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STRUCTURE: A COMPARATIVE
ANALYSIS OF MULTINATIONAL FIRMS'
PREFERENCES IN GREECE
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DETERMINANTS OF OWNERSHIP STRUCTURE: A COMPARATIVE ANALYSIS OF MULTINATIONAL FIRMS' PREFERENCES IN GREECE AND PORTUGAL

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ABSTRACT

Determinants of Ownership Structure: A Comparative Analysis of Multinational Firms' Preferences in Greece and Portugal*

The aim of the Paper is to examine the determinants of the ownership choice (full, majority, minority) of manufacturing multinational firms (MNFs) established in Greece and Portugal in the 1990s. Foreign Direct Investment (FDI) observations in the two countries underline differences between them in terms of relative FDI size and industry as well as ownership preferences. Transaction cost arguments together with bargaining power considerations provide the theoretical basis for the econometric model which uses multinomial logit analysis applied on 363 and 469 MNFs in Greece and Portugal. The estimations contribute to a better understanding of such differences, showing that location and industry characteristics through their effect on risk-adjusted expected profits influence ownership decisions.

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NON-TECHNICAL SUMMARY

The ownership structure that multinational firms (MNFs) select when investing abroad is a question not usually addressed in the Foreign Direct Investment (FDI) literature. Yet it is an issue of importance for both the MNF and the domestic partner since it affects the profitability of the respectively invested assets. Furthermore, the degree of foreign involvement may affect (through spillovers) the performance of the related industries as well as the general performance of the host economy.

MNFs decide on the extent of ownership (or, otherwise, on the degree of control) of their affiliates abroad taking into account the costs and benefits resulting from their alternative choices. The benefits depend on the affiliate's profits and the amount of transferable assets, for which a price has to be agreed. The costs depend on potential spillovers, due to leakage of important information-based assets to competitors within the same industry, which may lead to a reduction in future profits, and monitoring expenses necessary to prevent agency problems connected to controlling an investment and its related workforce in a foreign, unfamiliar market.

Maximization of net profits from operating abroad with respect to the ownership share provides the optimal demand for it. In particular, optimal ownership can be thought of as a mechanism to provide maximum gains as well as to protect proprietary rights, which cannot be fully contracted out and, at the same time, as an incentive device for reducing monitoring costs.

Transaction cost theory arguments together with bargaining power considerations influence the set of determinants of the optimal ownership as produced by the maximization of net profits. Firm and industry characteristics can be used as relevant proxies. Firm size, providing market power and hence potential increases in future profits, is hypothesized to positively affect the full ownership choice. Industry characteristics, such as profitability and growth rate exert a similar effect, while capital intensity and oligopolistic structure may lead to sharing ownership. The already-existing foreign presence in the industry may create information externalities, thus reducing the need to share ownership with domestic partners. R&D intensity together with labour costs (related to a skilled workforce) are thought to induce foreign firms to select full ownership, while resource intensity, marketing intensity (in need of domestic brand names) as well as geographical and cultural distance of the home firm from the host market are hypothesized to exert a positive influence on sharing ownership.

MNFs in Greece and Portugal display different ownership preferences despite the similarities of the two countries in terms of permissive institutional

environment and economic indicators such as market size, per capita income and GDP growth rate. In Portugal most MNFs opt for full ownership while in Greece minority ownership is preferred. Accordingly, the relative size of inward FDI in the late 1980s and 1990s is different, with Portugal having received larger investments as a share of GDP and exhibiting a relatively stronger EU and OECD presence in the origin of FDI.

Such differences can be justified by the reactions of MNFs to the determinants of ownership structure as suggested by the theoretical considerations and estimated by a multi-nomial logit model applied to 363 MNFs in Greece and 469 MNFs in Portugal. Greek data on ownership refer to 1997 and are collected by the Bank of Greece, while Portuguese data are collected by the Ministry of Employment and refer to 1992. The independent variables are instrumented with their lagged values and are taken from national industrial surveys. The choices assumed to be available to the foreign firms are three: full, majority and minority ownership.

The foreign ownership choice in Portugal is found to be significantly affected by firm characteristics such as size and labour costs, which both favour full ownership, while it does not respond to industry profitability, concentration or growth. MNFs located in Portugal seem to be export-oriented and hence able to ignore prominent domestic market features. Only the effects of R&D intensity and resource orientation of the industry are significant; these too favour full ownership.

On the contrary, the ownership choice in Greece is influenced by domestic market characteristics such as profitability, growth and concentration, giving the impression of domestic market-oriented investments. R&D intensity is not significant, implying reduced transference of intangible assets, while foreign presence and marketing intensity seem to suggest higher bargaining power for Greek firms subsequently forcing MNFs towards minority positions. Only capital intensity affects MNFs in both countries in a similar way, discouraging full ownership. The country of origin of MNF affects the ownership decision with firms in geographical and cultural proximity preferring full ownership in contrast to more distant MNFs, which prefer minority positions. Since Greece attracted a lower share of FDI from EU and OECD than Portugal, the minority position of MNFs in Greece together with their full ownership position in Portugal are further justified.

1. Introduction

The aim of the paper is threefold. First, it attempts to analyse the ownership structure multinational firms (MNFs) select when investing abroad by using an eclectic approach, blending together transaction cost theory arguments with considerations arising from domestic agents bargaining power. Second, following the theoretical suggestions, it uses econometric analysis in order to explain the observed ownership preferences of MNFs in the two most peripheral European Union (EU) countries, Greece and Portugal. And third, through the theoretical and empirical findings, it tries to explain the observed differences in MNF behaviour in the two countries.

The ownership structure of foreign affiliates is believed to affect technology diffusion in host economies², since the intensity of foreign participation is likely to influence the incentive of parent firms to transfer intangible assets (such as technology and management skills) to their affiliates. Thus, productivity or technological spillovers may differ according to the ownership structure³. From a firm-specific viewpoint, ownership is important in that it affects the profitability enjoyed by the economic agents involved. Moreover, as Nakamura and Xie (1998) have stressed, the profits of the MNFs may be strongly affected by the impossibility of all aspects of operating abroad to be efficiently contracted out to local agents. In particular, ownership structure can be used as a mechanism to protect proprietary rights, which cannot be fully contracted out, and, at the same time, as an incentive device for reducing monitoring (agency) costs.

In choosing the desirable ownership structure, MNFs should decide whether full or partial ownership of the affiliate's assets is preferred and what degree of partnership, if any, they want to establish with domestic partners. That is, foreign firms should choose the degree of partnership as well as the degree of control that they want to have over their affiliates⁴. Our analysis will be based on the assumption that foreign firms aim at

² Markusen and Venables (1999) develop an analytical framework to assess the linkage effects of MNFs to domestic industries and their role as a catalyst for industrial development in the host country.

³ In a first effort to estimate productivity differences due to foreign ownership structure Blomström and Sjöholm (1999) found no significant effects in an LDC framework (Indonesian manufacturing industry).

⁴ Ownership is not a unique way to appropriate returns from operating abroad. Other ways (royalties, franchising etc.) are possible. Nevertheless, our aim here is to examine the ownership channel only.

maximising their expected rate of return from operating abroad, which, in turn, implies minimising the risk and cost of establishing their production units abroad.

Greece and Portugal, being the recipients of generous Foreign Direct Investment (FDI) in the 1980s and 1990s and displaying many similarities in terms of institutional framework as well as economic development, provided the background for the empirical part of our research. With respect to inward FDI Portugal attracted larger investments than Greece both in absolute and relative terms. Also ownership preferences were different with MNFs preferring full ownership in Portugal and minority ownership in Greece.

