

**Idiosyncratic outward FDI strategic motivation based on size and technology:  
a firm level analysis<sup>1</sup>**

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**Abstract**

In the present study we examine the strategic motivation for outward FDI by combining ownership and location advantages within the eclectic paradigm of Dunning and Lundan (2008) for different firm size and technology intensity. By employing appropriate panel estimation techniques for the period 2001-2010 we reach significant results for policymakers and managers. Our results demonstrate that there are distinctive differentiations among firms both in what regards if and how they exploit their ownership advantages and how they combine them with location advantages. Small firms are in this matter quite different compared to medium and large firms. Regulation freedom and taxation are high in the agenda of medium and large firms while small firms seem to be more market and efficiency seeking. High tech firms appear to exploit their Ot advantage if prior presence in a host market which then moderates the effect of local regulatory and taxation context.

*Keywords: eclectic paradigm, ownership advantages, firm size, regulation, taxation*

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## **1. Introduction**

FDI is a key element of globalization and is considered an important vehicle for local enterprise development, which improves the competitive position of both host and home economies (OECD, 2008). Large multinational enterprises (MNEs) are traditionally the dominant players in FDI transactions, although, it is believed that small and medium-sized enterprises have also become increasingly involved in FDI (OECD 2008). In the present paper, we try to explore the behavior of firms in terms of their outward investment decisions by classifying them according to size and technology intensity in order to understand their strategic motivations.

Firms invest abroad in order to exploit their ownership (firm specific) advantages in other locations (Dunning, 1981), to profit from foreign markets, to obtain competitive advantages (Child and Rodrigues, 2005) and also escape their home country's weak institutions, and economic underdevelopment (Cuervo-Cazurra and Ramamurti, 2015). Within related literature, firm size has been proved to be an important predictor of FDI activities (e.g., Blomstrom and Lipsey, 1989; Grubaugh, 1987) and has been identified by a large number of theoretical and empirical studies of FDI as an important source of strategic advantage (Ursacki and Vertinsky, 1992). It is considered that large firms have more resources and privileged access to learning channels than that of small firms for international expansion through equity investment. The larger the firm size the higher the ownership advantage (Dunning, 2000). Urata and Kawai (2000) report that Japanese firms' FDI motives differ based on their size of being large and small. The factors underlying the expansion of small and medium sized firms to international markets are poorly explored and the literature suggests that their internationalization activity is centered on exports alone, and rarely evolves to establishing facilities abroad (Selassie et al. 2004). While some studies have explored the different motives of large, medium and small-sized firms (Kinoshita, 1998; Hansson and Hedin, 2007; Osei-Bonso, 2014) none of them until now has explored strategic motivations based on firm size within the OLI framework using both ownership and location advantages.

In parallel, technological development has affected global economy and therefore, the motives and the way in which MNEs operate. FDI, due to its complex and interdependent nature takes place both in high, medium and low tech industries. Studies investigating innovation and new knowledge creation focus on R&D-intensive

industries such as information and communication technology (ICT) and biotechnology (Orstavik, 2004). High-tech industries are seen as the main drivers of growth processes, employment and productivity. On the other hand, low-tech industries persist as major sectors of employment and growth (Kaloudis et al., 2005). These industries have continued to play a major role in advanced countries and economies due to constant technological upgrading in the form of continuous incremental product and process innovations, which account for their growth and trade performance.

Few studies until now have focused on Greece (Kottaridi et al, 2019). Greece is of great interest as a EU small and peripheral country in the South, where the consequences of the recent financial crisis have become most salient and where governmental efforts to overcome the crisis have generated deep institutional changes (Manasse and Katsikas, 2018). While there are a few studies dealing with Greece, no study to date according to our knowledge has investigated more thoroughly strategic motivation of Greek MNEs based on size and technology intensity, which may provide useful implications for other small and peripheral EU countries.

This paper contributes to the literature in several ways. First, it uses a ten years (2001 to 2010) firm-level dataset consisting of the total population of Greek MNEs from all sectors that invest overseas; the dataset is further enriched with other firm-specific attributes and country level data, creating a very informative database which allows for more accurate and conclusive analysis. Secondly, it provides results and thus conclusions for differentiating FDI strategies of firms based on their size. Thirdly, it provides results and policy implications for firm internationalization strategies based on technology intensity to capture variations of ownership and location advantages. Fourth, we put this analysis within the expanded OLI paradigm, placing emphasis on institutional quality as suggested by Dunning and Lundan (2008). Our results open the floor to further research in order to capture firms' internationalization strategies of small, peripheral European Union countries.

The rest of the paper is organized as follows: We first discuss the theoretical framework and present a brief literature review. Section 3 describes the incorporated variables and model specification, as well as the sample description and the methodology used. In section 4 we present and discuss our empirical results. Finally, in Section 5 we conclude

by providing some managerial and government recommendations and some ideas for future research.

## **2. Theoretical Background and Literature Review**

Dunning (1981) introduced the OLI (Ownership, Location, and Internalization) paradigm to explain the origin, level, pattern and growth of MNEs' activities. In International Business (IB) literature, OLI has become the dominant paradigm. The OLI framework combines the competitive advantages of firms and the comparative advantage of nations in order to explain production and subsequent growth of MNE operations (Estrella Tolentino, 2001). Based on the OLI paradigm, a firm must possess O advantages which it chooses to use them itself rather than sell or lease them when it realizes that it can generate profit in a foreign location (Eden and Dai, 2010). When selecting a foreign location, location-bound advantages are important drivers.

The OLI paradigm is suggested to be seen as context specific rather than a generally applicable framework irrespective of firms, regions or countries, industries or value-added activities (Stoian and Filippaios, 2008). Adopting this notion here, we set up our OLI formulation within the context of Greek MNEs focusing on their size and technology intensity.

