



**Do foreign owned multinational subsidiaries pay more taxes  
than domestic enterprises?**

by

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2015

## **Biographic Note**

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## **Acknowledgments**

This dissertation proved to be a demanding mission. It surely could not have been carried out without the support/contribution of several people to whom I am deeply grateful.

First of all, my special thanks to my advisor, Professor Ana Teresa Tavares-Lehmann. Her extensive knowledge and experience about the issues addressed, coupled with her brilliant motivational skills, criticism and supervision ability were undoubtedly the main pillars of this work.

I also want to thank my tutor, Professor Vitor Manuel Carvalho, who was always available for help and advise me, essentially at the stage of literature review. Additionally, my sincere thanks to Professor Frederick Lehmann that gave me priceless tips regarding the Stata econometric package.

As for the particular characteristics of the bibliographic and statistical databases, valuable assistance was provided by Dra. Elisabete Ribeiro and Dra. Paula Carvalho, respectively. Hence my thanks to both. Furthermore, specifically related to the Amadeus database, I want to emphasize the invaluable help and availability provided by Dr. António Silva and Dr. Hugo Corga.

Last, but certainly not least, I am thankful to all my family and girlfriend for permanent encouragement and understanding, realizing the importance of this dissertation in my academic path.

## **Abstract**

The striking growth of Foreign Direct Investment (FDI) in recent decades, and the relevance attributed to its effects led to a booming literature on several aspects of that FDI and of the multiple dimensions of that impact. However, and although there is extensive literature on the importance of taxes in location decisions of investments by Multinational Enterprises (MNEs), an underdeveloped theme is whether MNEs' subsidiaries pay more or less taxes than Domestic Enterprises (DEs). Given the lack of empirical work on this subject, this research is focused on the question: *Do foreign owned multinational subsidiaries pay more taxes than domestic enterprises?* Furthermore, we propose also to investigate whether the domestic companies with foreign subsidiaries pay more or less taxes than domestic enterprises without foreign subsidiaries, estimating the effect of internationalization on the taxes paid, accrued or deferred by firms. The dissertation will undertake, using the Amadeus database, a large-scale cross-country econometric study, which will be an innovative and ambitious contribution to the literature. The present research draws upon data for all the EU-28 countries throughout 9 years (2005-2013). After a detailed literature review on the topic of interest, we perform log-log regressions to investigate our main research question. The results point to higher levels of taxes paid, accrued or deferred by MNEs when compared to DEs and higher tax burden borne by DEs with foreign subsidiaries than DEs without foreign subsidiaries. The measures of the firm's size exert a positive influence on tax level, the leverage ratio and the maturity of the firm also confirm, respectively, the expected negative and positive relation to taxation. As for the sectors of activity, only the mining and utilities sectors seem to indicate a positive impact on tax level. Lastly, we extract some conclusions and policy implications and establish avenues for future research.

**JEL Code:** F23, H25, H26, I28.

**Keywords:** Foreign Direct Investment, Multinational Enterprises, Foreign Subsidiaries, Domestic Enterprises, Tax Burden, Corporate Income Taxes, Tax Avoidance.

## **Resumo**

O impressionante crescimento do Investimento Direto Estrangeiro (IDE) nas décadas recentes e a relevância atribuída ao seu impacto impulsionou uma expansão da literatura sobre diversos aspetos que caracterizam o IDE e as várias dimensões desse impacto. No entanto, embora exista vasta literatura sobre a importância dos impostos nas decisões de localização dos investimentos por parte das empresas multinacionais (EM), um tema escassamente desenvolvido é se as subsidiárias das EM pagam mais ou menos impostos do que as empresas domésticas (ED). Dada a quase ausência de trabalhos empíricos sobre esta temática específica, a presente investigação incidirá sobre a questão: *Do foreign owned multinational subsidiaries pay more taxes than domestic enterprises?* Além disso, propomo-nos também investigar se as ED com subsidiárias no exterior pagam mais ou menos impostos do que as ED sem subsidiárias estrangeiras, analisando o efeito de internacionalização nos impostos pagos, vencidos ou diferidos pelas empresas. A dissertação realiza, utilizando a base de dados Amadeus, um estudo econométrico abrangendo 28 países, e dados em larga escala, o qual será uma contribuição inovadora e ambiciosa para a literatura. A presente pesquisa analisa os 28 países membros da União Europeia durante 9 anos (2005-2013). Após uma revisão detalhada da literatura sobre o tema de interesse, realizamos regressões *log-log* para explicar a carga fiscal suportada pelos distintos grupos de empresas em análise. Os resultados apontam para maiores níveis de impostos pagos por EM quando comparadas com ED e maior carga fiscal suportada por ED com subsidiárias estrangeiras do que por ED sem subsidiárias estrangeiras. As medidas do tamanho da empresa exercem uma influência positiva sobre o nível fiscal, o rácio de alavancagem e a maturidade da empresa também confirmam, respetivamente, a relação esperada negativa e positiva com a tributação. Quanto aos setores de atividade, apenas os setores de mineração e de serviços públicos parecem indicar um impacto positivo sobre o nível fiscal. Por fim, extraem-se algumas conclusões e implicações de política, bem como se identificam oportunidades para investigação futura.

**Código JEL:** F23, H25, H26, I28.

**Palavras-chave:** Investimento Direto Estrangeiro, Empresas Multinacionais, Subsidiárias Estrangeiras, Empresas domésticas, Carga Fiscal, Imposto sobre o Rendimento das Pessoas Coletivas, Evasão Fiscal.

## Index of Contents

Biographic Note .....	i
Acknowledgments .....	ii
Abstract .....	iii
Resumo .....	iv
Index of Contents .....	v
Index of Tables .....	vi
Index of Figures .....	vii
Index of Acronyms .....	viii
1. Introduction.....	1
2. Literature Review .....	3
2.1. Taxation and other determinants of FDI .....	3
2.2. Costs and Benefits of using Fiscal Incentives .....	6
2.3. Tax Measures .....	7
2.4. Tax Systems and Double Taxation.....	9
2.5. Tax Competition, Profit Shifting and related issues .....	12
2.6. Multinational vs Domestic Firms .....	16
3. Empirical Investigation.....	18
3.1. Data .....	18
3.2. Descriptive Analysis .....	20
3.3. Methodology .....	27
3.3.1. Variables .....	27
3.3.1.1. Dependent Variable: Taxation.....	27
3.3.1.2. Main Independent Variable: Multinational Enterprise .....	27
3.3.1.3. Other Independent Variables .....	28
3.4. Econometric Model.....	31
3.5. Estimations and Results .....	33
4. Conclusions and Policy Implications.....	40
References.....	43
Appendix.....	50

## **Index of Tables**

Table 1: Number of companies in each group of companies (Period 2005-2013) .....	20
Table 2: Descriptive statistics (2005-2013): MNEs .....	21
Table 3: Descriptive statistics (2005-2013): DEs .....	21
Table 4: Descriptive statistics (2005-2013): Services - MNEs vs DEs .....	22
Table 5: Descriptive statistics (2005-2013): Mining - MNEs vs DEs .....	23
Table 6: Descriptive statistics (2005-2013): Manufacturing - MNEs vs DEs .....	24
Table 7: Descriptive statistics (2005-2013): Utilities - MNEs vs DEs .....	25
Table 8: Descriptive statistics (2005-2013): Construction - MNEs vs DEs .....	26
Table 9: Synthesis of the independent variables .....	30
Table 10: Log-log model results (Period 2005-2013) .....	34
Table 11: Log-log model results (Period 2005-2013) .....	37
Table 12: Extracted observations: Active companies with at least 10 employees .....	50
Table 13: Percentages of enterprises by size classes (EU-23) .....	52
Table 14: Breakdown of companies of each country according to levels of employment (EU-28) .....	53
Table 15: Companies exhibiting maximum value and mean of taxation by country (2005-2013) .....	56
Table 16: Variable names and definitions .....	57
Table 17: Correlation matrix of all variables used in the various estimations .....	58

## **Index of Figures**

Figure 1: Enterprises by size classes (EU-23) .....	52
Figure 2: Process of treatment of the data in the sample .....	54

## **Index of Acronyms**

BEATR: Bilateral Effective Average Tax Rate

CEEC: Central and East European Countries

DE: Domestic Enterprise

DTT: Double Taxation Treaty

EATR: Effective Average Tax Rates

EC: European Commission

EMTR: Effective Marginal Tax Rate

EMU: Economic and Monetary Union

ETR: Effective Tax Rate

EU: European Union

FDI: Foreign Direct Investment

MNE: Multinational Enterprise

OECD: Organization for Economic Co-operation and Development

R&D: Research and Development

STR: Statutory Tax Rate

## 1. Introduction

The notable growth in Foreign Direct Investment (FDI) in the last decades sparked a renewed interest in the effects of FDI on the economic performance of both host and home countries and in the suitable government policies toward FDI (Fuest, Huber and Mintz, 2005; Maza, Villaverde, Gutiérrez-Portilla and Gutiérrez-Portilla, 2013).

Nowadays, virtually every country takes part in a “race” to attract FDI (Oxelheim and Ghauri, 2004), entering in “location tournaments” - policy adjustments, promotional campaigns and incentives programs to attract investment from Multinational enterprises (MNEs) (Wheeler and Mody, 1992; Belloumi, 2014; Azémar and Dharmapala, 2015). One of the main types of incentives used are fiscal (i.e. tax-related) incentives (Gergely, 2003; Bénassy-Quéré, Fontagné and Lahrière-Révil, 2005; Jensen, 2013).

Many policy makers believe that the tax burden plays a core role, proving crucial to the success of government measures in FDI attraction (Baccini, Li and Mirkina, 2014). Although the sensitivity of FDI to taxation is a widely debated subject (Mutti and Grubert, 2004; Bellak and Leibrecht, 2007; Baccini *et al.*, 2014), no unanimity exists in the literature on this matter (Bénassy-Quéré, Fontagné and Lahrière-Révil, 2000; Chakrabarti, 2001; OECD, 2007; Demirhan and Masca, 2008; Moosa, 2009; Tavares-Lehmann, Coelho and Lehmann, 2012; Shah, 2013).

There is a vast literature on the importance of taxes on the location decisions of MNEs’ investments. However, an under-researched theme is whether MNEs subsidiaries pay more or less taxes than domestic firms. We propose to contribute to filling this gap in the empirical literature. Hence, our research question is: *Do foreign owned multinational subsidiaries pay more taxes than domestic enterprises?*

Additionally, we intend to investigate whether domestic companies with foreign subsidiaries pay more or less taxes than domestic firms without foreign subsidiaries, analyzing the effect of internationalization on the taxes paid by firms.

This dissertation will conduct a large scale cross-country econometric study, aiming to provide a relevant, ambitious and innovative contribution to this literature.

The structure of this dissertation is as follows. First, a thorough, state of the art review of the relevant literature will be provided. Following that, regressions will be performed to investigate the main research question using appropriate econometric models. These estimations will draw on the Amadeus database (Bureau Van Dijk, 2015). The results obtained will be discussed and conclusions, policy implications and avenues for future research derived.

## 2. Literature Review

### 2.1. Taxation and other determinants of FDI

The sensitivity of FDI to taxation is a much discussed topic (Mutti and Grubert, 2004; Bellak and Leibrecht, 2007; Baccini *et al.*, 2014), and no consensus exists in the literature on this matter (Bénassy-Quéré *et al.*, 2000; Chakrabarti, 2001; OECD, 2007; Demirhan and Masca, 2008; Moosa, 2009; Tavares-Lehmann *et al.*, 2012; Shah, 2013; Baccini *et al.*, 2014).

In fact, the literature remains fairly hesitant concerning whether FDI may be sensitive to tax incentives. While many earlier studies (Agodo, 1978; Root and Ahmed, 1979; Lim, 1983; Porcano and Price, 1996) considered that taxes were not significant FDI determinants (an exception being Hartman, 1984), more recent work using more comprehensive and rigorous measures of taxes concluded that taxes tend to be significant determinants of FDI attraction (Bénassy-Quéré *et al.*, 2000; Devereux, Griffith and Klemm, 2002; De Mooij and Ederveen, 2005; Demirhan and Masca, 2008; Bellak, Leibrecht and Damijan, 2009; Baccini *et al.*, 2014), this meaning that MNEs are likely to locate where they can enjoy fiscal advantages. Recent literature also suggests that investment location choices are considerably affected by taxes though these effects differ according to the type of FDI data, sample and tax measure (Bénassy-Quéré *et al.*, 2005; De Mooij and Ederveen, 2005; Clark, 2007; De Mooij and Ederveen, 2008; Markle and Shackelford, 2012; Baccini *et al.*, 2014).

There is widespread evidence that high corporate income tax rates<sup>1</sup> are linked to reduced levels of FDI. This literature has little to say about the association between FDI and high rates of taxes other than corporate income taxes (Desai, Foley and Hines, 2004). However, the role of non-income taxes can be particularly significant for FDI (OECD, 2007) since indirect taxes significantly exceed the foreign income tax obligations of foreign subsidiaries of American companies (Desai *et al.*, 2004). Also Bénassy-Quéré *et al.* (2000) alert for the importance of other taxes, notably social taxes on wages, stating that the fiscal burden on companies is not restricted to corporate income taxes.

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<sup>1</sup> The various measures of the corporations' tax burden are presented and clarified below.