The novelties of our approach are (a) the formulation of a model following an integrated theoretical approach to determine the ownership structure of foreign affiliates, (b) the application of the model to Greece and Portugal, countries not examined previously in the FDI literature and (c) the comparison of the empirical findings in the two countries so that indications about how the specified determinants interact with location and hence differ according to the host country are provided.

The paper is organised as follows. Section 2 offers some general observations on FDI and MNF preferences in terms of industry and ownership in both countries. Section 3 explains the theoretical base for the determinants of ownership structure. Section 4 presents the data and the econometric model. Section 5 discusses the empirical findings and Section 6 concludes.

2. Foreign Investments in Greece and Portugal

2.1 FDI Trends

Greece and Portugal are the two most peripheral countries of EU both in terms of geography and economic development. Their similarities include their market size (10.5 and 9.9 million people respectively) as well as their GDP *per capita* (ECU 8,170 and 8,460 in 1995) and their growth rate (6.1% and 7.1% in 1991-95). In the late 1980s and 90s both countries, embracing a permissive legal framework for the operation of foreign firms, were the recipients of generous FDI originating mostly from EU countries. A large (but unstable) part of this FDI was directed to the manufacturing sector.

Tables 1 and 2, based on OECD published statistics, give us a macroeconomic picture of the relative importance of FDI in both economies. Portugal has attracted more FDI in absolute as well as in relative terms until the mid 1990s. In 1987 the ratio FDI/GDP was 0.35% for Greece and 0.73% for Portugal. In 1990 the respective ratio was 0.45% for Greece and 3.26% for Portugal. In 1995 Greece exceeded Portugal for the first time with 1.63% vs. 0.63%.

_____ Table 1 and Table 2 _____

FDI as a share of gross fixed capital formation (FDI/I) follows a similar development. In 1987 it was 1.83% for Greece and 3.21% for Portugal. In 1990 it was 2.44% for Greece and peaked to 12.01% for Portugal. The Greek ratio exceeded the Portuguese in 1993 and reached its peak of 13.91% in 1995.

FDI disaggregated by area of origin (EU and OECD) as a share of total FDI underlines the unambiguous importance of EU and OECD as providers of international capital for both countries. As can be seen in Table 3 in 1987 54% of total FDI in Greece and 68% of total FDI in Portugal was of EU origin, while 71% and 93% of total FDI respectively was of OECD origin. In 1992 the respective EU FDI shares were 79% for Greece and 77% for Portugal, while the OECD FDI shares were 94% and 92%. On average, in the 1987-92 period 72% of inward FDI in Greece originated from EU countries, while 89% originated from OECD countries. In the 1987-95 period in Portugal 75% of FDI originated from the EU and 90% from the OECD. The trend was for both countries to converge, with Greece starting lower in EU and OECD shares but eventually closing the initial difference with Portugal.

_____ Table 3 _____

2.2 MNF Sectoral and Ownership Preferences

The macroeconomic picture can be further analysed in its sectoral components, manufacturing and services being most favoured by FDI. More specifically, the share of manufacturing FDI in general FDI (M/FDI) fluctuated between 36% to 69% in Greece and 14% to 46% in Portugal (Tables 1 and 2). In 1992 M/FDI in Greece was 69%, while it was only 14% in Portugal where it peaked to 46% in 1994. For its many backward and forward linkages, manufacturing is considered as most important for a country's

economy, its spillover effects being felt in many other sectors. Our subsequent analysis will focus on it and especially on the distribution of FDI within it.

In order to examine FDI industry preferences within Greek and Portuguese manufacturing a different source of information than the OECD had to be used. We had to resort to country-specific sources based on firm-specific information (see Section 4 for a detailed description of data sources). The number of MNFs on which information was available in 1997 in Greece was 363 and their distribution is shown in Table 4.

_____ Table 4 _____

More than one third (34.5%) of foreign firms in Greece are found in the consumer goods producing sectors of food-beverage-tobacco and textiles-clothing. Another 31.4% of them are in chemicals and machinery-equipment, while the rest is spread in different sectors, basic metals being the most important. In terms of ownership preferences, more than half of foreign firms (57.3%) prefer minority participation while only 23.7% have full ownership, majority ownership being the least favoured choice. The preferences among industries differ with full ownership fluctuating between one third in chemicals and zero in oil & coal.

Information on 469 MNFs in Portugal refers to 1992 and is presented in Table 5. Food-beverage-tobacco and textiles-clothing concentrate 35.1% of foreign firms. Chemicals and machinery-equipment gather 27.9% of them. The remaining 37.0% of foreign firms is distributed among different sectors, electric machinery being the most important. Most foreign firms (48.8%) prefer full ownership. Minority is second in frequency while majority ownership is again least favoured. Only 24.7% of MNFs opt for it, higher than Greece's respective 19.0%. Preferences among industries differ markedly.

_____ Table 5 _____

3. Theoretical Bases for the Choice of Ownership Structure

Foreign affiliates differ in regard to the percentage of equity owned by foreign agents. Since a MNF may choose to share the ownership of its affiliates abroad for a variety of economic or strategic reasons, this section will be concerned with the identification of the

factors that might determine such a choice. We will mainly focus on the economic reasons for the observed variety of ownership structures.

Even when host countries do not impose restrictions on foreign ownership, as is the case in Greece and Portugal, profit-maximising firms should rank every alternative ownership structure in terms of expected return and select the best choice. Formally, suppose a firm i , considering to invest abroad in a production plant, has a set J of alternative choices regarding the ownership structure. Profitability at each alternative, say π_{ij} , can be derived as a function of its potential costs and benefits. A firm will choose the ownership structure j if and only if

$$\pi_{ij} > \pi_{it} \quad \forall t \in J, t \neq j. \quad (1)$$

When the expected economic gains of sharing ownership outweigh the organisational and co-ordination costs, partial ownership will be the preferred mode of operation. Otherwise, a full-owned affiliate structure will be selected. That is, the process of weighing costs and benefits of various ownership options will shape MNEs' preferences. In the case of partnership, the issue of who has control of the affiliate is also relevant in determining the observed degree of partnership (majority vs. minority). Partial ownership may imply a mixed corporate culture and much looser ties to the parent firm. But this option can offer a better knowledge of local (supplier and customer) market conditions.

In fact, one reason for the formation of partnerships between foreign firms and local agents may be the need to share risk, notably that associated with the uncertainty of operating abroad. The risks associated with FDI can be classified in various types⁵. For our study the most relevant types appear to be *competition* risks and *resource* risks. The former is related to uncertainties about competitors' behaviour and industry-specific characteristics, while the latter includes the uncertainties associated with the acquisition of resources, notably natural resources or skilled labour.

Assuming that a foreign partner transfers to its affiliate mostly intangible assets (e.g. managerial skills) and technology (either through intermediate goods or technical licensing), the expected gains from operating abroad (G) can be specified as a function of

⁵ See, for instance, Dunning (1992) for a detailed classification of the risks associated with FDI.

the amount of transferable assets (TA), for which a transfer price should be agreed, and the profits of the affiliate (π_a)⁶. That is,

$$G=f_g(TA, \pi_a). \quad (2)$$

The amount of assets transferred to an affiliate can be seen as a positive function of the ownership share, since the effort to transfer skills is likely to be better compensated the higher the share of the foreign partner who then receives a larger part of the direct or indirect rent yielded by these assets. In a similar way, the higher the foreign partner's ownership share, the larger its share in the affiliate's profits. Therefore, a foreign partner will demand higher ownership in case of profitable affiliates and large intangible assets to be transferred. Otherwise, we may observe an under-supply of these assets since the gain obtained by the foreign partner may not be proportional to its transferring effort.

