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Characteristics of Foreign Multinational Subsidiaries in Portugal: Comparison with Portuguese owned firms

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Biographic Note

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Resumo

Nos anos mais recentes foram diversos os autores que contribuíram para a literatura sobre diferenças entre empresas estrangeiras e domésticas. No entanto muitos destes estudos tem o seu foco nas diferenças de produtividade e rentabilidade, enquanto que o objetivo deste estudo é abranger um maior número de características e identificar as devidas diferenças bem como não apenas compara empresas estrangeiras com as empresas domésticas mas dividir estas últimas em dois grupos: empresas domésticas sem investimento direto estrangeiro e com investimento direto estrangeiro. Para além disso esta dissertação foca-se no caso Português onde o objetivo é testar hipóteses geradas com base na literatura e gerar conclusões através de resultados empíricos.

A base teórica desta dissertação são as teorias de Negócios Internacionais tais como o conceito de vantagem de Hymer, o Paradigma Eclético, entre outras. A parte empírica utiliza dados extraídos da base de dados SABI e a parte econométrica utiliza regressões Pooled linear simples para verificar a existência de diferenças entre os diferentes tipos de empresas em análise.

Os resultados são inequívocos: as empresas estrangeiras são mais produtivas, rentáveis, pagam salários maiores, são maiores e é mais provável que sejam exportadoras do que as empresas domésticas sem investimento direto estrangeiro. Os resultados demonstram também que as empresas domésticas multinacionais são mais produtiva, rentáveis e maiores que as empresas estrangeiras.

Este estudo e os seus resultados proporcionam uma visão geral do panorama Português de negócios e pode ser utilizado para análise de políticas a implementar nesta área.

Palavras Chave: Negócios Internacionais, Diferenças Características, Empresas Estrangeiras, Empresas Domésticas, Multinacionais, Subsidiárias, Portugal.

Abstract

In recent years, several authors contributed to the literature about differences between Foreign Owned and Domestic Owned companies. However these studies were mainly focused on productivity and profitability differences. The goal of the present study is to do that but also to cover more characteristics and identify what are the differences in those characteristics as well as not only compare Foreign Owned with Domestic Owned companies but also split the Domestic Owned companies into two groups: Domestic without FDI and Domestic with FDI. Moreover, this dissertation focuses on Portugal, and has the aim of testing postulated hypotheses derived from the literature, and generating empirical results. The theoretical background for this dissertation is based on International Business theories, such as Hymer's concept of advantage, the Eclectic Framework, among others. The empirical part used data extracted from the SABI database, and the methodology include an econometric study using Pooled OLS and OLS regressions to test the existence of characteristic differences between the different types of firms under analysis.

The results are unequivocal: FO are more productive, profitable, pay higher wages, larger and more likely exporters than DO. However when comparing FO and DOM the results show unequivocal that DOM are more productive, profitable and larger than FO.

This study, and its results, provide a general insight into the Portuguese business landscape, in terms of the distinct groups of firms, and may be useful as an instrument for the analysis and policy making in this area

Keywords: International Business; Characteristic Differences; Foreign Owned; Domestic Owned; Foreign Multinational Subsidiaries; Portugal.

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- DO – Domestic Owned Firms
- DOM – Domestic Owned Multinationals
- EU – European Union
- FDI – Foreign Direct Investment
- FO – Foreign Owned firms
- GVA – Gross Value Added
- GVAEMP – Gross Value Added per Employee
- IB – International Business
- KBV – Knowledge Based View
- MNE – Multinational Enterprise
- NACE: Statistical Classification of Economic Activities in the European Community
- Oa – Ownership advantages related to assets
- OECD – Organization for Economic Cooperation and Development
- Oi – Ownership advantages related to institutions
- OLI – Ownership Location Internalization
- Ot – Ownership advantages related to transactions
- PROFEMP – Profit per Employee
- R&D – Research and Development
- RBV – Resourced Based View
- SABI: Sistema de Análise de Balanços Ibéricos
- UNCTAD – United Nations Conference on Trade And Development
- VRIN - Valuable, Rare, Inimitable, and Not substitutable
- WAGESEMP – Wages per Employee

Introduction

The economic globalization process has been driven by multinational enterprises (MNEs) to a very large degree (Kleinert, 2001).

Traditionally, the literature in International Business (IB) assumes that there are important differences between foreign multinational subsidiaries and domestic firms. Relevant theories (Hymer 1960/1976; Dunning, 1977, cited in Dunning 2000) support the idea that MNEs must have a competitive advantage over their local counterparts in order for foreign direct investment (FDI) to occur.

More recently, various authors have corroborated, conceptually and empirically, that these differences are a fact. In the Belgian case, De Baecker & Sleuwaegen (2001) concluded that foreign firms are significantly more productive than domestic firms. They go even further affirming that “*large differences in productivity between foreign firms and domestic firms exist even after controlling for other firm characteristics put forward by theoretical models formalizing heterogeneity between firms*”. (p.1)

Bellak (2004) argued that performance gaps between foreign owned (FO) versus domestic owned (DO) firms can be noticed in variables such as productivity, technology, profitability, wages, skills and growth.

The superior performance of foreign ownership in comparison with domestic ownership would not surprise when the FO firm is from a developed country and the host country is a developing country (Willmore, 1986). However, FO firms tend to reveal superior performance even in comparison with their domestic counterparts in developed countries. These differences are related not only with ownership but also with firm characteristics - such as size, age, industry, capital intensity and R&D (Bellak, 2004).

In spite of the acknowledged differences, there are not many empirical studies in this matter, particularly in the Portuguese case (an exception being Cardoso, 2008 – that in any case had a narrower focus than the present study, as it set only to study performance differences, and that was based on a much more specific literature on performance). This scarcity, and the opportunity to add to this literature, motivates this study.

The present study aims to go deeper and to analyze what are the main differences in the characteristics between FO and Portuguese owned companies (DO and DOM). Even in the recent literature about differences between FO and DO firms, the focus of analysis tends to be on productivity/performance, leaving often other variables unattended. This scarcity, and the opportunity to add to this literature, motivates this study. As well as the opportunity to verify if there are or not substantial differences between both, in the Portuguese case, that is an under-researched setting.

The characteristics under analysis in this study will be Productivity, Profitability, Exporter, Size, Wages. Comparing these characteristics between FO and DO firms we can identify the importance that foreign ownership represents in all of them, as well to identify how they can be correlated.

Having these motivations in mind, the main aims of this dissertation are:

- (i) To review the most relevant theories that may refer to, or explain, the differences in characteristics between FO and DO firms.
- (ii) To conduct a thorough analysis of the conceptual/theoretical and of the empirical literature on this theme.
- (iii) Bearing on the relevant theoretical frameworks and extant literature, to formulate hypotheses on the likely differences in the characteristics of foreign subsidiaries and Portuguese domestic firms.
- (iv) To conduct an empirical application, based on a large scale dataset taken from the SABI database (Bureau Van Dijk, 2014). It will be used, first of all, to identify and take stock of the characteristics of FO and DO firms in Portugal (i.e. first, in a descriptive manner) and, after that, to test econometrically the determinants of the foreign versus domestic ownership (using a pooled regression model).

The main research question underlying this dissertation is:

“Are there significant differences in the characteristics of FO and DO companies, in the Portuguese case?”

“Are there significant differences in the characteristics of FO and DOM companies, in the Portuguese case?”

Going even further, and following De Baecker and Slewaegen’s (2001) suggestion, our analysis will divide Portuguese firms into two types: multinationals (i.e., Portuguese-owned firms with FDI/subsidiaries abroad) and domestic firms (Portuguese firms without FDI abroad).¹ This will allow the identification of the characteristics and respective differences between foreign subsidiaries and each of the latter two categories. This will be a relevant development relative to extant works in this area (even the already cited work by Cardoso, 2008, that had a substantially narrower focus, and was based on a different dataset, did not distinguish the two types of Portuguese firms).

¹¹ This is a very important distinction that has gained increasing acceptance in the literature. It considers the existence of foreign subsidiaries as the distinctive factor. Firms with less committed entry modes (such as exports and/or contractual forms) are not considered, naturally, as Portuguese multinationals. They are included in the domestic firms, even if they may conduct (non-proprietary, non-investment related) operations abroad. This distinction is key, and we use the accepted perspective employed in the most relevant literature.

Chapter 1 – Theoretical Background and Literature review

1.1 - Key Concepts

To develop this study it is necessary to clarify some concepts as Multinationals, Foreign Direct Investment (FDI), Domestic Firms and Foreign Affiliates.

According to Dunning and Lundan (2008, p.3), “A multinational enterprise is an enterprise that engages in foreign direct investment (FDI) and owns, in some way, controls value-added activities in more than one country”.

In the World Investment Report (UNCTAD, 2007, p.245), “*Foreign direct investment (FDI) is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate)*”. “*The lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the enterprise. The direct or indirect ownership of 10% or more of the voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship*” (OECD, 2008; p. 234).

Portuguese-owned Firms are all companies which their ownership is Portuguese (less than 10% of foreign capital). However, it is necessary to distinguish Domestic Firms (DO) and Domestic Multinationals (DOM). Domestic Firms are those Portuguese-owned companies that not have FDI abroad, while Domestic Multinationals are those Portuguese-owned firms with FDI (i.e. affiliates established) abroad. As already mentioned, this is the usual distinction in the literature (see for example De Baecker and Slewaegeen's, 2001; Iyer, 2009). Doms and Jensen (1998) argued that this distinction should be made in order that, when comparing domestic owned companies with foreign owned subsidiaries do not compare “apples and oranges”. However in this study, firms that export or have contractual forms but do not have affiliates, industrial or commercial, abroad will be considered Domestic Firms.

A Foreign Affiliate, according to UNCTAD (2007: p. 245) “*is an incorporated or unincorporated enterprise in which an investor, who is a resident in another economy, owns a stake that permits a lasting interest in the management of that enterprise (an equity stake of 10% for an incorporated enterprise, or its equivalent for an unincorporated enterprise)*”.

1.2 - Theoretical Background

1.2.1 - The concept of advantage

The concept of advantage is key to the present analysis. In this vein, the seminal contribution was that of Hymer (1960/1976). He argued that FDI involves the transfer of different resources such as technology, management skills, entrepreneurship, marketing and so on. Hymer argued that a firm must possess specific advantages (innovation, cost, financial or marketing) to compensate the disadvantages of competing in a foreign unfamiliar environment (cultural, political and economic differences), i.e. their “costs of foreignness”. In a related manner, other authors referred that firms face costs implied by their liability of foreignness (Zaheer, 1995) and the geographical coordination of the activities, hence they must have distinctive advantages that allow to surpass these extra costs (Dunning and Lundan, 2008) of operating in foreign markets, as problems due the spatial distance, communications and transportation barriers.

1.2.2 - The OLI Paradigm

Dunning argued that FDI is associated with the capability of the firms to explore some of their specific advantages in another country (Dunning, 1988). The author identifies, in the OLI Paradigm, specific advantages related to ownership, location and internalization. The OLI paradigm does not intend to be a theory of the MNE *per se*, but a conceptual framework for explaining “what is”, rather than “what should be”, the level and structure of the foreign value activities of enterprises. (Dunning and Lundan, 2008) Summarized, the paradigm argues that FDI will only occur if firms have simultaneously three types of advantages (OLI). Ownership advantages (O) are related

with the assets, not only tangible but also intangible, that are unique and that confer a competitive advantage to the firm. Location advantages (L) are connected with a specific location that means a specific advantage, i.e, it is more advantageous for the firm to perform certain activities abroad than in the home country. Internalization advantages (I) are associated with the need of the firms to preserve the value chain “in doors” in order to protect their ownership advantages.

For the aims of this study, the Ownership advantages are the most relevant, given that we intend to measure the impact of ownership in the different characteristics of the identified firm cohorts. The Ownership specific advantages are the most difficult and critical to deal with from the OLI paradigm (Dunning and Lundan, 2008). The O advantages reflect “*the resources and capabilities of the home countries of the investing firms; and that FDI would only occur when the benefits of exploiting, i.e. adding value to, these advantages from a foreign location outweighed the opportunity costs of so doing*”(Dunning, 2000; p 168). They are critical because are “*a necessary precondition for domestic firms to become MNEs*”(Gelübcke, 2013a, p.1566).

1.2.3 - OLI - Ownership Advantages

Dunning (1988), distinguishes two kinds of ownership advantages: those related to the assets (tangible or intangible) (Oa) and those with transactions (Ot). While the former are advantages that result from the different assets that a firm posses, the latter mirror the transactional benefits of common governance these assets in a multinational network. Oa includes the specific firms` know how related to production management, organizational systems, innovatory capacity, organization of work and so on. Ot results mainly from size, product diversity, learning experience, favored access to inputs or markets, access to resources of parental company at marginal cost and synergetic economies related with the multinational network. The success of firms abroad will be as high as its capabilities and abilities to exploit these ownership advantages.

In Dunning and Lundan (2008), the authors examine even another type of Ownership advantage related to institutions (formal or informal) (Oi) distinct from the asset and transaction based advantages. The firms would need strong institutions because many decisions nowadays need to be made based on discretion and incorporate issues related

with corporate social responsibility. The Oi advantages are related to “*the formal and informal institutions that govern the value-added processes within the firm, and between its stakeholders*” (Dunning and Lundan, 2008; p. 101). Some components of Oi reflect the specific corporate culture (intra firm) while other are more influenced by the norms and values of where the firm conduct its activities (extra firm). It is important not to misunderstand Oa with Oi. Although both have an internal perspective Oi has an external perspective too, and while Oa is related to changes in services or products the Oi is influenced for shifts in values which may or may not be related with the products or services that the firm offers (Dunning and Lundan, 2008).

1.2.4 - Internalization

A relevant contribution is also Internalization theory (Buckley and Casson, 1976). This theory intends to explain why Multinationals exists comparing cross border transaction organized by hierarchies, i.e MNEs, and by markets. The MNEs` activities imply coordination costs, whereas transfers by market imply transactions costs. Coordination costs are those related to managing that are activities geographically dispersed. So, the main conclusion of this theory is that when transactions costs are higher than coordination costs, which justifies why firms coordinate transnational activities, within their organization, instead of doing it through the market. In other words, MNEs exist when hierarchies are more efficient than the market in the coordination of transnational activities.

This conclusion is an important theoretical building block in the analysis of foreign ownership, because it explains why there are foreign companies competing in international markets. For the aims of this study the concept of cross border costs will be used to compare FO firms with Portuguese owned firms with FDI and even to compare FO firms with Portuguese owned firms without FDI.

1.2.5 - Resource-based view

Other relevant theory, a more recent theoretical perspective of IB, is the resource-based view (RBV) of the firm that derives from Penrose’s seminal work (1959) (cited in

Wernerfelt, 1984). This theory argues that firms' competitive advantages are based on tangible and intangible resources, which are difficult or costly for other firms obtain. These resources must be VRIN - valuable, rare, inimitable, and not substitutable (Barney, 1991). The firm should not just possess but try to increase assets with these characteristics in order to build a sustainable competitive advantage over its competitors. In other words, the growth of a firm is directly related to its capability to accumulate VRIN resources. These resources can be physical, financial, human, and organizational, so on and influence the firm's characteristics, as size, wages, productivity and other performance measures.

The RBV identifies the "international knowledge and experience as a valuable, unique, and hard-to-imitate resource that differentiates the winners from the losers and mere survivors in global competition (Peng, 2001). This corroborates the idea of recent authors (see Bellak, 2004) that multinationality is competitive advantage *per se*.

1.2.6 - Knowledge-based view and dynamic capabilities

The knowledge based view (KBV) is a related theoretical approach that has gained increased relevance in the IB. Literature of the KBV is an evolution of the RBV and considers knowledge as the most important and strategically significant resource of a firm because resources based on knowledge are almost value, rare and difficult to imitate (Grant, 1996) what means sustained competitive advantages and a superior performance (Deeds and Decarolis, 1999).

The knowledge generated by companies can be tacit or explicit articulated and this will influence the form through which it will be transferred. The tacit knowledge is inherent to the company, so more difficult to transfer by market and more efficiently transferred within the firm, what can justify the existence of MNEs (Kogut and Zander, 1993).

