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DO FOREIGN OWNED FIRMS PAY LESS TAXES THAN DOMESTIC ENTERPRISES? EMPIRICAL EVIDENCE FROM PORTUGAL

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Do foreign owned firms pay less taxes than domestic enterprises?
Empirical evidence from Portugal

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Biographic note

Ana Seco was born on the 8th of July 2000 in Coimbra. Upon graduating from high school, she enrolled in the University of Coimbra, where she obtained a bachelor's degree in Economics after spending a semester at the University of the Sacred Heart in Milan.

Driven by an appreciation for management, Ana continued her academic journey at the University of Porto by enrolling in the Master's in International Economics and Management. This dissertation represents the culmination of her efforts, showcasing her dedication and commitment to this field of study.

Beyond academia, Ana took on an active role in ShARE-UP, a student organization based in the Faculty of Economics, where she pursued her passion for driving meaningful contributions to society – something she is eager to continue to do in her professional life.

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Abstract

The pivotal role of foreign direct investment (FDI) in shaping today's global economic dynamics has made governments proactively seek to attract multinational corporations (MNCs) to capitalize on the expected benefits they may bring to their economies. While FO affiliates and MNCs (foreign or domestic) typically outstrip their counterparts in terms of productivity, profitability and size, their internationalization strategies often hinge on tax considerations and strategies of profit shifting. Therefore, the tax payments of FO, domestic owned (DO) MNCs and non-MNCs have been widely discussed, both in academia and in public policy. However, there is an evident gap in the literature related to this subject, and, to the best of our knowledge, the Portuguese case has never been studied. Through a comprehensive analysis, this dissertation proposes to shed some light on this phenomenon by assessing the causal relationship between the ownership structure of firms and their tax payments in Portugal. Our econometric study uses data collected from the SABI database for the period 2010-2022 and employs the Generalized Least Squares (GLS) estimator to show a positive and statistically significant effect of foreign ownership on tax payments, indicating that FO affiliates pay more taxes than their domestic counterparts. This evidence was consistent across the various robustness checks. Furthermore, we show that being a DO MNC has a positive and significant effect on tax payments. This highlights the relevant contribution of FDI, FO affiliates and DO MNCs to the Public Treasury, indicating the importance of having internationalized and more competitive firms in our economy. We expect our novel and solid quantitative results will offer valuable insights to the academic literature and to policymakers interested in this area.

Keywords: Multinational Corporations, Foreign-Direct Investment, Foreign-Owned Firms, Domestic-Owned Firms, Corporate Income Tax, Profit-Shifting, Portugal.

JEL Classification: F23; F38; H25; H26.

Resumo

O papel central do investimento direto estrangeiro (IDE) na atualidade levou os governos dos diversos países a implementar políticas públicas direcionadas à atração de empresas multinacionais (MNCs), na expectativa de usufruir dos seus benefícios. Se por um lado estas empresas tendem a ser maiores, mais produtivas e lucrativas que as empresas domésticas, por outro adotam estratégias de internacionalização assentes em considerações fiscais, tanto ao nível da seleção dos mercados como da otimização da sua carga fiscal. Tal tem suscitado ativa discussão acerca dos impostos pagos pelas empresas estrangeiras versus as suas congéneres domésticas. Apesar disso, o contributo do IDE para a receita fiscal e a comparação entre os impostos pagos por estes tipos de empresas (estrangeiras, domésticas, MNCs e não MNCs) continua pouco estudado. Em particular, este tipo de análise comparativa nunca foi feita para o caso português, pelo que esta tese propõe colmatar uma evidente lacuna na literatura avaliando se as filiais de MNCs estrangeiras pagam mais ou menos impostos que as empresas domésticas. Para isso foram recolhidos dados da base SABI para o período 2010-2022 e realizadas estimações usando um modelo de efeitos aleatórios. Os resultados mostram que as filiais estrangeiras pagam mais impostos que as suas congéneres domésticas, e as domésticas MNCs pagam mais impostos que as suas congéneres não domésticas. Isto revela a contribuição positiva do IDE e da internacionalização das empresas domésticas, mais competitivas, para as finanças portuguesas. Com os nossos resultados quantitativos robustos, esperamos oferecer uma contribuição importante para a literatura e todos os interessados nesta matéria.