The negative relationship between tax burden and FDI inflows is confirmed by the empirical evidence for OECD countries (De Mooij and Ederveen, 2005). Further, studies using more recent information are found to produce larger semi-elasticities, demonstrating that FDI is becoming more responsive to taxation over time (OECD, 2007). However, the role of taxes should not be overrated relative to that of other location determinants (OECD, 2007; Bellak and Leibrecht, 2009). There is endless literature that has been conducted in order to identify the determinants of FDI but here too, unanimity was not yet attained (Wheeler and Mody, 1992; Chakrabarti, 2001; Blonigen, 2005; Demirhan and Masca, 2008; Moosa, 2009; Shah, 2013; Baccini *et al.*, 2014). Some considerations on these other (non-tax related determinants) will be provided subsequently.

In addition to the importance of taxation in FDI attraction, there are other determining factors (or, as usually called, determinants) that must be taken into account. For Bellak and Leibrecht (2009) the host market size and distance between home and host countries are the most important determinants of net FDI outflows. Similarly Bénassy-Quéré *et al.* (2000) and Chakrabarti (2001) found robust support for the explanatory power of the market size of a host country in its FDI. Also Blonigen and Piger (2014) established a strong relationship between the variable distance and FDI. The market size, infrastructure and openness have a positive statistically significant influence on FDI (Demirhan and Masca, 2008). Likewise according to the OECD (2007) report, well-developed infrastructure and market size are crucial determinants of FDI inflows.

Policy makers, in an attempt to attract more FDI, try to increase the participation of their countries in international trade (Demirhan and Masca, 2008) as openness to trade is the variable most likely to be correlated with FDI attraction, among the controversial variables (Chakrabarti, 2001). For Bénassy-Quéré *et al.* (2000), a larger bilateral openness to trade is linked to further bilateral FDI. In Central and East European Countries (CEEC), openness had an outstanding positive impact on the inflows of FDI (Popescu, 2014).

A sound macroeconomic environment, the relatively low unit labor costs and the Eurozone business cycle had a positive and considerable consequence on FDI inflows in CEEC (Popescu, 2014). Also in the OECD (2007) report, the macroeconomic stability,

skilled labor and labor market flexibility are recognized as being important features in attracting FDI. For developing countries, the coefficient associated with the labor costs is positive yet not significant, showing that low wages have not been a determining element in attracting FDI (Demirhan and Masca, 2008).

Hansson and Olofsdotter (2013), by focusing on the EU15 countries, found evidence concerning the impact on FDI of several variables, namely corporate taxes, technological externalities and concentration of economic activity. As for corporate taxation, for 19 OECD economies, it was not found any relationship between them and flows of FDI (Jensen, 2012). The agglomeration economies may mitigate the impact of corporate taxes (Hansson and Olofsdotter, 2013).

Moreover, high expenditures on research and development (R&D) and a large share of intensive industries in intermediate goods in the host countries increase foreign investment flows (Hansson and Olofsdotter, 2013). Moosa (2009) considers that the key determinants in attracting FDI are GDP growth rate, educational level, R&D spending, country risk and domestic investment. For Demirhan and Masca (2008), the variable country risk has a negative sign, but not significant, which reveals that risk has not been an essential feature in appealing FDI. The high returns linked to host countries may make the country risk an irrelevant variable (Demirhan and Masca, 2008).

There are other perspectives, which posit that, although market potential has its importance, the differentials in terms of corporate tax also play a very significant role in the attraction of FDI flows (Bénassy-Quéré *et al.*, 2005).

Chakrabarti (2001) presents a possible explanation for the lack of consensus regarding the relevance of certain variables in determining FDI, arguing that many of the variables that have been identified as controversial (e.g., taxes, wages, openness, external debt, political stability) are extremely sensitive to changes “in the conditioning information set” (Chakrabarti, 2001, p. 108). The substantial uncertainty associated to models of bilateral FDI patterns is probably due to the adoption of very diverse specifications and FDI measurement (Blonigen and Piger, 2014). According to Blonigen (2005), given that the empirical literature on determinants of FDI is still in its infancy, it is thus not

unexpected that Chakrabarti (2001) has not found statistical significance in most of the determinants of FDI.

## **2.2. Costs and Benefits of using Fiscal Incentives**

Governments are usually involved in a policy competition motivated by defining strategic elements of their economic policies (Demirhan and Masca, 2008). More specifically, when choosing what tax instruments to use and what rates to impose, governments are frequently influenced by their expectations regarding the effects of taxation on economic activity, including FDI (Desai *et al.*, 2004). Blonigen and Piger (2014) do not found robust support for the hypothesis that government policies encourage FDI, with exceptions for policies that comprise negotiated bilateral agreements. FDI decisions are influenced by tax policy through changes on the cost of capital and the revenues of diverse activities (Feldstein, Hines and Hubbard, 1995). Contrariwise, Jensen (2012) considers that tax policy has no noticeable effect on FDI flows.

On the one hand, if FDI is not sensitive to taxes, host countries could increase their revenue without sacrificing the economic benefits arising from FDI. On the other hand, if the volume of FDI decreases with taxation, host countries face a trade-off between the possible revenue gains from an increase in taxation and the economic costs of discouraging FDI (Shah and Slemrod, 1991).

For the UK industry, the magnitude of the associated spillover of the presence of foreign MNEs appears to be less than the incentives per job paid by local governments (Haskel, Pereira and Slaughter, 2007), which suggests overestimation of the spillover effects or the existence of other interests, beyond the spillover effects, on the basis of the incentive provided.

According to Bénassy-Quéré *et al.* (2005), the impact of tax differentials on FDI is asymmetric given that while higher tax rates tend to discourage foreign investment inflows, lower tax rates significantly fail in its attraction. Nonetheless, companies from low tax countries have a propensity to invest in high tax countries (Hansson and Olofsdotter, 2013). Hansson and Olofsdotter (2013) found that effective marginal tax rate in the home country appears to have a greater impact on foreign investment flows than the effective marginal tax rate in the recipient country. Despite the importance of tax

differentials for FDI flows, the taxation level should not converge to zero due to the relevance of market potential and public investment, and also because FDI reacts asymmetrically to tax differentials so that the high tax countries have no incentive to cut their taxes (Bénassy-Quéré *et al.*, 2005).

### **2.3. Tax Measures**

The taxes paid by firms depend on the profitability of their investments, the legal status of the company and the source of finance. There are several measures that can be used to compute these taxes – measures based on tax legislation (Statutory Tax Rates – STRs), measures that take into account the different sources of finance of FDI (Effective Tax Rates - ETRs), and those considering the international regulations on taxes (Bilateral Effective Average Tax Rates – BEATRs) (Devereux *et al.*, 2002). STRs indicate the amount of tax liability relative to taxable income, providing thus only an incomplete measure of the share of income that corporations pay in taxes because several other aspects of the tax system (exemptions, tax credits and other incentives) are not taken into account (OECD, 2007; GAO, 2013). The STRs are a satisfactory indicator of tax burden in case of financial investment or tax planning measures (Bellak, Leibrecht and Römisch, 2007). The ETRs are frequently divided into Effective Average Tax Rates (EATRs) and Effective Marginal Tax Rates (EMTRs). While the EATRs are related to the decisions of where to produce and invest, at home or abroad, the EMTRs refers to the optimal scale of an investment (Bellak and Leibrecht, 2007). The BEATRs are a conceptually superior tax measure, combining various features, such as home country, host country, international and supranational tax rules (Bellak *et al.*, 2007). Sometimes substantial differences may arise from the use of different measures (Bellak *et al.*, 2007; GAO, 2013).

Whereas each measure has its advantages and disadvantages, the choice of the most suitable measure of the tax burden should be guided by the underlying research question (Bellak and Leibrecht, 2007). The results indicate that the use of STRs instead of BEATRs in empirical surveys of FDI is expected to result in tax rate elasticities that are too low in absolute value (Bellak *et al.*, 2007). Similarly, GAO (2013) report mentions that, for the years 2008 to 2010, the average ETRs for large profitable US firms were well underneath the statutory rate.

Host country average effective tax rate seem to have a highly significant negative effect on the location and investment decisions of American manufacturing companies (Grubert and Mutti, 2000). Grubert and Mutti (2000) claim that a lower ETRs results in an increase in the after-tax return to capital which in turn is associated with a greater flow of capital.

Tax planning behavior may have significant consequences for the average ETRs on cross-border investment across a range of cases, such as the type of tax system and/or the type of recipient country of FDI (low/high tax) (Clark, 2007). Thus, using the STRs can stain the effects of the tax burden on FDI and lead to doubtful results (Bellak and Leibrecht, 2009). Also De Mooij and Ederveen (2005) states that effective or average tax rates are thought to be a better approximation of the tax burden on foreign investment. According to Markle and Shackelford (2012), ETRs for MNEs domiciled in high tax countries are approximately the double of those located in low tax countries.

The current trend demonstrates that most governments are aware that corporate tax rates may not be the main factor but are surely one of the most important factors in FDI attraction. We are witnessing "location tournaments" (Mytelka, 2000), based on policy measures, promotional campaigns and incentive programs to attract investment by MNEs (Wheeler and Mody, 1992). In fact, nowadays virtually all countries enter a "race" to attract FDI (Oxelheim and Ghauri, 2004) given the anticipated significant benefits to the host country. The evidence of this "race" is present in the strong reduction of statutory rates, which fell from an average of 48% at the beginning of the 1980s to 35% at the end of the 1990s (Devereux *et al.*, 2002). This downward trend remains clear whether we extend the analysis until more recent years. The average statutory corporate tax rate of 13 Western Europe countries was 49.2% in 1983, having fallen to 27.2% in 2008 (Overesch and Rincke, 2011). Based on all countries of the European Union, between 2006 and 2014, the average corporate tax rates fell from 24.83% to 21.34%<sup>2</sup>.

Bellak and Leibrecht (2007) report that the statutory tax rates have been reduced substantially between 1995 and 2005 along with changes in tax deductions. They claim that these changes have lowered the overall effective tax burden of foreign investors

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<sup>2</sup> Corporate tax rates table provided by KPMG and available on <http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>.

significantly. The current downward trend in corporate taxes is essentially the result of tax competition (Overesch and Rincke, 2011).

Bellak *et al.* (2007) state that there have been striking changes to statutory tax rates, accompanied by major changes to the definitions of tax bases. In other words, the tax bases have been widened as tax rates have dropped. Accordingly, the tax wedge has increased in several countries as a result of a broadening of the tax base (Devereux, Lockwood and Redoano, 2008).

Indeed, the most common reform to corporate income taxes over the 1980s and 1990s has been to reduce tax rates and to broaden tax bases. Furthermore, the effect of this type of reform has been to reduce the tax rate on profitable investments by more than that on less profitable investments (Devereux *et al.*, 2002). Although over the last two decades the ETRs have steadily dropped worldwide, the ordinal rank from high to low tax countries has changed little (Markle and Shackelford, 2009, 2012).

This recent phenomenon, known as “rate-cutting, base-broadening reforms” (Devereux *et al.*, 2002, p. 452) or “tax-cut-*cum*-base broadening reforms” (Bellak and Leibrecht, 2007, p. 11), has remarkable effects on incentives to invest by MNEs. The two sides of these reforms have countervailing effects on these incentives to invest. If, on the one hand, lower tax rates typically increase the incentive to invest, on the other hand, widening the base works in the opposite direction. The combined effect depends on the minutiae of each reform (Devereux *et al.*, 2002).

The evidence suggests that the whole fall in average statutory tax rates can be explained by more intense competition induced by the relaxation of capital controls (Devereux *et al.*, 2008). Devereux *et al.* (2008) show robust proof that governments respond to changes in other countries’ taxes. This phenomenon may be due to globalization, which has forced a “herding effect” (Markle and Shackelford, 2009, p. 35).

#### **2.4. Tax Systems and Double Taxation**

Strategic interaction in statutory rates is not well enlightened by concepts such as “yardstick competition” or “common intellectual trends” (Devereux *et al.*, 2008, p. 1228), since this interaction in general arises simply among open economies without significant

capital controls (Devereux *et al.*, 2008). Otherwise, Overesch and Rincke (2011) do not find any difference in the intensity of tax competition that might be related to different degrees of openness.

Hines (1999) states that there is a large difference between the taxation of domestic economic activity and the taxation of international transactions, particularly due to the possible taxation of the same income by multiple governments. “Double taxation is the levying of taxes on the same income (or capital) of the same taxpayer in the same period across two jurisdictions” (Baker, 2014, p. 341). A foreign subsidiary is always subject to corporate income tax in the host country. Nevertheless, the foreign subsidiary’s earnings can be taxed once more under the corporate income tax in the home country of the parent (De Mooij and Ederveen, 2003).<sup>3</sup>

So, some mechanism is needed to reverse the discouragement to international business brought by double taxation (Hines, 1999). Countries adopt a particular taxation system which sets out how the foreign income will be taxed. Among the various methodologies used, there are two types of systems that have been widely implemented. Territorial taxation or exemption system happens when foreign income taxed in the host country is exempt in home country (Fuest *et al.*, 2005). In other words, territorial systems only tax the domestic income of corporations domiciled in their country (Markle and Shackelford, 2009). Worldwide taxation or credit systems force that tax liabilities in the host country are credited against taxes in the parent’s home country (De Mooij and Ederveen, 2003, 2008; Markle and Shackelford, 2009). Credit systems deny certain benefits to foreign investors (Mutti and Grubert, 1985). Whereas the generalization of territorial systems in the EU would intensify FDI inflows, the generalization of worldwide systems in the same area would lessen these flows, because it would take away the opportunity to avoid high tax rates at home country (Bénassy-Quéré *et al.*, 2000). Recently, the trend adopted by many countries is the movement from worldwide to territorial taxation schemes (Markle and Shackelford, 2009).