On the other hand, a firm that decides to invest in a production plant abroad may incur costs, notably those associated with spillovers following the transfer of its intangible assets as well as with monitoring the affiliate's operations, the last being a function of geographical and cultural distance. Therefore, the total costs that a foreign partner has to balance against expected gains (equation (2)) can be expressed as

$$C=f_c(S, M) \quad (3)$$

where S stands for potential spillover costs and M for monitoring costs.

The costs of spillover tend to be of significant concern for foreign firms, in particular in R&D intensive industries, since the leakage of important information-based assets to direct competitors may cause a loss of competitive advantage and hence a reduction in future profits (Nakamura and Yeung, 1994). For this reason, a foreign partner has the incentive to increase its ownership share in order to protect its property rights and to control the use of its intangible assets. Therefore, S is assumed to decrease as the foreign partner, the owner of the intangible assets, increases its ownership participation in the affiliate. By contrast, as the foreign participation increases monitoring costs are expected to increase, since the domestic partner has less incentive to supervise the affiliate

⁶ We could also assumed that, in case of partnership, the foreign partner may receive a portion of its domestic partner's skill or technological spillovers. However, the lack of information on the characteristics of domestic firms previous to foreign acquisition or the contribution of the domestic partner to the joint-venture prevents us to take into account gains due to skill spillovers or other externalities from the domestic to the foreign partner. Nakamura and Xie (1998) suggest a model in which foreign partner's expected gains are the expected income of its affiliate plus the benefits from the joint-venture partner's technological spillover.

operations (Nakamura and Xie, 1998). Thus, M is expected to increase as the foreign partner increases its ownership share. When a foreign partner faces great loss in proprietary rights, the effect of S in C tends to outweigh the effect of M and hence, the foreign partner will demand more ownership. The contrary may occur when the potential reduction in affiliate's profits due to agency problems tends to exceed the expected spillover costs.

Combining the expected gains of the foreign partner (equation (2)) and his cost of control (equation (3)) we obtain the net gains he can derive from operating abroad, i.e.,

$$\pi_i = G - C = g(s) \quad \text{with } 0 < s \leq 1 \quad (4)$$

which is assumed to be maximised with respect to the foreign ownership share, s . The resulting optimal s will be adopted.

Although TA and π_a are not directly observable, we can see them as a function of firm-specific characteristics and host industry conditions. It would be expected that factors related to the structure of competition in the host industry might affect the affiliate's profits and hence the choice of ownership participation. In profitable and growing industries expected profits from an affiliate may be greater than those in less profitable or declining industries. Therefore, the foreign partner's demand for ownership will be higher, the more profitable and dynamic is the host industry. However, when the domestic competition in the industry is imperfect it may be advantageous to work with a local partner familiar with the industry environment. In an oligopolistic industry the level of profits an affiliate can achieve may be higher but its volatility may be higher as well. Therefore, the partnership with a domestic agent may be a mechanism to reduce or at least share the risk associated with an unknown industry environment.

Still, related to industry-specific factors is capital and research and development (R&D) intensity. Industries characterised by high capital intensity require a large resource commitment but may yield large profits. Although high profits may induce foreign firms not to share ownership with local partners, high capital requirement may lead them to share potential financial risks by engaging in a partial ownership structure. This may be particularly relevant if the foreign firm cannot afford the entire investment and sees the partnership option as a way to complement its resources (Palenzuela and Bobillo, 1999).

A similar reasoning predicts a negative relationship between the affiliate's size and the ownership choice. One reason underlying the decision to produce abroad may be a reaction to the moves of direct competitors. Some firms operating in an oligopolistic industry may find optimal to follow the leading multinational firm strategy and, hence, to engage in FDI (Knickerbocker, 1973; Franko, 1989). Yet, the presence of economies of scale in the industry may force some foreign firms to set up plants larger than they can afford and manage (Gomes-Casseres, 1990). In particular, the difficulty of managing alone a large local workforce may lead the foreign partner to reduce demand for ownership in order to decrease the monitoring costs (M) associated with large affiliate size (Nakamura and Xie, 1998). In these situations, searching for local partners and sharing the ownership may be a profitable way to follow the leading firm without compromising the success of the operation.

However, the size of the affiliate can have an opposite effect in determining foreign ownership choice, if it is conceived as proxy of market power. The greater the size and the market power of a firm, the larger will be its potential for increasing profits. Hence, the larger the share that the foreign partner may demand. Moreover, as Nakamura and Yeung (1994) have suggested, the affiliate's size may also affect the amount of assets that the foreign partner finds optimal to transfer. If size affects positively TA , the ownership share demanded by the foreign partner will follow the size of the affiliate.

Regarding R&D activities, which are believed to yield rents, it would be expected that foreign firms decide to establish their affiliates abroad in research-intensive industries to exploit their own proprietary knowledge (Cleeve, 1997). This firm-specific advantage may render large profits and hence create increased ownership demand. In this context, the propensity to search for local partners is lower. Most importantly, in R&D intensive industries skill or technological spillovers tend to be of significant concern for the foreign partner. The ownership control of his affiliate tends to be the mechanism used to protect his proprietary rights. In particular, a fully owned affiliate has the advantage of being tailor-made to fit the foreign firms' objectives with respect to R&D and, additionally, all the potential gains of these activities can be fully internalised by the affiliate and parent firm. In case of partial ownership, the cost of co-ordinating, monitoring and defining the proprietary rights (i.e. minimise the costs of spillovers) may outweigh the potential gains

of a partnership with local agents⁷. Therefore, the prediction is that the more research-intensive is the industry, the more ownership the foreign firm demands in its affiliate and, hence, the greater tends to be the probability of observing fully owned affiliates.

The net gains a foreign partner can derive from operating abroad are, in general, a positive function of the TA and π_a and a negative function of the control costs. While a fully owned affiliate can minimise a foreign partner's loss due to misappropriation of its intangible assets, it might, however, be unable to maximise the return that these assets could potentially earn. That is, the observed π_a may differ from the potential maximum level of profits, say π_a^* . It may well occur when the production is natural resource or skilled labour intensive and the foreign firm is unable to contract efficiently the necessary production inputs. In particular, when the chief resources are locally controlled, foreign firms may find partnership with a local agent as the best option to produce in the host country, since it may narrow the potential gap between π_a^* and π_a . In this case, the benefits of using the ownership channel to gain access to relevant inputs may outweigh the cost of sharing ownership. This is, in fact, the main argument of the transaction costs theory in relation to MNF ownership choices. The theory posits (Teece, 1986) that the problem of structuring ownership is solved by evaluating the trade-off between the costs of using the market or the internal channels for transferring or gaining access to the relevant inputs, such as natural resources, skilled labour, R&D, marketing or organisational capabilities. In this context, the choice of partial ownership can be seen as an incentive mechanism used by the foreign partner to induce the domestic partner to provide efficiently the required production resources instead of contracting them out.

Another factor that is likely to narrow the potential gap between π_a^* and π_a is related to asymmetric information between foreign and domestic agents. Partial ownership may be the appropriate way to acquire industry-specific knowledge since the partnership with local agents may facilitate access to a stock of valuable information unknown to the foreign firm (Cleeve, 1997). On the other hand, the previous presence of foreign firms in a given industry may also reveal relevant information. Results presented by Barbosa *et al.*

⁷ As Caves (1996) reports, the decision to produce abroad as well as the choice of ownership structure for the affiliate can be significantly affected by the potential risk of misappropriation or leakage of the technological developments. When the industry is research intensive and property rights are weakly protected, foreign firms are more likely to establish fully owned affiliates.

(1998) for foreign firms operating in Portugal suggest a positive relation between the intensity of previous presence of foreign firms and the number of new foreign firms that each year enter the Portuguese manufacturing industry. This result appears to suggest that some kind of informational externalities may occur in industries that have experienced a significant presence of foreign firms. We can speculate that these informational externalities may influence the choice of the ownership structure towards fully owned affiliates. Moreover, as the number of foreign firms increases in a given industry it would be expected that industry-specific information becomes more and more disseminated and available among foreign agents.

