export-Orientation of Foreign Production by U.S. Multinationals: An Inter-Country Analysis", *Journal of International Business Studies*, Vol. 25, N° 1, pp. 141-156.

Lansbury, M., N. Pain and K. Smidkova (1996), "Foreign Direct Investment in Central Europe since 1990: an Econometric Study", *National Institute Economic Review*, N^o. 156, pp. 104-113.

Lopes, J. S. (1996), *A Economia Portuguesa desde 1960*, Lisboa : Gradiva.

Lucas, R. (1988), "On the Mechanics of Economic Development", *Journal of Monetary Economics*, Vol. 22, N^o 1, pp. 3-42.

Lucas, R. E., Jr. (1990), "Why Doesn't Capital Flow from Rich to Poor Countries?", *American Economic Review*, Vol. 80, N^o 2, pp. 92-96.

Lucas, R. (1993), "On the Determinants of Direct Foreign Investment: Evidence from East and Southeast Asia", *World Development*, Vol. 21, N^o 3, pp. 391-406.

Lunn, J. (1980), "Determinants of US Direct Investment in the EEC", *European Economic Review*, Vol. 13, N^o 3, pp. 93-101.

MacSharry, R. and P. White, (2000), *The Making of the Celtic Tiger. The Inside Story of Ireland's Boom Economy*, Cork: Mercier Press.

Mankiw, G. N., D. Romer, and D. N. Weil (1992), "A Contribution of the Empirics of Economic Growth" *The Quarterly Journal of Economics*, Vol. 107, N^o 2, pp. 407-437.

Mansfield, E. and A. Romeo (1980), "Technology Transfer to Overseas Subsidiary by US-Based Firms", *Quarterly Journal of Economics*, Vol. 95, N^o 4, pp. 737-750.

March, J. G. (1991), "Exploration and Exploitation in Organizational Learning", *Organization Science*, Vol. 2, N^o 1, pp. 71-87.

Matos, L. S. (1973), *Investimentos Estrangeiros em Portugal : Alguns Aspectos*, Lisboa: Seara Nova.

McFadden, D. (1984), "Econometric Analysis of Qualitative Response Models", in Z.

Griliches and M.D. Intriligator, (editors), *Handbook of Econometrics II*, pp. 1395-1457, Amsterdam: North Holland.

Michie, J. (2001), "The Impact of Foreign Direct Investment on Human Capital Enhancement in Developing Countries". Paper prepared for the OECD, Paris: Organisation for Economic Cooperation and Development

Miyamoto, K. (2003), "Human Capital Formation and Foreign Direct Investment in Developing Countries", OECD Development Centre Working Paper No. 211, Paris: Organisation for Economic Cooperation and Development.

Mohnen, P. and C. Hoareau (2003), "What Type of Enterprises Forges Close Links with Universities and Government Labs? Evidence from CIS2", *Managerial and Decision Economics*, Vol. 24, N° 2- 3, pp. 133-145.

Morrison, A. and K. Roth, (1992), "A Taxonomy of Business-Level Strategies in Global Industries", *Strategic Management Journal*, Vol. 13, pp. 399-418.

Mytelka, L. K. (2000), "Locational Tournaments for FDI: Inward Investment into Europe in a Global World", in N. Hood and S. Young, (editors), *The Globalisation of Multinational Enterprise Activity and Economic Development*, pp. 278-302, London: Macmillan.

Narula, R. and A. Marin (2003), "FDI Spillovers, Absorptive Capacities, and Human Capital Development: Evidence from Argentina." MERIT- Infonomics Research Memorandum Series, 2003-016. Maastricht: MERIT and Infonomics, University of Maastricht.

Neven, D. and G. Siotis (1996), "Technology Sourcing and FDI in the EC: An Empirical Evaluation", *International Journal of Industrial Organisation*, Vol. 14, N° 5, pp. 543–560.

Neves, J. L. C. (1994), *The Portuguese Economy: a Picture in Figures XIX and XX Centuries*, Lisbon: Universidade Católica.

Nelson, R. and E. Phelps, (1966), “Investment in Humans, Technological Diffusion, and Economic Growth”, *American Economic Review*, Vol. 46, N° 2, pp. 69 – 75.

Nelson, R. R. and S. G. Winter (1982), *An Evolutionary Theory of Economic Change*, Cambridge (MA): Harvard University Press.