Palavras-chave: Empresas Multinacionais, Investimento Direto Estrangeiro, Subsidiárias Estrangeiras, Empresas Domésticas, Imposto sobre o Rendimento das Pessoas Coletivas, Profit-Shifting, Portugal

Classificação JEL: F23; F38; H25; H26

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List of acronyms

ATR: Average Tax Rate

BEATR: Bilateral Effective Average Tax Rate

BEPS: Base Erosion and Profit Shifting

CIT: Corporate Income Tax

DO: Domestic Owned

EATR: Effective Average Tax Rates

EMTR: Effective Marginal Tax Rate

ETR: Effective Tax Rate

EU: European Union

FO: Foreign Owned

GloBE: Global Anti-Base Erosion

GLS: Generalized Least Squares

IB: International Business:

LM: Breusch and Pagan Lagrangian Multiplier

MNC: Multinational Corporation

Oa: Proprietary Rights and Intangible Assets Ownership Advantages

OECD: Organization for Economic Cooperation and Development

Oi: Institutional Assets Ownership Advantages

OLI: Ownership, Location, and Internalization

Ot: Transaction Cost Minimizing Ownership Advantages.

PE: Permanent Establishment

PSM: Propensity Score Matching

R&D: Research and Development

SABI: Iberian Balance Sheet Analysis System

SME: Small Medium Enterprise

STR: Statutory Tax Rate

UK: United Kingdom

UNCTAD: United Nations Conference on Trade and Development

US: United States

VAT: Value-Added Tax

VIF: Variance Inflation Factor

Introduction

The relevance of FDI in the global economic landscape of the past four decades is undeniable, and alongside it is the belief that MNCs have superior performance than DO firms due to several advantages that allow them to overcome the *costs of foreignness* (An et al., 2022; Bellak, 2004; Doms & Jensen, 1998; Griffith, 1999; Hymer, 1976). Thus, FDI inflows and the presence of FO affiliates are expected to exert a beneficial influence on economic variables like employment, exports, capital, technology and overall growth and development (Blomström & Kokko, 1998; Doran et al., 2024; Görg & Greenaway, 2004). This has led governments to implement several proactive policies, such as investment incentives (Haufler et al., 2018; Tavares-Lehmann et al., 2016). Moreover, they anticipate a positive impact of these firms on host jurisdictions' tax revenues due to their larger size and higher productivity and profitability (Balıkçioğlu et al., 2016; Bellak, 2004; Camara, 2023).

When MNCs choose where and how to engage in FDI, taxation can play a relevant role, significantly influencing firms' decisions. It can be considered a location advantage as, *ceteris paribus*, firms will choose locations with the lowest tax rates (Barrios et al., 2012; Cooper & Nguyen, 2020; De Mooij & Ederveen, 2003; Dunning & Lundan, 2008; Hajkova et al., 2007; Hines, 1999). Consequently, governments have engaged in (harmful) tax competition (Bellak & Leibrecht, 2007; Devereux, 2023; Devereux et al., 2002), even though the significance of taxation as an FDI determinant (like that of investment incentives) is not consensual in the literature (Feld & Heckemeyer, 2011; Hintosova & Barlasova, 2021; Wheeler & Mody, 1992).

Furthermore, the different corporate income tax (CIT) rates across countries incentivize MNCs to exploit the internalization of their activities to decrease their global tax burden. They achieve this through international profit-shifting practices from high-tax to low-tax economies, usually employing transfer pricing or strategic intracompany debt structuring (Cristea & Nguyen, 2016; Huizinga & Laeven, 2008). Besides the empirical evidence of these practices provided by several econometric studies (Egger et al., 2010; Finke, 2013; Hines & Rice, 1994; Huizinga & Laeven, 2008), there are also examples of MNCs like Google and Starbucks, that faced accusations of using transfer pricing to minimize their global tax burden (Cooper & Nguyen, 2020; Wang, 2018).

These gains derived from the *multinationality* and the cross-border internalization of activities are not experienced by DO firms, leaving the latter relatively disadvantaged in managing their tax burden. Hence, it has been regularly posited in the public and academic debates that FO pay relatively fewer taxes in the host economies than their domestic counterparts (Bilicka, 2019; Egger et al., 2010; Finke, 2013; Hansson et al., 2018).