Asymmetric information with respect to doing business in their home country as well as advantaged access to local resources may give domestic agents the possibility to exercise some kind of bargaining power in determining the ownership choice of the foreign partner (Svejnar and Smith, 1984). At this point we depart from the assumption that the ownership structure derives exclusively from the determination of foreign partner's preferences without any constraints on behalf of domestic partners. In our conceptual framework, inspired mostly by Nakamura and Xie (1998), the observed ownership structure is assumed to derive from a process of weighing costs and gains of various ownership options which combine arguments based on transaction cost theory and arguments about the potential strategic benefits of co-operating with domestic partners.

4. Data, Variables and Econometric Model

4.1 The Data and Empirical Variables

The data used came from several sources. In the Portuguese case, the data were mainly obtained from an annual survey that has been conducted by the Portuguese Ministry of Employment since 1982. The statistical department of this ministry collects, on an annual basis, information both on plant and firm specific characteristics, through a compulsory questionnaire: *Quadros de Pessoal*. Among other variables, the database contains for each firm information on ownership structure (i.e. the equity share held by non-resident and resident agents), industry (at 6-digit Portuguese industry classification level) and firm's characteristics such as number of employees. This allows us to identify all active firms that, in a given year, have foreign participation, which ranges from 1% to 100%.

Following the international criterion, we consider as MNF affiliates all firms that have at least 10% of foreign participation. In 1992, there are 469 foreign affiliates, which is the Portuguese sample to be used in this study. A number of variables constructed from the industrial statistics collected by the National Institute of Statistics (I.N.E.) were added to the *Quadros de Pessoal* data.

In the Greek case, the data were obtained from a Bank of Greece questionnaire survey where the ownership share of foreign firms is measured in terms of invested capital. The survey refers to 1997 and includes 1010 foreign firms, 414 out of which in manufacturing industry. Only 363 displayed foreign ownership shares above 10% and are thus included in the analysis. Industry data were obtained from the *Annual Industrial Surveys* of the National Statistical Service.

Regarding the definition of the dependent variable, we consider different types of ownership. One of them is *full ownership*, which means that an affiliate is fully or quasi-fully owned by foreign agents (i.e. non-resident agents have an equity share greater than 95%). The other type is partial ownership, which is distinguished in *majority-* and *minority-owned* affiliates. An affiliate is classified as majority-owned if the foreign participation ranges from 51% to 95%. In case of affiliates with less than or equal to 50% of foreign participation, we classified them as minority-owned⁸. This implies that our dependent variable assumes only three possible values: 0 for minority-owned affiliates, 1 for majority-owned, and 2 for fully owned affiliates.

The choice of independent variables is driven by the theoretical issues and data availability. They are defined as follows:

SIZE (Affiliate size): In the Portuguese case, this variable is measured by the logarithm of the number of employees of affiliate in 1992, while, in the Greek case, the logarithm is applied to affiliate's capital in 1997. The lack of reliable information on Greek affiliates' employment prevents us from using the same measure of affiliate size in both countries⁹.

CAP (Capital intensity): The ratio of gross investment to total output in the relevant industry over the past 3 years.

⁸ Parity or 50-50% ownership was initially distinguished as an independent type of ownership but the econometric estimations did not show any response significantly different from that of the minority ownership type.

⁹ No other firm-specific characteristic was included due to lack of available data comparable for the two countries.

PCM (Profitability): The average of industry price cost-margins over the past 3 years. The price cost margin in each year is calculated as $(\text{Value added} - \text{Total wages}) / (\text{Gross value of production})$, all measured at the end of each year.

GROW (Growth): The average annual rate of growth of output in the relevant industry over the past 3 years.

CR4 (Oligopolistic structure): The share of employees contained in the industry's four largest firms.

%FDI (Intensity of foreign firms in the industry): This variable aims to capture the intensity of foreign presence in the relevant industry. Thus, we measure it as the ratio of the number of foreign firms (regardless their participation rates) to the total number of firms in the relevant industry.

R&D (R&D intensity): Dummy variable equal to 1 if the main economic activity of the affiliate is developed in an R&D-intensive industry and 0 otherwise. Unfortunately, the available data prevent us from using a more direct measure of R&D intensity. In the Portuguese case, we only have information for the expenditure in patents and trademarks until 1989. Nevertheless, using this information we classify industries as R&D-intensive if no less than 1% of their output is spent in R&D activities. A similar classification is used for the Greek sample.

RES (Resource intensity): Dummy variable equal to 1 if the main economic activity of the foreign firm is in a resource-intensive industry and 0 otherwise. Following a similar classification to Gomes-Casseres (1990), we identified as resource-intensive the industries of food, beverage and tobacco, textiles, clothing, footwear, leather, wood and cork, pulp and paper, mineral products, and rubber.

In order to fully use the available information for each country we have extended the initial empirical model (henceforth, *benchmark model*) by including additional explanatory variables. The resulting model is called *extended model*. It aims to explore the data and, possibly, to contribute a more complete explanation on the determinants of foreign partner's ownership preferences.

Since a major motive underlying FDI in Portugal and Greece appears to be resource seeking, foreign firms being interested in skilled local labour among other resources, we

explore the possibility of labour costs affecting the foreign partner's choice regarding the affiliate ownership structure. Transaction cost considerations may lead the foreign partner to share ownership in order to gain access to skilled labour. On the other hand, given that it is not reasonable to presume that firms pay relatively high wages for nothing, the rationale behind a possible labour cost effect is that industries may experience high unit labour costs due to a skilled and highly qualified workforce. Firms operating in those industries may possess an intangible asset – workforce's capabilities –, which is likely to yield large profits. Therefore, we explore whether high unit labour costs tend to lead to high foreign ownership share.

LAB (Labour costs) is measured by the logarithm of industry's unit labour costs, in the Greek case, and by the ratio of firm's to industry's unit labour costs, in the Portuguese case. The different measurement was initially motivated by the availability of firm-specific information on labour costs in the Portuguese data. But, most importantly, it has the advantage to allow us to investigate whether inter- or intra- industry labour cost differences are the most significant determinants of ownership choices.

In addition, we explore whether the origin of foreign investment has a significant effect on MNF's ownership preferences. The rationale underlying this hypothesis is that geographical and cultural distance may increase the cost (or risk) of doing business abroad (Veugelers, 1991). In particular, monitoring costs for the foreign firm increase when the geographical distance limits its efficient access to information concerning the operation of the affiliate and the cultural distance reduces its capability to cope with potential co-ordination or organisational problems. Thus, as the geographical and cultural distance increases a decline in foreign demand for ownership is expected.

ORIGIN (Origin of foreign investment) is thus defined as a discrete variable, which assumes the value 1 if the foreign parent firm is located in the European Union (EU), 2 if it belongs to (non EU) OECD and 3 otherwise. This classification of FDI origin aims at capturing the increasing distance costs for foreign firms in Greece. The lack of similar data on FDI in Portugal prevents us to explore the hypothesis there.

S_PRO (Sales-promotion intensity) is measured as the ratio of sales-promotion expenditures to gross value of production and attempts to control for possible industry sales-promotion effects on the ownership choice of foreign firms in Greece. It would be

expected that industries where sales-promotion expenditures are important attract mostly marketing intensive foreign firms. Such firms have created a brand name, which can be seen as an intangible asset. The transference of this asset to its affiliate may lead the foreign partner to be strongly concerned about free riding on its brand name. Taking a large ownership share in its affiliate may be the way selected by the foreign partner to protect its intangible asset from misappropriation. Therefore, the reasoning behind the inclusion of S_PRO in the extended model is similar to that exposed for R&D activities. Again, we lack similar Portuguese information.