Nunnenkamp, P. and J. Spatz (2002), “Determinants of FDI in Developing Countries: Has Globalization Changed the Rules of the Games?”, *Transnational Corporations*, Vol. 11, N° 2, pp. 1-34.

Noorbakhsh, F., Paloni, A. and A. Youssef (2001), “Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence”, *World Development*, Vol. 29, N° 9, pp. 1593-1610.

OECD (1997), *Revision of the High-Technology Sector and Product Classification*, STI Working Paper 1997/2, Paris: Organisation for Economic Cooperation and Development.

OECD (2000), *Education at a Glance*, Paris: Organisation for Economic Cooperation and Development.

OECD (2004), *The OECD Productivity Database*, Paris: Organisation for Economic Cooperation and Development.

O’Gráda, C. and K. H. O’Rourke (1994), “Irish Economic Growth, 1945-88”, CEPR Discussion Papers 975, London: C.E.P.R.

Oman, C. (2000), *Policy Competition for Foreign Direct Investment: A Study of Competition among Governments to Attract FDI*, Paris: Organisation for Economic Cooperation and Development

O’Sullivan, P. J. (1993), “An Assessment of Ireland’s Export-led Growth Strategy via Foreign Direct Investment: 1960-80”, *Weltwirtschaftliches Archiv*, Vol. 129, N° 1, pp.

139-158.

Oxelheim, L. and P. Ghauri (2003), *European Union and the race for foreign direct investment in Europe*, Oxford: Elsevier (Pergamon).

Owen, R. F. (1982), "Inter-industry Determinants of Foreign Direct Investment: a Canadian Perspective," in A. M. Rugman, (editor), *New Theories of Multinational Enterprises*, London: Croom Helm.

Papanastassiou, M. and R. Pearce (1999), *Multinationals, Technology and National Competitiveness*, Cheltenham: Edward Elgar.

Papanastassiou, M. and R. Pearce (1997), "Technology Sourcing and the Strategic Roles of Manufacturing Subsidiaries in the UK: Local Competences and Global Competitiveness", *Management International Review*, Vol. 37, N° 1, pp. 5–25.

Pearce, R. (1999), "The Evolution of Technology in Multinational Enterprises: the Role of Creative Subsidiaries", *International Business Review*, Vol. 8, N° 2, pp. 125-148.

Pearce, R. (2001), "Multinationals and Industrialisation: the Bases of Inward Investment Policy", *International Journal of the Economics of Business*, Vol. 8, N° 1, pp. 51-73.

Penn World Tables, (2005), University of Pennsylvania Center for International Comparisons, <http://pwt.econ.upenn.edu/>, accessed on 05/12/2005.

Penrose, E. (1959), *The Theory of the Growth of the Firm*, Oxford: Oxford University Press.

Pestana, M. H. and J. N. Gageiro (2003), *Análise de Dados para Ciências Sociais : a Complementaridade do SPSS*, Lisbon: Edições Sílabo.

Peteraf, M. (1993), "The Cornerstones of Competitive Advantage: A Resource-Based View", *Strategic Management Journal*, Vol. 14, N° 3, pp. 179-191.

- Polanyi, M. (1958), *Personal Knowledge*, London: Routledge and Kegan Paul.
- Posner, M. V. (1961), "International Trade and Technical Change", *Oxford Economic Papers*, Vol. 13, pp. 323-341.
- Prahalad, C. K. and Y. L. Doz (1987), *The Multinational Mission: Balancing Local Demand and Global Vision*, New York: The Free Press.
- Proença, I., M. P. Fontoura and N. Crespo (2002), "Productivity Spillovers from Multinational Corporations in the Portuguese Case: Evidence from a Short Time Period Panel Data", Working Paper 6/2002, Lisbon: Department of Economics, ISEG, Technical University of Lisbon.
- Resmini, L. (2000), "The Determinants of Foreign Direct Investment in the CEECs. New Evidence from Sectoral Patterns", *Economics of Transition*, Vol. 8, N° 3, pp. 665-689.
- Richardson, G. B. (1972), "The Organisation of Industry", *Economic Journal*, Vol. 82, N° 327, pp. 883-896.
- Riedel, J. (1975), "The Nature and Determinants of Export-Oriented FDI in a Developing Economy: a Case of Taiwan", *Weltwirtschaftliches Archiv*, Vol. 111, N° 3, pp. 505-528.
- Romer, P. (1990), "Endogenous Technological Change", *Journal of Political Economy*, Vol. 98, N° 5, pp. 71-101.
- Root, F. R. and A. Ahmed (1979), "Empirical Determinants of Manufacturing Direct Foreign Investment in Developing Countries", *Economic Development and Cultural Change*, Vol. 27, N° 4, pp. 751-767.
- Roth, K. and A. J. Morrison (1992), "Implementing Global Strategy: Characteristics of Global Subsidiary Mandates", *Journal of International Business Studies*, Vol. 23, N° 4, pp. 715-735.