This dissertation proposes to address these two paramount phenomena (FDI and taxation) of the current global economy by documenting the relationship between foreign ownership of firms and tax payments. More specifically, it aims to assess this by answering the following research question: *Do foreign-owned firms pay less taxes than (Portuguese) domestic firms?* Additionally, it distinguishes between Domestic MNCs and Domestic non-MNCs to analyze whether being a DO MNC has a significant effect on our dependent variable, hence allowing us to assess whether DO MNCs are more akin to FO or DO non-MNC firms. Notwithstanding some studies (see, for example, Egger et al., 2010; Finke, 2013; Hansson et al., 2018), this area of the literature remains very understudied, so we aim to provide a tangible contribution in several ways. Firstly, we conduct a comprehensive review of the existing literature examining the complex relationship between taxation and FDI, which is particularly relevant due to the ongoing debate about the international taxation of MNCs, the governments' efforts to boost tax revenues, and the recent implementation of the second phase of the Base Erosion and Profit Shifting (BEPS) Action Plan. Secondly, this study extends the analytical research to the case of Portugal, whose selection hinges on the fact that, to our knowledge, this issue remains unaddressed in this country.

With observations compiled from the SABI database for the period 2010-2022, we use the GLS estimator, and conduct several robustness checks, to answer our research question. We conclude that FO affiliates pay around 0.98 % more taxes than DO firms, and DO MNCs pay around 0.94 % more taxes than their counterparts. These results are statistically significant across estimations.

The dissertation's structure is as follows. Chapter 1 consists of a comprehensive review of the key concepts, theories, and literature related to MNCs, FDI, and taxes, which underpin the development of the research hypotheses. Chapter 2 regards the quantitative nature of the study, describing the methodology and results. Lastly, conclusions and implications are derived.

Chapter 1. Literature review and hypothesis development

Chapter 1 clarifies the key concepts and theories related to our research question, presenting a comprehensive and exhaustive review of both the seminal and the latest relevant literature. It is divided into three main sections. Sections 1 and 2 focus on the key concepts and theories of FDI and taxation, respectively. Section 3 analyses the complex nature of the relationship between these variables, leading to the development of the proposed research hypotheses.

1.1. Conceptual and theoretical background related to FDI

1.1.1. Key concepts: FDI, multinational and domestic enterprises

According to OECD (2008) and UNCTAD (2023), there is FDI whenever a firm resident in a country invests in a firm located in a country other than the one of the direct investor, reflecting its long-lasting relationship and control. This association is represented by owning at least 10% of equity shares or voting power. FDI involves the initial and subsequent capital transactions among these parties, including equity investment, reinvested earnings, and intracompany loans.

The concept of FDI is intrinsically related to that of an MNC. An MNC is a firm that controls assets or value-added activities in at least another foreign country, usually by owning 10% or more of equity shares or voting power of these assets. Essentially, it is a business entity that undertakes FDI (among other activities). It includes a parent firm, which controls the foreign assets, and its foreign affiliates, the firms in which it owns a stake. These affiliates can have different classifications according to the percentage of equity detained by the direct investor. In the case of associates, the parent firm owns 10% to 50% of the shareholders' voting power, while with subsidiaries, the direct investor holds over 50% of the shareholders' voting power (UNCTAD, 2023). In this dissertation, we will abide by the OECD (2008) benchmark definition, including as FO firms all affiliates with at least 10% of foreign ownership – thus considering both associates and subsidiaries.

Conversely, and considering the work of Bellak (2004), domestic (or DO) firms are the remaining companies whose ownership is less than 10% foreign. Within this group, we can further categorize them according to their internationalization strategies. DO MNCs

engage in FDI, DO Exporters focus on outward cross-border transactions of their products, and the remaining are purely domestic. In this study, we distinguish between these types of DO firms since, without this, it would be like comparing “*apples with oranges*” (Doms & Jensen, 1998). This categorization allows for a more comprehensive and precise estimation and enables us to assess the differences between firms in terms of tax payments.

There has always been substantial interest in the literature regarding the nature of FO firms. Not only do numerous scholars argue that they must have some advantages over DO enterprises, but also that these advantages might create a positive impact on the host economy. Therefore, several academics have devoted their studies to the effect of ownership structure on various economic variables. The majority concluded that FO enterprises present overall better performance, pay higher salaries, are more capital and skilled-labour intensive and have superior productivity and profitability (Bellak, 2004; Doms & Jensen, 1998; Griffith, 1999).