Some descriptive statistics of the variables used in the benchmark and the extended models can be seen in the Appendix, Table A1.

4.2 *The Econometric Model*

Given the nature of the dependent variable, which represents the individual choice of each foreign firm among three alternative ownership structures for their affiliates in Greece and Portugal, discrete choice models offer the best approach to assessing the determinants of the observed ownership structures. As we have stated above, a firm will choose alternative j if and only if it renders the highest expected profits (see equation (1)). The profit firm i can expect from choosing the alternative j is,

$$\pi_{ij} = \beta' \mathbf{x}_i + \varepsilon_{ij}, \quad (5)$$

where the vector \mathbf{x}_i comprises the observed firm- and industry-specific characteristics, β is the compatible vector of unknown parameters to be estimated, and ε_{ij} the stochastic term associated with each choice and firm. The introduction of the stochastic term aims to capture unobserved firm-specific characteristics, such as firm capabilities and strategies, that may also determine whether or not a foreign firm needs contributions from local firms, and unobserved choice-specific attributes.

Given the stochastic nature of the profit function, the probability that ownership structure j is selected by any firm i can be written as

$$P_{ij} = Prob(\pi_{ij} > \pi_{it} \forall t \in J, t \neq j). \quad (6)$$

To specify a particular discrete choice model a particular joint distribution of the stochastic term should be selected. The common specifications are the *multinomial logit (ML) model*, which assumes that ε_{ij} 's are draws from independent and identical extreme

value distributions, and the *multinomial probit (MP) model*, which assumes that ε_{ij} 's are normally distributed with standard deviations equal to σ_j and unrestricted correlations (Green, 1997). The difficulty of estimating a MP model when there are many alternatives leads most of the researchers to opting for specifying the ML model, although the former has an important advantage that it allows for any arbitrary variance-covariance structure of the stochastic terms across alternative ownership structures.

Despite the small number of choices available to each firm (only three), it turns out that the MP model cannot be estimated. The optimisation stopped before a global minimum was achieved. Therefore, the estimated results presented in Section 5 are based on the ML model, which provides a set of probabilities for the choices of a firm with characteristics \mathbf{x}_i . These probabilities are

$$P_{ij} = \frac{\exp(\beta'_j \mathbf{x}_i)}{1 + \sum_{j=0}^2 \exp(\beta'_j \mathbf{x}_i)}, \quad \text{for } j=1,2 \quad (7)$$

and

$$P_{i0} = \frac{1}{1 + \sum_{j=0}^2 \exp(\beta'_j \mathbf{x}_i)}. \quad (8)$$

This means that the coefficient estimates give the marginal effects of \mathbf{x}_i on the estimated log-odd ratios, which can be computed as

$$\ln \left[\frac{P_{ij}}{P_{i0}} \right] = \hat{\beta}'_j \mathbf{x}_i. \quad (9)$$

That is, the estimated coefficients, $\hat{\beta}_j$, give the effect on the odds of choosing the j ownership structure over the base choice, say $j=0$, of changes in the explanatory variables. To obtain the estimated marginal effects of the regressors (\mathbf{x}_i) on the probabilities, one should compute

$$\frac{\partial \hat{P}_j}{\partial \mathbf{x}_i} = \hat{P}_j \left[\hat{\beta}_j - \sum_{k=0}^2 \hat{P}_k \hat{\beta}_k \right]. \quad (10)$$

which differs from (9) in its magnitude or interpretation. Since our main objective is to identify the determinants of foreign firms' preferences with respect to ownership structure of their affiliates, we will mostly base the discussion of the results on the estimated marginal effects on the probabilities and their standard errors. Nevertheless, the

estimation effects of x_i changes on log-odd ratios could be useful to shed light on the relative ownership preferences of foreign partners.

5. Empirical Results

Estimation results from equation (10) for Portugal and Greece are presented in Table 6 and Table 7, respectively. Overall, our results suggest that firm- and industry-specific characteristics affect differently foreign firms' preferences in the two countries. Such differences may further be interpreted as indicating that MNEs choose distinct roles for their affiliates in host countries.

_____ Table 6 and Table 7 _____

As can be seen in Table 6 we find evidence that foreign firms operating in Portugal select their ownership share based on affiliate's size and capital as well as R&D and resource intensity of the industry to which they belong. Industry profitability and growth seem to have no effect in determining the ownership structure of Portuguese affiliates. A possible interpretation is that foreign partners' profit expectations differ from average industry profitability. Or, that expected profitability differs between foreign and domestic firms, the latter shaping mostly the industry average. Nonetheless, we should stress that this finding does not come as a surprise since a previous study carried out by Barbosa *et al.* (1998) showed that industry average profits have no effect on entry behaviour of foreign firms. It may be the case that it is the export orientation of many foreign firms investing in Portugal, that makes them insensitive to the profitability of domestic markets rendering such a variable insignificant for both entry behaviour and ownership preferences.

The irrelevance of industry profitability in determining ownership preferences is consistent with the effect of affiliate's size. Holding everything else constant, as size increases foreign partners tend to prefer fully owned affiliates instead of partially-owned ones (either minority- or majority-owned). This suggests that foreign partners may form profit expectations based on affiliate's market power or, its potential to yield high profits (proxied here by the size of the affiliate) rather than on industry profitability. Thus, unlike previous studies (Nakamura and Xie, 1998), we find that the expected profits associated with large plants may well outweigh their potential monitoring costs.

By contrast, in the Greek case we find no evidence that affiliate's size impacts significantly on foreign firms' ownership choices¹⁰, while industry profitability and growth turn out to be important determinants. Another contrasting result is related to R&D intensity. This variable displays the expected sign and significance for firms operating in Portugal, while, in Greece, neither its significance nor its behaviour is as expected. Based on this evidence, we may speculate that foreign firms seem to transfer to their Portuguese affiliates more intangible assets than those operating in Greece. Consequently, MNFs in Portugal will be more concerned with potential spillover costs, which together with the size effect lead them to select larger ownership shares.

Comparing the estimated effects of the variables associated with domestic firms' bargaining power, we find additional differences between the two countries. Despite the fragility of the results, namely in terms of statistical significance, they appear to suggest that Portuguese firms (or, more generically, Portuguese economic agents) tend to constrain their foreign partners towards extreme ownership structures, i.e., fully- or minority- owned affiliates. In fact, RES affects negatively the probability of observing majority-owned affiliates. Holding everything else constant, its negative sign suggests that resource oriented foreign firms may find a way to efficiently contract out the required resources and set up fully-owned affiliates or, alternatively, they may use the minority ownership channel to gain access to them. On the contrary, in the Greek case, RES impacts negatively and significantly only on the probability of observing minority-owned affiliates and positively on the log-odd ratio of fully owned affiliates (see Table A2). The insignificant effect of %FDI in both countries enhances the potential bargaining power of domestic firms, since information does not seem to be disseminated by already existing foreign firms thus increasing the need for domestic partners.

Regarding capital intensity, there are no substantial differences among ownership preferences of foreign firms operating in the two countries. Our findings suggest that, holding everything else constant, the resource commitment effect associated with capacity intensity outweighs the potential effect on affiliate's profits and, as a result, foreign firms operating in capital intensive industries tend to prefer partially-owned affiliates as

¹⁰ It should be noted that this conclusion is not dependent on the different way affiliate's size was measured in the Greek case. We have also estimated both models using employment as a measure of affiliate's size. The estimated results were based on a sample of 160 firms, for which information on the number of employees was available, and failed to show any substantial difference from those presented in Table 7.

opposed to fully owned ones. This is, in fact, the most significant similarity between in the two countries. In the Portuguese case, we can go somewhat further and conclude that between the two types of partial ownership, foreign firms operating in capital intensive industries seem to prefer minority ownership given the significantly negative effect of CAP on both the majority and full ownership log-odd ratios.