Dunning and Lundan (2008) extended the determinants of FDI in terms of locational components of the OLI paradigm including policy-induced effects generated by the institutional framework. Taking this as a starting point, we expand this framework and incorporate institutional effects as an important L factor that may be different based on the size and technology of firms.

MNEs' investment motives are thought to be different based on their size. Larger firms are more international than smaller ones (Kriauciunas et al., 2010) although small and medium sized enterprises (SMEs) account for over 95% of firms and 60-70% of employment and generate a large share of new jobs in OECD economies (OECD, 2000). The latter have specific strengths and weaknesses that may require special policy responses. As new technologies and globalization reduce the importance of economies of scale in many activities, the potential contribution of smaller firms is enhanced. However, many of the traditional problems facing small and medium sized firms like

the lack of financing, difficulties in exploiting technology, constrained managerial capabilities, low productivity, regulatory burdens etc. become more acute in a globalized, technology-driven environment (OECD, 2000).

Even though SMEs are largely focused on their home markets, more and more are entering global markets, which is particularly challenging for those at the doorstep of joining the European Union. International trade liberalization, progress in telecommunications and transport, and Internet utilization have created completely new business possibilities for SMEs, and at the same time, exposed them to fiercer international competition, as the ICT revolution has diminished the significance of home-market size and geographic distances. Enhanced foreign competition and liberalized global markets are driving SMEs to internationalize because it is the only way to survive in the long term. More SMEs also realize that without globalizing their activities, they will fall behind in the world market. Kriauciunas et al. (2010) report that, despite the disadvantages of smaller firms in terms of physical resources, low-cost manufacturing capabilities and pro-active managerial orientation towards international operations are positively associated with increased internationalization of SMEs. As SMEs can obviously globalize, the question is whether their pattern differs from large firms. According to Lipsey et al. (1983) the larger the firm, and the higher its capital intensity, technological intensity, and the skill level of its labor force, the higher the probability to invest abroad. Due to their limited resources SMEs are acting differently compared to their big counterparts. Rieckmann et al. (2018) suggest that networks play a major role in the internationalization process of SMEs.

The factors underlying the OFDI behavior of SMEs to international markets are poorly explored; the literature suggests that their internationalization activity is centered on exports alone and rarely evolves to establishing facilities abroad (Selassie et al. 2004). However, there are some worth noting studies that deal with SMEs and their motives. Hansson and Hedin (2007), explored the motives of small Swedish firms and proved that in contrast to larger and already internationalized firms that are mainly efficiency and strategic resource seekers, smaller companies follow market-seeking and network-seeking motives. Osei-Bonsu (2014), studied the internationalization process of small and medium manufacturing enterprises from developing countries and found that the development of ownership advantages is more important for them, as main drivers of internationalization, centered on key personnel managerial capabilities and firm

specific factors (organizational process, networking abilities etc.). Kinoshita (1998) investigated in depth their motive differentiation based on firm size for Japanese MNEs investing in Asia. He found that sound institutions and a stable political environment consist the most important pull factor (greater than host market size and sufficient infrastructure) for large firms. However, the market size and the competitors' investment behavior play the most important role, not only for large firms, but also for medium sized ones. Contrary, small firms are induced to invest by low labor costs and sufficient infrastructure of the host country.

In parallel, technological advancement has affected global economy and therefore, the motives and the way MNEs operate. Many companies, in the context of competitiveness and the effort to grow and survive, have started to invest in R&D, in new technology tools, new patents, skilled labor force etc. Even though high-tech firms have more advantages to internationalize, low tech firms especially in manufacturing have also strong motives to operate abroad due to steady demand for low tech products like food or steel (Schroeder, & Purinton, 1998). Although, high tech companies, as biotechnology firms, tend to internationalize due to search for a larger host market in a reactive motive and due to managerial interest in a proactive reason (Hansson and Hedin 2007), high tech manufacturing firms are far more likely to be engaged in exporting activity than are service firms, regardless of whether the latter are high-tech (Lejpras 2009). Raluca and Alecsandru (2014) explored different patterns of high tech and low-tech manufacturing companies that invest in Romania. They found that Romania was a target especially for firms with a low technology level, as the country is mostly an alternative for firms in search of cheap labor and low operational costs.

Indeed, according to World Investment Report (UNCTAD, 2001), motivation potentially differs across primary, secondary and tertiary sectors. Primary sector, for example, is mostly capital intensive and the scope for linkages between foreign companies and the rest of the economy is often limited. On the other hand, FDI flows from the manufacturing sector may have a larger impact in the economy through a broad range of potential linkage-intensive activities. Conventionally defined, services include a wide range of different activities such as finance, infrastructure (such as electricity, water, and telecommunications), wholesale and retail, real estate as well as tourism. Advances in technology and e-commerce, stricter environmental regulations, need for cost containment, people management and increased operating performance

expectations, impact the industrial companies' day to day operations heavily, which at the same time need to remain competitive, maintain their products' quality and deliver value to their clients (PWC Greece 2018). Despite that, the Manufacturing sector has a leading role on internationalization by trade and FDI patterns. In our sample, the Manufacturing sector comprises 43% of Greek MNEs that invest abroad.

Bitzenis and Marangos (2007) based on questionnaire data on a sample of manufacturing companies that invest in FYROM, found that the manufacturing sector perceives the low cost of unskilled labor as the strongest FDI driving force, followed by ownership advantages and geographical proximity. Kaya (2014) investigated the behavior of Turkish manufacturing companies, found that market-related motives such as market potential and market access, appear to be the most important motives. He also found that favorable business environment seeking and strategic asset seeking motives are significantly associated with investment in developed countries and cultural asset exploiting and efficiency seeking motives are significantly associated with investment in less developed countries. In the existing literature the predominant aspect is that foreign investors who invest in manufacturing industries are motivated by both market related aspects and efficiency related aspects (Hansson & Hedin 2007; Raluca & Alecsandru 2014). The motives of Chinese manufacturing companies, that have increased their international presence and have invested in depth in new technology and R&D, also include the strategic asset seeking investments (Lintunen 2011; Wang & Shao 2016). Particularly, Lintunen (2011) presents that Chinese investors are interested in developed infrastructure as well as high level of education and research and have engaged in OFDI in small and developed economies like Sweden (despite the high taxation and the limitation of the market size). We also pay particular attention to manufacturing industry and the motives of Greek MNEs that operate in this sector.