The reason behind the higher profitability of FO affiliates is that the parent company (MNC) can transfer at a low cost its unique firm-specific advantages – as explained in the next Section. These unique resources and capabilities are the basis for the firm’s profitability, and due to their mobile nature, foreign affiliates can easily access them and benefit from the same productivity and profitability (Pfaffermayr & Bellak, 2000). Therefore, it is no surprise that, when comparing FO and DO MNCs, these differences tend to diminish considerably, suggesting that MNCs as a whole are bigger, more productive and profitable, pay higher salaries, employ more skilled labour (Bellak, 2004; Doms & Jensen, 1998; Hansson et al., 2016). Particularly, Bellak (2004) attempted to uncover the underlying reasons for the economic performance gaps between FO and DO, ultimately concluding that they were due to factors such as size, industry, parent company, and the *multinationality per se* – but that foreign ownership did not play a role as important as was once thought.

1.1.2. The advantages of MNCs and FO affiliates

As previously stated, the literature on the differences in firms due to the ownership structure is levied upon the assumption that FO affiliates and MNCs have advantages over (purely) domestic enterprises. Hymer (1976) introduced the concept of advantage in the International Business (IB) literature. According to its seminal work, owning advantages such

as knowledge and technology superiority, product diversification, or economies of scale was the main reason for international operations, allowing firms to overcome the *cost of foreignness* and be profitable in a foreign country. The general idea is that, for a FO affiliate to effectively compete with the local firms, it must have significant advantages that outweigh the costs of setting up an operation in the foreign market – costs that DO firms do not incur. These advantages, consisting of unique resources and capabilities that enable them to gain competitiveness in the host economy, are considered the main drivers of MNCs' behavior.

Drawing on Hymer's work, Dunning (1977) proposed the Eclectic Paradigm of International Production. Following this framework, the international economic involvement of firms – FDI, exports or licensing – rests on the interplay of Ownership, Location, and Internalization advantages. MNCs recognize the strategic value of FDI over exporting or licensing agreements only when the three advantages are simultaneously present. Thereby, FDI requires the possession of valuable Ownership advantages better exploited through the direct control of the operations in a country with a comparative advantage.

Ownership Advantages stem from the possession of unique assets, granting the firm a competitive advantage *vis-à-vis* host country firms. These can either be Proprietary Rights and Intangible Assets (Oa), Transaction Cost Minimizing Advantages (Ot), or Institutional Assets (Oi). The Oa include assets such as innovatory capabilities, organizational and management skills, accumulated know-how and experience. The Ot derive from the efficient cross-border coordination of assets and the *multinationality per se* that offers arbitrage opportunities. They include economies of scale and scope, lower risk due to diversification, and the ability to exploit different factor endowments and regulations. The Oi are formal and informal governance mechanisms that rule the environment of the firms' operations, such as codes of conduct, corporate culture, and management diversity.

Location advantages refer to specific benefits or conditions of the host economy (external to the company), such as factor endowments, market structure, investment incentives, and policies like the taxation of corporate activities. They are relatively unique to each location and provide a comparative advantage to that country *vis-à-vis* the host country (or third countries).

Lastly, *Internalization advantages* encompass the benefits of retaining the hierarchical control of adding value to the Ownership advantages instead of selling them or their rights. They result from structural and endemic market failures and reflect, *inter alia*, better organizational efficiency and the ability to exploit monopoly power. Examples of these advantages are the capacity to control suppliers and market outlets and engage in transfer pricing as a competitive strategy.

There is a significant interconnection between taxes and the three advantages of the OLI Paradigm (De Mooij & Ederveen, 2003; Hajkova et al., 2007). The most direct influence of taxation is that on location advantages. *Ceteris paribus*, the higher (lower) the tax rates of a country, the lower (higher) the after-tax returns on the investment (Hines, 1999), thus creating a disadvantage (advantage) for that location. Dunning & Lundan (2008) explicitly show that higher taxes are considered a location (dis)advantage, thus affecting the proclivity of enterprises to engage in FDI. While the host country can levy taxes on the subsidiary's profits or the repatriation of dividends, conversely, the parent country might also tax the income earned by foreign subsidiaries, leading to double taxation. Barrios et al. (2012) have shown that the choice of location for foreign subsidiaries is sensitive to host and home country taxation. However, the empirical studies regarding taxes as a determinant of the FDI location decisions of firms do not provide consensual results, with taxes having either positive, negative, or insignificant effects (De Mooij & Ederveen, 2003; Desai et al., 2004; Hartman, 1984). This will be thoroughly examined in Section 1.3.1.