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<sup>3</sup> If the regime is Worldwide Taxation, like in the US.

Gravelle (2009) argues that a territorial taxation system allows companies to increase the opportunities for profit shifting. In turn, Mills and Newberry (2004) do not find evidence of enhanced profit shifting possibilities under territorial systems.

Since most of their activities happen in the home country, the location of the MNEs's parent has a major effect on its worldwide tax liability whereas the locations of its foreign subsidiaries have much less impact (Markle and Shackelford, 2012). In an integrated area like the Economic and Monetary Union (EMU), it is likely that tax competition results in the convergence of tax rates to the lowest continental level (Bénassy-Quéré *et al.*, 2005).

Bénassy-Quéré *et al.* (2005) claim that the impact of tax differentials is not homogeneous explaining that, when FDI comes from credit system countries, the impact of large tax differentials is stronger than those of narrow tax differentials. In turn, when FDI originates from exemption countries, such asymmetry does not happen. In this case, a linear reaction occurs (Bénassy-Quéré *et al.*, 2005).

To avoid double taxation of FDI in host and home country most countries formalize double taxation treaties (DTTs) based on the OECD Model Tax Convention (De Mooij and Ederveen, 2003). Nevertheless, authors like Baker (2014) do not found statistically significant effect of DTTs on FDI.

When the systems of taxation on foreign-source income of resident multinationals are particularly complex, considerable costs may arise for companies to comply with the system, complicating long-term planning decisions – hence, increasing compliance costs. Blumenthal and Slemrod (1995) state that the compliance costs of large American corporations are disproportionately larger than the aggregate share of assets, sales and employment that is abroad. For European MNEs, these compliance costs related to foreign source income are not greater than for domestic operations (Blumenthal and Slemrod, 1995). FDI decisions of MNEs are influenced by tax systems through this sometimes complicated interaction between domestic and host taxation and dissimilarities in the tax treatments of debt and equity finance (Feldstein *et al.*, 1995).

### **2.5. Tax Competition, Profit Shifting and related issues**

The substantial economic and political benefits often associated to FDI contrast with possible distortions caused by public policy. Associated to the continuous pursuit of FDI by international investors is the possibility of a "race to the bottom" in welfare expenditure, labor protection and corporate tax rates (Jensen, 2013). Indeed, the countries competing for FDI may have incentives to reduce taxes to levels below what they would be in the absence of international competition (Desai, Foley and Hines, 2006b). According to Bénassy-Quéré *et al.* (2000), the tax competition among member states can lead either to inefficiently high or low taxation levels.

Tax competition for mobile capital has been "on the table" in the political debate of several EU Member States against the background of the EU enlargement. In particular, CEEC have often been accused of engaging in aggressive tax competition for FDI (Bellak and Leibrecht, 2007).

Lately, the OECD and the EU have shown increasing concern with tax competition. In addition to the implementation of a "code of conduct" to limit the scope of tax competition, the EU has restricted the degree of freedom of the member countries concerning tax avoidance through various strategies that discriminate between domestic and foreigners owners of capital. The project "harmful tax competition" implemented by the OECD goes in the same direction, aiming to remove incentives to change tax bases to low tax jurisdictions (Fuest *et al.*, 2005).

Profit shifting is empirically important since it allows to MNEs change their profits from one country to another in order to reduce their overall fiscal responsibilities (OECD, 2007; Devereux *et al.*, 2008). For Europe, there is evidence of profit shifting more pronounced than debt shifting (Egger, Eggert and Winner, 2010b). However, debt shifting is a broadly used practice in worldwide tax planning of MNEs (Egger, Eggert, Keuschnigg and Winner, 2010a). Devereux *et al.* (2008) stated that the necessary incentive for profit shifting is grounded on differences in statutory rates between jurisdictions. Similarly, the relatively large elasticity of profit shifting may clarify why countries engage in fierce competition with their statutory tax rates in order to attract multinational profits (De Mooij and Ederveen, 2008). MNEs earn significantly higher

profits than domestic counterparts in low tax countries but significantly lower ones in high tax countries (Egger *et al.*, 2010b). Countries with a low tax rate could be considered as a potential location of profit shifting activities (Gravelle, 2009).

In addition to the use of offshore operations to reallocate profits away from high tax jurisdictions, it is furthermore conceivable that tax havens can be advantageous for multinational companies which face repatriation taxes from activities in low tax countries (Desai, Foley and Hines, 2006a). Tax havens allow US corporations operate in other foreign high tax countries without penalty since all foreign income and taxes paid are added together in the calculation of the foreign tax credit issued by the US authorities (Barry, 2005). For Markle and Shackelford (2009), the influence of tax havens on US parents' ETRs is not as significant as might be inferred by some political statements. It is also believed that tax havens accelerate the process of tax competition among governments (Desai *et al.*, 2006b).

These countries known as tax havens are “low-tax foreign countries that offer advanced communication facilities, promote themselves as offshore financial centers, and frequently feature legislation promoting business or bank secrecy” (Desai *et al.*, 2006a, p. 519). Hines and Rice (1994) concluded that the tax rate that maximizes tax revenue for a representative tax haven is nearby 6%. It is expected that MNEs are differentially attracted to places with lower labor costs, lower taxes, and a greater domestic market, *ceteris paribus* (Wheeler and Mody, 1992).

It is remarkable that, in spite of the argument of low tax rates, a relatively small number of MNEs relocate their corporate homes to tax havens. On the one hand, this reflects the tax and regulatory costs of doing so. On the other hand, it also reflects the unwillingness of governments to levy extremely heavy tax burdens that encourage widespread departures (Hines, 1999).

There is a strong presumption that tax havens are strongly related with tax avoidance purposes by MNEs (Desai *et al.*, 2006a). International tax evasion is clearly a successful activity and it can arise from wealthy individual investors and from bulky multinational companies (Gravelle, 2009).

Gravelle (2009) makes an interesting and important distinction between tax avoidance and evasion, noting that the first is sometimes used to refer to legal reductions in taxes, while the second refers to tax reductions that are considered illegal.

The reported profitability of MNEs is inversely related to local tax rates, a correlation that is, at least in part, the consequence of tax-motivated use of debt financing, the pricing of intrafirm transfers, royalty payments, and other techniques (Hines, 1999; Egger *et al.*, 2010b). Although this relationship varies amid developed and developing countries, factors associated with enterprise mobility are related with lower levels of taxation (Jensen, 2013). In the US, foreign multinationals adopt tax-motivated income reporting strategies (Mills and Newberry, 2004).

Companies have a motivation to raise leverage above the optimal level without taxation due to the deductibility of interest on debt from the tax base whereas the return on equity does not allow that deductibility (Egger *et al.*, 2010a). On average, foreign owned enterprises display a meaningfully higher debt ratio than their domestically owned counterparts in the host country. Also according to Egger *et al.* (2010a), this tax-motivated advantage of debt enlarges with the STR, nevertheless the MNEs are capable to minimize their tax payments via distributing debt over locations where they operates.

It is widely suspected that MNEs use the aggressive transfer pricing for within-firm transactions in order to reduce their tax obligations (Feldstein *et al.*, 1995; Desai *et al.*, 2006a; Egger *et al.*, 2010b). Furthermore, Barry (2005) adds that, in the presence of such transfer pricing activities, the application of conventional measures of R&D intensity (expenditures on R&D as a share of output) results in its underestimation for low tax countries.

International transfers of goods and services in transactions within the firm should be carried out at arm's-length prices, i.e., prices that would be used in a similar transaction between unrelated companies (Hines and Rice, 1994; Barry, 2005). However, for the majority of intangible assets, there are no arm's-length prices which complicates the implementation and monitoring of the reasonableness of the prices charged within corporations (Barry, 2005). When market prices are not available, MNEs may distort the

transfer price in order to shift taxable income to the jurisdiction where taxes are lower (Bénassy-Quéré *et al.*, 2000; Fuest *et al.*, 2005; Markle and Shackelford, 2009).

Whether they are incorporated in tax rules or in tax rates, tax incentives influence the decisions of MNEs (Bénassy-Quéré *et al.*, 2005). The reported income by multinational companies varies significantly with worldwide tax incentives of their foreign parent corporations (Mills and Newberry, 2004).

The contractual arrangements between related parties placed in countries with different tax rates offer countless possibilities of sophisticated tax evasion (Desai *et al.*, 2006a). Further, Desai *et al.* (2006a) explain that multinational companies may structure a variety of transactions (intrafirm debt, royalty payments, dividend repatriations, and intrafirm trade) in a way that is favorable to tax evasion.

Companies that face higher tax rates use more intensively debt than those that face lower tax rates (Graham, 2003). Likewise, on their balance sheets, MNEs in high tax rate countries have much more debt than those in low tax rate countries (Altshuler and Grubert, 2003; Mills and Newberry, 2004). Corporations can get away with relative ease, avoiding the burden of high liabilities on repatriations (Altshuler and Grubert, 2003).

As measured by their declared income, US MNEs locate a considerable fraction of their foreign activity in tax havens. Yet, it seems that this fraction includes reported profits that typically would not be earned by factors employed by American companies in the havens (Hines and Rice, 1994).

On average, American MNEs report that the fraction of their worldwide income earned in the US is meaningfully less than the fraction of their worldwide assets, sales or payroll that is in the US. One could argue that this implies that foreign operations are relatively more lucrative than domestic operations. However, it is likely that these results may also reflect the successful shifting of the chargeable income outside the US (Shackelford and Slemrod, 1998). Egger *et al.* (2010b) found a significant saving on profit tax for MNEs operating in high tax host countries. Further, this tax saving is more pronounced in larger and older firms (Egger *et al.*, 2010b).

Gravelle (2009) states that, in particular in the US, there was the need to undertake some steps to mitigate the rewards of profit shifting activities. Recently some prevalent measures have been discussed and its amendment has often been suggested. It should be noted, among such measures, the occurrence of a substantial reduction in the corporate tax rate (from 35% to 24%), the repeal of the deferral possibility and the imposition of a per country foreign tax credit limit (Gravelle, 2009).

## **2.6. Multinational vs Domestic Firms**

The heart of the matter is that, although (as shown before) there is a host of literature on related issues, little is known empirically about whether MNEs pay more or less taxes than domestic firms (among the exceptions are Shackelford and Slemrod, 1998; Markle and Shackelford, 2009, 2012; and Egger *et al.*, 2010b). Moreover, recent cases of high profile companies paying reduced tax amounts sparked this debate. A recent example<sup>4</sup> is the apparent tax agreement between Amazon and the government of Luxembourg, following a controversy on an unfair state aid that may have allowed the company to underpay its taxes over several years<sup>5</sup>. These types of cases of favorable tax treatment for MNEs necessarily leads to concerns about smaller domestic companies, which in turn are paying a disproportionate share of the taxes (Markle and Shackelford, 2009).

The results found by Shackelford and Slemrod (1998) seem to point to the successful shifting of taxable income out of the U.S., suggesting that the tax burden is shifted from domestic corporations to MNEs. After all, for Markle and Shackelford (2009), MNEs and their domestic counterparts face similar ETRs. The evidence supports neither statements that MNEs regularly pay lower taxes nor claims that MNEs consistently operate at a tax disadvantage compared with their domestic counterparts (Markle and Shackelford, 2012). Egger *et al.* (2010b) state that profit tax expenditures of foreign owned enterprises are

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<sup>4</sup> Available on [http://www.nytimes.com/2015/01/17/business/amazon-luxembourg-european-commission.html?\\_r=0](http://www.nytimes.com/2015/01/17/business/amazon-luxembourg-european-commission.html?_r=0).

<sup>5</sup> Recently (December, 2014), Google was charged of deliberately understating its profits by charging its UK operations too much for the use of overseas-owned intellectual property. The UK government responded by threatening to impose the measure that was became known as “Google tax”. It represents a revolution in tax policy, to the extent that introduces the idea that the volume of sales in a particular country should determine the tax paid in that country. There are many other companies that carried out the same type of Google practices, notably Apple, Amazon and Starbucks, *inter alia* (<http://www.bbc.com/news/business-30420571>).

inferior to those of domestic companies in high tax countries though higher in low tax countries.

For Markle and Shackelford (2012), there is no a global pattern about the tax burden faced by multinationals and their domestic counterparts. While in some countries are multinationals that faced higher effective tax rates, in other countries the reverse is true (Markle and Shackelford, 2012). Specifically for US corporations, another opinion is defended, which argues that foreign controlled US firms pay less taxes than do American owned US firms (GAO, 2008).

After all the literature surveyed with regard to key issues related to the topic, in section 3 we proceed with a large cross-country empirical investigation to explore our main research question, i.e., whether MNEs pay more taxes than DEs.

### **3. Empirical Investigation**

#### **3.1. Data**

The empirical part of this dissertation is based on the Amadeus database focused on the European Union-28 countries. Amadeus is a Bureau Van Dijk's database, which provides comparable financial and business information on Europe's public and private companies. This online tool covers 43 countries and it contains comprehensive information on around 21 million companies across Europe. In this way, Amadeus enables us to obtain data about relevant variables for the present study, such as: age, sector, size, taxation, and assets, among others.