Knowledge creation and transfer tend to arise within hierarchical organizations, what means MNE existence, and "*the decision to transfer technology within the firm or in the market can be explained by the attributes of knowledge that constitute the ownership advantage of the firm. A firm is a repository of knowledge that consists of how information is coded and action coordinated. The mode by which technology is*

transferred, e.g., within the firm or by licensing to other parties, is influenced by the characteristics of the advantage that motivates the growth of the firm across borders” (Kogut and Zander, 1993; p.626).

The specific advantages of MNEs are also highlighted in the dynamic capabilities framework (Teece *et al*, 1997). These competitive advantages are “*seen as distinctive processes (ways of coordinating and combining), shaped by the firm's (specific) asset positions (such as the firm's portfolio of difficult-to-trade knowledge assets and complementary assets), and the evolution path(s) it has adopted or inherited”* (Teece *et al*, 1997, p.509).

MNEs’ specific advantages can explain the differences in characteristics between FO and DO firms, however, can also be related with the difference between Domestic Firms and Domestic Multinationals (see Bellak, 2004). Pfaffermayr and Bellak (2000) argue that some gaps between firms are more related with being part of a multinational network than specifically with foreign ownership.

1.3 – Considerations on theoretical background

All theories cited above help to understand why FO firms may have different characteristics when compared with DO firms.

There are essential factors such as competition, market structure, barriers to entry, that tend to lead to differences between FO and DO firms. FOs tend to, and need to, have ownership-specific advantages in order to differentiate them and overcome intrinsic disadvantages vis-à-vis their domestic owned counterparts. FO firms have more incentives for internalization because they operate across borders and need to manage more complex systems.

FOs tend to benefit from belonging to a multinational network and from the advantages that this confers. Being part of this network can be the main explanation to better performance than the ownership status *per se*.

Taking into consideration the fact that firm-specific characteristics are the main source of firms’ heterogeneity, several empirical studies have studied how different are FO firms from their domestic counterparts. The following section aims to review these studies, presenting a summary of the relevant findings.

1.4 - Literature review: on Differences between FO and DO firms

MNEs have a crucial role in economic globalization, which has raised the academic and public interest about them (Gelübcke, 2013a). Even for policy-makers, the differences between FO and DO firms are a point of interest. Assuming the superior performance of FO over DO (the result of most empirical studies), it could be hypothesized that policy-makers should focus in attracting foreign affiliates in order to raise the average performance of the total economy. Nonetheless, the performance differences can be related not exactly with foreign ownership but with differences in firms' characteristics (Bellak, 2004).

More recently, various authors have corroborated, conceptually and empirically, that there are important differences between foreign multinational subsidiaries and domestic firms. However, conflicting results can be found, as explained subsequently. This section will present a summary of empirical studies analyzing the differences in the characteristics under analysis between FO and Portuguese owned firms. This review splits the studies and their findings according to the main characteristics that this study intends to analyze.

1.4.1 - Productivity

As referred to before, de Backer & Sleuwaegen (2001) concluded that foreign firms are significantly more productive than domestic firms, in the Belgian case, what is explained by scale and technical efficiency differences. The authors have distinguished the Belgian firms in two types: single nation Belgian owned firms and Belgian MNE. When these two groups are compared to foreign subsidiaries they found that the later are significantly more productive than single nation Belgian owned firms, but the productivity differences to Belgian MNE are not so significant, what shows the heterogeneity of Belgian firms.

Adenaeyer and Heckeley (2011), that analyzed the relevance of ownership in the European agribusiness sector, had found that MNEs are more productive. Barbosa and Louri (2005) argued that performance differences, in the Portuguese case are not

primarily related to ownership. Ownership is only significant when firms in the upper quantiles of gross profits are compared, in which case FO firms revealed significantly better performance than their DO counterparts. Iyer (2009) compares productivity in India of foreign MNEs, Indian MNEs, domestic firms which export and domestic firms which sell only at home. He concludes that Indian MNCs have higher productivity than foreign MNCs, followed by domestic firms which exports and finally domestic firms which only sell at home. In an analyses of the bank sector in, Poland, Havrylchuk (2006) concluded that FO banks exhibit higher productivity their inputs than DO banks.

In a recent cross country analysis of 15 Latin American countries (Chang and Van Marrewijk, 2013), that differentiate four kind of companies (National Domestic, National Exporter, Foreign Domestic and Foreign Exporter), the authors have found a clear foreign ownership productivity premium, which means that foreign companies tend to be more productive than domestic owned companies. The authors go even further arguing that companies with higher foreign ownership intensity are more productive.

Pfaffermayr and Bellak (2000) examine performance gaps among FO and DO Austrian firms. They concluded that *“direct positive effect of participating in a foreign MNE's network can mainly be found in productivity and profitability. Gaps concerning the investment propensity and growth are primarily explained by firm characteristics rather than foreign ownership”* (p.31). This conclusion is supported by Jungnickel and Keller (2003), arguing that structural characteristics as size can have impact in firm`s productivity. Both conclusion support the relevance, of the present study, in analysing the differences of the characteristics between FO and DO firms.

Some authors have compared not only FO with DO firms, but also FO with DO MNEs. This kind of comparison shows different results: Doms and Jensen (1998) argue that FO firms are more productive than general DO firms, however they are less productive when compared only with U.S.-owned MNEs. Temouri *et al.* (2008) found that foreign firms in Germany are in general more productive than domestic firms, but while *“German non-MNEs are less productive than FO firms, there is no such difference between German MNEs and FO affiliates”* (p.49). These authors have even found that

location in Germany is related to the gap between foreign and domestic owned companies (the gap is higher in Eastern than Western Germany).

In a study that focuses on Japanese companies, Murakami (2005), found that firms who engage in international activities, i.e FDI and exports, are more productive. In spite this, he has found that firms that only export show higher productivity than those that engage in FDI.

We can find also several studies that lead to inconclusive results, i.e that had not found significant differences in productivity between FO and DO firms (Globerman *et al*, 1994) or even studies that found differences but could not directly relate them to the ownership (Blomström, 1988).

Criscuolo and Martin (2009) suggest that productivity gaps can also be related with the country of origin (see Gelübcke, 2013a). They found that “*U.K. MNEs are less productive than U.S. affiliates, but as productive as non-U.S. foreign affiliates*” (p. 263).

There are results that found gaps even between FO firms. Firms with majority foreign ownership are more productive than firms with minority foreign ownership (Dimelis and Louri, 2002). This conclusion suggests that ownership have an important rule in terms of firm`s productivity. Also in this line of research, Khawar, (2003), found a strong direct effect of firm-level foreign investment on the productivity of individual firms.

In the literature about foreign acquisitions (Karpaty, P. 2007; Girma, et al, 2006.), we can find conclusions indicating that ownership, *per se*, can have a positive and significant effect on firm performance. This means that domestic companies tend to be more productive after being acquired by foreign owned companies.

Girma, *et al*. (2004) studied the differences only between domestic companies, distinguishing those in three groups: domestic exporters, domestic non-exporters and domestic multinationals. The results shows that the performance of domestic multinationals is superior that the other two groups whereas, among the other two were not possible to identify conclusive results. This point to the importance, in terms of performance, in this case measured by productivity, of being part of a multinational network.

Table 1. Productivity Literature Review: A Synthesis

Author (Year)	Sample (Years)	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Gelübcke, 2013b	304471 Observations (2007-2008)	Germany	The performance of FO in German manufacturing: evidence from a new database	Cross-section; t-test; Kolmogorov–Smirnov test	FO (+)
Gelübcke, 2013a	33922 - 41292 Observations (2007-2008)	Germany	FO and firm performance in German services.	OLS ; t-test; K-S- test	FO (+)
Chang and Marrewijk, 2013	10930 Observations (2006)	Latin America	Firm heterogeneity and development: Evidence from Latin American countries	SLR ; K-S test; t-test	FO (+)
Adenaeyer and Heckelei, 2011	2001 firms (2008)	Europe	FDI and the performance of EU agribusiness firms	binary-choice approach; Kaiser–Meyer–Olkin test	FO (+)
Temouri et al, 2008	10343 firms (1995-2004)	Germany	Analysis of productivity differences among FO and DO firms: Evidence from Germany	Olley and Pakes approach	FO (+)
Havrylchuk, 2006	136 Banks (1997-2001)	Poland	Efficiency of the Polish banking industry: FO vs DO banks	Tobit regression	FO (+)
de Backer and Sleuwaegen, 2005	22452 Firms (1990-1995)	Belgium	A closer look at the productivity advantage of FO firms	stochastic frontier methodology ; OLS	FO (+)
Griffith et al, 2004	1662824 Establishments (1998-2001)	UK	FO and productivity: New evidence from the service sector and the R&D lab	Index Comparison	FO (+)
Griffith and Simpson, 2003	12900-10457 Establishments (1980-1996)	UK	Characteristics of FO firms in British manufacturing	OLS; F-test	FO (+)
Khawar, 2003	2362 Observations (1990)	Mexico	Productivity and FDI - Evidence from Mexico	OLS ; t-test	FO (+)
Girma et al, 2002	460 firms (1989-1994)	UK	Why are Productivity and Wages Higher in FO Firms	Panel regression ; t-test	FO (+)
Pfaffermayr and Bellak, 2000	536 Firms (1996-1999)	Austria	Why FO firms are different : a conceptual framework and empirical evidence for Austria	Kruskal-Wallis Test, OLS	FO (+)

Koirala and Koshal, 2000	1021 Firms (1992)	Nepal	Productivity and technology in Nepal: An analysis of foreign and domestic firms	OLS; TSLS	FO (+)
Ramstetter, 1999	1970-1996	Asia	Comparisons of FO and DO in asian manufacturing over time	Means Comparison	FO (+)
Oulton, 1998	40113 firms (1995)	UK	Labour Productivity and FO in the UK	OLS	FO (+)
Boardman et al, 1997	350 Corporations (1986-1991)	Canada	The role of agency costs in explaining the superior performance of foreign MNCs	OLS	FO(+)
Howenstine and Zeile 1994	11934 Establishments (1989-1990)	USA	Characteristics of FO U.S. Manufacturing Establishments	Simple comparison	FO (+)
Blomstrom, 1988	215 Firms (1970)	Mexico	Labor productivity differences between FO and DO firms in Mexico	OLS	FO (+)
Willmore, 1986	282 Firms (1978-1983)	Brazil	The Comparative Performance of FO and DO Firms in Brazil	Matched Pairs	FO (+)
Girma et al, 2004	1200 Plants (2000)	Ireland	Exports, international investment, and plant performance: Evidence from a non-parametric test	First order stochastic dominance; K-S test	FO(+)
de Backer and Sleuwaegen, 2001	25190 Observations (1990-1995)	Belgium	Why are FO more productive than DO firms?	Panel data; Stochastic frontier approach	FO(+)
Temouri et al, 2008	10343 Firms (1995-2004)	Germany	Analysis of Productivity Differences among FO and DO Firms: Evidence from Germany	Levinsohn and Petrin (2003) extended Olley and Pakes (1996) approach ; OLS	FO MNE are more productive than DO, but there are not significant differences between FO MNE and DO MNE
Iyer, 2009	112 Firms (1989-2004)	India	Indian MNEs, foreign MNEs and domestic firms	Levinson–Petrin method	Indian MNCs have higher productivity than foreign MNCs.

Doms and Jensen, 1998	115000 Observations (1987-1988)	USA	Comparing Wages, Skills, and Productivity between DO and FO: Manufacturing Establishments in the United States	Compare averages; Regression Linear Model	FO more productive than DO. DO MNEs more productive than FO MNEs
Criscuolo and Martin, 2009	19000 firms (1996-2000)	UK	MNEs and U.S. productivity leadership: Evidence from Great Britain	Olley and Pakes approach and assume that evolves as a first-order Markov process	MNEs are less productive than U.S. affiliates, but as productive as non-U.S. foreign affiliates.
Karpaty, 2007	3834 Firms (1986-2002)	Sweden	Productivity effects of foreign acquisitions in Swedish manufacturing: The FDI productivity issue revisited	OLS; Matched Pairs	Foreign acquisitions increase the productivity
Girma et al, 2006	542 Firms (1988-1996)	UK	International acquisitions, domestic competition and firm performance	GMM	It finds evidence of significant positive productivity effects following acquisition
Yeaple, 2005	Model	Model	A simple model of firm heterogeneity, international trade, and wages	Model	Exporting firms appear to be more productive than firms that do not export.
Murakami, 2005	68369 Observations (1994-1998)	Japan	Are multinational enterprises more productive? A test of the selection hypothesis	Mean and STD comparison	Firms which engage in FDI display the highest productivity.
Bellak, 2004	Review	Review literature	How DO and FO firms differ and why does it matter?	Review literature	Gaps strongly points to the importance of factors related to the multinationality.
Castellani and Zanfei, 2003	3932 Firms (1992-1997)	France Spain Italy	Technology gaps, absorptive capacity and the impact of inward investments on productivity of European firms	Longitudinal firm-level data; OLS regression with standard errors robust to heteroschedasticity	FO firms are not always more productive than DO. France, on average, DO firms are more productive.

Source: Own elaboration based on literature review

Having in mind the literature about productivity differences between FO and DO firms, this study will assume that, in the Portuguese case, FO firms are more productive than their DO counterparts. Besides that, different studies present conclusions allowing us to hypothesize that DOM firms are more productive than DO firms:

H1.1: FO firms more productive than DOM and DO firms.

H1.2: DOMs are more productive than DO firms.

1.4.2 - Profitability

In a recent study about the German services sector Gelübcke (2013a) compared the foreign owned affiliates with German owned affiliates and concluded that although foreign affiliates consistently perform better than German affiliates, in terms of profitability happens the opposite. The same author developed a similar study for the German manufacturing sector and found that German companies do not differ in terms of profitability comparing to FO firms (Gelübcke, 2013b).

Aydin *et al*, (2007) analyzed the financial performance of FO and DO in the Turkish stock market. The conclusion was that in respect of Return on Assets (ROA) the FO firms had better performance than their domestic counterpart. They propose two reasons for this: *“One reason might be ability to monitor or control or give incentives for managers leading manage a firm more seriously and avoiding initiatives reducing the corporate values. Another one would be transferring new technology by foreign firms generating savings on operating expenses.”* (p. 109)

Using a micro panel data of firms located in Japan, Kimura and Kiyota (2007), examine differences in static and dynamic corporate performance between FO and DO firms. They found that FO firms reflect superior static characteristics and grow faster in terms of profitability.

Qian et al (2003) used a sample that included MNEs, domestic firms and hybrid firms (a mix between MNEs and domestic firms). The study concluded that MNEs are more profitable than both other 2 groups of firms. Ramstetter (1999) compared MNEs to DO firms in five Asian countries, and found the same conclusion. Boardman et al (1997)

explore an additional explanation for the observed profitability differences that are the agency costs. Using a data set of Canadian companies they found that when control agency costs FO firms are significantly more profitable than DO firms.

Bellak (2004) argues that is one of the characteristics in which FO firms tend to perform worse than DO firms. In his own words this can be related to “*the motivation of MNEs to minimize their tax burden may be responsible for an inferior profitability performance of affiliates*” (p. 17).

Using a data set of Canadian firms for the years 1992–1994 and 1997, Mathur et al (2001), found evidence that DO appear to be more profitable than FO firms. DO have showed “*higher profitability for at least four of the six profitability measures for the first three years of data and for two measures for the last year*”(p. 569-570).

In a study developed by Luo and Tan (1998), that compares FO and DO firms in a emerging market, the authors concluded that DO firms are more profitable than FO.

Gomes and Ramaswamy (1999) studied the relationship between multinationality and performance, using profitability measures. The conclusion is that increase the multinationality degree brings significant performance benefits but only till a certain point. This means that are a optimum level of multinationality and a U inverted relationship between multinationality and performance.