Taxation can also increase or decrease the Oa advantages by affecting how royalties and dividends are taxed (Hajkova et al., 2007), impacting the profitability of proprietary assets. Likewise, it plays a crucial role in Ot advantages because the *multinationality* of the firms allows for tax planning strategies according to each location's tax system. Taxes themselves can be considered Oi advantages since they are formal enforcement mechanisms that are externally imposed and affect the incentive structure of a specific firm. Moreover, Oxelheim et al. (2001) argue that the ability to negotiate reduced taxation is an ownership advantage. Considering his theoretical work, we can regard that this ability depends on the management and leadership of the enterprise, both of which are institutional assets.

Lastly, taxation affects the tax burden of investment projects and the benefits derived from internalization (Hajkova et al., 2007), thus making other forms of international

involvement more (or less) efficient. Additionally, it is much easier to reduce the overall tax burden of foreign subsidiaries if they are fully owned (Oxelheim et al., 2001), creating an incentive to engage in FDI.

Later on, Dunning & Lundan (2008) also addressed potential reasons or motivations for firms to engage in FDI. *Market seeking* refers to the exploitation of new markets, increase in market share or the need to overcome barriers imposed on exports. *Resource seeking* FDI is related to access to resources, capabilities, or other inputs that are scarce, unavailable, or more expensive in the home country. *Efficiency seeking* is often associated with large firms that derive efficiency gains from the common governance and distribution of their activities over a limited number of locations. Lastly, *Strategic asset seeking* firms aim to acquire core and strategic assets or exploit market imperfections to strengthen their competitive advantage in the long run.

There is another motivation which tends to be overlooked by many scholars, which is particularly relevant for this study. *Escape investments* occur to avoid certain characteristics or regulations in the home country, one of the examples being high corporate taxes.

Taxation can (at least indirectly) influence all these motives, yet its role is particularly more pronounced in only three. First, one of the reasons for market-seeking FDI is related to the encouraging actions of host governments, among which can be investment and fiscal incentives like tax concessions and subsidies. Second, efficiency-seeking investments intend to leverage, among others, different regulatory and market structures. Therefore, although not explicitly stated, a reason for FDI could be to take advantage of the differences in tax structures by centralizing operations in a limited number of countries with lower corporate tax rates. Third, escape investments may directly result from high taxes in the parent company's country.

1.1.3. Internalization theory: transfer pricing as an efficient strategy

Internalization Theory (Buckley & Casson, 1976; Hennart, 1982; Rugman, 1980) analyses the firm as an alternative to the markets. Accordingly, FDI and MNCs exist whenever the transaction costs arising from natural and structural market imperfections surpass those of internalizing their activities.

Buckley & Casson (1976) highlighted several market imperfections that make internalization more advantageous, including incentives for transfer pricing due to government interventions in international markets. They hypothesized that the ability to exploit transfer pricing depends on the nature of the product, the structure of the external markets and the features of the fiscal system of the various countries where the MNC operates.

Transfer pricing can create advantages for firms significant enough to influence their decision to choose internalization over other forms of market-based internationalization since it allows firms to avoid government regulations like tariffs and exchange controls. In addition to these advantages, there is the ability to increase global after-tax profits, lowering the cost of capital or reducing the worldwide tax burden, thereby improving financial performance (Eden, 2019). Therefore, many authors posit the ability to arbitrage through transfer pricing as one of the main drivers for internalization. Rugman (1980) also reinforces this perspective, stating that “*transfer prices are an efficient response by the multinational enterprise to exogenous market imperfections*” (Rugman, 1980, p. 76).

Transfer prices express the value assigned to the intra-group exchange of goods, services, and intellectual property. According to Eden (2019), the differences in CIT rates create incentives for affiliates in high-tax countries to present lower profits than domestic firms by strategically setting their transfer prices below the opportunity cost – a practice known as transfer pricing manipulation. Thus, transfer pricing enables MNCs to reduce their global tax burden by strategically allocating incomes across affiliates according to the tax rates of each jurisdiction (Cristea & Nguyen, 2016).

Striving to soften abusive transfer pricing, the OECD (2022) created the Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations, which embodied the arm’s length principle. This international standard determines that the transfer price should be the same as that that exists or would exist if the sale of the product or service was between unrelated firms. The application of the arm’s length principle involves two primary steps. First, the firm performs a *comparability analysis* to identify the transaction conditions between related and unrelated firms and undertake a comparable transaction under these circumstances. Second, it selects the most appropriate transfer pricing method according to its particular case – i.e. considering the nature of the transaction, the strengths and

weaknesses of each process, the available data, and the similarity of the transactions (OECD, 2022).