When unit labour costs are accounted for, the conclusions reached so far still hold, although some instability on the sign of the estimates is observed. Regarding the labour costs effect on ownership preferences, the results point out that intra-industry differences appear to be more relevant in explaining ownership choices than inter-industry ones, although this conclusion might be biased by country-specific differences already stressed. The results on Greece reported in Table 7 and Table A2 show a weak explanatory power of inter-industry labour costs differences, while those on Portugal reported in Table 6 and Table A2 clearly show the effects of firm labour costs on foreign partners' ownership preferences. Holding everything else constant, affiliates experiencing high unit labour costs relative to the industry average tend to be controlled by foreign partners. This means that when a foreign affiliate uses a skilled and highly qualified workforce, subsequently resulting in relatively high unit labour costs, the most probable choice of the foreign partner will be full or majority ownership.

The results associated with the explanatory variable ORIGIN provide a reasonable basis to conclude that geographical and cultural distance constrain foreign partners' ownership preferences, notably towards minority participation. The expected increase on the cost (or risk) of doing business, in particular the monitoring costs, due to geographical and cultural distance tend to affect negatively the probability of observing full- and majority-owned affiliates, while minority-owned affiliates are more likely to be established when such distance is larger.

Finally, the addition of the explanatory variable S_PRO did not perform as it was expected. Despite its weak significance, the sign of its estimated coefficient seems to suggest that when foreign firms operate in marketing intensive industries they are more likely to share ownership. The rationale for the observed pattern has to be found in non-standard explanations. One possible explanation may be that the expected transference of the foreign partner's brand name to its affiliate may not be adequately proxied by the

empirical variable S_PRO, since it includes both advertising and administrative expenditures related to sales. Another possible explanation may be that foreign firms have set up manufacturing plants in Greece to exploit domestic proprietary advantages due to domestic partners' brand name. In this context, foreign firms would be not particularly concerned about misappropriation of their own brand name. On the contrary, they would find it optimal to use the ownership channel to access domestic intangible assets such as domestic brand name. This explanation is not completely unreasonable if one keeps in mind that ownership preferences of foreign firms operating in Greece, unlike their Portuguese counterparts, appear to be affected by the performance of the domestic market. Therefore, foreign partners may seek domestic resources, notably intangible assets, possibly adding to the bargaining power of domestic firms which then push MNFs to minority positions.

Still, related to domestic market conditions, it is interesting to observe that CR4 becomes statistically significant and its associated coefficients display the predicted sign when the extended model is estimated. This appears to reinforce our argument that domestic market matters for ownership preferences of foreign firms operating in Greece. No similar pattern is found for foreign firms operating in Portugal.

6. Conclusions

The ownership structure that MNFs select when investing abroad is a question not usually addressed in the FDI literature. Yet it is an issue of importance for both the MNF and the domestic partner since it affects the profitability of the respectively invested assets. Furthermore, the degree of foreign involvement may affect (through spillovers) the general performance of the host economy. MNFs decide on the extent of ownership based on the costs and benefits resulting from their alternative choices. Transaction cost theory together with bargaining power considerations produce a set of determinants which can be proxied by firm and industry characteristics.

MNFs in Greece and Portugal display different ownership preferences despite the similarities of the two countries. In Portugal most MNFs opt for full ownership while in Greece minority ownership is preferred. The relative size of inward FDI in the late 1980s and 1990s is consequently different with Portugal having received larger investments.

Such differences can be justified by the reactions of MNEs to the determinants of ownership structure as suggested by theoretical considerations and estimated by a multinomial logit model.

The foreign ownership choice in Portugal is found to be significantly affected by firm characteristics such as size and labour costs, while it does not respond to industry profitability and growth. MNEs located in Portugal seem to be export oriented and hence able to ignore prominent domestic market features. Only the effect of R&D intensity is significant and favours full ownership. On the contrary, the ownership choice in Greece is influenced by domestic market characteristics like profitability, growth and concentration giving the impression of domestic market oriented investments. R&D intensity is not significant implying reduced transference of intangible assets, while foreign firm and marketing intensity seem to suggest higher bargaining power for Greek firms thus pushing MNEs towards minority positions. Only capital intensity affects MNEs in both countries in a similar way discouraging full ownership. The country of origin of MNE affects the ownership decision with firms in geographical and cultural proximity preferring full ownership in contrast to more distant MNEs preferring minority positions. Since Greece attracted a lower share of FDI from EU and OECD than Portugal, the minority position of MNEs in Greece together with their full ownership position in Portugal are further justified.

Future research in the same strand of literature may include (a) an exploration of whether the entry mode (acquisition vs. greenfield) affects the observed ownership structure and its stability over time, (b) an investigation of whether the differences in foreign ownership preferences impact significantly on the economic performance of the host country and (c) a comparison of the determinants of ownership choice between manufacturing and services, the latter being the favoured sector by MNEs. If such questions were answered, distinctly with reference to countries not investigated before, interesting contributions to our knowledge in the field of FDI and MNE behaviour could be made.

References

- Barbosa, Natalia; Guimarães, Paulo and Woodward, Douglas (1998) "Foreign Firm Entry in Portugal: An Application of Event Count Models", Presented at the 25th Annual EARIE Conference, 27-30 August, Copenhagen, Denmark.
- Blomström, Magnus and Sjöholm, Fredrik (1999) "Technology Transfer and Spillovers: Does Local Participation With Multinationals Matter?", European Economic Review, Vol. 43, No. 4-6 (April), pp. 915-923.
- Caves, Richard E. (1996) Multinational Enterprise and Economic Analysis, 2nd edition, Cambridge University Press.
- Cleeve, Emmanuel (1997) "The Motives for Joint Ventures: A Transaction Costs Analysis of Japanese MNE's in the UK", Scottish Journal of Political Economy, Vol. 44, No. 1 (February), pp. 31-43.
- Dunning, John H. (1992) Multinational Enterprises and the Global Economy, Harlow: Addison-Wesley.
- Franko, Lawrence G. (1989) "Use of Minority and 50-50 Joint Ventures by United States Multinationals during the 1970s: The Interaction of Host Country Policies and Corporate Strategies", Journal of International Business Studies, Vol. 20, No. 1 (Spring), pp. 19-40.
- Gomes-Casseres, Benjamin (1990) "Firm Ownership Preferences and Host Government Restrictions: An Integrated Approach", Journal of International Business Studies, Vol. 21, No. 1 (First Quarter), pp. 1-22.
- Greene, W. (1997) Econometrics Analysis, 3rd edition, London: Prencite-Hall International, Inc.
- Greene, W. (1998) LIMDEP, Version 7.0: User's Manual, Plainview, N.Y.: Econometric Software, Inc.
- Knickerbocker, F.T. (1973) Oligopolistic Reaction and Multinational Enterprise. Boston: Division of Research, Graduate School of Business Administration, Harvard University.
- Markusen, J. and Venables, A. (1999) "Foreign Direct Investment as a Catalyst for Industrial Development", European Economic Review, Vol. 43, No. 2, pp. 335-256.
- Nakamura, M. and Xie, J. (1998) "Nonverifiability, Noncontractibility and Ownership Determination Models in Foreign Direct Investment, with an Application to Foreign Operations in Japan", International Journal of Industrial Organization, Vol. 16, No. 4, pp. 571-599.
- Nakamura, M. and Yeung, B. (1994) "On the Determinants of Foreign Ownership Shares: Evidence from US Firms' Joint Ventures in Japan", Managerial and Decision Economics, Vol. 15, No. 2, pp.95-106.
- Palenzuela, Valentin Azoirra and Bobillo, Alfredo Martinez (1999) "Transaction Costs and Bargaining Power: Entry Mode Choice in Foreign Markets", Multinational Business Review, Vol. 7, No. 1, pp. 62-75.
- Svejnar, J. and Smith, S. (1984) "The Economics of Joint Ventures in Less Developed Countries", Quarterly Journal of Economics, Vol. 99, No 3, pp. 149-167.
- Teece, D. (1986), "Transactions Cost Economics and the Multinational Enterprise: An Assessment", Journal of Economic Behaviour and Organization, Vol. 7, No 1, pp. 21-45.
- Veugelers, R. (1991) "Locational Determinants and Ranking of Host Countries: An Empirical Assessment", Kyklos, Vol. 44, No 3, pp. 363-382.