Table 2. Profitability Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Kimura and Kiyota, 2007	22500 Firms (1994-2000)	Japan	FO vs DO Firms: Economic Performance in Japan	random-effects model; Probit model	FO(+)
Girma et al, 2004	1200 Firms (2000)	Ireland	Exports, international investment, and plant performance: Evidence from a non-parametric test	First order stochastic dominance; K-S test	FO(+)

Qian et al, 2003	271 Firms (1998)	USA	Does multinationality affect profit performance? an empirical study of U.S. SMEs	Regression model	FO(+)
Pfaffermayr and Bellak, 2000	536 Firms (1996-1999)	Austria	Why FO firms are different : a conceptual framework and empirical evidence for Austria	Kruskal-Wallis Test, OLS	FO (+)
Ramstetter, 1999	1970-1996	Asia	Comparisons of FO and DO in Asian manufacturing over time	Means Comparison	FO (+)
Boardman et al, 1997	350 Corp. (1986-1991)	Canada	The role of agency costs in explaining the superior performance of foreign MNCs	OLS	FO(+)
Gelübcke, 2013a	33922 - 41292 Observations (2007-2008)	Germany	FO and firm performance in German services.	OLS ; t-test; K-S-test	DO (+)
Mathur et al, 2001	400 Firms (1992–1994 and 1997)	Canada	The evidence from Canadian firms on multinational diversification and performance	descriptive and parametric test; multiple linear regression models; nonlinear regressions; Panel data	DO (+)
Luo and Tan, 1998	51 Firms (1994)	China	A comparison of FO and DO firms in an emerging market: a strategic choice perspective	Survey; Gentleman-Givens transformation method	DO (+)
Kim and Lyn, 1990	100 Firms (1980-1984)	USA	FDI Theories and the Performance of Foreign Multinationals Operating in the US	univariate analysis	DO (+)
Gelübcke, 2013	304471 Observations (2007-2008)	Germany	The performance of foreign affiliates in German manufacturing: evidence from a new database	Cross -section; t-test; Kolmogorov–Smirnov test	NSD
Barbosa and Louri, 2005	523 Firms PT - 2651 Firms GR (1992 PT - 1997 GR)	Portugal Greece	Corporate Performance: Does Ownership Matter? A Comparison of FO and DO Firms in Greece and Portugal	OLS; t-test	NSD in Portugal case. In Greece, FO (+)
Gomes and Ramaswamy, 1999	95 Firms (1990-1993)	USA	The form of the relationship between multinationality and performance	crosssection/timeseries regression method ; autoregressive-heteroskedastic model	Curvilinear relationship between multinationality and performance.

Source: Own Elaboration based on literature review

As we can see above, it is possible to find different conclusions when the subject is profitability. On balance, it appears more often that FO>DO. It will be hypothesized that FO firms are the group that is more profitable followed by DOM firms and at last by DO firms.

H2.1: FO firms are more profitable than DOMs and DO firms

H2.1: DOMs are more profitable than DO firms.

1.4.3 - Innovation

In terms of Innovation, Dachs and Ebersberger (2009), found that, in the Austrian case, the impact of foreign ownership on innovation is not significant. However, being a part of a multinational group is very important in the innovation process. The same authors have found, when they included more countries in the analysis (Austria, Denmark, Finland, Norway and Sweden) a “*little indication that foreign-owned companies in small open economies are less innovative than their domestically owned counterparts*” (Dachs and Ebersberger, 2009, p.403).

Gelübcke (2013b) argued that FO firms spend more money in R&D activities than DO German firms, and Dachs *et al* (2008) found little indication that FO firms are less innovative than DO firms. Griffith *et al* (2004), examining the role of multinationals in service sectors and the importance of R&D activity conducted by foreign MNEs in the UK, found that multinationals conduct a substantial amount of UK R&D. However comparing British owned MNEs to foreign MNEs, the study concluded that R&D intensity depends of the sector in analysis.

Falk, (2008) investigated the relationship between foreign ownership and innovation activities covering twelve European countries. He concluded that foreign owned firms are more likely to innovate than domestic firms, mainly in the New EU Member States, and that the differences in innovation are due to different firm characteristics, such as size, sector affiliation and exporting.

Based on the UK Community Innovation Survey 2007, Cook, *et al* (2013), concluded that subsidiaries of MNEs are more likely to produce innovations and to realise higher benefits from higher R&D intensity.

Sadowski and Sadowski-Rasters, (2006) show that, in the Dutch case, foreignness is an important factor to explain inter-firm differences related to innovation. They concluded that “*foreign subsidiaries are more innovative, they are more likely to introduce ‘imitative’ as well as ‘real’ innovations compared to domestic firms*” (p.447).

Bae and Noh (2001) have concluded that multinationals corporations invest more in R&D than domestic corporations. They argued that R&D investment has a positive effect on the market value of the both being more pronounced in the multinationals corporations.

Table 3. Innovation Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Gelübcke 2013b	304471 Observations (2007-2008)	Germany	The performance of foreign affiliates in German manufacturing: evidence from a new database	Cross-section; t-test; Kolmogorov–Smirnov test	FO (+)
Falk, 2008	28000 Observations (1998-2000)	Europe	Effects of foreign ownership on innovation activities: Empirical evidence for twelve European countries	Oaxaca-Blinder-type decomposition for binary probit models	FO (+)
Sadowski and Sadowski, 2006	4780 Firms (1996)	Netherlands	On the innovativeness of foreign affiliates: Evidence from companies in The Netherlands	logit estimation	FO (+)
Griffith et al, 2004	1662824 Establishments (1999-2001)	UK	FO and productivity: New evidence from the service sector and the R&D lab	Index Comparison	FO (+)
Iyer, 2009	112 Firms (1989-2004)	India	Indian multinationals, foreign multinationals and domestic firms	Levinson–Pettrin method	DOM>FO>DO
Dachs et al, 2008	5773 Firms (1998-2000)	Austria Denmark Finland Norway Sweden	The innovative performance of foreign-owned enterprises in small open economies	multivariate analysis	DO (+)

Kim and Lyn 1990	100 Fims (1980-1984)	USA	FDI Theories and the Performance of Foreign Multinationals Operating in the US	univariate analysis	DO (+)
Dachs et al, 2009	1294 Enterprises (1998-2000)	Austria	Does foreign ownership matter for the innovative activities of enterprises?	Based on the techniques to estimate treatment effects; Matching approach ; Heckman regression model	NSD
Cook et al, 2013	11775 Observations (2007)	UK	Clustering, MNEs, and Innovation: Who Benefits and How?	Probit model; ordered probit; Heckman two-step model	DOM show higher levels of innovation effort.

Source: Own Elaboration based on literature review

Unfortunately, the data set available for the empirical analysis does not allow us to analyze what kind of companies is more innovative in the Portuguese market. Nevertheless, we decided to report this literature review on this relevant topic, as it was purposefully developed for this dissertation, and may be tested in future applications.

1.4.4 - Investment

In terms of Investment, Griffith *et al* (2004), in a paper that examines the relationship between foreign ownership and productivity in service sector, found that FO MNEs have higher levels of investment than British owned MNEs. Griffith and Simpson (2003), found that FO firms invest more than British owned MNEs.

Bae & Noh (2001) analysed the differences in R&D investment activities between MNE corporations and domestic corporations and found that MNE corporations invest more in R&D than the domestic counterpart.

Pfaffermayr and Bellak (2000) argue that the gaps in investment propensity are essentially related to firm characteristics and not to foreign ownership.

Ylä-Anttila *et al* (2004) concluded that FO companies have invested less than Finnish owned companies and that the return on capital invested is higher in FO than in DO firms.

In a different perspective, Yoshikawa, *et al* (2005) analyzed the effect of ownership on human capital investment, to Japanese manufacturing firms, and concluded that domestic ownership has a positive effect on human capital investment while foreign ownership has an opposite effect.

Table 4. Investment Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Griffith et al, 2004	1662824 Establishments (1999-2001)	GB	FO and productivity: New evidence from the service sector and the R&D lab	Index Comparison	FO (+)
Griffith and Simpson, 2003	12900-10457 Establishments (1980-1996)	UK	Characteristics of FO firms in British manufacturing	OLS; F-test	FO (+)
Bae and Noh, 2001	563 Firms (1991-1995)	USA	MNE corporations versus DO corporations: A comparative study of R&D investment activities	cross-sectional regression analysis	FO (+)
Yla-Anttila <i>et al</i> , 2004	500 Firms (1986-1998)	Finland	FO in Finland: Boosting firm performance and changing corporate governance	Linear Regression; t-test	DO (+)
Yoshikawa et al, 2005	996 Firms (1998-2002)	Japan	The impact of ownership structure on wage intensity in Japanese corporations	autoregressive-distributed lag models ; GMM	DO has a positive effect on human capital investment, FO has the opposite effect
Pfaffermayr and Bellak, 2000	536 Firms (1996-1999)	Austria	Why FO firms are different : a conceptual framework and empirical evidence for Austria	Kruskal-Wallis Test, OLS	Gaps primarily explained by firm characteristics rather than foreign ownership

Source: Own elaboration based on literature review

This characteristics is another that it can't be developed in the empirical part. Nevertheless, we decided to report this literature review on this relevant topic, as it was purposefully developed for this dissertation, and may be tested in future applications.

1.4.5 - Exports

There are two points of view about the effects of FDI in the exports of the host country. On one hand, FDI promotes exports by increasing domestic capital availability for exports, transfer of technology and new products for exports, access to new and large foreign markets, upgrade of local workforce, technical and management skills. On the other hand, it is sometimes suggested that FDI may have a negative impact on the exports of home country by replacing domestic savings and investment; transfer technologies that are low level or inappropriate for the host country's factor proportions; target mainly the host country's domestic market; inhibit the expansion of indigenous firms that might become exporters (Zhang, 2005).

Even when the theme is exports, we can find different results. While Willmore (1986), Dachs and Ebersberger (2009), Rasiah, and Gachino (2005) found that FO firms export more than DO firms, Iyer (2009) concluded that Indian (DO) MNEs export more than foreign MNEs. Gelübcke (2013b), that studied the performance of FO affiliates in German manufacturing, have found that FO affiliates export more even when compared with DO MNEs.

In a research on the Greek food sector, Anastassopoulos (2003), developed a probabilistic regression model that allowed to conclude that is more likely to observe higher export performance in MNE subsidiaries than in their domestic counterparts.

Greenaway *et al*, (2004) concluded in their research about spillovers on the UK market, that there is evidence that foreign MNEs influence the decision of domestic firms to export, as well as their export propensity.

There are studies relating the importance of going abroad to the productivity firms` (Murakami, 2005; Kimura and Kiyota, 2006). We can find results suggesting that exports have an important role of on firms` productivity. Murakami (2005) observed that purely domestic firms (that do not serve at all foreign markets) are less productive than firms that serve foreign markets, and from those who serve foreign markets, those that only export have higher productivity than those who engage in FDI.

Recently, Du *et al* (2012) analyzed how foreign affiliates and domestic Chinese firms differ in learning by exporting. The results of the study show that domestic firms learnt

by exporting and foreign affiliates did not. This can be explained by the fact that domestic export starters after getting in contact with foreign firms acquire know how and learn the international best practices that enable them to improve their productivity.

Table 5. Exports Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Gelübcke, 2013b	304471 Observations (2007-2008)	Germany	The performance of FO in German manufacturing: evidence from a new database	Cross -section; t-test; Kolmogorov–Smirnov test	FO (+)
Dachs et al, 2009	1294 Enterprises (1998-2000)	Austria	Does FO matter for the innovative activities of enterprises?	methodology is based on the techniques to estimate treatment effects; Matching approach ; Heckman regression model	FO (+)
Willmore, 1986	282 Firms (1978-1983)	Brazil	The Comparative Performance of FO and DO in Brazil	Matched Pairs	FO (+)
Greenaway et al, 2004	3662 (1992-1996)	UK	Do domestic firms learn to export from multinationals?	Heckman selection model	Exporting firms more productive
Iyer, 2009	112 Firms (1989-2004)	India	Indian multinationals, foreign multinationals and domestic firms	Levinson–Petrin method	DOM>FO>DO
Du et al, 2012	438457 Firms (1998-2005)	China	Do DO and foreign exporters differ in learning by exporting? Evidence from China	Olley–Pakes method ; propensity score matching method	DO learnt by exporting and foreign affiliates did not.
Murakami, 2005	68369 Observations (1994-1998)	Japan	Are multinational enterprises more productive? A test of the selection hypothesis	Mean and STD comparison	Productivity of MNE differs significantly from that of DO.
Kimura and Kiyota, 2006	22000 Firms (1994-2000)	Japan	Exports, FDI, and productivity: Dynamic evidence from Japanese firms	multilateral index ; probit model	Most productive firms engage in exports and FDI
Anastassopoulos, 2003	75 Firms (1988-1992)	Greece	MNE subsidiaries versus DO enterprises: An analysis of their ownership and location-specific advantages	probabilistic regression model ; pre-regression tests	It is more likely to observe higher export performance in MNE.

Source: Own elaboration based on literature review

The data set allow us to identify if a company is exporter or not. So having in mind the literature review and following the results of Iyer (2009) it will be hypothesized that it is more likely an exporter company to be DOM than otherwise.

H3.1: It is more likely to find an Exporter company among FO than DOM and DO.

H3.2: It is more likely to find an Exporter company among DOM than DO

1.4.6 - Capital Intensity

Iyer (2009) found, that Indian MNEs are more capital intensive than Foreign MNEs (consistent with Doms and Jensen, 1998). On the other hand, Pfaffermayr and Bellak (2000), Koirala and Koshal (2000) and Willmore (1986) concluded that FO firms show higher capital intensity than DO firms.

Dimelis and Louri (2002) found that, for the case of Greece, ownership is directly related to capital intensity. FO firms are more capital intensive than DO and as higher is the foreign owned part, in a company, the higher is the capital intensity.

Howenstine and Zeile (1994) argued that in the USA the higher capital intensity of FO establishments can be explained by the great concentration of FO establishments in industries that are most capital intensive.

There is literature correlating capital intensity and firm exports (Siddharthan, and Nollen, 2004). This research results show that capital intensity is not a preponderant determinant in MNEs affiliates, but it is important in the case of domestic firms.

Table 6. Capital Intensity Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Pfaffermayr and Bellak, 2000	536 Firms (1996-1999)	Austria	Why FO firms are different : a conceptual framework and empirical evidence for Austria	Kruskal-Wallis Test, OLS	FO (+)
Koirala and Koshal, 2000	1021 Firms (1992)	Nepal	Productivity and technology in Nepal: An analysis of FO and DO firms	OLS; TSLS	FO (+)
Ramstetter, 1999	1970-1996	Asia	Comparisons of FO and DO in asian manufacturing over time	Means Comparison	FO (+)
Doms and Jensen, 1998	115000 Observations (1987-1988)	USA	Comparing Wages, Skills, and Productivity between DO and FO Manufacturing Establishments in the United States	Compare averages; Regression Linear Model	FO (+)
Howenstine and Zeile, 1994	11934 Establishments (1989-1990)	USA	Characteristics of Foreign-Owned U.S. Manufacturing Establishments	Simple comparison	FO (+)
Blomstrom, 1988	215 Firms (1970)	Mexico	Labor productivity differences between FO and DO firms in Mexico	OLS	FO (+)
Willmore, 1986	282 Firms (1978-1983)	Brazil	The Comparative Performance of FO and DO Firms in Brazil	Matched Pairs	FO (+)
Iyer, 2009	112 Firms (1989-2004)	India	Indian multinationals, foreign multinationals and domestic firms	Levinson–Petrin method	DO (+)

Source: Own elaboration based on literature review

The data available for the aims of this study does not allow us to compare this characteristic through the different set of companies. However, we decided to report this literature review on this relevant topic, as it was purposefully developed for this dissertation, and may be tested in future applications.

1.4.7 - Technological intensity

Relevant literature has shown that being part of a MNE network is more important than foreign ownership *per se*. FO firms tend to be more technology intensive than DO firms. However, when FO firms are compared with DO MNEs, the latter tend to be more technology intensive than the first (Iyer, 2009; Doms and Jensen, 1998; Dobbelaere, 2004). This reflects the importance of firm specific advantages, showing that firms

which are part of a MNE network have comparative advantage over their domestic counterparts which are not part of an MNE (Gelübcke, 2013b).