The resulting database used to conduct the estimations was collected in June 2015. In order to serve the purposes of the present dissertation, the final database was divided into three distinct types of companies:

- Multinational Enterprises (MNEs);
- Domestic Enterprises (DEs) with foreign subsidiaries;
- DEs without foreign subsidiaries.

To identify MNEs, we applied the criterion that selects firms owned by a foreign shareholder, wherein the direct or total participation is greater than 50% (majority ownership) in the company.<sup>6</sup> When this criterion is used in the negative form, Amadeus database excludes MNEs and presents us only DEs. It is a criterion used for selecting and excluding observations depending on how it is applied. Further, we split the last group (DEs) into two, applying the criterion that identifies corporations that own a foreign subsidiary, being that direct or total percentage of ownership in its foreign subsidiary of at least 50%. Thus we obtain DEs with foreign subsidiaries, and the other DEs in the sample are considered DEs without foreign subsidiaries, as they do not have majority ownership of any foreign subsidiaries.

The observations were collected for nine years, from 2005 to 2013, given that we intended to gather a relatively significant number of years to obtain a robust empirical base and also not to restrict our sample to the recent years of deep economic and financial crisis.

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<sup>6</sup> Like this, it is undeniable that the issue of control by a foreign multinational enterprise is ensured. Majority ownership is very often the criterion used to determine the ownership of the company.

Although Amadeus provides data from 2005 to 2014, we decided to exclude from the analysis the last year available, 2014, since the information about the companies was rather incomplete for that year, which would hinder the reliability of our data.

The criteria used to select the companies (applied in all extractions) considered for the analysis were: all firms with an active status and also companies with at least 10 employees. The latter aimed to exclude micro enterprises, following the definition of the European Commission (EC, 2003) that considers micro enterprises are those that employ less than 10 workers. We needed to be selective given the overwhelming number of observations in the database, thus we imposed a criterion of minimum size, deciding to exclude the micro enterprises (which we feared would distort the analysis of taxation). In the same Commission report, the EC also refers to annual turnover and annual balance sheet total measures. However, we opted for the criterion of the number of employees given the greater stability of total employment compared to other measures as size measures of the corporations. Using the Amadeus database, we realize that we can apply a particular criterion for some recent years, with the maximum limit of four years. Therefore, and being our analysis wider (nine years), we decided not to apply this criterion to all recent years available on the database as it would be restricted to the years of crisis. That said, we decided to choose as the criterion for the minimum number of employees, the last year of analysis, 2013, which is often a strategy used in the Amadeus dataset.

Subsequently, since we intend to study the taxation level borne by companies, we excluded from the sample all observations with missing values of our key variable “taxation”. Additionally, and taking the countless diversity associated to different sectors (we had NACE at four digits in the sample), we considered unreasonable to create variables for all sectors. In this way, we consolidated key sectors such as mining, manufacturing, utilities, construction and services.

After detecting a few cases where the companies’ date of incorporation was more recent than the last year of analysis (2013), we excluded these observations from our sample with the purpose of not invalidating the reliability of variable age which is built on the date of incorporation. Plus, it would not make any sense, if our dataset would be only until 2013, to include these few odd cases with date of incorporation after 2013.

conclude further methodological step consisted in undertaking took logarithmic transformations of the variables in order to implement to the model adopted in the empirical part, which is described in detail in section 3.4. For this purpose, we had to drop all non-positive observations associated to variables that suffered logarithmic transformation.

After all these steps, we ended up with a still very impressive number of observations for each year. Figure 2 in appendix, summarizes the procedures used in the data treatment process and the respective implications in the number of observations.

Under these conditions, the final database for the period 2005-2013 is composed by 3,526,552 observations. As stated above, this sample was divided into three different groups including 368,215 (10.44%) MNEs, 152,324 (4.32%) DEs with foreign subsidiaries and 3,006,013 (85.24%) DEs without foreign subsidiaries. For a clearer overview, see Table 1.

**Table 1: Number of companies in each group of companies (Period 2005-2013)**

All observations	3,526,552	MNEs	368,215		
		DEs	3,158,337	With foreign subsidiaries	152,324
				Without foreign subsidiaries	3,006,013

Source: Own elaboration.

### **3.2. Descriptive Analysis**

In this section, we provide a more detailed analysis of the data in the sample. Five distinct measures are used for this descriptive study. The measures of central tendency are mean, median, maximum and minimum value, while standard deviation is our measure of the dispersion of the sample. The relevant descriptive statistics are presented in Tables 2 and 3.

**Table 2: Descriptive statistics (2005-2013): MNEs**

	MNEs					Observations
	Mean	Median	Minimum Value	Maximum Value	Standard Deviation	
Taxation (th €)	1,827.8	165.1	0.0	9,793,520.1	41,894.0	368,215
Number of Employees	256.4	58.0	0.0	263,517.0	1,842.6	341,492
Sales (th €)	81,004.0	11,619.8	0.0	98,501,445.0	653,215.1	294,613
Fixed assets (th €)	40,912.7	1,300.0	0.0	150,300,000.0	731,115.2	362,348
Total assets (th €)	86,749.1	8,807.5	0.4	593,900,000.0	1,590,860.0	356,224
Gearing (%)	81.4	24.6	0.0	1,000.0	142.2	312,758
Age (Years)	19.8	15.0	0.0	313.0	18.7	368,215

Source: Own elaboration based on Stata 12.0.

**Table 3: Descriptive statistics (2005-2013): DEs**

	DEs					Observations
	Mean	Median	Minimum Value	Maximum Value	Standard Deviation	
Taxation (th €)	484.1	29.7	0.0	18,818,710.0	29,328.0	3,158,337
Number of Employees	101.9	21.0	0.0	648,254.0	2,006.2	2,763,706
Sales (th €)	15,653.4	2,387.5	0.0	144,200,000.0	295,818.6	2,828,764
Fixed assets (th €)	14,429.8	410.3	0.0	180,700,000.0	578,083.8	3,055,795
Total assets (th €)	24,926.8	1,881.7	0.0	256,700,000.0	777,340.0	2,992,455
Gearing (%)	116.3	48.2	0.0	1,000.0	171.5	2,727,913
Age (Years)	18.4	15.0	0.0	813.0	17.1	3,158,337

Source: Own elaboration based on Stata 12.0.

Confronting our two interest groups (MNEs and DEs) and taking as backdrop the whole period of our analysis (2005-2013), we can make several relevant inferences. Considering their mean values, MNEs present in general higher values for most variables under consideration, when compared with DEs. On average MNEs pay 3 times more taxes, employ 2 times more people, and sell 5 times more than DEs. This analysis can be extended to other variables, such as fixed and total assets, where MNEs own 2 times more and 3 times more of such assets than DEs, respectively. Furthermore, MNEs have 30.0% lower gearing, i.e., the measure of the firm's leverage level as indicator of the company's performance has, on average, higher values in DEs than in MNEs. The age of the firm, which corresponds to difference between a given year of our analysis and the enterprise's year of incorporation, as referred in more detail below in section 3.3.1.3., reflects that MNEs are on average one year older than DEs.

After obtaining our data broken down by sectors, a descriptive analysis of the same kind was undertaken for companies in each of the sectors under review – notably services, mining, manufacturing, utilities and construction, which is displayed in Tables 4, 5, 6, 7 and 8, respectively.

**Table 4: Descriptive statistics (2005-2013): Services - MNEs vs DEs**

	By Sector: Services			
	MNEs		DEs	
	Mean	Observations	Mean	Observations
Taxation (th €)	1,159.2	225,598	389.3	1,752,337
Number of Employees	237.5	207,963	115.4	1,539,008
Sales (th €)	68,975.2	178,402	14,710.1	1,551,950
Fixed assets (th €)	30,446.9	222,179	14,425.2	1,703,297
Total assets (th €)	72,168.9	217,976	23,666.6	1,663,468
Gearing (%)	79.9	191,009	113.9	1,498,684
Age (2013) (Years)	18.2	225,598	17.4	1,752,337

Source: Own elaboration based on Stata 12.0.

For the period under analysis (2005-2013), companies established in the services' sector follow in line with the overall pattern seen previously, although in absolute values, both pay slightly less taxes, on average. Specifically, MNEs pay more taxes, employ more and sell more when compared with DEs, although differences are somewhat smaller. The same applies to fixed and total assets where there are no substantial differences comparing to the general picture. More, MNEs present 29.9% lower gearing, very close value to that seen in the overall analysis. Compared to that previous analysis, also differences associated to age of companies do not show noteworthy modifications.

**Table 5: Descriptive statistics (2005-2013): Mining - MNEs vs DEs**

	<b>By Sector: Mining</b>			
	<b>MNEs</b>		<b>DEs</b>	
	<b>Mean</b>	<b>Observations</b>	<b>Mean</b>	<b>Observations</b>
Taxation (th €)	66,617.3	2,796	16,563.7	14,627
Number of Employees	1,431.6	2,662	270.2	12,994
Sales (th €)	403,357.1	1,828	59,622.3	12,812
Fixed assets (th €)	842,710.8	2,779	204,446.4	14,266
Total assets (th €)	1,327,233.0	2,747	314,038.4	14,026
Gearing (%)	89.7	2,428	99.7	12,948
Age (2013) (Years)	23.4	2,796	24.4	14,627

Source: Own elaboration based on Stata 12.0.

Regarding to mining for same period, the discrepancy is huge – in absolute values, MNEs and DEs pay far more in the mining sector, compared with the global settings. The mean values related between the two groups under consideration deviate slightly from the mean values presented without the sectoral division. In respect to taxation in absolute values. On average, MNEs continue to pay more taxes than DEs and in this regard there is no substantial difference. Although MNEs employ and sell more compared to DEs, these differences increase considerably relatively to the overall picture. The equivalent applies

to fixed and total assets, where the dissimilarities widened noticeably. Further, MNEs present 10.0% lower gearing (substantially lower value than 30.0% - reference value). Unlike the overall picture, MNEs are younger around one year than DEs in the mining.

**Table 6: Descriptive statistics (2005-2013): Manufacturing - MNEs vs DEs**

	By Sector: Manufacturing			
	MNEs		DEs	
	Mean	Observations	Mean	Observations
Taxation (th €)	1,543.8	121,231	446.7	894,766
Number of Employees	265.3	113,612	90.5	781,479
Sales (th €)	92,644.0	98,944	17,266.6	815,693
Fixed assets (th €)	35,521.2	119,050	9,979.1	855,690
Total assets (th €)	77,379.4	117,445	20,571.9	841,251
Gearing (%)	83.0	103,903	124.3	787,458
Age (2013) (Years)	23.1	121,231	21.1	894,766

Source: Own elaboration based on Stata 12.0.

As to manufacturing for the period 2005-2013 we also found some deviations from the pattern seen earlier. Nevertheless, in absolute values, the amount of taxes paid, accrued or deferred by MNEs and DEs in the manufacturing sector is the closest to the main picture. On average, MNEs continue paying about 3 times more taxes than DEs. Concerning the number of employees and sales, the differences remain in the same direction and are slightly more pronounced. Compared to the overall analysis, the differences on assets also widen, especially in terms of fixed assets (from 2 times more to 3 times more). About the variable gearing, there is no substantial modification (MNEs have 33.2% lower gearing). In the manufacturing sector, the difference about the age of companies widens for two years, continuing MNEs to be older, on average.

**Table 7: Descriptive statistics (2005-2013): Utilities - MNEs vs DEs**

	By Sector: Utilities			
	MNEs		DEs	
	Mean	Observations	Mean	Observations
Taxation (th€)	4,838.0	5,947	2,140.3	57,934
Number of Employees	266.4	5,610	177.1	51,655
Sales (th€)	255,521.2	4,929	69,531.6	53,839
Fixed assets (th€)	224,455.3	5,878	112,085.9	56,100
Total assets (th€)	320,749.9	5,798	153,845.1	55,383
Gearing (%)	102.7	5,043	121.1	50,900
Age (2013) (Years)	15.4	5,947	18.3	57,934

Source: Own elaboration based on Stata 12.0.

Comparing to the overall picture, MNEs and DEs in utilities sector pay substantially more taxes, about 3 times more in absolute values. In the utilities sector, for the same period, the difference in mean values associated to the two groups under consideration are largely identical to the difference in mean values presented earlier. On average, MNEs continue to pay more taxes than DEs although the difference has fallen from 3 times more to slightly more than to 2 times. Similarly in terms of number of employees and sales, the differences are smaller. These two measures of firms' size indicate a slight approximation between MNEs and DEs. In utilities, the fixed and total assets owned by MNEs and DEs follow same pattern as the overall analysis, despite the slight drop in the difference in terms of total assets. The difference concerning the leverage level measured by the gearing ratio remained in the same direction even though it declined from 30.0% to 15.2%, i.e., MNEs present 15.2% lower gearing than DEs in the utilities. Contrary to the general picture, MNEs are younger about three years than DEs in this sector.