Although this is the international standard for determining the transfer price, this principle has some challenges. For example, the transfer price might be difficult to assess when there is not an external market (e.g. intermediate or knowledge-based goods and services), the intra-company commercial circumstances are different from those between independent firms and complex to replicate, and this standard does not account for the synergies and competitive advantages created by the internalization (Cooper & Nguyen, 2020). Therefore, there is still room for transfer pricing manipulation under the arm's length principle and MNCs can shift profits even when complying with the tax code, as shown by Bauer & Langenmayr (2013), which call for the introduction of a *global formulary apportionment* system. Supporters of his alternative method claim that it reduces opportunities for manipulation by using a standardized formula instead of the complex (and more subjective) analysis required in the arm's length principle. To address the ability of firms to arbitrage through transfer pricing, the OECD and G20 countries have developed the BEPS plan, as detailed in Section 1.2.3. of this study.

Outside the academic context, we can find numerous firms employing transfer pricing as a mechanism to optimize tax liabilities. For example, Apple, in 2016, was accused of exploiting transfer pricing in the exchange of intellectual property to shift profits from the U.S. to Ireland. The company allegedly used a "*sweetheart deal*" methodology negotiated with the Irish government, instead of complying with the Guidelines. These benefits enabled Apple to significantly reduce its tax burden, notably avoiding the payment of at least \$14.5 billion in taxes (Wang, 2018).

1.2. Conceptual background related to taxation

1.2.1. Taxes and taxation measures

According to the (OECD, 2023b, p. 1), taxes are "*unrequited payments to the government*". The literature usually classifies them into two categories: direct and indirect. Indirect taxes are imposed on transactions or goods and can be passed on to the consumers (e.g. VAT, excise duty, sales tax), whereas direct taxes cannot be transferred. The latter are levied on income and profits and are directly paid to national authorities (e.g. income or dividend tax).

This paper focuses only on CITs as their impact is still considerably controversial, warranting the need for more studies (Desai et al., 2004). Moreover, more firm-level data and a more extensive body of literature are available for comparison (Bellak et al., 2007; Devereux et al., 2002), thus providing a more robust foundation for this analysis. To compute CIT, an array of measures can be used. Table 1 below provides a summary of the key tax indicators that tend to be employed in the literature related to FDI and taxation.

Table 1. Main tax measures used in the literature related to FDI and taxation.

Tax Measure	Definition	Literature
Statutory Tax Rate (STR)	“Marginal rate of tax on any additional income given the level of allowance” (Devereux et al., 2002, p. 457).	Wheeler & Mody (1992)
Average Tax Rate (ATR)	Tax to operating profits (before tax) ratio in the host country (De Mooij & Ederveen, 2003).	Hines & Rice (1994)
Effective Marginal Tax Rate (EMTR)	Determines the tax burden of a marginal investment that solely earns the cost of capital (De Mooij & Ederveen, 2003)	Slemrod (1990)
Effective Average Tax Rate (EATR)	Captures the “wedge between the pre and post-tax return on typical investments on which the firm earns economic rent” (De Mooij & Ederveen, 2003, p. 667).	Devereux & Griffith (1998); Grubert & Mutti (2000)
Bilateral Effective Average Tax Rate (BEATR)	“Scaled difference between the pre and post-tax net present values of FDI with a given inframarginal financial rate of return” (Bellak & Leibrecht, 2007, p. 604).	Bellak & Leibrecht (2007); Feld & Heckemeyer (2011)

Source: Own elaboration.

The most appropriate measure for each study depends on the underlying research problem and the FDI decision in question. For example, the EATR tends to be used when studying the choice of investment locations, the EMTR when assessing the scale of the investment, and the STR when studying the distribution of profits (Bellak & Leibrecht, 2007; Devereux & Griffith, 2002). Even so, the STR is considered misleading because it does not take in consideration tax base effects nor home country, international, and supranational tax regulations, hence likely resulting in incomplete estimates of tax rate elasticities. Conversely, the BEATR is more accurate as it considers the impact of host country allowances, withholding taxes, repatriating profits, and double taxation agreements (Bellak et al., 2007; Bellak & Leibrecht, 2007).

Despite their relevance, our dissertation will not apply these measures due to constraints in the database. Rather, our empirical assessment will draw upon a proxy widely used in the literature (Egger et al., 2010; Finke, 2013; Hansson et al., 2016, 2018), the actual CIT payments extracted from the accounting statements of the Portuguese firms. This is the

best available tax measure to answer our research question since it ensures a comprehensive understanding of the tax liabilities of the different types of Portuguese firms.