Yeaple (2005), argued that this trend can be verified even in the first step of internationalization, e.g. exports. In his model, he has compared firms that export and those who do not. He concluded that the former employ more advanced technologies than the latter.

Table 7. Technological Intensity Literature Review: A Synthesis

Author	Year	Period	Country Focus	Research Focus concerning FO vs DO firms	FO vs DO firms
Iyer, 2009	2009	112 Firms (1989-2004)	India	Indian multinationals, foreign multinationals and domestic firms	Indian MNCs have better technological characteristics
Doms and Jensen, 1998	1998	115000 Observations (1987-1988)	USA	Comparing Wages, Skills, and Productivity between DO and FO Manufacturing Establishments in the United States	FO (+)
Yeaple, 2005	2005	Model	Model	A simple model of firm heterogeneity, international trade, and wages	Exporting firms employ more advanced technologies than non exporting firms

Source: Own elaboration based on literature review

This is another characteristic about it is not possible identify empirical results. Once again, we decided to report this literature review on this relevant topic, as it was purposefully developed for this dissertation, and may be tested in future applications.

1.4.8 - Size

Another important firm characteristic is size. It tends to be assumed that differences in size are an important source of differences in productivity (De Backer and Sleuwaegen, 2001).

In this point the literature seems to be very convergent showing that FO firms on average are larger than DO firms (Pfaffermayr and Bellak, 2000; De Backer and Sleuwaegen, 2005; Gelübcke, 2013b; Griffith and Simpson, 2003). This fact it is related

to the capability of FO firms better exploit economies of scale, what shows that the superior performance of FO can be attributed to the larger scale of operations (De Backer and Sleuwaegen, 2001).

Using a database of Japanese companies in USA Blonigen and Tomlin, (2001) not only concluded that Japanese plants are larger and grow faster, but also they have established a relationship between size and growth for FO firms. They have concluded that smaller plants grow faster.

There are some researches on the size-wage effect and ownership (Brown and Medoff, 1989; Dobbelaere, 2004) that found evidence of a positive firm size-wage effect. Having in mind this finding and the literature convergence, that FO firms are larger than DO firms, we can expect that FO firms pay higher wages than DO firms.

However it can be find researches with non conclusive results as it is the case of the study developed by Mathur *et al* (2001) in the Canadian market.

Table 8. Size Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Gelübcke, 2013	304471 Observations (2007-2008)	Germany	The performance of FO in German manufacturing: evidence from a new database	Cross -section; t-test; Kolmogorov–Smirnov test	FO (+)
Wang and Mathur, 2011	2184 Firm-year Observations (1993-2004)	USA	Return on capital analysis: U.S.-based multinational corporations versus U.S. domestic corporations	Univariate analysis; multivariate analysis.	FO (+)
Dachs et al, 2009	1294 Enterprises (1998-2000)	Austria	Does foreign ownership matter for the innovative activities of enterprises?	Matching approach ; Heckman regression model	FO (+)
Backer and Sleuwaegen, 2005	22452 Firms (1990-1995)	Belgium	A closer look at the productivity advantage of foreign affiliates	stochastic frontier methodology ; OLS	FO (+)
Dobbelaere, 2004	1514 Firms (1997-1998)	Bulgaria	Ownership, firm size and rent sharing in Bulgaria	Cross-sectional time-series estimates; OLS; Panel data	FO (+)

Griffith and Simpson, 2003	12900-10457 Establishments (1980-1996)	UK	Characteristics of FO firms in British manufacturing	OLS; F-test	FO (+)
Pfaffermayr and Bellak, 2000	536 Firms (1996-1999)	Austria	Why FO firms are different : a conceptual framework and empirical evidence for Austria	Kruskal-Wallis Test, OLS	FO (+)
Howenstine and Zeile, 1994	11934 Establishments (1989-1990)	USA	Characteristics of FO U.S. Manufacturing Establishments	Simple comparison	FO (+)
Globerman et al, I 1994	5553 Firms N.A	Canada	The economic performance of foreign affiliates in Canada.	OLS; White - test; t- test	FO (+)
SR Yeaple 2005	Model	Model	A simple model of firm heterogeneity, international trade, and wages	Model	Export firms are larger than non export
Mathur et al, 2001	400 Firms (1992–1994 and 1997)	Canada	The evidence from Canadian firms on multinational diversification and performance	multiple linear regression models; nonlinear regressions; Panel data	NSD

Source: Own Elaboration based on literature review

The literature tends to assume that FO firms are larger than DO firms. Following this general conclusion, in this study we posit the following hypothesis.

H4.1: FO firms are larger than DOMs and DO firms

H4.2: DOM larger than DO firms

1.4.9 - Wages

In fact, there is a significant convergence in the literature about wages. FO firms tend to pay higher wages than DO firms (Doms and Jensen 1998; Griffith and Simpson, 2003; Gelübcke, 2013a; Willmore, 1986). *“Above-average wages can be used by human resource management as an incentive to prevent shirking and other absences, since the resulting costs are higher for MNEs which are more capital intensive”* (Globerman et al. 1994: 152f., cited in Gelübcke, 2013b). Higher wages can be used to overcome disadvantages related to long-distance monitoring (Bellak, 2004) or they can be used as

an attempt to compensate the lack of information that companies face in foreign labor markets (Feliciano and Lipsey 2006, cited in Gelübcke, 2013b). Görg *et al* (2007) argued that one explanation to higher wages in FO firms may be the provision of on-the-job training. While starting wages can be higher or lower, the wage growth is higher in FO firms. This can be related to on-job-training that is higher in FO firms than in their DO counterparts.

The results found by Girma *et al* (2002) are consistent with the previous ones, but they go even further arguing that once a domestic company is acquired by a foreign firm the wages increase; in the opposite situation, a decrease in wages tends to occur.

In the Portuguese case, Martins (2004) found that FO firms pay more unconditional terms, however, concluded that there are not “*evidence of a positive relationship between the degree of foreign control and the wage premium of the firm*” (p. 22-23).

Consistent with the results reported, Feenstra and Hanson, (1997) concluded that the “*growth in FDI is positively correlated with the relative demand for skilled labor*” (p. 371) which means higher wages. This is corroborated for the more recent study to German market (Jungnickel and Keller, 2003) that shows the demand for qualified labour is higher in FO firms when compared to DO firms. Another explanation is that FO firms hire workers more productive and pay them higher wages (Griffith, 1999 cited in te Velde, 2002).

Jungnickel and Keller (2003) concluded that there is a positive relation between wages and size, i.e., wages increase with size. However, and surprising, this relation is stronger, in the German case, for DO firms that are oriented to the national market.

Not only demand for skilled jobs and wages is higher in FO firms but also the wage elasticity of labour demand is higher. Godart *et al* (2012a): p.611 concluded that “*the wage elasticity of labour demand is about 40 % lower in domestic than in foreign multinationals*”. Hakkala *et al* (2010) argue that, in the Swedish case, there are no differences between FO and DO firms wage elasticity, but differences can be found between MNEs and Non-MNEs. MNEs have more wage elasticity than Non-MNEs, what can be explained by the flexible international network of MNEs.

As can be seen, the literature on differences between FO and DO firms wages` has been the theme of several studies in recent years, and it can be found researches that had

quantified the wages differences as is the case of te Velde (2002) who argues that foreign establishment in Britain pay 13% more than domestic establishments. Kimura and Kiyota (2007) did not quantify the effects but concluded that wages have a faster growth in FO firms than in DO firms.

Notwithstanding the literature convergence, Heyman, *et al* (2007), paid attention the aggregation level of the researches. The author used a detailed matched employer-employee data and found that the wage premium in foreign owned firms is not so high as those found in studies with more aggregated level.

Table 9. Wages Literature Review: A Synthesis

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
Gelübcke, 2013	304471 Observations (2007-2008)	Germany	The performance of foreign affiliates in German manufacturing: evidence from a new database	Cross -section; t-test; Kolmogorov–Smirnov test	FO (+)
Dobbelaere, 2004	1514 Firms (1997-1998)	Bulgaria	Ownership, firm size and rent sharing in Bulgaria	Cross-sectional time-series estimates; OLS; Panel data	FO (+)
Griffith and Simpson, 2003	12900-10457 Establishments (1980-1996)	UK	Characteristics of FO firms in British manufacturing	OLS; F-test	FO (+)
Lipsey and Sjöholm, 2003	1975-1999	Indonesia	FO and Indonesian manufacturing wages: an analysis with panel data		FO (+)
Girma et al, 2002	460 firms 1989-1994	UK	Why are Productivity and Wages Higher in FO Firms	Panel regression ; t-test	FO (+)
Te Velde, 2002	846 Establishments (1990-1998)	UK	FO and wages in British establishments	sample weights in estimation	FO (+)
Doms and Jensen, 1998	115000 Observations (1987-1988)	USA	Comparing Wages, Skills, and Productivity between DO and FO Manufacturing Establishments in the United States	Compare averages; Regression Linear Model	FO (+)

Howenstine and Zeile, 1994	11934 Establishments (1989-1990)	USA	Characteristics of FO U.S. Manufacturing Establishments	Simple comparison	FO (+)
Globerman et al, I 1994	5553 Firms N.A	Canada	The economic performance of foreign affiliates in Canada.	OLS; White - test; t- test	FO (+)
Willmore, 1986	282 Firms (1978-1983)	Brazil	The Comparative Performance of FO and DO Firms in Brazil	Matched Pairs	FO (+)
SR Yeaple 2005	Model	Model	A simple model of firm heterogeneity, international trade, and wages	Model	Exporting firms pay higher wages than non export
Godart et al, 2012a)	1081 Firms (1996-2005)	Ireland	Domestic multinationals, foreign affiliates, and labour demand elasticities	OLS ; GMM	The wage elasticity of labour demand is lower in DOM than FO.
Hakkala et al, 2010	10264 Observations (1990-2002)	Sweden	Multinationals, skills, and wage elasticities	GMM	The wage elasticity is higher in MNE than in DO firms
Jungnickel and Keller, 2003	2001	Germany	Foreign-owned Firms in the German Labour Market		The demand for qualified labour is higher in FO than DO.

Source: Own elaboration based on literature review

The literature present us an important set of conclusions that support the hypothesis that FO firms pay higher wages than the other two groups of companies under analyzes in this study. This trend allows us to follow that:

H5.1: FO firms pay higher wages than PTC

H5.2: FO pay higher wages than DOM and DO

H5.3: DOM pay higher than DO firms.

1.4.10 - Efficiency

Once FO firms know they need to compensate for their liability of foreignness, they need to be more efficient than DO firms (De Backer and Sleuwaegen, 2001), confirming classic theory about competition in a foreign environment. However it is possible to find results contrasting with classic theory. Kim and Lyn (1990) concluded that US-owned firms tend to be, on average, more efficient than their FO counterparts, and Koirala and Koshal (2000) found that foreign firms, in Nepal, are not more efficient than domestic companies. Wang and Mathur (2011) argue that DO firms manage their assets more efficiently than FO firms.

Blomstrom (1986) argued that the presence of FO firms, in Mexican case, is positively correlated with structural efficiency of the industry. This suggests that FO firms are more efficient than DO firms.

Girma and Wright (2002), found that differences in efficiency are essentially related to the use of capital. FO firms tend to be more efficient in the use of their capital than their domestic counterparts.

Table 10. Efficiency Literature Review

Author	Period	Country Focus	Research Focus concerning FO vs DO firms	Methodology	FO vs DO firms
de Backer and Sleuwaegen, 2005	22452 Firms (1990-1995)	Belgium	A closer look at the productivity advantage of foreign affiliates	stochastic frontier methodology ; OLS	FO (+)
Koirala and Koshal, 2000	1021 Firms (1992)	Nepal	Productivity and technology in Nepal: An analysis of foreign and domestic firms	OLS; TSLS	DO (+)
Kim and Lyn, 1990	100 Firms N.A	USA	FDI Theories and the Performance of Foreign Multinationals Operating in the US	univariate analysis	DO (+)

de Backer and Sleuwaegen, 2001	25190 Observations (1990-1995)	Belgium	Why are FO firms more productive than domestic firms?	Panel data; Stochastic frontier approach	FO firms are highly efficient since they know they have to compensate for their liability of foreignness.
Blomström, 1986	215 Firms (1970-1975)	Mexico	Foreign Investment and Productive Efficiency: The Case of Mexico	OLS	Foreign presence in an industry is positively correlated with structural efficiency

Source: Own elaboration

Having in mind the theoretical background of liability of foreignness and the need of foreign companies to be more efficient in order to overcome the difficulties of doing business in a foreign market, we could assume that FO are more efficient than DO and DOM, however this characteristic it will not be analyzed in present study. We decided to report this literature review on this relevant topic, as it was purposefully developed for this dissertation, and may be tested in future applications.

There is a considerable number of studies covering literature about differences between foreign owned companies and their domestic counterpart. Many of them were analyzed in this literature review, but as can be seen the trend of studies focus tend to be on differences of performance. The present dissertation aims to going even further presenting results about other characteristics and distinguish domestic companies in two different groups (DO and DOM).

Having in mind that different conclusions, in the literature, can be related to the use of different methodologies, samples, and host countries, this study intends to provide significant conclusions about the differences in characteristics between Portuguese companies (DO and DOM) and FO firms, following the hypothesis summarized above.

Chapter 2 – Empirical Investigation

This chapter will describe the methodology used, the estimation procedures of the econometric model and the analysis of the results contrasting them with the relevant theoretical and empirical literature.

2.1 - Data Source

To achieve the aims of this study, data were extracted from the SABI database, notably from the last version (updated on January 6th). This database provides information of almost 500.000 companies in Portugal, which constitutes a rich and relevant data set for research and analysis. The database allows the use of search criteria to extract the data on specific characteristics under analysis in this study.

Bureau Van Dijk's SABI database provides information about companies located in Portugal. We used the period between 2008 and 2012 because it suits better the purposes of this study. An important feature of the data set is that it enables the identification of foreign owned firms as well as domestic MNEs, and which is very important to the aims of this study.

Before undertaking the extraction, we selected two important criteria, in order to narrow down the sample and use the data that were more relevant for the aims of the study. We decided to eliminate micro enterprises from the sample, as their inclusion would mean that most companies were single-owner companies, or even single-employee companies, which would distort our results. For that, we used the European Union criterion (less than 10 employees) to define a micro enterprise (European Commission, 2005). This criteria was followed to guarantee that no one of the groups will be biased because of the size of the companies

As referred before in this study a foreign firm is defined as one in which at least 10 per cent of equity is owned by a foreign business entity. This threshold is suggested and used for statistical purposes by the UNCTAD (2007) and OECD (2008) as well as in the literature (e.g. Gelübcke, 2013b; Griffith et al. 2004; Doms and Jensen 1998). For the

aims of this study this will be the second criterion used and all firms not meeting this criterion are defined as Domestic owned.

These two criteria conjugated allowed us to extract 3 different groups of data, one per type of company of interest to the present study. One to analyze the FO firms another to the DO with FDI (DOM) and last by one related to DO firms without FDI. With these mutual exclusive groups of data it will be possible to compare the characteristics of the 3 groups.

The data was extracted by year (each year at once) and then preceded to the elimination of those companies that have changed their status in terms of ownership in order to have three different and independent data sets.

Using the criteria referred to above, i.e., more than 10 employees and at least 10% of foreign capital ownership, it was possible to identify a total of 1213 FO companies in Portugal.

The second group are the DOM. To extract this group the same criterion for size was used, as well as the OECD Benchmark Definition (OECD, 2008) but in this case to identify the Portuguese companies that have subsidiaries abroad and hold at least 10% of the equity of those subsidiaries. This group is composed by a total of 363 companies.

The third group represents the DO firms without FDI, i.e. Portuguese firms without subsidiaries abroad. As in the other groups we used the European Union criterion of micro companies (European Commission, 2005) and the additional criterion that enables us to extract the companies in Portugal whose capital ownership is at least 90% Portuguese capital (OECD, 2008). Our final sample for this type of companies is composed by 19.359 firms.