Taking into account all the above, we try to shed light in the gaps of the existing literature and empirical work by exploring the relative significance of ownership and location-bound determinants that induce OFDI of Greek MNEs both for all sectors and manufacturing based on firm size and technology intensity within the expanded OLI context.

### **3. Data Analysis and Estimation method**

#### **3.1 Data Analysis**

To set the OLI in a specific context, we account for all sectors of Greek MNEs and destination countries with special reference on manufacturing sector. The period under examination covers the decade from 2001 up to 2010, i.e. pre-crisis period.

Our analysis is based on firm level data derived from a unique database maintained by the Department of Statistics of the Bank of Greece. The data are derived from an annual census survey which is applied on the total of Greek firms possessing or investing for the first-time equity capital of 10% abroad and include the identity and the sector of the parent firm. This database has been used in Kottaridi et al. (2018). We further enriched that dataset with classification of firms according to their size and technology intensity. Particular attention is paid to the manufacturing sector since most firms investing abroad fall within this sector (Table 1). It is worth noting that the vast majority (more than 60%) of manufacturing FDI takes place in Cyprus and Austria, while Netherlands and Bulgaria follow with significantly lower proportions.

Our dependent variable measures total capital stock by each parent firm overseas, either to a new affiliate or established ones, as registered by the Bank of Greece.

We use three subsets of variables based on Dunning's eclectic paradigm (Dunning, 1993a, 1993b). The first one includes ownership variables, i.e. firm-specific variables, with special focus on the number of already established affiliates in each particular location by the parent MNE. The second one includes location-specific variables. Particular emphasis within this set is paid to corporate taxation and institutional quality. Finally, the third set includes traditional location macroeconomic factors which are used more frequently in the related literature.

We follow the OECD technology classification, i.e. the International Standard Industrial Classification (OECD, 2003). The OECD classifies 23 divisions into four categories based on technology intensity: high technology, medium-high technology, medium-low technology and low technology. The two extreme industries (high tech and low tech) present some differences: a) High tech industries do have a more multi-country approach, thus high-tech firms are more globally focused than low tech firms, b) in high tech industries there is relatively more competitiveness present than in low tech industries, c) high tech firms seems to have more access to the global network than low tech, d) high tech firms collaborate more with larger companies than low tech companies and the last deference is e) that high tech firms try to use research and

development in existing products to keep products in the introduction phase and, although, this is not the case for low tech firms, that just let the products go through the whole product life cycle in a natural way (Atmer and Thagesson, 2006)).

### *Ownership advantages*

Regarding the total sample, we use firm size (SIZE) (Dunning, 1993a, 1993b, p. 81) as already discussed in related literature above. When splitting our sample according to their size, this variable is excluded.

Particular emphasis is placed on the pre-existing operating facilities in the host market (PRES) in order to capture the familiarity of institutions and developed tacit knowledge. Some authors use the existence of a firm in a host market as an O advantage (Dunning and Lundan 2008), while others consider it as a L advantage (Narula 2010). Narula and Santangelo (2012) follow the dichotomy of ownership advantages, based on Dunning (1980s), that presents two primary types of O advantages, the asset-type of O advantages (Oa) and the transaction-type of O advantages (Ot). Ot advantages include the knowledge of institutions, because familiarity of institutions plays an important role and reduces the coordination costs, shirking costs, and other transaction costs (Narula, 2010; Santangelo and Meyer, 2011). Therefore, in this paper we use prior existence as an O advantage.

Multinationals usually are in a better position to raise capital, either domestically or internationally. This leads to financial assets advantages which reinforce multinationality (Dunning, 1993a, 1993b, p. 162). However, investment decisions of MNEs may be restricted by creditors if the targeted country is perceived as too risky (Stoian and Filippaios, 2008). These firms have different capabilities when raising capital and thus we expect that a higher level of leverage might have an ambiguous effect on FDI decision. We use short-term and long-term debt over own capital to capture firm's leverage (LEV).

Gross profit margin, indicates how much profit a company makes after paying off its cost of goods sold. It is a measure of the efficiency of a company using its raw materials and labor during the production process. The value of gross profit margin varies from company and industry. Particularly, it looks at the cost of goods sold as a percentage of sales and shows how well a company controls the cost of its inventory and the manufacturing of its products and subsequently pass on the costs to its

customers. The larger the gross profit margin, the better for the company and the more efficient a company is (Cantwell & Sanna-Randaccio, 1993). Therefore, we expect a positive effect of the gross profit margin (EFF) on firms' international investments.

The second set of factors that this paper examines captures host country characteristics. Among these characteristics, we pay particular attention on the role of corporate taxation and regulatory context. Taxation (TAX) is measured by the corporate tax rate of the host nations which is vital for business operations and at the same time it consists a significant element of a country's institutional context.