1.2.2. Taxation systems

The main distinction between the taxation of international and domestic transactions is the complexity of taxing the same income in multiple jurisdictions. This intricacy can result in double taxation that enhances the efficiency costs of internalization and discourages FDI (Hines, 1999). Countries can adopt an exemption system – territorial taxation – or a credit system – worldwide taxation to tax foreign affiliates.

Under *territorial taxation*, the foreign earnings are taxed only in the jurisdiction of the affiliate. This system might differ according to each jurisdiction, with some allowing tax exemptions only when the firm holds a designated percentage of the foreign affiliate and has paid a minimum amount of foreign tax. So, if the home country of the MNC adopts this system, a foreign economy with higher (lower) tax rates will be less (more) attractive since the net return on the investment is lower (higher) (De Mooij & Ederveen, 2003). Under territorial taxation, firms have substantial opportunities to shift profits abroad, and research has shown that MNCs of countries adopting it engage in these activities (Langenmayr & Liu, 2023). Additionally, both theory and the literature consistently indicate that FDI from exemption countries tends to be more tax sensitive than that from worldwide tax system countries (De Mooij & Ederveen, 2008).

Under *worldwide taxation*, the parent company can claim tax liabilities of the parent entity (De Mooij & Ederveen, 2003; Desai et al., 2004). However, the foreign tax credit can never exceed the home country's tax liability on foreign income (Hines, 1999). Even if host country tax liabilities exceed the parent company's liabilities (i.e. there is an excess foreign tax credit), firms can claim a credit only for the domestic liability amount. When tax deferral is allowed, the parent company can postpone tax liabilities on foreign profits in the home country until the affiliate repatriates the dividends, and the effect of higher tax rates on FDI becomes more subtle. For an MNC with accumulated tax credits, an increase in the foreign country's tax rate discourages FDI because there is no equal compensation for domestic credit. However, if the MNC does not have excess credit, higher host economy tax rates decrease the parent company's liabilities, therefore having a neutral effect on FDI flows (De Mooij & Ederveen, 2003).

1.2.3. Competition to attract FDI and profit-shifting of MNCs

When examining the impact of tax payments on a country's economy, one should consider several factors. Firstly, countries compete to attract FDI by influencing the tax burden of FO firms (Devereux et al., 2002). They use proactive policies to attract inflows and foster FDI (Desai et al., 2004; Reurink & Garcia-Bernardo, 2021). Secondly, FO firms leverage the differences in CITs across jurisdictions (which can decrease their tax payments *vis-à-vis* their DO counterparts), and their proclivity to engage in international profit-shifting encourages countries to reduce their STR (Huizinga & Laeven, 2008).

Aiming to attract several positive benefits that promote economic growth – such as employment and salary increases and technological spillovers – governments use targeted policies (Haufler et al., 2018), like the concession of investment incentives – i.e. financial, fiscal, and regulatory measures designed to influence MNCs' investment decisions (Tavares-Lehmann et al., 2016). Some of these tools include changing the general tax system to lower the effective tax rates, conceding tax holidays or tax allowances, and, at the extreme, eliminating tax rates. Despite the noticeable evidence that several EU countries have endeavoured to implement these measures for FDI attraction (European Commission, 2017), many authors do not find significant evidence of the impact of tax policy in attracting FDI (Hintosova & Barlasova, 2021; Wheeler & Mody, 1992). The relationship between taxation (including tax incentives) and FDI is explained in greater detail in the next Section.

Tax competition can be defined as “*the non-cooperation of independent jurisdiction in taxation with an impact on the allocation of tax bases between jurisdictions*” (Bellak & Leibrecht, 2007, p. 14). Many studies find that there is a strategic engagement of governments when setting taxes – i.e. they adjust their tax rates based on those of others (Devereux et al., 2008) – and, although, according to Bellak & Leibrecht (2007), this does not mean that there is tax competition *per se*, as the interdependency and decrease in tax rates might result from other factors (such as profit-shifting), he concludes that that tax competition is a plausible situation in Europe (Bartelsman & Beetsma, 2003; Bellak & Leibrecht, 2007; Huizinga & Laeven, 2008).