Table 1: Total and Manufacturing FDI in Greece as a % of GDP and I^(a)

Year	FDI/GDP	FDI/I	M/FDI ^(b)	M/GDP	M/I
1987	0.35	1.83	57	0.20	1.05
1988	0.29	1.49	48	0.14	0.74
1989	0.37	1.99	49	0.18	0.94
1990	0.45	2.44	36	0.16	0.90
1991	0.37	2.31	46	0.17	1.07
1992	1.09	7.52	69	0.75	5.22
1993	0.94	7.62	n.a.	n.a.	n.a.
1994	1.15	9.47	n.a.	n.a.	n.a.
1995	1.63	13.91	n.a.	n.a.	n.a.

^(a) I is gross fixed capital formation, M is FDI in manufacturing industry.

^(b) Manufacturing FDI as % of total FDI

Source: OECD (1999), Statistical Compendium, Paris;

Bank of Greece (1999), Unpublished Information on FDI, Athens.

Table 2: Total and Manufacturing FDI in Portugal as a % of GDP and I^(a)

Year	FDI/GDP	FDI/I	M/FDI ^(b)	M/GDP	M/I
1987	0.73	3.21	26	0.19	0.84
1988	1.34	5.60	34	0.45	1.89
1989	2.82	11.09	20	0.57	2.24
1990	3.26	12.01	19	0.62	2.28
1991	2.92	10.47	17	0.49	1.75
1992	2.01	7.60	14	0.28	1.07
1993	1.81	6.69	28	0.50	1.86
1994	1.42	5.53	46	0.65	2.53
1995	0.63	2.39	38	0.24	0.92

^(a) I is gross fixed capital formation, M is FDI in manufacturing industry.

^(b) Manufacturing FDI as % of total FDI

Source: OECD (1999), Statistical Compendium, Paris;

Bank of Greece (1999), Unpublished Information on FDI, Athens.

Table 3: FDI in Greece and Portugal by area of origin as share of total FDI

Year	Greece		Portugal	
	F _{EU} /FDI	F _{OD} /FDI	F _{EU} /FDI	F _{OD} /FDI
1987	0.54	0.71	0.68	0.93
1988	0.55	0.90	0.75	0.95
1989	0.73	0.92	0.76	0.90
1990	0.87	0.96	0.77	0.89
1991	0.86	0.92	0.76	0.89
1992	0.79	0.94	0.77	0.92
1993	n.a.	n.a.	0.82	0.94
1994	n.a.	n.a.	0.65	0.84
1995	n.a.	n.a.	0.76	0.87

F_{EU} is Aggregate FDI originating from EU countries.

F_{OD} is Aggregate FDI originating from OECD countries.

Source: OECD (1999), Statistical Compendium, Paris;

Table 4: MNFs' Sectoral and Ownership Preferences in Greece

Sector Description	No. Firms			Full Foreign Ownership	Majority	Minority
	Abs.	%	%Acum.			
Food, Beverage and Tobacco	87	24,0%	24,0%	19	20	48
Chemicals	82	22,6%	46,6%	27	15	40
Other Manufacturing Industries	43	11,8%	58,4%	13	10	20
Textiles, Clothing and Leather	38	10,5%	68,9%	8	9	21
Machinery and Equipment	32	8,8%	77,7%	9	1	22
Basic Metals	29	8,0%	85,7%	5	2	22
Wood, Paper, Printing and Publishing	22	6,1%	91,7%	2	6	14
Oil refineries and Coal	13	3,6%	95,3%	0	1	12
Plastics and Rubber	10	2,8%	98,1%	1	3	6
Electric machinery	7	1,9%	100,0%	2	2	3
Total	363			86 23,69%	69 19,01%	208 57,30%

Table 5: MNFs' Sectoral and Ownership Preferences in Portugal

Sector Description	No. Firms			Full Foreign Ownership	Majority	Minority
	Abs.	%	%Acum.			
Textiles, clothing, footwear and leather	116	24,7	24,7	70	23	23
Metal products and no electric machinery	68	14,5	39,2	24	21	23
Chemicals	63	13,4	52,7	37	16	10
Food, beverage and Tobacco	49	10,4	63,1	16	11	22
Electric machinery	44	9,4	72,5	28	7	9
Mineral products, except metal products	29	6,2	78,7	13	8	8
Wood and Cork	26	5,5	84,2	9	11	6
Paper, printing and publishing	22	4,7	88,9	13	1	8
Plastics and rubber	14	3,0	91,9	3	6	5
Other manufacturing industries	14	3,0	94,9	8	3	3
Vehicles and other transportation equipment	12	2,6	97,4	6	5	1
Basic metals	11	2,3	99,8	2	3	6
Oil refineries and Coal	1	0,2	100,0	0	1	0
Total	469			229 48,83%	116 24,73%	124 26,44%

Table 6: Estimated marginal effects on the probability of each ownership structure to Portugal

Variables	Benchmark Model			Extended Model		
	Full Foreign Ownership	Majority Foreign Ownership	Minority Foreign Ownership	Full Foreign Ownership	Majority Foreign Ownership	Minority Foreign Ownership
Intercept	-0,1266 (-0,944)	0,1274 (1,128)	-0,00076 (-0,007)	-0,229 (-1,576)	0,111 (0,905)	0,119 (0,993)
Size	0,05*** (3,188)	-0,0171 (-1,300)	-0,0328*** (-2,449)	0,0536*** (3,347)	-0,0176 (-1,307)	-0,0359*** (-2,647)
CAP	-0,0119* (-1,670)	-0,0038 (-0,654)	0,0158** (2,321)	-0,0118* (-1,651)	-0,0038 (-0,647)	0,0157** (2,286)
PCM	-0,0005 (-0,127)	0,0002 (0,061)	0,0003 (0,086)	-0,0008 (-0,210)	-0,0002 (0,056)	0,0007 (0,186)
GROW	0,0017 (1,157)	-0,00196 (-1,475)	0,00028 (0,226)	0,00136 (0,920)	-0,0023 (-1,499)	0,0007 (0,548)
CR4	0,0028 (1,329)	-0,0009 (-0,501)	-0,0019 (-1,052)	0,00283 (1,333)	-0,0009 (0,515)	-0,0019 (-1,055)
%FDI	0,0001 (0,024)	-0,0016 (-0,433)	0,00149 (0,447)	0,0005 (0,126)	-0,0014 (-0,379)	0,0009 (0,259)
R&D	0,1745*** (2,555)	-0,076 (-1,255)	-0,0985* (-1,670)	0,1695*** (2,467)	-0,0792 (-1,297)	-0,0904 (-1,527)
RES	0,0826 (1,546)	-0,093** (-2,054)	0,0102 (0,223)	0,0927* (1,719)	-0,091** (-1,997)	-0,00164 (-0,036)
LAB	-	-	-	0,0669** (1,981)	0,0143 (0,518)	-0,0812*** (-2,510)
Log-Likelihood		-474,91			-471,29	
χ^2		32,55***			39,78***	
Average of p_{ij}		32,76			34,13	
Sample Size		469			469	

Notes: Figures in parentheses are t-ratios. *, ** and *** mean that coefficients are statistically significant at 10%, 5% and 1% level, respectively. The indicator p_{ij} measures the proportion of correct predictions for choice j and, for each model, we present the average of p 's.