**Table 8: Descriptive statistics (2005-2013): Construction - MNEs vs DEs**

	<b>By Sector: Construction</b>			
	<b>MNEs</b>		<b>DEs</b>	
	<b>Mean</b>	<b>Observations</b>	<b>Mean</b>	<b>Observations</b>
Taxation (th €)	737.0	12,643	184.4	438,673
Number of Employees	234.1	11,645	54.4	378,570
Sales (th €)	37,692.1	10,510	7,247.1	394,470
Fixed assets (th €)	13,636.1	12,462	4,174.7	426,442
Total assets (th €)	47,116.6	12,258	11,934.6	418,327
Gearing (%)	81.7	10,375	108.5	377,923
Age (2013) (Years)	18.6	12,643	16.8	438,673

Source: Own elaboration based on Stata 12.0.

Regarding to construction, for the period under analysis, the inverse happens to that in utilities sector in terms of absolute values borne with taxes by companies, on average. In the construction sector, MNEs and DEs pay approximately 3 times less comparing to the overall picture. Concerning the mean values connected to MNEs and DEs deviate slightly from the mean values presented without the sectoral division. Herein there is some differences that increase: MNEs pay taxes around 4 times more instead of 3 times, employ nearly 4 times more instead of 2 times and sell more than 6 times more in place of 5 times. As to assets, there is an increase in differences between MNEs and DEs, from 2 to 3 times more and from 3 to 4 times more, roughly and respectively. Regarding to gearing, there is no considerable modifications (MNEs present 24.7% lower gearing than DEs). In the construction, the difference about aging of companies is slightly larger than the overall picture, i.e., MNEs are approximately two years older than DEs, on average.

Concluding, MNEs and DEs, in services and manufacturing sectors present similar tax levels to those seen in the general picture, in absolute values and on average. In the utilities sector, the tax burden borne by two groups of companies are, on average, three times more comparing to the overall picture, whereas in the construction sector, the reverse happens, approximately. The highlight is the mining sector, where MNEs and DEs have, on average, tax levels that significantly exceed the general context.

### **3.3. Methodology**

After the minucious explanations of the data collection procedures and its descriptive analysis, this section aims to present the models adopted to test econometrically whether MNEs pay more taxes than DEs. Furthermore, all the variables included in the models, the type of model adopted and the software used to implement the estimations will be explained in this section. To conclude this section, the achieved results of the econometric estimations will be presented.

#### **3.3.1. Variables**

As mentioned in the literature review, the main objective of this dissertation is to ascertain whether foreign owned multinational subsidiaries pay more or less taxes than domestic enterprises. Hence, we needed to gather a relevant array of variables to address all the matters described in the literature review. This part presents and describes the dependent and independent variables used to investigate our research question.

##### **3.3.1.1. Dependent Variable: Taxation**

To analyze the level of taxes paid by enterprises, we will use the taxation variable (**taxation**) as proxy. Taking into account our claims, we preferred the absolute variable **taxation** to the detriment of the relative variable taxation per employee since the latter is very dependent on the sector under analysis. Assuming a certain level taxes, while in some economic activities the use of employees is high, which decreases the ratio taxation per employee, in other sectors the use of workers is highly replaced by the use of machinery. However, to ascertain whether some companies pay more taxes than others, we needed a variable of effectively paid taxes, which the Amadeus database did not provide, whereby we had to work with the best available proxy. Our variable **taxation** refers to all taxes related to the accounting period (paid, accrued or deferred).

##### **3.3.1.2. Main Independent Variable: Multinational Enterprise**

Our main explanatory variable of interest is the multinational enterprise status, since we intend to analyse the tax level burden by multinational companies versus their domestic counterparts. For that reason, our main explanatory or independent variable is a binary variable/dummy (**mne**), which is equal to 1 if the company is a foreign multinational

subsidiary<sup>7</sup> and equal to 0 otherwise (meaning that the enterprise is domestic). As multinationals are, on average, larger companies, associated with them is expected a positive sign of influence on variable **taxation**.

### ***3.3.1.3. Other Independent Variables***

Additionally, we propose to evaluate the effect of internationalization (via outward FDI) on the taxes paid by domestic companies, i.e., whether DEs internationalized via FDI pay more or less taxes than DEs without foreign subsidiaries. For this, we split domestic firms into two distinct groups: with and without foreign subsidiaries. That way, emerges another crucial dichotomous variable (**dew**) that assumes the value 1 if the company owns a foreign subsidiary and the value 0 otherwise (meaning that besides being a domestic firm, it does not own any foreign subsidiary). Due to the unpredictability about the expected sign of the variable **dew** on **taxation**, it remains undetermined.

It is widely accepted by the scientific community that it may be problematic to include companies from different sectors (such as agriculture, manufacturing, education, construction, services, among others) in the same analysis group. The particular case of the California industry shows that the sectors are extremely broad and are at times not comparable across regions (Dean Runyan Associates, 2009). Indeed, different industries have dissimilar industrial structures and characteristics, facing profoundly different competitive and economic environments and profit forecasts, which makes them incomparable (Qin, Chang, Li and Li, 2014). To conclude, “Different enterprises face different situations...different industry sectors do not have comparability, and then enterprises in different sectors are also not comparable.” (Qin *et al.*, 2014, p. 32). We generated an independent variable which identifies the comparable sectors, i.e., we adopted a binary variable “nace”, taking the value 1 when companies are set in the mining, manufacturing, utilities, construction or services and the value 0 otherwise. This variable was built on the “NACE Rev. 2 primary code” extracted by Amadeus database, which incorporates the 4-digit NACE code. There, we drop all observations for which “nace” is equal to zero. Next, to allocate the different codes to diverse sectors, we used the approach

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<sup>7</sup> A firm is considered a foreign MNE subsidiary when a non-resident entity owns at least 10% of its equity. Some studies consider a cut-off of 10% and others of 50% (majority ownership). In this dissertation we use the concept of majority ownership, which is unequivocal and very frequent in related literature.

outlined in Eurostat's publication (Eurostat, 2008). This way, and after we have kept only the five sectors of interest, we generated four dummies (**mining**, **manuf**, **utilit** and **construc**). Every one these explanatory variables takes the value 1 when companies belong to the sector in question and the value 0 otherwise. To conclude, and to clarify the procedure adopted, companies that are not identified in any of these four binary variables correspond to services. The sign expected of the coefficients connected to different sectors is also undetermined, given the diversity and complexity associated to them and even within each one.

Another explanatory feature of tax effort borne by companies is its size. It will be proxied by total employment (**empl**), measured as the number of employees in each corporation. Alternatively, as measures of size of the company, we will use the total sales (**sales**) and finally the fixed and total assets accessible to the enterprise (**fixasset** and **totasset**). It is conceivable that larger companies pay more taxes; consequently, the measures of a firm's size have an expected positive sign.

The financial aspects inherent to the entities are very useful in order to assess for example the long-term financial stability, expanding the horizons. Hence we have chosen to analyze the effect of the company's leverage on taxation through the use of the gearing ratio (**gearing**). Assuming that the largest companies are those that invest more, they possess more loans and as such they have higher leverage ratios. Thus, it is expected a negative sign of the influence of **gearing** on **taxation**.

One more characteristic considered is the "maturity" of the enterprise. The independent variable that we will assume as proxy to that is the age of corporation itself (**age**). This variable was built by the difference between each of the years of the sample and the companies' date of incorporation (obtained from Amadeus). While the newer companies are still in their infancy (phases of research and investment), older companies already have their portfolio of products, services and more established clients. As such, it is expected that older companies are larger and, therefore, pay more taxes - positive sign on taxation.

Table 9 summarizes the most relevant information about the independent variables.

**Table 9: Synthesis of the independent variables**

Measure	Independent Variable	Description	Unit	Variable Name on Stata	Expected Sign on Taxation
Company's status	Multinational Enterprise	Binary variable: 1=company owned by a foreign shareholder, 0=domestic company	{0,1}	mne	+
	Domestic Enterprise with Foreign Subsidiary	Binary variable: 1=domestic company with foreign subsidiary, 0=domestic company without foreign subsidiary	{0,1}	dew	?
Size	Employment	Number of employees	Number of employees	empl	+
	Sales	Total sales	Thousands euros	sales	+
	Fixed Assets	Fixed assets	Thousands euros	fixasset	+
	Total Assets	Total assets	Thousands euros	totasset	+
Financial	Leverage	Leverage/gearing	Percentage	gearing	-
Sector	Mining	Binary variable: 1= companies in the mining	{0,1}	mining	?
	Manufacturing	Binary variable: 1= companies in the manufacturing	{0,1}	manuf	?
	Utilities	Binary variable: 1= companies in the utilities	{0,1}	utilit	?
	Construction	Binary variable: 1= companies in the construction	{0,1}	construc	?
Age	Company's Age	Number of years from the date of incorporation to each of the years	Years	age	+

Source: Own elaboration.

After the logarithmic transformation of variables, all non-binary variables (those that have changed) came to possess in its name the letter "l" at the beginning to identify that it is a

logarithmic variable (new variable names and its definitions are in Table 16 of the Appendix).

### **3.4. Econometric Model**

It is fundamental to remember that our central research question is to ascertain if MNEs pay more or less taxes than DEs. For that, we have to apply a model that allows us to analyze the effect of the distinct chosen variables on the level of taxes owed. Thence, we decided to adopt a log-log model (using the base 10 logarithm) in order to achieve our goals.

Logarithmically transforming variables in a regression model predominantly seeks to handle situations where a non-linear relationship exists between the explained and explanatory variables (Benoit, 2011). Going further, the use of logarithms for the dependent and independent variables is the most used methodology in econometrics for allowing nonlinear relationships between them (Wooldridge, 2012). Using the logarithm of one or more variables as an alternative of the un-logged form makes the effective relationship non-linear, while still preserving the linear model (Benoit, 2011).

Furthermore, “logarithmic transformations are also a convenient means of transforming a highly skewed variable into one that is more approximately normal” (Benoit, 2011, p. 2). Indeed, there is a distribution whose logarithm is normally distributed but whose untransformed scale is skewed, known as log-normal distribution (Benoit, 2011). This is the essence of our choice for a log-log model. To carry out regressions we run the command *regress*.

We then proceeded to test, as usual in this type of models, for skewness and kurtosis. “Lack of symmetry (skewness) and pointiness (kurtosis) are two main ways in which a distribution can deviate from normal” (Ghasemi and Zahediasl, 2012, p. 487). The skewness is an indicator used in distribution analysis as a sign of asymmetry and deviation from a normal distribution (Bai and Ng, 2005). After we had implemented (using Stata 12.0) the test for skewness designed for the variable **taxation**, we concluded that our dependent variable is highly skewed. This test assumed the value 334.8, whereas the reference skewness value to consider the mean equal to median is 0, i.e., the distribution is symmetrical around the mean when the skewness value is close to 0. Our result

indicates undoubtedly that taxation presents a right skewed distribution, and that most of the values are concentrated on left of the mean, with extreme values to the right. Regarding kurtosis, it is an indicator used in distribution analysis as a sign of flattening of a distribution (DeCarlo, 1997). For this test, our result is 161,575.2 which is well above to reference value 3 that characterizes a normal distribution. This means high probability of extreme values (Ghasemi and Zahediasl, 2012). Once completed the logarithmic transformation of the variable **taxation**, the skewness and kurtosis test correspond to values -0.2 and 3.9, respectively. A reference of substantial range from normality happens when an absolute skew value is greater than 2 and an absolute kurtosis value is greater than 7 (West, Finch and Curran, 1995). According to what has been said so far, and taking into account the sample size, these values are perfectly acceptable as an approximation to a normal distribution.

Additionally also for most of the independent variables, the skewness and kurtosis test indicated the absence of a normal distribution. The equivalent logarithmic transformations were implemented for these cases too.

In this type of models, the meaning of the coefficients is specific and so it is critical a correct interpretation for an unadulterated understanding of the results. Thus, in cases where both the explained and explanatory variables are log-transformed variables, the interpretation is given as an expected percentage change in Y when X increases by a certain percentage (Benoit, 2011).

It is also important to point out that the larger the standard error, the greater the uncertainty about the estimated parameter value. With large samples, parameters can be estimated very accurately and so standard errors are frequently quite small compared to the coefficient estimates (Wooldridge, 2012). In consequence, *t* statistics assume high values and therefore the variables are statistically significant at very low levels of significance. Thus, all of our variables are statistically significant at rather small significance levels. Particularly when we are working with large samples (as in our case), it is imperative to interpret the magnitude of the coefficients, in addition to looking at *t* statistics (Wooldridge, 2012).

### 3.5. Estimations and Results

Following the above considerations, at this stage we are in the position to follow our intentions with the aim of being able to answer our research question. To this end, we carried out various estimates.

In Table 10 are summarized some results of the estimates carried out in order to assess the differences between the fiscal effort made by MNEs compared to DEs.

An overview of this table allows us to identify a relatively constant pattern for certain variables across all our estimates. As said above, all variables are statistically significant at a very low significance level (1% level). However, we should focus primarily our analysis on the magnitude of the coefficients.

In our base regression, **(1)**, the variables **mne**, **lemp** and **lage** have a positive impact on taxes owed by enterprises, where MNE status is associated to a 0.39% increase in taxation, a one percent increase in number of employees is connected to a 0.84% increase in taxes and a one percent increase in age is linked to a 0.35% increase in taxes owed.