Regulatory quality is measured by a composite index capturing the overall regulatory freedom (REG). We employ the index of economic freedom which is published annually by the Heritage Institute and Wall Street Journal. We chose this particular index because it covers a wide spectrum of regulation aspects in relation to other measures such as the International Country Risk Guide variables or the Governance Indicators. In particular, the Economic Freedom of the world annual reports measure and rank countries along five important dimensions: size of the government, legal structure and security of property rights, access to sound money, freedom to trade internationally and regulations of labor, credit and business. These five dimensions include ten quantitative and qualitative factors which are weighted equally (freedom of corruption, property rights freedom, financial freedom, trade freedom, business freedom, investment freedom, labor freedom, fiscal freedom, monetary freedom, plus the government size). Each of the ten economic freedom items within these categories is graded on a scale of 0 to 100. A country's overall score is derived by averaging these ten economic freedom scores, with equal weight being given to each. A higher score represents openness of the economy to international business, presence of strong market institutions, ease of doing business, and sound financial and fiscal policies. The economic freedom data are widely used in international business, institutional economics and international political economy studies (Cole, 2003; Feldman, 2009; DiRienzo et al., 2007; Quazi, 2007; Cass, 2007; Heriot, Theis & Campbell, 2008; Caetano & Caleiro, 2009; Arslan & Larimo, 2012; Kang and Chiang, 2012; Saadatmand & Choquette, 2012; Arslan & Larimo, 2016). The majority of these studies though have concentrated on analyzing particular dimensions of the freedom data. However, investors have varying motivations and particular interests with respect to regulations and including isolated items may not capture the specific regulatory frames. We

therefore use the overall index in order to capture the entire spectrum of regulation conditions prevailing in an economy.

Finally, the third set of variables included those variables that are most commonly used in the literature. Market size (MARKET) is the most widely used determinant of FDI (Bevan & Estrin, 2004; Bevan, Estrin and Meyer, 2004). Larger host countries' markets may be associated with higher FDI due to larger potential demand and lower costs due to scale economies. For instance, Resmini (2000), investigating manufacturing FDI, found that countries in Central and Eastern Europe with larger populations tend to attract more FDI, while Bevan and Eastin (2000) presented similar results; transition economies with larger economies also tend to attract more FDI.

The openness of an economy (OPEN) is defined as a share of total imports and exports over the total country's GDP and describes the competitiveness position of country in terms of international trade and exposure. The larger the weight of exports and imports in overall GDP of a country, the more it seems able to attract FDI (Wagle, 2010; ECB, 2017). Singh and Jun (1995) also found that export orientation is very important in attracting FDI, and link this to the rising complementarity of trade and FDI flows.

We also include the average wage prevalent at host countries (WAGES). Labor cost is considered one of the most important factors by the MNEs when deciding to locate their investments, as described by the OLI paradigm. The reasoning is linked to the opportunity to lower production costs through the utilization of low-cost factors of production in the host country (Dunning, 1993). Contrary, the natural expectation has been that a rise in the host country's wages would discourage foreign investors. An important trend in labour markets in the globalization of the world economies has been a steady shift in demand away from the less skilled toward the more skilled workers. Nowadays, MNEs that are engaged in investments in the service sector require more educated and thus more costly workers. According to this, wages are seen as a guarantee of a better productivity and labour quality (Wei and Balasubramanyam, 2005).

Finally, we employ the interest rate (IRATE) which is the rate charged or paid for the use of money or more precisely the cost of borrowing. Gross & Trevino (1996) argued that a relatively high interest rate in a host country has a positive impact on inward FDI. However, the direction of the impact could be reversed if the foreign investors depend

on host countries capital market for raising FDI funds. We use the lending rate of the host country to capture its potential effect on Greek foreign investors.

An overview of all variables is presented in Table 1 of the Appendix, together with the relevant sources of information.

### **3.2. Estimation Method**

Consistent with the theory, our empirical specification includes corporate taxation, prior existence in a market and institutional quality as well as their interaction term as explanatory variables. More precisely, the main estimated equation is:

$$OFDI_{it} = \alpha + \beta_1 O_{it} + \beta_2 L_{it} + \eta_{it} + v_{it}$$

where the dependent variable measures outward FDI stock of firm  $i$  at year  $t$ .  $O$  denotes the ownership advantages as described above,  $L$  the location determinants,  $\eta$  is a common fixed effect term and  $v_{it}$  a white-noise term. Moreover,  $i$  represents the parent firm investing abroad and  $t$  represents time, i.e. 2001-2010. We should note that each parent firm may invest in more than one subsidiary either in the same or in different host countries, so each firm investment year consists of multiple records. We have panel estimation with fixed effects based on Hausman's specification test (Hausman, 1978; Greene, 2003). We also use robust standard errors to wipe out heteroskedastic residuals, and obtain corrected estimates; multicollinearity has been tested with the variance inflation factor (VIF).

Given that our database includes all Greek MNEs covering the entire spectrum of sectors, we are able to conduct sector-based analysis, too. We first test for the entire population which includes all sectors.

Our main focus rests on the size and technology intensity of firms' investment behavior. Hence, we have classified firms into distinct categories according to their size, i.e. small, medium and large. The classification is made using the Greek accounting standards of 2014. The classification method is based on three key criteria: a) firm's total assets, b) firm's net turnover and c) the average number of employees during the period under investigation. According to this method, companies are classified in four groups (very small, small, medium and large). Each company belongs to one of these groups as long as it fulfils at least two of the above criteria. In our sample we put

together small and very small firms in one group due to limited number of observations of very small firms.

Further, since manufacturing sector constitutes a large share in our total sample, we proceeded in estimating our models by focusing also, on this sector exclusively. In addition to the firm size classification, we also introduced the technology intensity classification which concerns only the firms that operate in manufacturing sector. The classification of manufacturing industries by the intensity of technology as used in OECD is based on the International Standard Industrial Classification (ISIC Rev.3). ISIC Rev.3 classification is an internationally accepted standard for categorizing producing units within an economy. In manufacturing industry, there are 23 divisions, which can be further classified into 61 groups. The OECD classifies 23 divisions into four categories based on technology intensity: high technology, medium-high technology, medium-low technology and low technology. In this paper, for simplicity we classify them into low tech (low and medium-low technology) and high tech (medium-high and high technology) categories<sup>2</sup>.

#### **4. Estimation Results**

Table 1 demonstrates results for the full sample and the three firm size categories. Column 1 includes results for the baseline model, columns 2-4 decompose the full sample into large, medium and small firms in order to examine potential differentiations while columns 5-12 depict the extended models with interaction terms.