Table 11. Number of Companies and Observations

	Number of Companies	Observations	Manufacturing Companies	Observations Manufacturing
FO	1.213	6.065	6.114	1.765
DOM	363	1.815	164	820
DO	19.359	96.795	353	30.570

Note: FO represents Foreign Owned companies; DOM stands for Portuguese Companies with FDI and DO for Portuguese Companies without FDI.

2.2 - Variables and Proxies

Before present the descriptive and econometric result it is important to specify the variables used to these estimations and results.

2.2.1 - Dependent Variables

The dependent variables, proxied by several measures related to the characteristics identified, allow to test for the existence of differences in characteristics between FO and DO firms, and whether those differences vary from characteristic to characteristic.

The characteristics under analysis in the models that will be estimated are: Productivity, Profitability, Size, Exporter Status and Wages. Even if we have analyzed even more characteristics in the literature review, due the data set limitations the above mentioned variables are only those for what there are data available and, therefore, for which results can be presented.

Productivity will be measured as the ratio of Gross Value Added per Employee (Davies and Lyons, 1991). To measure Profitability, different kinds of proxies/measures will be used in order to test if there are differences between FO and DO firms. In terms of profitability as used by Girma *et al*, (2004) profit per employee is going to be included in the analyses.

To study and analyze the differences between FO and DO firms in terms of size, this latter variable is going to be measured by the number of employees (Dachs et al, 2009).

Another important characteristic under analysis is wages. To measure the differences in term of wages, wages per employee will be used (Jungnickel and Keller, 2003).

To identify if a company is an exporter or not, this study uses a dummy (1 if exporter; 0 if not exporter).

Table 12. Dependent variables

Dependent Variables	Proxies
Productivity	log (GVA per Employee)
Profitability	log (Profit per employee)
Size	log (Number of Employees)
Wages	log (Wages per Employee)
Exporter	Export dummy; If companies export or not

2.3.2 - Independent Variables

The main variables of interest to the aims of this study are the dummies FO and DOM. If the share of foreign ownership on the focal firm's equity is greater or equal to 10% FO assumes the value 1 and 0 otherwise. DOM assumes the value of 1 when it is a Portuguese company that owes at least 10% of a subsidiary abroad, otherwise it is 0.

Other explanatory variable is the age of a firm. Firm's age is represented by the number of years since the firm was founded and it is the one of the most used proxy in the key literature (see for instance Barbosa and Louri, 2005). Always that possible we are going to test the age square in order to test a U shaped relationship between age and all the characteristics.

Firm size is a relevant measure that can affects characteristics and it will be measured by the number of total employees (Gelübcke, 2013b). Always that possible we are going to test the size square in order to test a U shaped relationship between size and all the characteristics.

The data set enable the extraction of the NACE codification. This classification it will be used to split the data set into different kind of companies, according to sector. To the econometric estimations of what are the implications of each kind of companies on the differences in characteristics, we are going to test two kinds of companies using a dummy: 1 if it is a manufacturing company, and 0 if it is a non manufacturing company.

The choice of these independent variables took into account previous researches about this area.

In order to not compare “apples with oranges” Doms and Jensen (1998), one of the first studies to distinguish between DO and DOM, have set the same independent variables as this study with the difference that they used a dummy to industry and in this study it is going to be used a dummy to manufacturing companies (Temouri *et al.*, 2008).

The literature tends to assume Size as an important source of differences between FO and DO firms (Pfaffermayr and Bellak, 2000). Studies as those conducted by Siddharthan and Nollen, 2004; Barbosa and Louri, 2005; Wang and Mathur, 2011 use Size as independent variable to their estimations.

Following Gelübcke (2013b)’s findings, a positive impact of size on productivity, wages and export probability is expected. A negative impact is expected in profitability (Gelübcke, 2013a).

Globerman *et al.*, 1994 used Age as one of the control variables to find differences in terms of productivity between FO and DO firms. Jovanovic (1982) and Pakes and Ericsson (1998) have predicted that young firms tend to be less productive than older firms. Age it will be used as one of independent variables in the estimations to reach our goal in terms of econometric approach. It is expected a positive relation between this variable and productivity (Backer and Sleuwaegen, 2005). In terms of profitability it is expected a positive relation between both variables (Qian *et al.*, 2003). It is also expected a positive relation with Size, Wages and Exporter Probability.

Another variable that can have impact on the characteristics differences between FO and DO firms is the sector of activity (Görg *et al.*, 2007; Temouri *et al.*, 2008), so it will be included to understand what impact the sector of activity can have in the Portuguese case on the characteristics under analyses. It will be used the European Union classification of activities known as NACE to identify if companies are manufacturing or non manufacturing. Having in mind the literature review and the specifications of each study that are related with a specific country or countries (and different codifications) we are not going to do predictions about this dummy.

Table 13. Independent Variables And Expected Signs

Independent Variables	Proxy/ Description
Size	log (Number of Employees)
Age	log (Age)
Manufacturing	Manufacturing vs non Manufacturing (dummy)
FO	Foreign Owned Company (Dummy)
Age2	log (Number of Employees), squared
Size2	log (Number of Employees), squared
DOM	Domestic Company with FDI (Dummy)

Variable	Characteristic	Expected Sign
FO	Productivity	+
	Profitability	+
	Wages	+
	Exports	+
	Size	+
DOM	Productivity	+
	Profitability	+
	Wages	+
	Exports	+
	Size	+
Size	Productivity	+ and inverted U shaped
	Profitability	-
	Wages	+
	Exports	+
	Size	
Age	Productivity	+ and inverted U shaped
	Profitability	+
	Wages	+
	Exports	+
	Size	+

Source: Own Elaboration

2.4 - Descriptive Statistics

As to the empirical study itself, it will start with the descriptive analysis highlighting different characteristics of FO and Portuguese firms, splitting the domestic firms into the two kinds referred before (DOM and DO). After the extraction, we performed a detailed preliminary analysis of the data¹.

From the data below (table 14 till 17) we conclude that, despite the fact that DOMs have a higher dispersion around the mean, they are on average older than FO and DO companies.

Analyzing the main variables that it will be used to the econometric study the first results prove interesting.

The number of employees is used as measure company's size and indicate that DOM are larger than the other group of companies. This can indicate that unlike we hypothesized and unlike the expectation of the literature (Gelübcke, 2013; Wang and Mathur, 2011; Dachs et al, 2009; Backer and Sleuwaegen, 2005), in the Portuguese case, DOMs tend to be larger than FO firms followed by DO firms.

DOMs generate, on average, almost 3 times of the turnover generated by FO firms and the turnover of DO firms not even represents 5% of the average turnover generated by the DOM's.

In terms of Gross Added Value the DOMs appear once again as those with higher results on average. DOMs' Gross Added Value is almost 3 times of the FO firms and more than 21 times the Gross Added Value of DO firms.

Using this variable and the number of employees we can calculate which group is on average more productive. In table 14 and 15, it is possible to see that, on average, DOMs are more productive than FO and DO firms what is not in line with part of literature (Gelübcke, 2013; Chang and Marrewijk, 2013; Adenauer and Heckelei, 2011; Temouri et al, 2008; Havrylchyk, 2006) but corroborates the results found by Iyer (2009) and Doms and Jensen (1998). However, when comparing only FO and DO firms

¹ The description of each variable are in the section appendix I. In all the analyses of this dissertation related to data set DO stands for just Portuguese Owned Companies without FDI.

the results are in line with literature referred above, i.e., FO firms are more productive than DO firms.

In terms of profitability, if we analyze the profit generated per employee (profemp) we conclude that, on average, the DOMs` employees are almost 2 times more profitable than those who work on FO companies, while those who work on DO firms present a profit per employee of only 1,5%. This results show us that the Portuguese case is in line with the literature who mainly predict that FO firms are more profitable than DO firms (Kimura and Kiyota, 2007; Girma et al, 2004; Qian et al, 2003; Pfaffermayr and Bellak, 2000). However FO firms are, on average, less profitable than DOMs in the Portuguese case.

More profitable employees mean, in the Portuguese case, higher wages paid on average. Once again, the literature (Gelübcke, 2013; Dobbelaere, 2004; Griffith and Simpson, 2003; Lipsey and Sjöholm, 2003; Girma et al, 2002) indicates that FO firms tend to have higher wages than DOMs and DO firms. This happens in the DO firms case but not in DOMs.

We can see that DO firms worked in Portugal, on average, with almost null profit margins (0,89%). DOMs have a profit margin of 6,95% and FOs of 4,60%.

Table 14. Descriptive Data – Main Variables - 2008 - 2012

DO	size	age	turnover	gva	gvaemp	wages	wagesemp
Mean	41,97	20,16	4.605,67	1.379,71	27,06	565,28	12,39
Sd	155,90	14,02	41.849,06	24.134,31	223,49	2.674,76	8,44
Min	10	0	0,01	0,00	0,00	2,99	0,04
Max	8574	144	4.955.272	6240424	32.262,30	227.162,20	747,64
Median	20,00	17	1.190,24	405.151,00	18,97	227,05	10,77
DOM	size	age	turnover	gva	gvaemp	wages	wagesemp
Mean	425,14	27,98	103.727	31.241,78	399,71	8.092,71	25,86
Sd	1.606,96	20,10	505.219,30	121.621,50	3.530,88	26.340,85	30,98
Min	10	0	4,09	5,38	0,06	24,00	0,73
Max	22734	140	10.400.000,00	2334640	82.822,33	311.347,20	478,47
Median	120	23	15594	5.202,62	39,68	2.301,04	18,64

Table 15. Descriptive Data – Main Variables - 2008 – 2012, cont

FO	size	Age	turnover	gva	gvaemp	wages	wagesemp
Mean	155,36	24,90	35.015,44	11.442,10	201,99	2.854,76	24,32
Sd	545,48	18,09	128.887	91.297,33	3.688,47	6.308,00	23,74
Min	10	0	12	4,65	0,03	6,54	0,05
Max	12643	107	2.432.189	5316572	241.662,40	89.690,34	515,43
Median	44	20	7.178,10	1.957,04	37,19	996,97	19,44
TOTAL	size	age	turnover	gva	gvaemp	wages	wagesemp
Mean	55,06	20,56	8.038,95	2.470,26	43,49	825,39	13,31
Sd	295,02	14,48	84.503,90	35.931,55	1.021,88	4.688,71	11,19
Min	10	0	0,01	0,00	0,00	2,99	0,04
Max	22734	144	10.400.000,00	6240424	241.662,40	311.347,20	747,64
Median	21,00	18	1.312,10	434.485,00	19.677,00	243.336,00	15,24

Source: Own Elaboration based on SABI data set

Table 16. Descriptive Data – Main Variables - 2008 – 2012, count

DO	profmarg	profemp	tsales	ebit	netincom
Mean	0,89	3,28	4.110,35	331,65	217,95
Sd	16,41	91,71996	33.811,43	20.529,16	19.561,05
Min	-945,75	9.505,95	0	-41628	-73.517,30
Max	908,98	17.398,41	4705156	6.039.844	58.89.054
Median	1,49	0,81	1.022,36	33,86	12,03
DOM	profmarg	profemp	tsales	ebit	netincom
Mean	6,95	220,09	88.806,46	8.539,99	8.191,69
Sd	54,58	1.908,17	519.281,90	49.903,14	50.708,64
Min	-745,07	-314,48	0,07	-158.212,40	-209.049,20
Max	930,14	32.700,16	10.300.000,00	1.169.465	832.681,70
Median	2,79	3,94	11.472,40	651,85	323,42

Source: Own Elaboration based on SABI data set

Table 17. Descriptive Data – Main Variables - 2008 – 2012, cont

FO	profmarg	profemp	tsales	ebit	netincom
Mean	4,61	109,39	29.691,16	4.025,79	3.911,05
Sd	24,73	3.170,75	125.401	73.109,18	72.547,61
Min	-253,49	-704,74	0	-54.110,49	-56.984,47
Max	743,32	231.666	2.263.447	5210703	5124695
Median	2,66	3,57	3.663,19	213,86	113,20
TOTAL	profmarg	profemp	tsales	ebit	netincom
Mean	1,21	13,09	7.239,65	684,62	566,84
Sd	18,34	805,00	84.287,83	27.221,79	26.490,78
Min	-945,75	-9.505,95	0	-158.212,40	-209.049,20
Max	930,14	231.666	10.300.000,00	6039844	5889054
Median	1,54	0,87	1.094,26	36,78	13,19

Source: Own Elaboration based on SABI data set

Table 18. Correlation Matrix³

	dom	fo	logage	logsize	manuf	logage2	logsize2
dom	1.0000						
fo	-0.0316	1.0000					
logage	0.0502	0.0581	1.0000				
logsize	0.2365	0.2196	0.1179	1.0000			
manuf	0.0391	-0.0081	0.0834	0.0952	1.0000		
logage2	0.0570	0.0661	0.9742	0.1317	0.0860	1.0000	
logsize2	0.2525	0.2204	0.1128	0.9810	0.0770	0.1261	1.0000
loggvaemp	0.1593	0.2443	0.1092	0.1577	-0.1225	0.1071	0.1498
logprofemp	0.1211	0.2071	0.0714	0.0900	-0.1161	0.0739	0.0886
wagesemp	0.1484	0.2376	0.0696	0.1139	-0.1252	0.0735	0.1094
export	0.1381	0.1116	0.1649	0.2483	0.3671	0.1673	0.2285
	loggvaemp	logprofemp	wagesemp	export			
loggvaemp	1.0000						
logprofemp	0.7284	1.0000					
wagesemp	0.6349	0.3738	1.0000				
export	0.1922	0.1495	0.0888	1.0000			

Source: Own elaboration based on Stata

As presented in table above, the correlation matrix show a high correlation between Wages per employee (wagesemp) and DOM as well as Profit per employee (profemp) and DOM.

³ Variables description in section appendix I.

2.5 - Econometric Approach and Estimation Issues

Before analyzing the results, some considerations ought to be made. Considering the nature of the data, and that we want to guarantee that there are no changes of status (in strategic variables FO, DO and DOM), during the period in analysis, it was tested a Pooled OLS Model.

Pooled Regression⁴ is usually carried out on Time-Series/Cross-Sectional data- data that has observations over time for several different units or cross-sections that is the case. This model is also known as population averaged model assuming that any latent heterogeneity has been averaged out (Greene, 2003). We did not consider that our research question allows us to use a panel data modelling approach, as it is not expected that there will be considerable changes in the key independent variable in the period analysed. So, it was used a Pooled Ordinary Least Squares (OLS) regression estimation which by the words of Park (2011, p. 19) is a “pooled linear regression” that “assumes a constant intercept and slopes regardless of group and time period”.

This econometric approach was already followed in another important studies about the theme under analysis in this study. De Backer and Sleuwaegen (2005) have used this kind of estimation in their study about the advantages of foreign affiliates in terms of productivity. Kimura and Kiyota (2007) used pooled regression models for the period 1990-1993 in their study about performance differences between FO and DO firms in the Japanese market. In a study about the relationship between multinationality and performance Gomes and Ramaswamy (1999) have tested their model using pooled time series methodology. To identify the effects of multinational diversification on the corporate financial performance in the Canadian market was used a “*pooled time-series-cross-sectional data for the years 1992–1994 and 1997*” (Mathur *et al*, 2001; p. 561). Also Criscuolo and Martin (2009) that studied the productivity of U.S. and other foreign-owned plants in the United Kingdom used a pooled sample (1996-2000) to their descriptive statistics.

⁴ The empirical work was performed using STATA (version 12.1.)

After we estimated Pooled OLS regressions, some unexpected results were emerging, leading us to hypothesize that the 2008 crisis may have had a significant impact on firms and their characteristics, hence we decided to implement also (by simple OLS estimations) a cross-section approach, as done by Gelübcke (2013a).

Model

In the estimations a log-linear function (Konings, 2001). it will be applied at the firm level to test whether (1) Are there significant differences in the characteristics of FO and DO companies, in the Portuguese case?, (2) And are there significant differences in the characteristics of FO and DO companies, in the Portuguese case?