Ruane, F. (2001), “Reflections on Linkage Policy in Irish Manufacturing - Policy Chasing a Moving Target?”, Background Paper for the Financing for Development Expert Meeting, Geneva: United Nations Economic Commission for Europe.

Rugman, A. and J. D'Cruz (2000), *Multinationals as Flagship Firms: Regional Business Networks*, Oxford: Oxford University.

Sapir, A. (2004), *An Agenda for a Growing Europe – the Sapir Report*, Oxford: Oxford University Press.

Saunders, R. S. (1982), “The Determinants of Inter-Industry Variation of Foreign Ownership in Canadian Manufacturing”, *Canadian Journal of Economics*, Vol. 15, N° 1, pp. 77-84.

Schmitz, A. and J. Bieri (1972), “EEC Tariffs and U.S. Direct Investment,” *European Economic Review*, Vol. 3, pp. 259-270.

Schneider, F. and B. Frey (1985), “Economic and Political Determinants of Foreign Direct Investment”, *World Development*, Vol. 13, N° 2, pp. 161-175.

Simões, V. C. (1985), “Portugal”, in J.H. Dunning (editor) *Multinational enterprises, economic structure and international competitiveness*, Chichester: John Wiley & Sons, pp. 337-378.

Simões, V. C. (1992), “European Integration and the Pattern of FDI Inflow in Portugal”, in J. Cantwell, (editor), *Multinational Investment in Modern Europe*, pp. 257-297, Cheltenham: Edward Elgar Publishers.

Slaughter, M. (2002), “Skill Upgrading in Developing Countries: Has Inward Foreign Direct Investment Played a Role?”, CEPA Working Paper 2002-08, New York: Center for Economic Policy Analysis.

Taggart, J. H. (1997a), “Autonomy and Procedural Justice: A Framework For

Evaluating Subsidiary Strategy”, *Journal of International Business Studies*, Vol. 28, N° 1, pp. 51-76.

Taggart, J. H. (1997b), “An Evaluation of the Integration-Responsiveness Framework: MNC Manufacturing Subsidiaries in the UK”, *Management International Review*, Vol. 37, N° 4, pp. 295-318.

Taggart, J. H. (1999), “MNC Subsidiary Performance, Risk, and Corporate and Expectations” *International Business Review*, Vol. 28, N° 1, pp. 51-76.

Taggart, J. and N. Hood (1999), “Determinants of Autonomy in Multinational Corporation Subsidiaries”, *European Management Journal*, Vol. 17, N° 2, pp. 226-236.

Taveira, E. (1984), *Foreign Direct Investment in Portugal. The Present Structure, Determinants and Future Evolution after the Accession to the EEC*, Unpublished PhD thesis, Department of Economics, Reading: University of Reading.

Tavares, A. T. (2001), *Systems, Evolution and Integration: Modelling the Impact of Economic Integration on Multinationals’ Strategies*, Unpublished Ph. D. Dissertation, Department of Economics, Reading: University of Reading.

Tavares, A. T. (2004), “Multinational Subsidiary Evolution and Public Policy: Two Tales from the European Periphery”, *Journal of Industry, Competition and Trade*, Vol. 2, N° 3, pp. 195-219.

Tavares, A. T. and R. Pearce (2000), “Emerging Trading Blocks and their Impact on the Strategic Evolution of Multinationals”, *Managerial Finance*, Vol. 26, N° 1, pp. 26- 40.

Tavares, A. T. and A. Teixeira (2005), “Human Capital Intensity in Technology-Based Firms Located in Portugal: Do Foreign Multinationals Make a Difference?” Working Paper 187, Porto: Faculdade de Economia da Universidade do Porto.