Table 7: Estimated marginal effects on the probability of each ownership structure to Greece

Variables	Benchmark Model			Extended Model		
	Full Foreign Ownership	Majority Foreign Ownership	Minority Foreign Ownership	Full Foreign Ownership	Majority Foreign Ownership	Minority Foreign Ownership
Intercept	-0,04612 (-0,073)	-1,285 (-2,772)	1,331 (1,698)	-5,0082 (-1,272)	5,4679 (1,332)	-0,4597 (-0,099)
Size	-0,01087 (-0,459)	0,0124 (0,553)	-0,0015 (-0,052)	-0,01478 (-0,637)	0,01021 (0,454)	0,00457 (0,159)
CAP	-0,171*** (-2,517)	0,0307 (0,547)	0,1399** (1,938)	-0,2315** (-2,431)	0,04358 (0,746)	0,1879** (2,021)
PCM	0,0323 (1,400)	0,0351** (1,975)	-0,06739** (-2,290)	0,0887* (1,808)	-0,00603 (-0,187)	-0,0827 (-1,471)
GROW	0,0376* (1,743)	-0,0059 (-0,514)	-0,0317* (-1,610)	0,04657** (2,332)	-0,0156 (-1,161)	-0,031 (-1,539)
CR4	-0,0223 (-1,069)	0,0129 (1,040)	0,00931 (0,417)	-0,0637* (-1,923)	0,04233* (1,836)	0,0214 (0,638)
%FDI	0,00361 (0,423)	-0,00267 (-0,445)	-0,00094 (-0,102)	0,01743 (1,147)	-0,01026 (-1,003)	-0,00717 (-0,460)
R&D	-0,0635 (-0,748)	-0,0425 (-0,604)	0,106 (1,029)	0,0469 (0,237)	0,0969 (0,452)	-0,1438 (-0,581)
RES	0,1744 (1,600)	0,0644 (0,764)	-0,239* (-1,861)	-0,0868 (-0,478)	0,2266 (1,459)	-0,1398 (-0,674)
ORIGIN	-	-	-	-0,0602* (-1,734)	-0,01868 (-0,641)	0,0789** (2,020)
LAB	-	-	-	1,4843 (1,477)	-1,889* (-1,776)	0,4049 (0,346)
S_PRO	-	-	-	-0,0499* (-1,703)	0,03227 (1,537)	0,01759 (0,544)
Log-Likelihood		-338,12			-332,44	
χ^2		32,22***			43,59***	
Average of p_{ij}		33,72			34,11	
Sample Size		363			363	

Notes: Figures in parentheses are t-ratios. *, ** and *** mean that coefficients are statistically significant at 10%, 5% and 1% level, respectively. The indicator p_{ij} measures the proportion of correct predictions for choice j and, for each model, we present the average of p's.

Appendix

Table A1: Some descriptive statistics of dependent and independent variables

Extended Models	Benchmark Model	Variable	Portugal				Greece			
			MIN	MAX	Mean	STDEV	MIN	MAX	Mean	STDEV
			Ownership	0	2	1.224	0.839	0	2	0.664
SIZE	0	8.059	4.058	1.568	2.820	8.527	5.819	0.950		
CAP	-32.412	21.735	6.392	3.842	2.206	8.335	5.795	1.177		
PCM	6.918	52.216	24.328	8.226	13.143	28.297	23.951	2.967		
GROW	-58.043	122.454	14.416	17.677	1.826	25.812	11.102	4.230		
CR4	4.860	52.097	22.729	12.955	5.000	52.100	12.832	9.613		
%FDI	0.308	45.454	7.149	8.368	2.591	76.470	14.070	16.043		
R&D	0	1	0.292	0.455	0	1	0.653	0.477		
RES	0	1	0.461	0.499	0	1	0.372	0.484		
LAB	0.005	8.722	1.460	0.731	3.389	3.838	3.576	0.114		
ORIGIN	-	-	-	-	1	3	1.419	0.725		
S_PRO	-	-	-	-	12.000	28.000	19.675	5.445		

Note: Correlation coefficients among the independent variables were low. There was no indication of potential multicollinearity problems in the estimations.

Table A2: Estimated marginal effects in numerator of log-odd ratios (Base category: *Minority-owned*)

	Portugal		Greece	
	Benchmark Model	Extended Model	Benchmark Model	Extended Model
Majority-owned				
Intercept	0,5168 (0,735)	-0,0204 (-0,027)	-9,2668 (-2,598)	30,9329 (1,085)
Size	0,0568 (0,664)	0,0695 (0,799)	0,0701 (0,450)	0,0488 (0,308)
CAP	-0,0761* (-1,832)	-0,0764* (-1,812)	-0,0696 (-0,184)	-0,0711 (-0,180)
PCM	-0,0003 (-0,015)	-0,00177 (-0,079)	0,3056** (2,258)	0,1038 (0,434)
GROW	-0,0089 (-1,082)	-0,0107 (-1,285)	0,0214 (0,288)	-0,0344 (-0,372)
CR4	0,0037 (0,320)	0,0037 (0,317)	0,0549 (0,614)	0,1981 (1,243)
%FDI	-0,0122 (-0,537)	-0,0091 (-0,393)	-0,0129 (-0,311)	-0,0447 (-0,632)
R&D	0,0717 (0,184)	0,0349 (0,089)	-0,4116 (-0,814)	0,7731 (0,521)
RES	-0,4131 (-1,427)	-0,3583 (-1,226)	0,756 (1,246)	1,4822 (1,348)
LAB	-	0,3733* (1,890)	-	-11,0958 (-1,496)
ORIGIN	-	-	-	-0,2338 (-1,159)
S_PRO	-	-	-	0,1489 (0,977)
Fully-owned				
Intercept	-0,2545 (-0,405)	-0,9297 (-1,360)	-2,4589 (-0,626)	-22,4719 (-0,918)
Size	0,2274*** (3,017)	0,2487*** (3,221)	-0,0454 (-0,322)	-0,0761 (-0,532)
CAP	-0,0848** (-2,270)	-0,085** (-2,240)	-0,9903** (-2,421)	-1,3854** (-2,165)
PCM	-0,0022 (-0,113)	-0,0043 (-0,216)	0,2568* (1,767)	0,5486* (1,669)
GROW	0,0024 (0,351)	0,0002 (0,024)	0,2194* (1,716)	0,2675** (2,033)
CR4	0,0130 (1,287)	0,0131 (1,294)	-0,1141 (-0,898)	-0,3312 (-1,580)
%FDI	-0,0055 (-0,299)	-0,0024 (-0,126)	0,0175 (0,345)	0,0927 (1,015)
R&D	0,7331** (2,250)	0,6955** (2,110)	-0,4598 (-0,890)	0,4559 (0,381)
RES	0,1288 (0,506)	0,1943 (0,752)	1,1745* (1,753)	-0,1710 (-0,155)
LAB	-	0,4518*** (2,512)	-	6,2148 (0,995)
ORIGIN	-	-	-	-0,4099** (-1,936)
S_PRO	-	-	-	-0,2605 (-1,395)

Notes: Figures in parentheses are t-ratios. *, ** and *** mean that coefficients are statistically significant at 10%, 5% and 1% level, respectively.