We observe some interesting differentiations based on the size of the firm that performs OFDI. Starting with ownership variables our results indicate that leverage is significantly negative in total sample and large firms, however, it loses its significance in medium and small firms. Also, efficiency turns out very important for the entire sample as well as large and medium sized firms, but not so for small firms. Finally, our Ot advantage, prior experience in a foreign market, is also very significant for Greek MNEs but not for the small ones. Consequently, we observe that ownership advantages

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<sup>2</sup> Low technology category includes manufacture of food, beverages, tobacco, textiles, wearing apparel, leather and related products, wood, furniture, paper and paper products, printing and recorded media, coke and refined petroleum, rubber, plastic, non-metallic mineral, fabricated metal products. High technology category includes manufacture of chemicals, pharmaceutical products, general and special purpose machinery, motor vehicles, computers, and electronic equipment.

affect differently MNEs according to sizes. The most noteworthy case regards small firms; this result may indicate that small firms don't follow the OLI framework with respect to the O part, i.e. ownership advantages in their internationalization process, maybe because they do not really possess such advantages but, instead, they invest abroad in search of other benefits.

Turning now to L advantages and especially traditional macroeconomic characteristics we also depict some differentiations according to firm size: the size of the market is significant in all samples with the smallest effect observed in large firms; obviously, while important, host market size may not be the primary focus of such firms as they may also have other motives as well as ownership advantages as shown above that may want to internalize. Wages are positive and significant for large firms, while it is non significant for medium firms but negatively significant for small ones. This result may indicate that indeed, small firms are in search for better wages in order to lower their cost and survive. It seems that large firms perceive wages as an indication of skills and competencies (as higher wages may indicate higher qualifications). Interest Rates are rare also positively significant for large firms but non significant for medium and small firms, i.e. large firms seek for higher capital returns (Gross and Trevino, 1996). It is noteworthy that openness is positively significant for all samples.

In regard to our special attention to L advantages of taxation and regulatory freedom, our results also point to different effects. Specifically, taxation is very important for large firms but not so for medium and small ones. Regulation seems to be very important both for large and medium sized firms but not so for small ones.

Our interaction effects are also noteworthy: PRESTAX is negatively significant for large firms but not for medium and small ones. This effect indicates that prior experience in a foreign market reinforces the effect of taxation; in other words, firms with prior presence in foreign markets are more willing to invest again when taxation in the host country is more friendly. Let us remind here that prior presence is significant on its own for large and medium sized MNEs, while taxation came up to be significant only for large firms.

Our second interaction effect regards that of prior presence in a foreign market and regulatory freedom. This effect is present in medium sized MNEs: it seems that medium sized MNEs with prior presence in a foreign market are more willing to invest again

when host regulation is freer, i.e. there is a reinforcing effect of a freer regulation framework. This does not turn out to be the case for large and small MNEs.

Moving onwards, Table 2 focuses on manufacturing which accounts for the majority of internationalized firms in our sample. We also carry out the same analysis as before discriminating the sample according to firm size, we also move forward and discriminate our sample based on technology intensity.

Starting again from ownership advantages, firm size is now very important for manufacturing in total sample, in contrast with all sectors in Table 1. Leverage now turns non-significant for all sub-samples. This indicates a very distinct effect compared to all sectors in Table 1 and the same holds for efficiency. In our special focus of ownership advantages, i.e. prior experience in a market, this result resembles that of the entire sample; it is positive and significant for large and medium sized MNEs but not for the small ones.

In the L front, market size turns out to be a significant factor for OFDI irrespective of firm size. This result conforms with the one of the entire sample though it was less significant for large firms in that case. The labor cost as measured by wages emerges with a negative sign and is significant for all firm sizes. That is to say, manufacturing seeks for lower production costs and this holds either for large, medium or small firms. Interest rates do not appear to be important in this case of manufacturing irrespective of firm size, while openness turns out very important for large and medium sized manufacturing firms but not for the small ones.

We see a quite differentiated pattern in regard to taxation and regulatory framework depending on firm size. Taxation is very important for large manufacturing MNEs but it loses its significance in medium and low firms, while overall regulation freedom is highly important for all firm sizes. We observe though that regulation, though still important, has a smaller significance for small MNEs.

Interaction variables resemble the effects of total sample. PRESTAX indicates that manufacturing firms that have already invested in a host market, will be reinforced to re-invest when taxation is low enough. This result holds for large MNEs but not for medium and small sized ones. We don't get any significant effect in the case of PRESEREG, i.e. the joint effect of prior presence and regulatory freedom. This is

different from our total sample, where the effect is reinforcing in the case of medium MNEs.

Finally, Table 3 presents the third set of results, that of high and lower tech firms. Indeed, discrimination based on technology intensity provides some interesting outcomes. Within the ownership advantages, prior experience in a market is highly significant for both samples. From the L factors, the host market size is also highly significant for both. However, we observe that lower taxation is more significant in low tech firms than in high tech, potentially indicating the need of such firms to save cost. The reverse holds for regulatory freedom, which is more significant for high tech firms, obviously due to the nature of their operations and the complexity of technology they use. Our interaction terms don't have any effect whatsoever in low tech firms; however, we find a moderating effect in high tech firms. Specifically, prior presence in a foreign market moderates the effect of a freer regulation context. This indicates that high tech firms, once having invested in a country, they become familiarized with domestic rules and even in the case of less free regulation environments, they still invest domestically. This points to a differentiated motivation of high-tech firms which they obviously invest for strategic reasons.

From our results it is obvious that the differential behavior of Greek firms' internationalization calls for more attention into specific strategic needs and decision making based on MNEs size and technology intensity.