The following specification is the starting point of the analysis:

$$Y_{it} = \alpha_i + \beta_{it} * X_{it} + \epsilon_{it} ,$$

Where i stands for firm i , t for year t , n for Y is the log of each one of the characteristics under analysis and X each of the independent variables. In this way, the models to estimate are the following:

(M1): Model 1– Comparing FO firms with all Portuguese Companies

$$\text{LogProductivity}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{LogSize}_{it} + \beta_3 \text{LogAge}_{it} + \beta_4 \text{LogAge}^2 + \beta_5 \text{LogSize}^2 + \beta_6 \text{Manuf}_{it} + \epsilon_{it}$$

$$\text{LogProfitability}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{LogSize}_{it} + \beta_3 \text{LogAge}_{it} + \beta_4 \text{LogAge}^2 + \beta_5 \text{LogSize}^2 + \beta_6 \text{Manuf}_{it} + \epsilon_{it}$$

$$\text{LogWages}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{LogSize}_{it} + \beta_3 \text{LogAge}_{it} + \beta_4 \text{LogAge}^2 + \beta_5 \text{LogSize}^2 + \beta_6 \text{Manuf}_{it} + \epsilon_{it}$$

$$\text{Exporter}^5_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{LogSize}_{it} + \beta_3 \text{LogAge}_{it} + \beta_4 \text{LogAge}^2 + \beta_5 \text{LogSize}^2 + \beta_6 \text{Manuf}_{it} + \epsilon_{it}$$

$$\text{LogSize}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{LogAge}_{it} + \beta_3 \text{LogAge}^2 + \beta_4 \text{Manuf}_{it} + \epsilon_{it}$$

(M2): Model 2 – Comparing FO with DOM and DO

$$\text{LogProductivity}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{DOM} + \beta_3 \text{LogSize}_{it} + \beta_4 \text{LogAge}_{it} + \beta_5 \text{LogAge}^2 + \beta_6 \text{LogSize}^2 + \beta_7 \text{Manuf}_{it} + \epsilon_{it}$$

$$\text{LogProfitability}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{DOM} + \beta_3 \text{LogSize}_{it} + \beta_4 \text{LogAge}_{it} + \beta_5 \text{LogAge}^2 + \beta_6 \text{LogSize}^2 + \beta_7 \text{Manuf}_{it} + \epsilon_{it}$$

⁵ Related to the characteristic Export Status, a probit model is going to be estimated, allowing to identify the probability of a company to be or not an exporter and how that depends of ownership.

$\text{LogWages}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{DOM} + \beta_3 \text{LogSize}_{it} + \beta_4 \text{LogAge}_{it} + \beta_5 \text{LogAge}_{it}^2 + \beta_6 \text{LogSize}_{it}^2 + \beta_7 \text{Manuf}_{it} + \varepsilon_{it}$

$\text{Exporter}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{DOM} + \beta_3 \text{LogSize}_{it} + \beta_4 \text{LogAge}_{it} + \beta_5 \text{LogAge}_{it}^2 + \beta_6 \text{LogSize}_{it}^2 + \beta_7 \text{Manuf}_{it} + \varepsilon_{it}$

$\text{LogSize}_{it} = \alpha + \beta_1 \text{FO} + \beta_2 \text{DOM} + \beta_3 \text{LogAge}_{it} + \beta_4 \text{LogAge}_{it}^2 + \beta_5 \text{Manuf}_{it} + \varepsilon_{it}$

Model 1 (M1) allow to compare FO firms with all the kinds of Portuguese Owned companies, i.e, with or without FDI.

Model 2 (M2) intends to compare FO firms with their Portuguese counterpart splitting these in two kinds: domestic companies with FDI (DOM) and domestic companies without FDI (DO).

For each of the dependent variables it will be used the proxy referred above in table 12. And quadratic relations it will be tested always that pertinent by including in the functional form log age square and log size square.

In order to estimate if foreign ownership has direct impact in the characteristics under analyse it will be used a Dummy Variable that can assumes the values 1 if the company is FO and 0 otherwise. With a first look of the descriptive it is expected that FO has a positive impact in all the dependent variables.

In this case DOM it will be a dummy variable that assumes the value 1 if the company it is Domestic owned with FDI and 0 otherwise. The use of these kind of dummies were already used for other authors that studied the characteristics differences between FO and DO firms (see for example Boardman et al, 1997; Greenaway et al, 2004; Hakkala et al, 2010).

The primary estimations trough OLS showed the presence of heteroscedasticity in the data. In order to present consistent results it is going to be used OLS with robust standard errors.

Taking in account the large number of observations and the vast number of factors which influence firm characteristics R-squared coefficients are normally low because the nature of the data (Cardoso, 2008; Gelübcke, 2013a.), and the fact that firms are

distinct units among themselves. Notwithstanding, the result for the STATA global significance test indicates the global significance of the overall estimated models.

Both models it will be applied to 3 different approaches:

- 1) All the data set available and extracted from SABI
- 2) Only to the manufacturing companies
- 3) Only manufacturing companies but controlled by subsectors⁶

⁶ The subsectors used are described and explained in Appendix II.

2.5.1 – Pooled OLS Regressions

Table 19. Regression Results (M1) – All the data set available

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,65***	(0,01)	1,39***	(0,03)	0,51***	(0,01)	0,13***	(0,01)	0,80***	(0,02)
logage	0,14***	(0,01)	0,14***	(0,01)	0,08***	(0,00)	0,07***	(0,00)	0,11***	(0,00)
logsize	0,26***	(0,02)	0,10***	(0,01)	0,06***	(0,00)	0,10***	(0,00)	0,16***	(0,01)
manuf	-0,21***	(0,00)	-0,44***	(0,01)	-0,19***	(0,00)	0,33***	(0,00)		
logage2	-0,01***	(0,00)								
logsize2	-0,02***	(0,00)								
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,10		0,06		0,14		0,20		0,07
Nr. Obs		100.756		78.212		39.991		100.756		100.756

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 20. Regression Results (M2) – All the data set available

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,69***	(0,01)	1,47***	(0,03)	0,54***	(0,01)	0,15***	(0,01)	0,83***	(0,02)
dom	0,85***	(0,03)	1,62***	(0,06)	0,52***	(0,02)	0,30***	(0,01)	1,59***	(0,03)
logage	0,15***	(0,01)	0,13***	(0,01)	0,08***	(0,00)	0,07***	(0,00)	0,10***	(0,00)
logsize	0,30***	(0,01)	0,04***	(0,01)	0,04***	(0,00)	0,09***	(0,00)	0,15***	(0,01)
manuf	-0,22***	(0,00)	-0,44***	(0,01)	-0,19***	(0,00)	0,33***	(0,00)		
logage2	-0,01***	(0,00)								
logsize2	-0,03***	(0,00)								
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,12		0,08		0,15		0,20		0,12
Nr. Obs		100.756		78.212		39.991		100.756		100.756

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 21. Regression Results (M1) – Manufacturing Companies – Not using sub sectors as control variables

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,48***	(0,02)	1,29***	(0,05)	0,37***	(0,02)	0,09***	(0,01)	1,08***	(0,03)
logage	0,08***	(0,00)	0,05***	(0,01)	0,08***	(0,00)	0,08***	(0,00)	0,20***	(0,01)
logsize	0,12***	(0,00)	0,22***	(0,01)	0,06***	(0,00)	0,21***	(0,00)		
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,10		0,06		0,13		0,16		0,13
Nr. Obs		32.300		25.107		12.838		32.300		32.300

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 22. Regression Results (M2) – Manufacturing Companies - Not using sub sectors as control variables

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,48***	(0,02)	1,30***	(0,05)	0,37***	(0,02)	0,09***	(0,01)	1,08***	(0,03)
dom	0,58***	(0,13)	1,00***	(0,35)	0,31**	(0,13)	0,12***	(0,05)	1,33***	(0,19)
logage	0,08***	(0,00)	0,05***	(0,01)	0,08***	(0,00)	0,08***	(0,00)	0,20***	(0,01)
logsize	0,12***	(0,00)	0,21***	(0,01)	0,06***	(0,00)	0,21***	(0,00)		
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,10		0,06		0,13		0,16		0,13
Nr. Obs		32.300		25.107		12.838		32.300		32.300

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 23. Regression Results (M1) – Manufacturing Companies – With sub sectors as control variables

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,29***	(0,02)	0,91***	(0,05)	0,23***	(0,01)	0,05***	(0,01)	1,00***	(0,03)
logage	0,12***	(0,02)	-0,07***	(0,01)	0,04***	(0,00)	0,08***	(0,00)	0,23***	(0,01)
logsize	0,21***	(0,02)	0,26***	(0,01)	0,08***	(0,00)	0,20***	(0,00)		
logage2	-0,02***	(0,00)								
logsize2	-0,01***	(0,00)								
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,34		0,16		0,42		0,23		0,18
Nr. Obs		32.300		25.107		12.838		32.300		32.300

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 24. Regression Results (M2) – Manufacturing Companies – With sub sectors as control variables

Variables	GVA per Employee		Profit per Employee		Wages per Employee		Exporters		Size	
fo	0,30***	(0,02)	0,93***	(0,05)	0,24***	(0,02)	0,05***	(0,01)	1,01***	(0,03)
dom	0,43***	(0,11)	0,70**	(0,32)	0,18*	(0,10)	0,08	(0,05)	1,31***	(0,18)
logage	0,11***	(0,02)	-0,07***	(0,01)	0,04***	(0,00)	0,08***	(0,00)	0,23***	(0,01)
logsize	0,22***	(0,02)	0,27***	(0,01)	0,09***	(0,00)	0,20***	(0,00)		
logage2	-0,02***	(0,00)								
logsize2	-0,01***	(0,00)								
F- test		0,0000		0,0000		0,0000		0,0000		0,0000
R2		0,34		0,16		0,41		0,23		0,18
Nr, Obs		32.300		25.107		12.838		32.300		32.300

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

2.5.2 – Cross Section Regressions

To the cross-section estimations it was done a deeply analysis of the data. There were found some outliers that due the nature of their data can be considered data set errors. These outliers were not considered in our estimations being dropped by using in each case an appropriate filter. These eliminations have changed the number of our observations. So the final sample used in the cross section estimations is reported in table 25 below.

Table 25. Final Sample to Cross Section Estimations

All Data set					
DO					
Year	2008	2009	2010	2011	2012
Obs	19.255	19.275	19.270	19.180	18.996
DOM					
Year	2008	2009	2010	2011	2012
Obs	355	360	360	353	356
FO					
Year	2008	2009	2010	2011	2012
Obs	1.197	1.199	1.198	1.180	1.171
Manufacturing Companies					
DO					
Year	2008	2009	2010	2011	2012
Obs	6.106	6.106	6.106	6.106	6.106
DOM					
Year	2008	2009	2010	2011	2012
Obs	112	156	164	144	144
FO					
Year	2008	2009	2010	2011	2012
Obs	353	353	353	353	353

Source: Own Elaboration based on Sabi dataset

The cross section analysis will allow us to have a better understanding of how dependent variables have evolved from year to year.

For purposes of global and individual significance, the squared age and size variables were not applied to every single model that we are about to present.

We will follow the structure of the previous section, presenting the results for the full database, then only manufacture and lastly manufacturing controlling for subsector.

Regression Results – All the data set available

Table 26. Cross Section Regression - Productivity

Gross Value Added per Employee						
(M1) Variables	2008		2009		2010	
fo	0,47***	(0,02)	0,42***	(0,02)	0,42***	(0,02)
logage	0,10***	(0,01)	0,10***	(0,01)	0,09***	(0,01)
logsize	0,04***	(0,01)	0,05***	(0,01)	0,06***	(0,01)
manuf	-0,18***	(0,01)	-0,19***	(0,01)	-0,17***	(0,01)
F- test	0,0000		0,0000		0,0000	
R2	0,08		0,07		0,07	
Nr. Obs	20.063		20.385		20.392	
GVA per Employee						
(M2) Variables	2008		2009		2010	
fo	0,44***	(0,02)	0,43***	(0,02)	0,44***	(0,02)
dom	0,55***	(0,04)	0,61***	(0,03)	0,47***	(0,04)
logage	0,10***	(0,01)	0,09***	(0,01)	0,09***	(0,01)
logsize	0,03***	(0,01)	0,03***	(0,01)	0,05***	(0,01)
manuf	-0,18***	(0,01)	-0,19***	(0,01)	-0,17***	(0,01)
F- test	0,0000		0,0000		0,0000	
R ²	0,09		0,09		0,08	
Nr. Obs	20.063		20.382		20.384	
GVA per Employee						
(M2) Variables	2011		2012			
fo	0,46***	(0,02)	0,45***	(0,02)		
dom	0,39***	(0,04)	0,39***	(0,04)		
logage	0,09***	(0,01)	0,08***	(0,01)		
logsize	0,06***	(0,01)	0,10***	(0,01)		
manuf	-0,16***	(0,01)	-0,13***	(0,01)		
F- test	0,0000		0,0000			
R2	0,08		0,08			
Nr. Obs	20.275		20.111			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 27. Cross Section Regression - Profitability

Profit per Employee						
(M1) Variables	2008		2009		2010	
fo	1,03***	(0,06)	0,92***	(0,06)	1,04***	(0,06)
logage	0,15***	(0,02)	0,16***	(0,02)	0,15***	(0,02)
logsize	-0,04**	(0,02)	0,01	(0,02)	0,07***	(0,02)
manuf	-0,43***	(0,03)	-0,37***	(0,03)	-0,40***	(0,02)
F- test	0,0000		0,0000		0,0000	
R ²	0,04		0,04		0,04	
Nr. Obs	15.331		15.446		16.900	
	2011		2012			
fo	1,11***	(0,06)	1,09***	(0,06)		
logage	0,17***	(0,02)	0,17***	(0,02)		
logsize	0,10***	(0,02)	0,18***	(0,02)		
manuf	-0,33***	(0,03)	-0,31***	(0,03)		
F- test	0,0000		0,0000			
R ²	0,04		0,05			
Nr. Obs	15.661		14.241			
Profit per Employee						
(M2) Variables	2008		2009		2010	
fo	1,08***	(0,06)	0,97***	(0,06)	1,09***	(0,06)
dom	1,12***	(0,10)	1,13***	(0,09)	1,24***	(0,09)
logage	0,15***	(0,02)	0,15***	(0,02)	0,15***	(0,02)
logsize	-0,07***	(0,02)	-0,03*	(0,02)	0,03*	(0,02)
manuf	-0,42***	(0,03)	-0,38***	(0,03)	-0,40***	(0,02)
F- test	0,0000		0,0000		0,0000	
R ²	0,05		0,05		0,05	
Nr. Obs	15.331		15.446		16.900	
	2011		2012			
fo	1,15***	(0,06)	1,14***	(0,06)		
dom	0,96***	(0,10)	0,82***	(0,11)		
logage	0,17***	(0,02)	0,17***	(0,02)		
logsize	0,07***	(0,02)	0,14***	(0,02)		
manuf	-0,34***	(0,03)	-0,31***	(0,03)		
F- test	0,0000		0,0000			
R ²	0,05		0,05			
Nr. Obs	15.661		14.241			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 28. Cross Section Regression - Wages per Employee

Wages per Employee				
(M1) Variables	2008		2009	
fo	0,45***	(0,02)	0,42***	(0,02)
logage	0,08***	(0,00)	0,07***	(0,00)
logsize	0,04***	(0,00)	0,04***	(0,00)
manuf	-0,16***	(0,01)	-0,17***	(0,01)
F value	0,0000		0,0000	
R2	0,11		0,11	
Nr. Obs	19.889		20.032	
Wages per Employee				
(M2) Variables	2008		2009	
fo	0,46***	(0,02)	0,42***	(0,02)
dom	0,56***	(0,05)	0,45***	(0,03)
logage	0,08***	(0,00)	0,07***	(0,00)
logsize	0,04***	(0,00)	0,04***	(0,00)
manuf	-0,16***	(0,01)	-0,17***	(0,01)
F value	0,0000		0,0000	
R ²	0,12		0,12	
Nr, Obs	19.889		20.032	