Introducing the variable **lsales** to regression **(1)** we obtain regression **(2)**. In this case, the coefficient allied to MNEs falls from 0.39 to 0.09, the number of employees now has a negative impact on taxation, although the associated coefficient is low (-0.07) and a one percent increase in age is connected with a 0.05% increase in tax effort. The introduced variable, **lsales**, has a strong impact on taxes owed, assuming the coefficient 0.99, i.e., a one percent increase in sales is associated with a 0.99% increase in taxation.

Adding the variable **lgearing** to regression **(1)** we reach regression **(3)**. Herein, there are no substantial differences regarding to existing variables. Concerning the variable introduced, **lgearing**, we obtain a coefficient of -0.09.

**Table 10: Log-log model results (Period 2005-2013)**

Independent Variables	Dependent Variable: Itaxation						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
mne	0.3897785 * (258.99)	0.0868317 * (64.71)	0.3750364 * (221.19)	0.4517958 * (284.92)	0.0916158 * (67.60)	0.3881308 * (257.27)	0.0544297 * (34.80)
lemp1	0.8391186 * (898.90)	-0.0732885 * (-68.26)	0.833008 * (820.55)			0.8348803 * (890.61)	-0.0849993 * (-68.80)
lsales		0.9940175 * (1,267.26)					1.005898 * (1,055.44)
lfixasset				0.510409 * (900.32)			
ltotasset					0.9271735 * (1,527.30)		
lgearing			-0.0940282 * (-144.73)	-0.1541544 * (-252.65)	-0.1308521 * (-259.03)		-0.1152044 * (-207.54)
lage	0.3467563 * (285.17)	0.0493591 * (46.25)	0.2520444 * (182.09)	0.1281336 * (97.90)	-0.0955968 * (-86.76)	0.3490777 * (286.45)	0.0075495 * (6.12)
mining						0.2401712 * (37.22)	0.2275403 * (38.06)
manuf						-0.0203671 * (-19.33)	0.0821953 * (83.95)
utilit						0.292147 * (85.48)	0.1755125 * (57.88)
construc						-0.0411627 * (-28.76)	0.0730494 * (53.58)
cons	-0.1559123 * (-91.45)	-2.00629 * (-978.48)	0.1951029 * (85.32)	0.236268 * (113.58)	-1.309118 * (-596.89)	-0.1476766 * (-85.39)	-1.813677 * (-660.94)
R-squared	0.3062	0.5477	0.3174	0.3305	0.5444	0.3085	0.5421
F-Statistic	.	.	.	.	.	.	.
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. Observations	3,067,329	2,691,886	2,330,426	2,562,816	2,505,071	3,067,329	2,035,014

Source: Own elaboration based on Stata 12.0.

Note: \* stands for significance at 1% level, \*\* means significance at 5% level and \*\*\* denotes significance for 10% level; t-statistics are reported in the parentheses below the parameter estimate.

Replacing the variable **lempl** by **lfixasset** to proxy the firm's size and introducing **lgearing** to regression (1), we obtain regression (4). The coefficients associated to **mne** and **lage** remain with a positive impact on taxation and **lgearing** also continues to have a negative effect on tax effort. A one percent increase in fixed assets is associated with a 0.51% increase in taxes owed. Furthermore, we decided to replace the variable **lempl** by **ltotasset** and introduce the variable **lgearing** to regression (1), obtaining regression (5). The coefficient related to **mne** remain with a positive impact on taxes owed although with less magnitude and **lgearing** also continues to have a negative effect on tax effort. The variable **ltotasset** has a similar effect on the tax effort to the effect of sales in the regression (2). Furthermore, **lage** presents a negative impact, although the associated coefficient is low (-0.10).

Finally, we introduced the sectoral variables **mining**, **manuf**, **utilit** and **construc** in the regressions (6) and (7). Compared to the regression (6), the regression (7) further includes the variables **lsales** and **lgearing**, which maintain the sign and the intensity of their impact on taxation. As for impact of **mne** and **lage** on taxation, they remain positive in both, although stronger in the regression (6) than regression (7) (coefficient 0.39 versus 0.05 and 0.35 versus 0.01, respectively). The coefficient associated to **lempl** becomes once again negative (conjugated with **lsales**), from 0.83 in regression (6) to -0.08 in regression (7). As for sectoral dummies, the interpretation is mixed for **manuf** and **construc**, where in addition to the effect being very small, the signal of the same is not unchanging for both variables. On the contrary, regarding **mining** and **utilit**, we denote a positive impact on taxes owed by corporations. More specifically, an enterprise in the mining sector is associated to a 0.24% increase in taxation according to regression (6) and a 0.23% increase according to regression (7). Concerning utilities, the coefficient is 0.29 in regression (6) and 0.18 in regression (7).

In sum, the coefficient associated to the presence of a multinational company is positive in all estimations carried out, and despite having a substantially smaller effect when we include sales or total assets as determinants of the taxation level, it keeps the same sign of influence. That said, being a multinational company translates into a positive correlation with the fiscal effort made by companies. This opinion is shared by Egger *et al.* (2010b) only for low-tax countries, since for high-tax countries the authors deliberate

that tax level of MNEs is lower than those of DEs, considering the existence of significant savings on profit tax for multinationals operating in high-tax countries. Not corroborating neither denying the existence of a significant saving in tax profit by multinational companies, what our results reflect is that the MNEs have higher tax level than DEs in the EU-28 as a whole. While GAO report (GAO, 2008) found that multinational enterprises pay less taxes than domestic counterparts in the US, our results show that the opposite was the case in the EU-28 for the period 2005-2013.

Additionally, we proposed to investigate whether DEs with foreign subsidiaries pay more taxes than DEs without foreign subsidiaries. To this end, we conducted another set of estimations presented in Table 11.

As for domestic companies, we found a substantial effect on taxes owed by companies when they have foreign subsidiaries. In parallel to the results found in the previous analysis, here too the effect is mitigated when we introduce the independent variable **sales** to regressions. Keeping in mind the effect of being an MNE on taxation, we conclude that the effect associated to DEs with foreign subsidiaries is slightly larger in all regressions, with the exception of regression **(4)**.

In our regression **(1)**, the variables **dew**, **lempl** and **lage** have a positive impact on taxes owed by companies, where a DE with foreign subsidiary is associated with a 0.45% increase in taxation, a one percent increase in number of employees is connected with a 0.86% increase in taxes and a one percent increase in age is linked with a 0.32% increase in taxes owed.

Once again, introducing the variable **lsales** to regression **(1)** we obtain regression **(2)**. In this case, the coefficient connected to DEs with foreign subsidiaries decreases from 0.45 to 0.16, the number of employees now have a negative impact on taxation, although the associated coefficient is low (-0.07) and a one percent increase in age is connected with a 0.04% increase in tax effort. The introduced variable, **lsales**, has the same strong impact (even the same magnitude) on taxes owed as the previous analysis.

**Table 11: Log-log model results (Period 2005-2013)**

Independent Variables	Dependent Variable: Itaxation						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
dew	0.4477744 * (198.77)	0.1612412 * (82.15)	0.4018676 * (173.17)	0.3709142 * (165.87)	0.0824551 * (44.42)	0.4514004 * (200.52)	0.1564731 * (77.06)
lemp1	0.8617509 * (929.14)	-0.0728754 * (-68.00)	0.8552051 * (849.99)			0.8570196 * (920.49)	-0.0873443 * (-70.83)
lsales		0.9944788 * (1,277.02)					1.002568 * (1,063.07)
lfixasset				0.5219458 * (908.66)			
ltotasset					0.9332125 * (1,564.41)		
lgearing			-0.1108153 * (-170.70)	-0.1743902 * (-284.93)	-0.134886 * (-268.53)		-0.1184509 * (-215.16)
lage	0.3221246 * (263.98)	0.0414586 * (39.06)	0.2295933 * (165.33)	0.1099821 * (83.25)	-0.1019459 * (-92.88)	0.3247195 * (265.65)	0.0026926 * (2.20)
mining						0.25549 * (39.43)	0.2301892 * (38.55)
manuf						-0.030829 * (-29.12)	0.0784689 * (80.14)
utilit						0.281887 * (82.15)	0.1775976 * (58.65)
construc						-0.0676595 * (-47.26)	0.0701854 * (51.65)
cons	-0.1389613 * (-80.69)	-1.997888 * (-972.42)	0.2343811 * (101.45)	0.286025 * (135.30)	-1.310951 * (-592.53)	-0.1241985 * (-71.09)	-1.788504 * (-647.86)
R-squared	0.3000	0.5481	0.3119	0.3166	0.5440	0.3027	0.5432
F-Statistic	.	.	.	.	.	.	.
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. Observations	3,067,329	2,691,886	2,330,426	2,562,816	2,505,071	3,067,329	2,035,014

Source: Own elaboration based on Stata 12.0.

Note: \* stands for significance at 1% level, \*\* means significance at 5% level and \*\*\* denotes significance for 10% level; t-statistics are reported in the parentheses below the parameter estimate.

Similarly, adding the variable **lgearing** to regression (1) we reach regression (3). Here too, there are no considerable differences concerning the variables considered. About the added variable, **lgearing**, we obtain a coefficient of -0.11, i.e., a one percent increase in the gearing ratio is connected to a 0.11% increase in taxes owed.

Continuing to follow the same procedure of the above analysis, we replaced the variable **lempl** by **lfixasset** to proxy the firm's size and introduced **lgearing** to regression (1), reaching regression (4). The coefficients associated to **dew** and **lage** persist with a positive impact on tax level and **lgearing** also continues to have a negative effect on tax effort. A one percent increase in fixed assets is associated with a 0.52% increase in taxes owed. Additionally, we decided to replace the variable **lempl** by **ltotasset** and introduce the variable **lgearing** to regression (1), obtaining regression (5). The coefficient related to **dew** remain with a positive impact on tax level although it is the lowest of all regression (0.08) and **lgearing** also endures to have a negative effect on tax effort. The variable **ltotasset** has again a similar effect on the tax effort to the effect of sales in regression (2). More, **lage** presents a negative impact, although the associated coefficient is low (-0.10).

To conclude, we introduced the sectoral variables **mining**, **manuf**, **utilit** and **construc** in the regressions (6) and (7). Compared to the regression (6), the regression (7) further includes the variables **lsales** and **lgearing**, which maintain the sign and the magnitude of their impact on taxation. As for impact of **dew** and **lage** on taxation, they remain positive in both, although stronger in the regression (6) than regression (7) (coefficient 0.45 versus 0.16 and 0.32 versus nil to two decimal places, respectively). The coefficient associated with **lempl** becomes once again negative (conjugated with **lsales**), from 0.86 in regression (6) to -0.09 in regression (7). As for sectoral dummies, the interpretation is identical to that performed in the previous analysis. For **manuf** and **construc**, in addition to the effect being very small, the signal of the same is varying. On the contrary, regarding **mining** and **utilit**, we note a positive impact on taxes owed by corporations. More specifically, an enterprise in mining is associated to a 0.26% increase in taxation according to regression (6) and a 0.23% increase agreeing to regression (7). The coefficients associated with utilities are 0.28% and 0.18%, nearly unchanged when compared with the previous analysis.

In short, the coefficient associated with ownership of foreign subsidiaries by domestic firms is positive in all our estimations. Again, the magnitude of the effect is mitigated by the presence of sales and total assets as explanatory factors of the tax level supported by the companies. To conclude, we can say that DEs with foreign subsidiaries are associated to higher taxation levels when compared to DEs without foreign subsidiaries.

#### **4. Conclusions and Policy Implications**

The main goal of this study was to assess whether multinational firms pay more or less taxes than their domestic counterparts, an underdeveloped issue in existing empirical literature. For such aim, we proceeded to a detailed literature review with regard to key issues related to the topic (yet not exactly addressing it), notably the extensive literature on the importance of taxes in location decisions of investments by MNEs. We found that although the sensitivity of FDI to taxation is a much discussed topic, no consensus exists in the literature on this matter. In fact, the literature remains fairly hesitant concerning whether FDI may be sensitive to tax incentives. Specifically regarding to our main focus of analysis, so far little exists, at least in terms of broad-based, large-scale studies. However we gathered some relevant findings on this topic and here also we found unclear conclusions.

We then followed with an empirical analysis in order to respond to our main research question. The study is built on the data drawn from the extremely inclusive Amadeus database (the best of its kind and the most appropriate for our purposes) and is conducted for a sample in the EU-28 context, testing data for 28 countries using a log-log model and covering the period 2005-2013.

Our main result points to a positive and significant relation between MNEs and taxes due (as measured by the logarithm of taxation) by companies. We found that being a multinational company translates into a 0.40% increase in the tax level, approximately. This figure drops to about 0.09% when we introduced the variable sales in explaining the taxes due. That said, we are able to state that there are higher tax levels associated to MNEs (relative to their domestic counterparts).

Additionally, we proposed to assess whether DEs with foreign subsidiaries paid more taxes than DEs without foreign subsidiaries. To that, we estimated another set of regressions and concluded that companies with foreign subsidiaries are positively and significantly associated to the tax level (compared to DEs without foreign subsidiaries). Here also, the variable sales mitigates the effect on taxation.

The measures of a firm's size confirm our predictions and exert a positive influence on tax level. The leverage ratio measured by gearing and the maturity of the firm also

corroborate, respectively, the expected negative and positive relation to taxation. Ultimately, as for the sectors of activity, only the mining and utilities sectors seem to indicate a positive impact on taxation.