Tavares, A. T., and S. Young (2005), “FDI and Multinationals: Patterns, Impacts and Policies”, *International Journal of the Economic of Business*, Vol. 12, N° 1, pp. 3-16.

Tavares, A. T. and S. Young (2006), “Sourcing Patterns of Foreign-Owned Multinational Subsidiaries in Europe”, *Regional Studies*, Vol. 40, N° 6, pp. 583-599.

Tavares, A. T. and S. Young (2003), “EU Periphery and the Quality of Manufacturing FDI” in L. Oxelheim and P. N. Ghauri (editors), *European Union and the Race for Foreign Direct Investment in Europe*, pp. 263-293, Oxford: Elsevier (Pergamon).

Te Velde, D. W. (2002), “Government Policies for Inward Foreign Direct Investment in Developing Countries: Implications for Human Capital Formation and Income Inequality”, OECD Development Centre Technical Paper no. 193, Paris: Organisation for Economic Cooperation and Development.

Teece, D. J. (1977), “Technology Transfer by Multinational Firms: the Resource Cost of Transferring Technological Know-How”, *Economic Journal*, Vol. 87, June, pp. 242-261.

Teece, D. J., G. P. Pisano, and A. Shuen (1997). “Dynamic Capabilities and Strategic Management”. *Strategic Management Journal*, Vol. 18, N° 7, pp. 509-533.

UNCTAD (2000), *World Investment Report 2000*, Geneva: United Nations.

UNCTAD (2001), *World Investment Report 2001*, Geneva: United Nations.

UNCTAD (2002), *World Investment Report 2002*, Geneva: United Nations.

UNCTAD (2005a), Key Data,

www.unctad.org/sections/dite_dir/docs/wir2005_inflows_en.xls, accessed 25/05/2006.

UNCTAD (2005b), *World Investment Report 2005*, Geneva: United Nations.

UNCTAD (2007), *World Investment Report 2007*, Geneva: United Nations.

Venables, A. J. (1996), “Equilibrium Locations of Vertically Linked Industries.”

International Economic Review, Vol. 37, N° 2, pp. 341-359.

Vernon, R. (1966), "International Investment and International Trade in the Product Cycle", Quarterly Journal of Economics, Vol. 80, N° 2, pp. 190-207.

Vernon, R. (1979), "The Product Cycle Hypothesis in a New International Environment", Oxford Bulletin of Economics and Statistics, Vol. 41, N° 4, pp. 255–267.

White, R. E. and T. Poynter (1984), "Strategies for Foreign-Owned Subsidiaries in Canada". Business Quarterly, Vol. 49, (Summer), pp. 59 – 69.

Wells, L. T. (1968), "A Product Life Cycle for International Trade?", Journal of Marketing, Vol. 32, N° 3, pp. 1-6.

Wheeler, D. and A. Mody (1992), "International Investment Decisions: The Case for U.S. Firms", Journal of International Economics, Vol. 33, N° 1, pp. 57-76.

Wood, A. and C. Ridao-Cano (1999), "Skill, Trade and International Inequality", Oxford Economic Papers, Vol. 51, N° 1, pp. 89-119.

Wößmann, L. (2003), "Specifying Human Capital", Journal of Economic Surveys, Vol. 17, N° 3, pp. 239-270.

Young S., N. Hood and S. Dunlop (1988), "Global Strategies, Multinational Subsidiary Roles and Economic Impact in Scotland", Regional Studies, Vol. 22, N° 6, pp. 487-497.

Young, S. and N. Hood (1994), "Designing Developmental After-care Programmes for Foreign Direct Investors in the European Union", Transnational Corporations, Vol. 3, N° 2, pp. 45–72.

Young, S., N. Hood and E. Peters (1994), "Multinational Enterprises and Regional Economic Development", Regional Studies, Vol. 28, N° 7, pp. 657-677.

Young, S., and A. T. Tavares (2004), "Centralisation and Autonomy: Back to the

Future”, *International Business Review*, Vol. 13, pp. 215-237.

Zhang, K. and J. Markusen (1999), “Vertical Multinationals and Host-Country Characteristics”, *Journal of Development Economics*, Vol. 59, N° 1, pp. 233-252.