## **5. Conclusions**

In the present paper we explore the effects of ownership and location advantages as suggested by Dunning and Dunning and Lundan (2008) in an effort to identify potential different strategic motivation in their internationalization process. We use an extended dataset covering all Greek MNEs for an extended time period expanding from 2001 until the beginning of the crisis, i.e. 2010. According to our results both ownership and location advantages play an important role on Outward FDI. While some determinants present the expected sign and level of significance, others present differentiations according to the size and the sector of the firm. In addition, we explore apparently the manufacturing sector, which account for the majority of internationalized firms, and we also investigate the differential motives of Greek firms according to high and low technology intensity and also according to firm size. In future research we will try to

examine the interaction effect of ownership and location determinants and enrich our sample with more recent data, in order to explore in depth, the sectoral behavior of Greek MNEs that investing abroad and compare this behavior in pre and post crisis period.

The purpose of the present work is to explore differential strategic behavior of MNEs based on their size and technological intensity within the recent extension of eclectic paradigm as posed by Dunning and Lundan (2008) where the emphasis is placed on institutional aspects as significant L factors. We combined these L factors with a specific ownership advantage, that of prior presence of a MNE in a host market which is perceived as a particular Ot advantage as suggested in related literature. This Ot advantage allows MNEs to familiarize themselves with the local institutional context.

Our findings provide insightful implications for both policy makers and firms' managers. At the policy forefront, attention should be paid at the kind of MNEs that they wish to attract, i.e. large and technology intense or maybe large irrespective of technology intensity. The answer to this question would form their policy toolkit, as our results indicate. Our evidence shows that managers exploit their ownership advantages and combine them with specific L advantages. As such, the regulatory context and taxation emerge as highly significant. Host policy makers can potentially advance their institutional contexts by relaxing stringent regulations and improving weaknesses where they exist.

From a managerial point of view, our findings suggest that managers of companies are seeking international markets to internalize their ownership advantages. That is to say, they choose a location in order to advance their competitive advantages (Ot advantage) by acquiring valuable local knowledge and networks that would further reduce their costs and risk taking in the host market. Results suggest that these firms are able to utilize institutional factors to ease their business and lower their overall costs. Knowledge about a host country provides these firms with Ot advantages stemming from a time-consuming learning-by-doing process, which then helps them to expand even more locally.

Our study could be extended in several ways. First, it open up the floor to more specific search of strategic motivation of MNEs based on their size and technology intensity. Second, one important aspect that could further advance internationalization theory

would be the mediating effect between ownership and location advantages. Furthermore, this study could be extended to more sector specific analysis providing even more accurate results concerning MNE idiosyncratic interests.

Several limitations should also be noted for this study. First, the time period regards the decade from 2001 to 2010; i.e., the pre-crisis period. Unfortunately, more recent data is not publicly available, and the Bank of Greece has maintained a very restrictive policy regarding the disclosure of sensitive data since 2013. The last year for which we were able to obtain information was for 2009 and 2010 in 2013. Second we used a limited number of firm-specific variables, although they are the most widely used ones. Variables that would be further informative include scientific, technical and other personnel of parent firms, R&D activity and networks that firms might have developed. Again, the questionnaire collected by the Bank of Greece does not include such information; consequently, we would not be able to have either the most accurate data that the Bank of Greece has or the entire population of MNEs. Researchers are truly constrained by the availability of reliable data sources, which is the most difficult restriction that we faced. Despite these limitations, this study provides some new insights into the IB literature worth further investigation and debate.

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## TABLES

**Table 1. Fixed effects estimation based on firm size**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ALL	LARGE FIRMS	MEDIUM- SIZE FIRMS	SMALL FIRMS	ALL	ALL	LARGE FIRMS	LARGE FIRMS	MEDIUM-SIZE FIRMS	MEDIUM- SIZE FIRMS	SMALL FIRMS	SMALL FIRMS
SIZE	0.138 (0.0865)				0.153* (0.0856)	0.143 (0.0869)						
LEV	-0.00610*** (0.000879)	-0.00707*** (0.000433)	0.0127 (0.0105)	-0.0767 (0.0767)	-0.00610*** (0.000893)	-0.00614*** (0.000885)	-0.00711*** (0.000422)	-0.00712*** (0.000438)	0.0127 (0.0106)	0.0152 (0.0113)	-0.0820 (0.0780)	-0.0796 (0.0774)
EFF	0.116*** (0.0195)	0.111*** (0.0222)	0.177** (0.0856)	-0.0276 (0.0559)	0.121*** (0.0192)	0.106*** (0.0235)	0.115*** (0.0215)	0.0982*** (0.0294)	0.178** (0.0847)	0.174** (0.0869)	0.00691 (0.0416)	-0.00892 (0.0442)
PRES	0.938*** (0.183)	0.926*** (0.201)	0.901** (0.410)	0.468 (0.626)	0.879*** (0.176)	0.921*** (0.182)	0.856*** (0.195)	0.893*** (0.212)	0.910** (0.423)	1.085*** (0.378)	0.663 (0.618)	0.210 (0.816)
MARKET	0.228** (0.0919)	0.198* (0.105)	0.506*** (0.155)	0.480*** (0.157)	0.221** (0.0912)	0.246*** (0.0920)	0.188* (0.104)	0.214** (0.104)	0.506*** (0.156)	0.541*** (0.159)	0.528*** (0.160)	0.506*** (0.163)
WAGES	0.0776 (0.189)	0.172 (0.221)	-0.330 (0.204)	-0.484*** (0.138)	0.0704 (0.191)	0.0533 (0.196)	0.162 (0.223)	0.151 (0.227)	-0.330 (0.204)	-0.409* (0.210)	-0.541*** (0.138)	-0.510*** (0.127)
IRATE	0.0269** (0.0119)	0.0319** (0.0151)	0.0148 (0.0236)	-0.00318 (0.0198)	0.0265** (0.0119)	0.0284** (0.0114)	0.0316** (0.0151)	0.0340** (0.0143)	0.0147 (0.0237)	0.0146 (0.0240)	-0.00839 (0.0173)	-0.00508 (0.0180)
OPEN	0.445*** (0.456)	0.439*** (0.516)	0.188** (0.608)	1.116*** (0.948)	0.454** (0.456)	0.449** (0.455)	0.450** (0.516)	0.441*** (0.515)	0.196** (0.604)	0.186** (0.603)	1.212* (0.869)	1.118* (0.940)
TAX	-0.0292*** (0.00946)	-0.0319*** (0.0112)	-0.0240 (0.0229)	-0.0202 (0.0196)	-0.0282*** (0.00957)	-0.0292*** (0.00946)	-0.0303*** (0.0115)	-0.0321*** (0.0112)	-0.0242 (0.0227)	-0.0264 (0.0223)	-0.0157 (0.0188)	-0.0249 (0.0237)
REG	0.0330** (0.0164)	0.0352* (0.0185)	0.0545** (0.0252)	0.0177 (0.0188)	0.0319* (0.0164)	0.0360** (0.0166)	0.0344* (0.0185)	0.0386** (0.0189)	0.0541** (0.0253)	0.0581** (0.0251)	0.0128 (0.0240)	0.0194 (0.0194)
PRESTAX					-0.0430*** (0.0147)		-0.0455*** (0.0158)		-0.00866 (0.0377)		0.103 (0.0805)	
PRESREGF						0.0433 (0.0415)		0.0438 (0.0527)		0.0800* (0.0443)		0.0464 (0.0719)
Constant	4.907** (1.906)	7.501*** (1.921)	4.845* (2.651)	9.816*** (2.201)	4.865** (1.900)	4.583** (1.845)	7.762*** (1.912)	7.242*** (1.810)	4.850* (2.664)	4.558* (2.552)	9.043*** (2.345)	10.20*** (2.049)
Observations	2,662	2,009	444	209	2,662	2,662	2,009	2,009	444	444	209	209
R-squared	0.111	0.112	0.179	0.263	0.116	0.114	0.118	0.115	0.179	0.193	0.276	0.267
Number of kodikos	237	173	81	41	237	237	173	173	81	81	41	41