Bearing in mind these results, some policy implications can be drawn. Since MNEs and DEs with foreign subsidiaries appear associated to higher levels of taxes due, governments, in order to raise their income and improve their budgetary conditions (*ceteris paribus*) should endeavor to create appealing conditions for both the attraction of foreign MNE subsidiaries and for the internationalization via FDI of their domestic enterprises. In fact, this idea has been adopted by some countries, and this has been the path followed by several countries in recent years, who have been implementing inward FDI-friendly policies, together with outward FDI promoting measures.

Throughout this work, we found various limitations in the dataset (albeit it is the most comprehensive and complete that is available), such as the abstention from answering by companies (with the glaring case of Cyprus explained in detail in a specific Appendix), the loss of observations that our sample suffered during the necessary process of data treatment, and the fact that to ascertain whether some companies pay more taxes than others, we needed a variable of effectively paid taxes (which the database did not provide, so we had to work, as usual in econometrics, with the best available proxy).

However, and despite the constraints faced during the development of this work, we managed to organize and use a vast set of extremely robust data. Our research is focused on a still striking number of approximately 3.5 million observations, which leads to a great deal of comfort when performing our analysis. Bearing all this in mind, our large-scale cross-country study in the EU-28 context contributes to the literature in an ambitious and innovative way.

Regarding avenues for future research, it would be useful for such research to evaluate the differences in the tax levied by each country or group of countries within the European Union. Thus, we could measure the differences in the tax effort made by companies in the various regions within the EU and also assess which are the most and least attractive regions for implementing companies.

There are other gaps to be fulfilled by future research. Further studies on this theme should address the same research question with a dependent variable that would be a measure of effective taxes or effective taxes over earnings before taxes to ascertain with more accuracy the kind of relationships posited. It would still be interesting to make a similar study to that made in this dissertation by addressing more details and being more discriminant, for instance dividing the countries into distinct groups: northern, southern, western, eastern and central Europe, or others. Time limitations prevented us from growing further, as this research (the simple construction of the dataset and then all the analysis and content of the dissertation) was an extremely demanding endeavor.

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## Appendix

**Table 12: Extracted observations: Active companies with at least 10 employees**

Country	Number of active companies with at least 10 employees	MNEs	DEs	DEs with foreign subsidiary	DEs without foreign subsidiary
Austria	21,687	2,548	19,139	937	18,202
Belgium	30,369	4,380	25,989	1,340	24,649
Bulgaria	43,149	1,710	41,439	104	41,335
Croatia	10,542	855	9,687	272	9,415
Cyprus	152	7	145	7	138
Czech Republic	51,764	5,365	46,399	788	45,611
Denmark	7,331	1,273	6,058	1,061	4,997
Estonia	5,802	966	4,836	85	4,751
Finland	16,767	1,202	15,565	906	14,659
France	61,044	6,547	54,497	2,159	52,338
Germany	187,283	12,609	174,674	4,395	170,279
Greece	9,451	901	8,550	176	8,374
Hungary	28,990	1,131	27,859	285	27,574
Ireland	4,596	1,176	3,420	271	3,149
Italy	139,052	6,941	132,111	5,547	126,564
Latvia	10,537	1,695	8,842	99	8,743
Lithuania	18,074	989	17,085	176	16,909
Luxembourg	796	311	485	59	426
Malta	184	45	139	18	121
Netherlands	53,644	4,651	48,993	1,944	47,049
Poland	85,125	1,474	83,651	152	83,499
Portugal	35,749	2,458	33,291	899	32,392
Romania	53,947	8,477	45,470	70	45,400
Slovakia	22,220	2,691	19,529	278	19,251
Slovenia	5,947	691	5,256	204	5,052
Spain	95,204	6,176	89,028	3,345	85,683
Sweden	36,671	2,843	33,828	1,892	31,936
United Kingdom	60,807	13,378	47,429	3,430	43,999
EU 28	1,096,884	93,490	1,003,394	30,899	972,495

Source: Own elaboration.

## Explanation – Cyprus

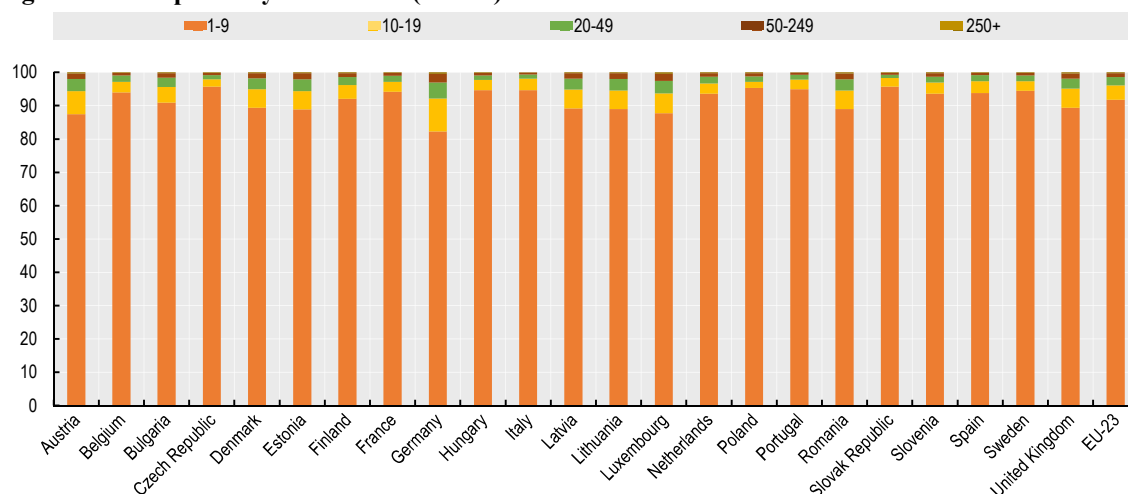
On its website ([www.oecd.org](http://www.oecd.org)), the Organization for Economic Co-operation and Development (OECD) indicates that in half of OECD countries, micro enterprises (those with less than 10 employees) account on average for more than 90% of total enterprises. Based on their information (for 2010 or latest available year), we arrive at an average value for the EU-23 countries (data for Croatia, Cyprus, Greece, Ireland and Malta were not available) of 91.74% of micro on total enterprises which confirms the above for not only by half of the countries, but to 23 out of the EU-28 countries. Figure 1 and Table 13 both clarify this distribution, identifying the percentage of enterprises by size classes.

Aware of this reality, our sample corresponds merely to the other 8%, approximately, as our data exclude micro enterprises. Hence, we are dealing with a “large minority” of European companies (which does not compromise the merit of our analysis given the still extremely high number of observations involved).

Even so, the case of Cyprus clearly stands out. Taking into account the overall picture of the Amadeus database we realized that something seemed peculiar with Cyprus’s observations, which included only 152 active companies with at least 10 employees in 2013. The option “Coverage” in the Amadeus database enabled to clarify this abnormal situation, selecting the field “Breakdown of companies according to main world regions/countries” and finalizing with “Versus employment”. Analyzing in great depth the collected information in the database, we could understand that the origin of the reduced Cyprus’s number of observations is the high non-response by Cypriot companies as for their number of employees, a limitation that is totally beyond our control. Table 14 shows that Cyprus has 21,106 companies, of which 18,597 have no data for employment variable. While the average for EU-28 countries for non-response to the employment variable is around 2%, for Cyprus it is 88%. The peculiar case encountered is thus duly explained.

Percentage, 2010 or latest available year

**Figure 1: Enterprises by size classes (EU-23)**



Source: Own elaboration based on OECD website.

Note: Data for Croatia, Cyprus, Greece, Ireland and Malta were not available.

**Table 13: Percentages of enterprises by size classes (EU-23)**

Country	Employees				
	1-9	10-19	20-49	50-249	250+
Austria	87.43	6.95	3.68	1.60	0.33
Belgium	93.98	3.15	1.92	0.78	0.16
Bulgaria	90.93	4.65	2.80	1.40	0.22
Czech Republic	95.73	2.18	1.27	0.68	0.14
Denmark	89.36	5.56	3.32	1.48	0.28
Estonia	88.88	5.49	3.53	1.85	0.25
Finland	92.07	4.17	2.41	1.08	0.27
France	94.21	2.92	1.90	0.80	0.17
Germany	82.27	9.85	4.86	2.55	0.47
Hungary	94.69	3.03	1.41	0.73	0.14
Italy	94.63	3.46	1.32	0.50	0.08
Latvia	89.23	5.66	3.26	1.64	0.23
Lithuania	89.02	5.59	3.38	1.77	0.25
Luxembourg	87.76	5.95	3.78	2.03	0.48
Netherlands	93.56	3.15	2.01	1.08	0.20
Poland	95.38	1.81	1.56	1.04	0.21
Portugal	94.92	2.87	1.49	0.63	0.09
Romania	89.00	5.56	3.40	1.71	0.33
Slovak Republic	95.68	2.68	0.95	0.57	0.12
Slovenia	93.60	3.34	1.80	1.06	0.20
Spain	93.79	3.56	1.85	0.68	0.12
Sweden	94.48	2.91	1.67	0.79	0.16
United Kingdom	89.36	5.74	3.00	1.55	0.35
EU-23	91.74	4.36	2.46	1.22	0.23

Source: Own elaboration based on OECD website.

Note: Data for Croatia, Cyprus, Greece, Ireland and Malta were not available.