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 29. Cross Section Regression - Exporter

Exporter						
(M1) Variables	2008		2009		2010	
fo	0,15***	(0,01)	0,14***	(0,01)	0,14***	(0,01)
logage	0,05***	(0,00)	0,06***	(0,00)	0,08***	(0,00)
logsize	0,10***	(0,00)	0,10***	(0,00)	0,10***	(0,00)
manuf	0,34***	(0,01)	0,34***	(0,01)	0,34***	(0,01)
F value	0,0000		0,0000		0,0000	
R2	0,19		0,20		0,20	
Nr. Obs	20.063		20.382		20.384	
Exporter						
(M2) Variables	2008		2009		2010	
fo	0,14***	(0,01)	0,14***	(0,01)		
logage	0,08***	(0,00)	0,09***	(0,00)		
logsize	0,10***	(0,00)	0,11***	(0,00)		
manuf	0,33***	(0,01)	0,33***	(0,01)		
F value	0,0000		0,0000			
R2	0,20		0,21			
Nr. Obs	20.275		20.111			
Exporter						
(M2) Variables	2008		2009		2010	
fo	0,16***	(0,01)	0,16***	(0,01)	0,15***	(0,01)
dom	0,29***	(0,02)	0,34***	(0,02)	0,36***	(0,02)
logage	0,05***	(0,00)	0,06***	(0,00)	0,07***	(0,00)
logsize	0,09***	(0,00)	0,09***	(0,00)	0,09***	(0,00)
manuf	0,34***	(0,01)	0,34***	(0,01)	0,33***	(0,01)
F value	0,0000		0,0000		0,0000	
R^2	0,20		0,20		0,21	
Nr. Obs	20.063		20.382		20.384	
Exporter						
(M2) Variables	2008		2009		2010	
fo	0,15***	(0,01)	0,15***	(0,01)		
dom	0,32***	(0,02)	0,31***	(0,02)		
logage	0,08***	(0,00)	0,09***	(0,00)		
logsize	0,09***	(0,00)	0,09***	(0,00)		
manuf	0,33***	(0,01)	0,33***	(0,01)		
F value	0,0000		0,0000			
R^2	0,21		0,21			
Nr. Obs	20.275		20.111			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 30. Cross Section Regression - Size

SIZE						
(M1) Variables	2008		2009		2010	
fo	0,80***	(0,04)	0,80***	(0,04)	0,81***	(0,04)
logage	0,14***	(0,01)	0,11***	(0,01)	0,11***	(0,01)
manuf	0,16***	(0,01)	0,14***	(0,01)	0,14***	(0,01)
F value	0,0000		0,0000		0,0000	
R2	0,07		0,06		0,06	
Nr. Obs	20.063		20.382		20.384	
	2011		2012			
fo	0,80***	(0,04)	0,79***	(0,04)		
logage	0,09***	(0,01)	0,10***	(0,01)		
manuf	0,17***	(0,01)	0,19***	(0,01)		
F value	0,0000		0,0000			
R2	0,06		0,06			
Nr. Obs	20.275		20.111			
Size						
(M2) Variables	2008		2009		2010	
fo	0,83***	(0,04)	0,82***	(0,04)	0,83***	(0,04)
dom	1,28***	(0,08)	1,45***	(0,07)	1,34***	(0,07)
logage	0,13***	(0,01)	0,10***	(0,01)	0,09***	(0,01)
manuf	0,16***	(0,01)	0,13***	(0,01)	0,12***	(0,01)
F value	0,0000		0,0000		0,0000	
R ²	0,11		0,11		0,10	
Nr. Obs	20.063		20.382		20.384	
	2011		2012			
fo	0,83***	(0,04)	0,83***	(0,04)		
dom	1,75***	(0,06)	2,52***	(0,07)		
logage	0,08***	(0,01)	0,08***	(0,01)		
manuf	0,14***	(0,01)	0,16***	(0,01)		
F value	0,0000		0,0000			
R ²	0,12		0,18			
Nr. Obs	20.275		20.111			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Manufacturing Companies – Not using sub sectors as control variables

Table 31. Cross Section Regression - Productivity

GVA per Employee						
(M1) Variables	2008		2009		2010	
fo	0,46***	(0,04)	0,43***	(0,04)	0,46***	(0,04)
logage	0,09***	(0,01)	0,09***	(0,01)	0,09***	(0,01)
logsize	0,12***	(0,01)	0,12***	(0,01)	0,12***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,11		0,10		0,11	
Nr. Obs	6.512		6.623		6.628	
GVA per Employee						
(M2) Variables	2008		2009		2010	
fo	0,43***	(0,04)	0,42***	(0,04)		
logage	0,07***	(0,01)	0,09***	(0,01)		
logsize	0,17***	(0,01)	0,18***	(0,01)		
F test	0,0000		0,0000			
R2	0,13		0,12			
Nr. Obs	6.662		6.625			
GVA per Employee						
(M2) Variables	2008		2009		2010	
fo	0,49***	(0,04)	0,49***	(0,04)	0,49***	(0,04)
dom	0,59***	(0,06)	0,61***	(0,05)	0,35***	(0,06)
logage	0,10***	(0,01)	0,09***	(0,01)	0,09***	(0,01)
logsize	0,10**	(0,01)	0,09***	(0,01)	0,10***	(0,01)
F test	0,0000		0,0000		0,00	
R2	0,13		0,12		0,12	
Nr. Obs	6.512		6.623		6.628	
GVA per Employee						
(M2) Variables	2011		2012			
fo	0,49***	(0,04)	0,46***	(0,04)		
dom	0,49***	(0,07)	0,43***	(0,06)		
logage	0,08***	(0,01)	0,10***	(0,01)		
logsize	0,13***	(0,01)	0,14***	(0,01)		
F test	0,0000		0,0000			
R2	0,14		0,13			
Nr. Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 32. Cross Section Regression - Profitability

Profit per Employee						
(M1) Variables	2008		2009		2010	
fo	1,20***	(0,11)	1,11***	(0,11)	1,24***	(0,10)
logage	0,09***	(0,03)	0,07***	(0,03)	0,06**	(0,03)
logsize	0,15***	(0,03)	0,24***	(0,03)	0,25***	(0,03)
F test	0,0000		0,0000		0,0000	
R2	0,05		0,06		0,06	
Nr. Obs	4.988		4.899		5.594	
	2011		2012			
fo	1,14***	(0,11)	1,22***	(0,10)		
logage	0,04	(0,03)	0,07**	(0,04)		
logsize	0,37***	(0,03)	0,40***	(0,03)		
F test	0,0000		0,0000			
R2	0,08		0,10			
Nr. Obs	5.238		4.965			
Profit per Employee						
(M2) Variables	2008		2009		2010	
fo	1,26***	(0,11)	1,21***	(0,11)	1,33***	(0,10)
dom	1,10***	(0,17)	1,03***	(0,14)	1,10***	(0,12)
logage	0,10***	(0,03)	0,08***	(0,03)	0,06**	(0,03)
logsize	0,11***	(0,03)	0,17***	(0,03)	0,19***	(0,03)
F test	0,0000		0,0000		0,0000	
R2	0,06		0,07		0,07	
Nr, Obs	4.988		4.899		5.594	
	2011		2012			
fo	1,28***	(0,11)	1,32***	(0,10)		
dom	1,18***	(0,16)	1,03***	(0,16)		
logage	0,05	(0,03)	0,08**	(0,04)		
logsize	0,27***	(0,03)	0,33***	(0,03)		
F test	0,0000		0,0000			
R2	0,09		0,10			
Nr, Obs	5.238		4.965			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 33. Cross Section Regression – Wages per Employee

Wages per Employee				
(M1) Variables	2008		2009	
fo	0,37***	(0,02)	0,35***	(0,02)
logage	0,08***	(0,01)	0,08***	(0,01)
logsize	0,07***	(0,01)	0,07***	(0,01)
F test	0,0000		0,0000	
R2	0,14		0,13	
Nr. Obs	6.448		6.493	

Wages per Employee				
(M2) Variables	2008		2009	
fo	0,38***	(0,02)	0,36***	(0,02)
dom	0,43***	(0,06)	0,35***	(0,04)
logage	0,08***	(0,01)	0,08***	(0,01)
logsize	0,07***	(0,01)	0,06***	(0,01)
F test	0,0000		0,0000	
R2	0,14		0,14	
Nr, Obs	6.448		6.493	

Robust standard errors in parentheses

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Own Elaboration based on STATA regression analysis

Table 34. Cross Section Regression - Exporter

Exporter						
(M1)Variables	2008		2009		2010	
fo	0,09***	(0,02)	0,09***	(0,02)	0,08***	(0,02)
logage	0,06***	(0,01)	0,08***	(0,01)	0,09***	(0,01)
logsize	0,20***	(0,01)	0,20***	(0,01)	0,21***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,16		0,17		0,17	
Nr Obs	6.512		6.623		6.628	
Exporter						
	2011		2012			
fo	0,09***	(0,02)	0,09***	(0,02)		
logage	0,10***	(0,01)	0,11***	(0,01)		
logsize	0,21***	(0,01)	0,21***	(0,01)		
F test	0,0000		0,0000			
R2	0,18		0,18			
Nr. Obs	6.662		6.625			
Exporter						
(M2)Variables	2008		2009		2010	
fo	0,10***	(0,02)	0,10***	(0,02)	0,09***	(0,02)
dom	0,13***	(0,03)	0,15***	(0,02)	0,15***	(0,02)
logage	0,06***	(0,01)	0,08***	(0,01)	0,09***	(0,01)
logsize	0,19***	(0,01)	0,20***	(0,01)	0,20***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,16		0,17		0,17	
Nr. Obs	6.512		6.623		6.628	
Exporter						
	2011		2012			
fo	0,09***	(0,02)	0,09***	(0,02)		
dom	0,04**	(0,02)	-0,01	(0,02)		
logage	0,10***	(0,01)	0,11***	(0,01)		
logsize	0,20***	(0,01)	0,21***	(0,01)		
F test	0,0000		0,0000			
R2	0,18		0,18			
Nr. Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 35. Cross Section Regression - Size

Size						
(M1) Variables	2008		2009		2010	
fo	1,07***	(0,07)	1,04***	(0,06)	1,04***	(0,06)
logage	0,22***	(0,01)	0,22***	(0,01)	0,22***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,14		0,13		0,12	
Nr. Obs	6.512		6.623		6.628	
Size						
(M2) Variables	2008		2009		2010	
fo	1,00***	(0,07)	1,00***	(0,07)		
logage	0,23***	(0,02)	0,22***	(0,02)		
F test	0,0000		0,0000			
R2	0,10		0,09			
Nr. Obs	6.662		6.625			
Size						
(M2) Variables	2008		2009		2010	
fo	1,09***	(0,07)	1,08***	(0,06)	1,08***	(0,06)
dom	1,47***	(0,12)	1,53***	(0,08)	1,33***	(0,08)
logage	0,22***	(0,01)	0,20	(0,01)	0,20***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,19		0,20		0,18	
Nr, Obs	6.512		6.623		6.628	
Variables	2011		2012			
fo	1,07***	(0,07)	1,07***	(0,07)		
dom	1,97***	(0,05)	2,25***	(0,06)		
logage	0,20***	(0,02)	0,20***	(0,02)		
F test	0,0000		0,0000			
R2	0,24		0,24			
Nr, Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Manufacturing Companies – Using sub sectors as control variable

Table 36. Cross Section Regression - Productivity

GVA per Employee						
(M1) Variables	2008		2009		2010	
fo	0,29***	(0,04)	0,26***	(0,04)	0,27***	(0,03)
logage	0,03***	(0,01)	0,01	(0,01)	0,01	(0,01)
logsize	0,14***	(0,01)	0,16***	(0,01)	0,15***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,38		0,36		0,37	
Nr. Obs	6.512		6.623		6.628	
	2011		2012			
fo	0,26***	(0,03)	0,26***	(0,04)		
logage	-0,01	(0,01)	0,01	(0,01)		
logsize	0,20***	(0,01)	0,19***	(0,01)		
F test	0,0000		0,0000			
R2	0,36		0,31			
Nr. Obs	6.662		6.625			
GVA per Employee						
(M2) Variables	2008		2009		2010	
fo	0,31***	(0,04)	0,30***	(0,04)	0,29***	(0,03)
dom	0,25***	(0,06)	0,40***	(0,05)	0,17***	(0,06)
logage	0,03***	(0,01)	0,01	(0,01)	0,01	(0,01)
logsize	0,13***	(0,01)	0,14***	(0,01)	0,14***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,38		0,37		0,37	
Nr. Obs	6.512		6.623		6.628	
	2011		2012			
fo	0,30***	(0,03)	0,28***	(0,04)		
dom	0,33***	(0,06)	0,18***	(0,05)		
logage	0,00	(0,01)	0,01	(0,01)		
logsize	0,17***	(0,01)	0,18***	(0,01)		
F test	0,0000		0,0000			
R2	0,36		0,31			
Nr. Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 37. Cross Section Regression - Profitability

Profit per Employee						
Variables	2008		2009		2010	
fo	0,89***	(0,11)	0,77***	(0,11)	0,88***	(0,10)
logage	0,00	(0,03)	-0,05*	(0,03)	-0,07**	(0,03)
logsize	0,17***	(0,03)	0,28**	(0,03)	0,29***	(0,03)
F test	0,0000		0,0000		0,0000	
R2	0,17		0,16		0,17	
Nr. Obs	4.988		4.899		5.594	
Profit per Employee						
Variables	2011		2012			
fo	0,81***	(0,10)	0,94***	(0,10)		
logage	-0,08**	(0,03)	-0,05	(0,04)		
logsize	0,40***	(0,03)	0,42***	(0,03)		
F test	0,0000		0,0000			
R2	0,18		0,18			
Nr. Obs	5.238		4.965			
Profit per Employee						
Variables	2008		2009		2010	
fo	0,92***	(0,11)	0,85***	(0,11)	0,95***	(0,10)
dom	0,46***	(0,16)	0,78***	(0,14)	0,83***	(0,12)
logage	0,00	(0,03)	-0,04	(0,03)	-0,06**	(0,03)
logsize	0,16***	(0,03)	0,23***	(0,03)	0,25***	(0,03)
F test	0,0000		0,0000		0,0000	
R2	0,17		0,17		0,18	
Nr. Obs	4.988		4.899		5.594	
Profit per Employee						
Variables	2011		2012			
fo	0,92***	(0,10)	1,00***	(0,10)		
dom	0,88***	(0,15)	0,58***	(0,15)		
logage	-0,07**	(0,03)	-0,05	(0,03)		
logsize	0,32***	(0,03)	0,38***	(0,03)		
F test	0,0000		0,0000			
R2	0,19		0,19			
Nr. Obs	5.238		4.965			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 38. Cross Section Regression – Wages per Employee

Wages per Employee				
Variables	2008		2009	
fo	0,24***	(0,02)	0,22***	(0,02)
logage	0,04***	(0,01)	0,03***	(0,00)
logsize	0,09***	(0,01)	0,09***	(0,01)
F test		0,0000		0,0000
R2		0,42		0,41
Nr. Obs		6.448		6.493
Wages per Employee				
Variables	2008		2009	
fo	0,25***	(0,02)	0,23***	(0,02)
dom	0,22***	(0,06)	0,21***	(0,05)
logage	0,04***	(0,01)	0,03***	(0,00)
logsize	0,10***	(0,01)	0,09***	(0,01)
F test		0,0000		0,0000
R2		0,42		0,42
Nr. Obs		6.448		6.493
Robust standard errors in parentheses				
Level of significance: *** p<0.01, ** p<0.05, * p<0.1				
Source: Own Elaboration based on STATA regression analysis				