**Table 2. FE estimation- Manufacturing sector based on firm size**

VARIABLES	(1) MANUFAC TURING	(1a) LARGE FIRMS	(1b) MEDIUM- SIZE FIRMS	(1c) SMALL FIRMS	(2) LOW TECH	(3) HIGH TECH	(4a) MANUFAC TURING	(4b) MANUFA CTURING	(5a) LARGE FIRMS	(5b) LARGE FIRMS	(6a) MEDIU- SIZE FIRMS	(6b) MEDIU- SIZE FIRMS	(7a) SMALL FIRMS	(7b) SMALL FIRMS
SIZE	0.181* (0.0981)				0.170 (0.120)	0.323* (0.165)	0.186* (0.0998)	0.168* (0.0936)						
LEV	-0.00188 (0.00582)	-0.00448 (0.00558)	-0.0686 (0.0708)	-0.0397 (0.174)	-0.00307 (0.00611)	0.00657 (0.0146)	-0.00207 (0.00587)	-0.00213 (0.00596)	-0.00476 (0.00565)	-0.00508 (0.00554)	0.0676 (0.0712)	0.0705 (0.0711)	-0.0906 (0.171)	-0.0906 (0.172)
EFF	-0.0526 (0.171)	-0.0452 (0.280)	-0.0923 (0.170)	0.263 (0.301)	-0.00239 (0.166)	-0.677 (0.652)	-0.0519 (0.170)	-0.0641 (0.174)	-0.0446 (0.278)	-0.0737 (0.289)	-0.0932 (0.172)	-0.0886 (0.167)	0.197 (0.335)	0.244 (0.347)
PRES	1.126*** (0.174)	1.148*** (0.189)	0.456** (0.339)	0.744 (0.573)	1.256*** (0.189)	0.590*** (0.116)	1.074*** (0.156)	1.203*** (0.191)	1.079*** (0.168)	1.236*** (0.219)	0.474 (0.462)	0.371 (0.993)	0.936* (0.470)	0.454 (0.556)
MARKET	0.324*** (0.114)	0.314** (0.128)	0.636** (0.236)	0.319** (0.148)	0.297** (0.123)	0.369*** (0.0926)	0.317*** (0.112)	0.311*** (0.117)	0.304** (0.126)	0.301** (0.130)	0.635** (0.236)	0.633** (0.236)	0.524*** (0.136)	0.375*** (0.128)
WAGES	-0.174 (0.204)	-0.160 (0.228)	-0.611 (0.450)	-0.0697 (0.339)	-0.222 (0.221)	-0.0706 (0.304)	-0.173 (0.206)	-0.150 (0.207)	-0.162 (0.231)	-0.136 (0.231)	-0.622 (0.449)	-0.588 (0.461)	-0.582* (0.296)	-0.231 (0.273)
IRATE	0.0243* (0.0145)	0.0260 (0.0198)	0.00726 (0.0305)	-0.00579 (0.0217)	0.0200 (0.0164)	-0.0234 (0.0223)	0.0243 (0.0147)	0.0223 (0.0151)	0.0261 (0.0200)	0.0236 (0.0207)	0.00766 (0.0305)	0.00647 (0.0308)	-0.0178 (0.0235)	-0.00530 (0.0205)
OPEN	0.334* (0.465)	0.382* (0.515)	0.162* (0.942)	-0.633 (0.734)	0.525 (0.522)	2.171** (0.951)	0.351 (0.472)	0.340 (0.465)	0.409 (0.523)	0.393 (0.516)	-0.210 (0.985)	-0.0539 (0.989)	-0.367 (0.669)	-0.561 (0.689)
TAX	-0.0347*** (0.0114)	-0.0336** (0.0135)	-0.0391 (0.0293)	-0.0303 (0.0275)	-0.0279*** (0.0122)	-0.0208 (0.0161)	-0.0342*** (0.0116)	-0.0345*** (0.0113)	-0.0325** (0.0139)	-0.0331** (0.0134)	-0.0360 (0.0289)	-0.0363 (0.0301)	-0.0494 (0.0287)	-0.0410* (0.0237)
REG	0.0569*** (0.0188)	0.0569*** (0.0202)	0.0968** (0.0454)	0.0480* (0.0254)	0.0605* (0.0216)	0.0363*** (0.0172)	0.0563*** (0.0189)	0.0523*** (0.0187)	0.0563*** (0.0203)	0.0518** (0.0202)	0.0983** (0.0464)	0.122** (0.0451)	-0.0246 (0.0254)	-0.0333 (0.0340)
PRESTAX							-0.0235** (0.0244)		-0.0318* (0.0243)		0.0394 (0.0787)		0.137 (0.0450)	
PRESREGF								-0.0459 (0.0380)		-0.0478 (0.0456)			0.211 (0.208)	-0.0596 (0.0501)
Constant	3.496 (2.291)	7.145*** (1.944)	4.162 (3.147)	12.09*** (2.493)	3.672 (2.617)	4.632 (3.919)	3.527 (2.315)	3.949* (2.254)	7.328*** (1.931)	7.376*** (2.020)	4.094 (3.164)	3.099 (3.468)	11.83*** (2.502)	12.11*** (2.406)
Observations	1,289	995	200	94	1,117	172	1,289	1,289	995	995	200	200	94	94
R-squared	0.186	0.179	0.283	0.478	0.182	0.549	0.188	0.189	0.182	0.182	0.284	0.287	0.513	0.488
Number of kodikos	111	79	41	21	96	15	111	111	79	79	41	41	21	21