**Table 14: Breakdown of companies of each country according to levels of employment (EU-28)**

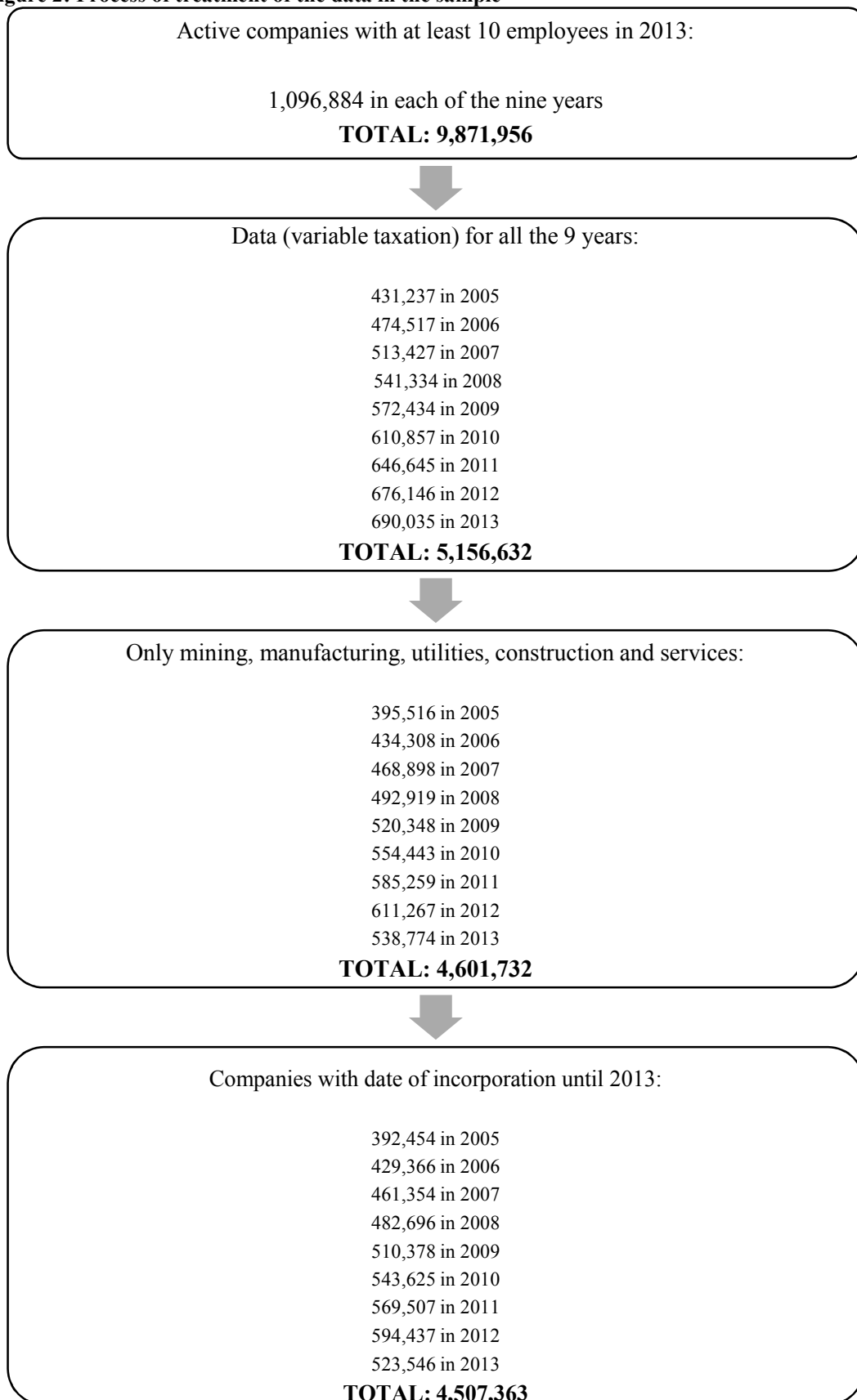
Last data update: 10/07/2015

World regions/countries	Employment*											
	Below 5	5 to 9	10 to 19	20 to 49	50 to 149	150 to 499	500 to 999	1000 to 4999	Over 5000	Not available	Total	Not available / Total
Austria (AT)	175,192	27,630	17,402	12,230	5,563	2,334	594	444	93	3,575	245,057	1%
Belgium (BE)	366,414	49,092	25,287	15,271	6,187	2,852	556	453	57	3,617	469,786	1%
Bulgaria (BG)	356,088	49,190	23,307	15,564	6,065	2,074	338	184	12	4,728	457,550	1%
Croatia (HR)	94,609	12,754	6,896	3,879	1,640	619	112	58	8	1,019	121,594	1%
Cyprus (CY)	172	1,583	137	344	108	96	20	36	13	18,597	21,106	88%
Czech Republic (CZ)	313,886	39,763	37,066	28,715	14,011	8,743	1,487	1,213	376	7,121	452,381	2%
Denmark (DK)	133,502	32,993	28,130	26,784	17,012	5,802	1,031	681	160	425	246,520	0%
Estonia (EE)	101,529	7,626	3,836	2,250	898	266	35	20	0	1,492	117,952	1%
Finland (FI)	241,420	20,589	11,778	7,138	3,170	1,256	277	253	53	3,474	289,408	1%
France (FR)	1,989,627	257,570	115,654	70,274	29,447	10,760	2,092	1,550	393	61,872	2,539,239	2%
Germany (DE)	991,291	169,165	126,171	93,744	46,239	16,162	3,567	2,860	583	30,451	1,480,233	2%
Greece (GR)	9,268	5,213	5,011	3,927	1,683	613	105	94	12	7	25,933	0%
Hungary (HU)	286,173	65,534	49,955	49,550	36,427	15,766	3,865	3,289	694	7,706	518,959	1%
Ireland (IE)	136,972	10,524	6,508	4,997	2,737	969	256	188	52	14,596	177,799	8%
Italy (IT)	774,388	143,829	94,505	50,719	20,033	6,673	1,342	995	203	2,935	1,095,622	0%
Latvia (LV)	122,640	18,098	6,626	3,838	1,559	419	56	28	7	10	153,281	0%
Lithuania (LT)	79,955	17,773	9,345	6,487	3,545	822	130	55	6	348	118,466	0%
Luxembourg (LU)	14,558	2,636	1,725	1,292	794	437	123	166	62	1,563	23,356	7%
Malta (MT)	15,274	383	305	328	285	141	36	21	3	1,886	18,662	10%
Netherlands (NL)	917,151	105,675	51,455	30,425	14,056	5,277	1,196	1,111	284	4,581	1,131,211	0%
Poland (PL)	58,808	894,969	19,947	102,576	18,447	15,745	2,760	1,922	326	1,342	1,116,842	0%
Portugal (PT)	296,416	53,416	24,995	13,448	5,058	1,426	236	187	21	4,555	399,758	1%
Romania (RO)	673,854	62,038	31,917	18,768	7,314	2,506	433	263	30	0	797,123	0%
Slovakia (SK)	199,481	17,323	10,127	6,730	3,123	806	149	94	12	17,739	255,584	7%
Slovenia (SI)	64,344	7,589	3,917	2,102	1,044	338	67	34	2	4,744	84,181	6%
Spain (ES)	650,270	131,216	69,924	40,004	14,162	4,968	1,016	815	218	19,935	932,528	2%
Sweden (SE)	492,990	45,989	24,029	15,468	7,621	2,950	711	670	184	282	590,894	0%
United Kingdom (GB)	2,565,037	94,261	55,870	41,440	33,791	16,617	4,060	3,865	994	84,026	2,899,961	3%
EU28	12,121,309	2,344,421	861,825	668,292	302,019	127,437	26,650	21,549	4,858	302,626	16,780,986	2%

Source: Own elaboration based on Amadeus database.

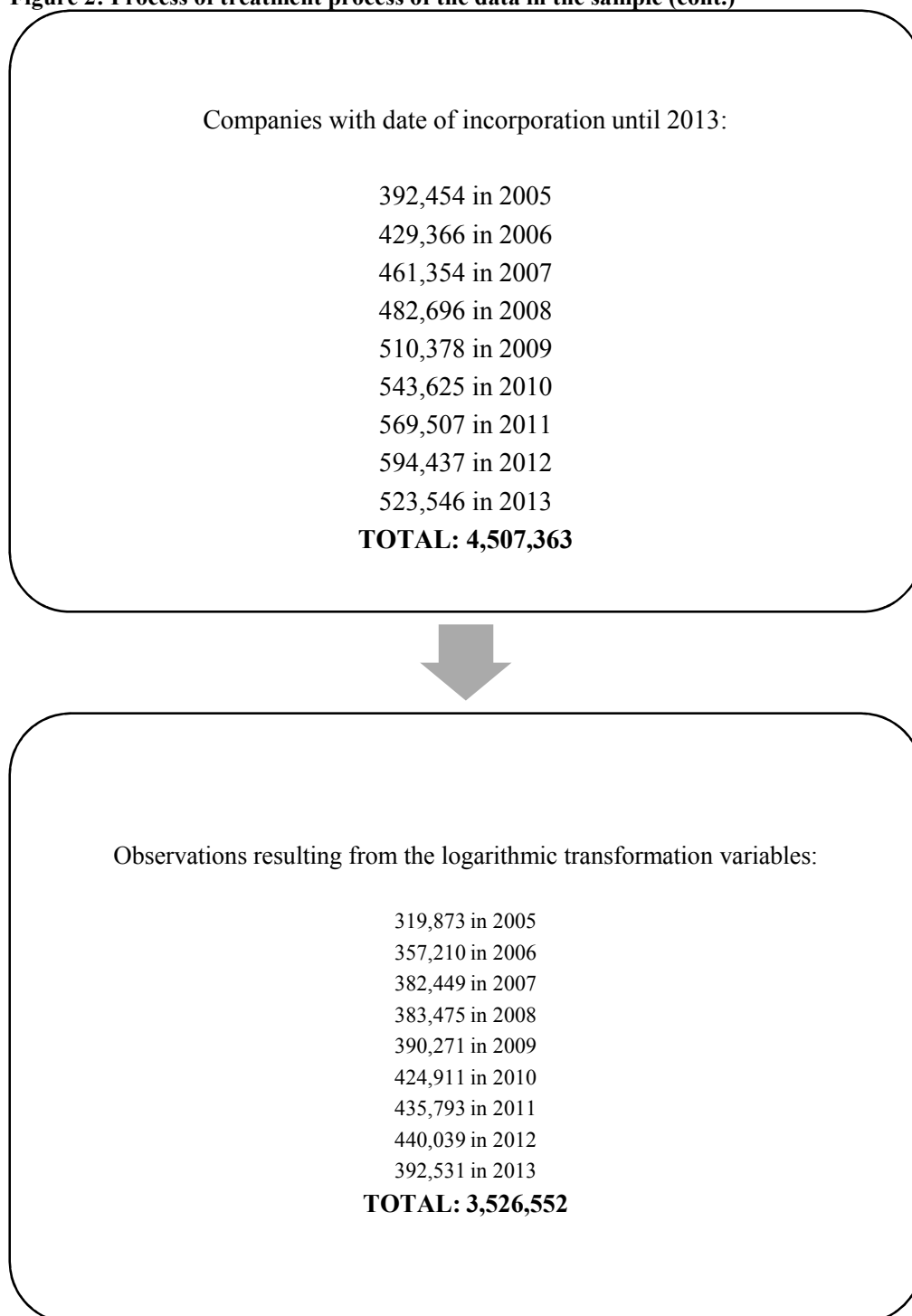
\* Includes companies for which the value is estimated.

**Figure 2: Process of treatment of the data in the sample**



Source: Own elaboration based on Stata 12.0.

**Figure 2: Process of treatment process of the data in the sample (cont.)**



Source: Own elaboration based on Stata 12.0.

**Table 15: Companies exhibiting maximum value and mean of taxation by country (2005-2013)**

Country	Company Name	Highest Value of Taxation * (th €)	Mean (Taxation) by Country * (th €)
Austria	OMV GAS & POWER GMBH	2,606,777	814.8
Belgium	B.A.S.F. ANTWERPEN	276,637	308.1
Bulgaria	ΕΒΡΟΦΥΤΕΒΟΛΙ ΟΟΔ	28,214	58.6
Croatia	INA, D.D.	79,436	88.1
Cyprus	CELESTYAL SHIP MANAGEMENT LIMITED	10,841	306.3
Czech Republic	CEZ, A. S.	365,810	185.8
Denmark	MAERSK OIL QATAR A/S	2,075,003	1,108.8
Estonia	ERICSSON EESTI AS	13,291	59.4
Finland	NOKIA OYJ	1,348,000	383.3
France	TOTAL SA	3,504,000	601.6
Germany	VOLKSWAGEN AKTIENGESELLSCHAFT	2,630,000	845.9
Greece	Ο.Π.Α.Π. ΟΡΓΑΝΙΣΜΟΣ ΠΡΟΓΝΩΣΤΙΚΩΝ ΑΓΩΝΩΝ ΠΟΔΟΣΦΑΙΡΟΥ Α.Ε.	351,891	421.8
Hungary	MOL MAGYAR OLAJ- ÉS GÁZIPARI NYILVÁNOSAN MUKÓDO RÉSZVÉNYTÁRSASÁG	154,031	52.7
Ireland	ACCENTURE PUBLIC LIMITED COMPANY	786,000	1,683.6
Italy	TELECOM ITALIA SPA	2,098,935	343.2
Latvia	LATVENERGO AS	37,696	63.7
Lithuania	AB ORLEN LIETUVA	34,574	84.2
Luxembourg	ARCELORMITTAL SOURCING SCA	612,673	1,355.8
Malta	ACTAVIS LIMITED	21,703	1,202.8
Netherlands	SHELL NEDERLAND B.V.	5,782,000	3,852.2
Poland	KGHM POLSKA MIEDZ S.A.	524,468	568.8
Portugal	MEO - SERVIÇOS DE COMUNICAÇÕES E MULTIMÉDIA, S.A.	262,133	112.4
Romania	OMV PETROM SA	183,542	51.4
Slovakia	SLOVENSKÝ PLYNÁRENSKÝ PRIEMYSEL, A.S.	168,136	167.7
Slovenia	KRKA, TOVARNA ZDRAVIL, D.D., NOVO MESTO	44,589	142.6
Spain	TELEFONICA MOVILES ESPAÑA SA	1,257,332	330.1
Sweden	ASTRAZENECA AB	1,248,430	389.8
United Kingdom	ROYAL DUTCH SHELL PLC	18,818,710	4,529.7
EU 28	ROYAL DUTCH SHELL PLC	18,818,710	617.9

Source: Own elaboration based on Stata 12.0.

\* Values for the period 2005-2013.

**Table 16: Variable names and definitions**

<b>Variable Name</b>	<b>Variable Name on Stata</b>	<b>Definition</b>
Taxation	ltaxation	All taxes related to the accounting period (paid, accrued or deferred)
Multinational Enterprise	mne	Identifies companies owned by a foreign shareholder
Domestic Enterprise with Foreign Subsidiary	dew	Identifies domestic companies with foreign subsidiary
Employment	lemp1	Total number of employees included in the company's payroll
Sales	lsales	Total sales
Fixed assets	lfixasset	Total amount (after depreciation) of non current assets (Intangible assets + Tangible assets + Other fixed assets)
Total assets	ltotasset	Total assets (Fixed assets + Current assets)
Leverage	lgearing	Proportion of a company's borrowed funds to its equity
Age	lage	Companies age in each year of the analysis period
Mining	mining	Identifies companies in the mining sector
Manufacturing	manuf	Identifies companies in the manufacturing sector
Utilities	utilit	Identifies companies in the utilities sector
Construction	construc	Identifies companies in the construction sector

Source: Own elaboration based on Amadeus database.

**Table 17: Correlation matrix of all variables used in the various estimations**

	ltaxation	mne	dew	Lempl	lsales	lfixasset	ltotasset	lgearing	lage	mining	manuf	utilit	construc
ltaxation	1.0000												
mne	0.2464	1.0000											
dew	0.2138	-0.0762	1.0000										
lemp	0.5043	0.2628	0.2175	1.0000									
lsales	0.7302	0.3063	0.2477	0.7170	1.0000								
lfixasset	0.5399	0.1805	0.2278	0.6066	0.6811	1.0000							
ltotasset	0.7271	0.2806	0.2651	0.6816	0.8896	0.8392	1.0000						
lgearing	-0.1093	-0.1104	0.0194	-0.0287	-0.0097	0.0859	0.0126	1.0000					
lage	0.2461	0.0224	0.0919	0.2624	0.3230	0.3417	0.3761	-0.0645	1.0000				
mining	0.0235	0.0083	-0.0030	0.0117	0.0102	0.0509	0.0352	-0.0052	0.0278	1.0000			
manuf	0.0729	0.0419	0.0798	0.1270	0.0695	0.1475	0.1104	0.0408	0.1064	-0.0494	1.0000		
utilit	0.0774	-0.0051	-0.0101	0.0640	0.0793	0.1402	0.1189	0.0067	-0.0044	-0.0108	-0.0998	1.0000	
construc	-0.0622	-0.0900	-0.0391	-0.0582	-0.1036	-0.1444	-0.0974	-0.0157	-0.0519	-0.0277	-0.2555	-0.0561	1.0000

Source: Own elaboration based on Stata 12.0.