Table 39. Cross Section Regression - Exporter

Exporter						
Variables	2008		2009		2010	
fo	0,06***	(0,02)	0,05***	(0,02)	0,05**	(0,02)
logage	0,06***	(0,01)	0,07**	(0,01)	0,08***	(0,01)
logsize	0,19***	(0,01)	0,20***	(0,01)	0,20***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,22		0,23		0,24	
Nr. Obs	6.512		6.623		6.628	
Variables	2011		2012			
fo	0,05**	(0,02)	0,06***	(0,02)		
logage	0,09***	(0,01)	0,10***	(0,01)		
logsize	0,20***	(0,01)	0,20***	(0,01)		
F test	0,0000		0,0000			
R2	0,24		0,25			
Nr. Obs	6.662		6.625			
Exporter						
Variables	2008		2009		2010	
fo	0,07***	(0,02)	0,06***	(0,02)	0,05**	(0,02)
dom	0,06*	(0,04)	0,13***	(0,02)	0,09***	(0,02)
logage	0,06***	(0,01)	0,07***	(0,01)	0,08***	(0,01)
logsize	0,19***	(0,01)	0,19***	(0,01)	0,20***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,22		0,23		0,24	
Nr. Obs	6.512		6.623		6.628	
Variables	2011		2012			
fo	0,06**	(0,02)	0,05**	(0,02)		
dom	0,04**	(0,02)	0,06***	(0,02)		
logage	0,09***	(0,01)	0,10***	(0,01)		
logsize	0,20***	(0,01)	0,20***	(0,01)		
F test	0,0000		0,0000			
R2	0,24		0,25			
Nr. Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Table 40. Cross Section Regression - Size

Size						
Variables	2008		2009		2010	
fo	0,98***	(0,06)	0,97***	(0,06)	0,97***	(0,06)
logage	0,24***	(0,01)	0,24***	(0,01)	0,25***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,18		0,17		0,16	
Nr. Obs	6.512		6.623		6.628	
Variables	2011		2012			
fo	0,92***	(0,06)	0,90***	(0,06)		
logage	0,25***	(0,02)	0,25***	(0,02)		
F test	0,0000		0,0000			
R2	0,17		0,15			
Nr. Obs	6.662		6.625			
Size						
Variables	2008		2009		2010	
fo	1,02***	0,06	1,02***	(0,06)	1,02***	(0,06)
dom	1,44***	0,11	1,55***	(0,08)	1,33***	(0,08)
logage	0,24***	0,01	0,23***	(0,01)	0,23***	(0,01)
F test	0,0000		0,0000		0,0000	
R2	0,23		0,24		0,22	
Nr. Obs	6.512		6.623		6.628	
Variables	2011		2012			
fo	1,01***	(0,06)	1,00***	(0,06)		
dom	1,88***	(0,05)	2,19***	(0,06)		
logage	0,23***	(0,02)	0,24***	(0,02)		
F test	0,0000		0,0000			
R2	0,29		0,29			
Nr. Obs	6.662		6.625			

Robust standard errors in parentheses

Level of significance: *** p<0.01, ** p<0.05, * p<0.1

Source: Own Elaboration based on STATA regression analysis

Chapter 3 – Results and Discussions

3.1 – Pooled OLS

This section analyzes and discusses the findings of the previous section.

Concerning the Pooled OLS estimations, we run the log-log regression and first of all it is important to notice that all the results are significant at a level of 1% when we use full data set available. If we use only manufacturing companies all the results are significant at level 1% with exception dom in wages per employee (5% significance. We control the manufacturing sample to subsectors dom in wages per employee it is significant at a level of 5% and dom in exporter it is not significant. All the other variables are significant at a level of 1% for this sample. The log model fits properly the data (F test), as we can see in tables above.

Using all the data set available, for both models, it is verified that FO has a positive and significant impact on all the characteristics under analysis. However, when the impact of FO and DOM is compared in M2 it is clear that that the impact of DOM is higher than the FO in all the characteristics with the exception of wages per employee, in line with the descriptive statistics. These results are in the line with findings by Iyer (2009) in Indian Market.

The findings, using all data set controlling the function only for FO, show that these firms are more profitable than Portuguese owned companies 1,39% and 0,65% more productive. But the results are different if both dummies (with DOM) are used at the same time. It is possible to identify that DOM are expected to be 0,15 p.p more profitable than FO and 0,16 p.p more productive (table 19 and 20).

The positive sign in logage and logsize, and negative in quadratic form, not only show a positive impact in Productivity as well as establish an inverted U shape relationship between these two variables and GVA per employee. Having this in mind and that, as we can see in both estimation, in table 19 and 20, the size tend to grow with age, it seems that are an optimal point of productivity. It is also possible to confirm findings of Qian *et al* (2003) that new firms have better performance than older firms.

A negative sign was expected in the relationship between size and profitability. However, the findings are different, what seems to indicate that, in Portugal, DOM and FO larger firms tend to be more profitable. Nonetheless it was not possible to estimate a quadratic relationship between these two variables to identify if there are or not an inverted U shaped relationship between them.

Results indicate that it is more likely to find an exporter company among DOM than any other group.

When the data set is used only for the manufacturing companies' sample, without controlling the estimations with subsectors (table 21 and 22), the results show some different findings and conclusions in this more homogeneous group. DOM (0,58) still to have a higher impact over productivity than FO (0,48), however the results changed in terms of profitability, showing that in the case of manufacturing companies the foreignness has a higher impact with FO firm being more profitable in 0,30 p.p.

Controlling this group for subsectors (table 23 and 24), a first insight of the results, is important to emphasize the increase of R square in the statistics to this controlled homogeneous group. The findings are almost the same without controlling for subsectors except that were not possible to find a statistical significance relation between DOM and the probability of the company to be an Exporter.

In the manufacturing group it is possible to verify that FO outperform DOM in terms of profitability what possible means a better resources allocation related to them need to be more efficient to overcome the liability of foreignness (Zaheer, 1995).

As expected age, in pooled regressions, have a positive and statistically significant relation with all the characteristics under analysis. However when controlling for subsectors age shows a negative and statistically significant relation with profitability but it was not possible to confirm a quadratic relation.

Beside the expected, and already not confirmed, negative relation between size and profitability the signs of all coefficients confirm the positive expected relation between this variable and all the characteristics.

Independent of what data set is used results show the importance of multinationality *per se* on firm characteristics confirming the Ownership advantages (Dunning, 1988). As

Pfaffermayr and Bellak (2000) argued the gaps between firms are many times more related to being part of a multinational network than specifically with foreign ownership.

In the Portuguese case FO are larger, more profitable, more productive, pay higher wages, then DO but it does not happen when compared with Portuguese owned Multinationals (DOM) with the latter outperforming the first in terms of productivity, profitability, size and probability of being an exporter company (see table 19).

3.2 – Cross Section

The cross section estimations allow identifying, year by year, the impact that each independent variable has in the dependent variables and complements the pooled analysis with a dynamic overview. Once again it is important to highlight the significance of all the tests done.

Analyzing the results in terms of productivity it can be identified that FO firms are, on average, more productive than Portuguese owned companies (table 26).

However this dynamic overview of the results allows identifying an interesting aspect when comparing FO with DOM. Between 2008 and 2010 DOM have higher impact than FO on GVA per employee, but it starts to decrease in 2009 being lower in 2011 and 2012. The same happens in terms of profitability (table 27). This can suggest that foreign firms are more efficient during periods in what the economy is running smoothly (Godart *et al*, 2012b).

In terms of wages per employee (table 28), there are only results for 2008 and 2009. It is possible to identify that DOM pay higher wages on average to their employees than FO and DO. These results seem to be inconsistent with the pooled regression that has shown a FO higher wages per employee. It is also interesting notice that manufacturing companies tend to pay lower wages than non manufacturing companies.

From table 29, the probit model, shows that it is more likely to find a exporter company, in all the years, among DOMs as predicted before. Cross-section results confirm that FO

are, on average, large than average Portuguese Owned companies (table 30) but DOM are larger than FO rejecting H4.1.

In the manufacturing sector (table 31) there are a similar results, for productivity, however instead of starts in 2009 it does in 2010. For this group of companies the H2.1 and H2.2 are confirmed. The statistically significant regression and results show that FO firms are more profitable than Portuguese companies (table 32) what is in line for instance with finding of Kimura and Kiyota (2007) for Japanese market.

Also in this sector a cross section analysis shows a positive relation between size and profitability what rejects, once again, our expectations.

The results of wages per employee, to manufacturing sector, corroborates those found by Lipsey and Sjöholm (2003) Girma et al (2002) who argue that FO firms have higher wages relative to domestic companies. It is also possible from the results conclude that, as can be seen in table 33, wage premium is not properly related to ownership but more with multinationality (Dobbelaere, 2004) because DOM also pay higher wages.

By using the probit model to identify if a company exports or not, with the cross section approach, results show that FO and DOM are more likely to be exporters, but the comparison between these two groups depends on the year analyzed (table 34).

The manufacturing sector cross section regression also confirms the results found with pooled OLS estimations that FO firms are larger than average Portuguese domestic companies (Pfaffermayr and Bellak, 2000; Howenstine and Zeile, 1994) but smaller than DOM (table 35).

The independent variables age and size present, to manufacturing sector, a positive and statistically significant relation with all the characteristics what means that when age and size grow have a positive impact in productivity, profitability, wages, probability to export and size.

Controlling the cross section approach to manufacturing subsectors it is important, once again, highlight that the R² of the regressions increases significantly in all the regressions.

The findings follow the same path as those already reported in the other estimations. Age and size still present a positive relation with all the characteristics (see tables 36 -

40). It is possible to confirm again H2.1, H2.2, H5.1 and H5.2. FO firms are more profitable than DO and DOM (table 37), and that pay higher wages (table 38), on average, to their employees than the other counterparts in analysis.

The conclusion in terms of productivity depends the year set in analysis. FO is more productive, in all the years, than Portuguese manufacturing companies as a set, confirming H1.2, but when compared with manufacturing DOM there are some years where the latter show higher productivity(table 36) rejecting H1.2.

Once again the results for exporter probit model depends on the year analyzed. DOMs are the larger companies of the manufacturing sector (table 40) what rejects H4.1 but support H4.2.

In Appendix III it is possible to see the conclusion of each regression (Pooled and Cross section) to all the hypotheses postulated in this study.

Chapter 4 – Conclusions, Policy Implications and Future Researches

4.1 – Conclusions

This dissertation analyzed and tested if there are significant differences on the characteristics of FO subsidiaries and Portuguese owned companies. In order to not compare “apples with oranges” the Portuguese companies were split into two different groups: Portuguese companies with FDI (DOM) and without FDI (DO).

The descriptive, pooled OLS and cross section results show that, in the characteristics under analysis, there are significant differences in the groups of companies covered. After pooled and cross section regressions and a deeply analysis is safe to argue that, from the data analyzed, DOM outstand. They are more productive, profitable, pay higher wages, are larger and seem to likely be exporters. These results rejects our hypothesis that FO are more productive, profitable, pay higher wages and larger than DOM.

Nonetheless it is very important to refer that, beside the interesting results and findings, all our results confirm the postulated hypothesis that FO are more productive, profitable, pay higher wages, are larger and more likely to be exporter than DO.

4.2 – Policy Implications

The conclusions and results of this study point to some relevant policy implications.

First of all, the superior performance of DOM on the Portuguese market when compared with FO subsidiaries show that is important to support the internationalization of Portuguese companies.

Besides that, once that in almost all the characteristics FO firms show better characteristics than DO firms without FDI it is rational to seek and attract FO subsidiaries to Portugal. Not only because of the shown better performance as noted by

Markusen and Venables (1999), but also because they tend to generate competition and efficiency.

Another implication is that Portuguese authorities should develop and implement specific programs aiming to transfer best practices from DOMs to DOs.

4.3 – Future Researches

Future research can go further in the analysis of characteristics` differences between FO and DO firms by splitting the latter not only in DOM and DO firms but also in DO exporters and non exporters.

It would be interesting in future research to cover other characteristics that were not in this study due the limitations of the available (SABI) dataset.

If the dataset would be available, it would be interesting to compare the differences in the characteristics between FO subsidiaries and DOM subsidiaries.

This kind of study could also be applied to other countries.

Appendix I

Variables and description

Variable	Description
do	dummy for DO companies
fo	dummy for FO companies
age	Age of the company
manuf	Dummy for manufacturing companies
size	Number of employees
turnover	Turnover in th EUR
tassets	Total Assets in th EUR
gva	Gross Value Added in th EUR
gvaemp	Gross Value Added per employee in th EUR
wages	Wages in th EUR
profmarg	Profit Margin in th EUR
profemp	Profit per Employee in th EUR
avcosemp	Average cost per employee in %
tsales	Total sales in th EUR
ebit	EBIT in th EUR
export	dummy exporter
netincom	Net Income in th EUR
logage	Log age of acompany
logsize	Log(size)
logage2	Log age of company, squared
logsize2	Log number of employees, squared
loggvaemp	Log gva per employee
logprofemp	Log profit per employee
wagesemp	Wages per employee
logwagesemp	Log wages per employee

Appendix II

Manufacturing subsectors

Sector	Sector Description
Sector_10	Manufacture of food products
Sector_11	Manufacture of beverages
Sector_12	Manufacture of tobacco products
Sector_13	Manufacture of textiles
Sector_14	Manufacture of wearing apparel
Sector_15	Manufacture of leather and related products
Sector_16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
Sector_17	Manufacture of paper and paper products
Sector_18	Printing and reproduction of recorded media
Sector_19	Manufacture of coke and refined petroleum products
Sector_20	Manufacture of chemicals and chemical products
Sector_21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
Sector_22	Manufacture of rubber and plastic products
Sector_23	Manufacture of other non-metallic mineral products
Sector_24	Manufacture of basic metals
Sector_25	Manufacture of fabricated metal products except machinery and equipment
Sector_26	Manufacture of computer, electronic and optical products
Sector_27	Manufacture of electrical equipment
Sector_28	Manufacture of machinery and equipment n.e.c.
Sector_29	Manufacture of motor vehicles, trailers and semi-trailers
Sector_30	Manufacture of other transport equipment
Sector_31	Manufacture of furniture
Sector_32	Other manufacturing
Sector_33	Repair and installation of machinery and equipment

Source: Own elaboration based on NACE Codes Rev. 2

Appendix III

Pooled

All data set	
H1.1	Reject
H1.2	Confirm
H2.1	Reject
H2.2	Confirm
H3.1	Reject
H3.2	Confirm
H4.1	Reject
H4.2	Confirm
H5.1	Confirm
H5.2	Confirm
Manufacturing companies without controlling	
H1.1	Reject
H1.2	Confirm
H2.1	Confirm
H2.2	Confirm
H3.1	Reject
H3.2	Confirm
H4.1	Reject
H4.2	Confirm
H5.1	Confirm
H5.2	Confirm
Manufacturing companies controlling subsectors	
H1.1	Reject
H1.2	Confirm
H2.1	Confirm
H2.2	Confirm
H3.1	Reject
H3.2	Confirm
H4.1	Reject
H4.2	Confirm
H5.1	Confirm
H5.2	Confirm

Cross Section

		All data set				
		2008	2009	2010	2011	2012
H1.1	Reject	Reject	Reject	Reject	Confirm	Confirm
H1.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H2.1	Reject	Reject	Reject	Reject	Confirm	Confirm
H2.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H3.1	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H3.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H4.1	Reject	Reject	Reject	Reject	Reject	Reject
H4.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H5.1	Reject	Reject				
H5.2	Confirm	Confirm				
		Manufacturing companies without controlling				
H1.1	Reject	Reject	Confirm			Confirm
H1.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H2.1	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H2.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H3.1	Reject	Reject	Reject	Confirm		
H3.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H4.1	Reject	Reject	Reject	Reject	Reject	Reject
H4.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H5.1	Reject	Confirm				
H5.2	Confirm	Confirm				
		Manufacturing companies controlling subsectors				
H1.1	Confirm	Reject	Confirm	Reject	Confirm	Confirm
H1.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H2.1	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H2.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H3.1	Confirm	Reject	Reject	Confirm	Confirm	Confirm
H3.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H4.1	Reject	Reject	Reject	Reject	Reject	Reject
H4.2	Confirm	Confirm	Confirm	Confirm	Confirm	Confirm
H5.1	Confirm	Confirm				
H5.2	Confirm	Confirm				

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