**Table 3. FE estimation- Manufacturing sector based on technology intensity**

VARIABLES	(8a) LOW TECH	(8b) LOW TECH	(9a) HIGH TECH	(9b) HIGH TECH
SIZE	0.169 (0.119)	0.170 (0.119)	0.309** (0.139)	0.205 (0.124)
LEV	-0.00318 (0.00618)	-0.00316 (0.00610)	0.00668 (0.0149)	0.0101 (0.0145)
EFF	-0.00931 (0.164)	-0.00274 (0.165)	-0.795 (0.797)	-1.556 (0.953)
PRES	1.201*** (0.156)	1.270*** (0.216)	0.599*** (0.113)	0.964*** (0.250)
MARKET	0.293** (0.122)	0.294** (0.125)	0.372*** (0.0874)	0.287** (0.124)
WAGES	-0.221 (0.223)	-0.217 (0.219)	-0.0689 (0.312)	0.213 (0.339)
IRATE	0.0201 (0.0165)	0.0198 (0.0168)	-0.0232 (0.0223)	-0.0232 (0.0181)
OPEN	0.538 (0.526)	0.528 (0.521)	-2.211* (1.040)	-2.038** (0.909)
TAX	-0.0282** (0.0125)	-0.0278** (0.0121)	-0.0232* (0.0128)	-0.0247 (0.0172)
REG	0.0602* (0.0217)	0.0593* (0.0215)	0.0373** (0.0156)	0.0330** (0.0145)
PRESTAX	-0.0200 (0.0278)		0.0110 (0.0484)	
PRESEREG		-0.0115 (0.0410)		-0.130** (0.0571)
Constant	3.806 (2.570)	3.736 (2.618)	4.871 (3.504)	5.753* (3.069)
Observations	1,117	1,117	172	172
R-squared	0.183	0.182	0.550	0.596
Number of kodikos	96	96	15	15

## APPENDIX

**Table 1: Data Description**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
<b>OFDI</b>	Total capital stock by each parent firm overseas, either to a new affiliate or established ones	Bank of Greece
<b>Ownership Advantages</b>		
<b>SIZE</b>	Total assets in US\$	ICAP Directory
<b>LEV</b>	Ratio of total liabilities to total assets	ICAP Directory
<b>EFF</b>	Gross profit margin	ICAP Directory
<b>PRES</b>	Number of affiliates belonging to the parent firm operating in the market	Bank of Greece, authors 'calculations
<b>Traditional Location Variables</b>		
<b>MARKET</b>	GDP of the host country in US\$	World Development Indicators (WDI), World Bank
<b>WAGE</b>	Average wage of the host country in US\$	International Labor Office (ILO)
<b>IRATE</b>	Lending rate of the host country	WDI, World Bank
<b>OPEN</b>	Total trade of the country as a share to its GDP	WDI, World Bank
<b>Location Advantages</b>		
<b>TAX</b>	Corporate tax rate of the host country	OECD, KPMG
<b>REGF</b>	Index of overall institutional quality	Economic Freedom, Heritage Institute

**Table 2. The pattern of Greek MNEs by sector**

Primary sector	Agriculture, livestock, hunting, forestry, fishing.	5
	Mining and quarrying except from oil and gas	8
Manufacturing	Food, beverages and tobacco	36
	Textiles, clothes and leather products	32
	Wood and paper products, publications and printing	11
	Production of coke, oil refinery and nuclear fuel	3
	Production of chemicals	10
	Medicines, chemical and herbal products	3
	Production of rubber and plastic products	12
	Production of primary metals and metallic products	21
	Production of machinery and equipment	3
	Production of electric machines and computers	3
	Production of vehicles	1
	Other industries	8
	Constructions	Constructions
Trade	Trade and repair of vehicles	10
	Wholesale trade	33
	Retail trade	10
Telecommunications	Telecommunications	5
Transports	Road and pipeline transports	1
	Sea transports	4
	Air transports	1
	Couriers	2
Financial institutions	Banks	11
	Other financial intermediates	1
	Holding companies	21
	Insurance and pension funds (except from required social security)	1
	Life insurances	2
	Activities relating to insurances and insurance funds	4
Consulting and other services	Hotels and restaurants	5
	Information technology and related activities	13
	Consulting and management (holding companies included)	6
	Advertising	2
	Health and social work	2
	Entertainment, cultural and athletic activities	1
	Cinema, radio, television and other entertainment activities	1
	Other services	8
Unclassified		16
Total		334