On the other hand, the extent to which firms shift their profits mainly relies on the corporate STR, so its gradual decline since the 80s might be closely related to profit-shifting (Devereux, 2023). The proclivity of firms to shift their earnings across jurisdictions and

reduce their worldwide tax burden creates incentives for governments to reduce their STR to decrease outward profit-shifting (or even increase inward profit-shifting) (Huizinga & Laeven, 2008)¹.

Essentially, firms can shift income across borders using two main strategies. The first is by strategic intra-company debt structuring, due to being usually more attractive for the MNC to finance an affiliate located in a high-tax country by debt than by equity – as firms can deduct interest payments from their income. The second is by using transfer pricing to reduce accounting profits, for example by overstating the prices of imports and understating the process of exports (Bartelsman & Beetsma, 2003; Huizinga & Laeven, 2008).

The incentives for profit-shifting are affected not only by the differences in CIT rates across jurisdictions but also by each country's tax system. While MNCs from countries with an exemption system have incentives to shift profits to countries with the lowest corporate tax rates, FO firms from countries with a credit system have incentives to shift income when they have excess foreign tax credits (Bartelsman & Beetsma, 2003).

It is inherently difficult to empirically test for profit-shifting due to the need to isolate firms' tax motivations² (Dharmapala & Riedel, 2013). Even so, there is widespread evidence that MNCs engage in these activities (Egger et al., 2010; Finke, 2013; Hines & Rice, 1994; Huizinga & Laeven, 2008). Hines & Rice (1994) concluded that an increase of 1% in the host country's CIT reduces the reported earnings of American affiliates by 3%. Similarly, Huizinga & Laeven (2008) also found robust evidence of profit-shifting in Europe – with semi-elasticities of reported profits to the STR of 1.3%– which is *“negatively related to the weighted average of international tax rate differences between a country and all the others where multinational is active”* (Huizinga & Laeven, 2008, p. 3). According to this article, Portugal had an estimated semi-elasticity of pre-tax profits in relation to tax rates of 2.86% – well above that of other European countries – and experiences net outward profit-shifting (Huizinga & Laeven,

¹ Given that the differences in CIT are one of the root causes for profit-shifting, some authors, such as Huizinga & Laeven (2008), advocate for introducing a homogeneous tax base for MNCs in the EU.

² According to Dharmapala & Riedel (2013), most research has delved into this topic by indirectly estimating firms' responses to changes or differences in CIT rates between home and host jurisdictions. These changes, which are the basis of the analysis, are rare and difficult to differentiate from the changes in the socio-economic context. Alongside this, the CIT rate can also affect other determinants of profitability, thus intensifying the bias.

2008). Finke (2013) showed that MNCs pay fewer taxes than their domestic counterparts, mainly due to tax planning and profit-shifting activities. Bilicka (2022) posed that one of the explanations for the decrease in tax payments of MNCs in the UK, many of which report no taxable profits, is their ability to move capital across borders easily. Several other papers discussed in Section 1.3.3. also confirm this phenomenon (Bilicka, 2019; Buyl & Roggeman, 2019; Hansson et al., 2018), which is posed as the main reason for the wedge in tax payments between FO and DO enterprises.

Besides the extensive academic literature evidencing the use of profit-shifting practices by MNCs to decrease their worldwide tax burden, there are several reports of firms accused of engaging in these practices. For instance, Google and Starbucks allegedly levied transfer pricing to minimize tax liabilities (Cooper & Nguyen, 2020; Wang, 2018). Another recent case was disclosed by Reuters, which reported that oil companies like Shell and BP were shifting profits from high to low-tax jurisdictions like the Bahamas or the UK Channel Islands by paying over-priced insurance services to micro-affiliates in these countries (Bergin & Bousso, 2020).

The EU has tried to address these issues by adhering to the BEPS Action Plan – which is the result of the OECD and G20 countries’ efforts to “*ensure the coherence of corporate income taxation, restore the intended effects and benefits of international taxation standards, as well as full transparency, certainty and predictability for businesses*” (OECD, 2013, pp. 13-14). The current phase of the project, BEPS 2.0, has introduced the Pillar Two Global Anti-Base Erosion (GloBE) Rules, which apply a tax floor of 15% of the Excess Profit of MNCs through a Top-up Tax percentage³. However, there may still be some space to compete below the floor by offering subsidies and qualified refundable tax credits, which makes the impact of this program on tax competition and profit-shifting less significant than anticipated (Devereux & Vella, 2023). This Plan will not result in tax harmonization *per se*, as the countries have some freedom on how to impose the Top-up Tax and other rules of the Plan, and only 145 countries might adopt these standards (OECD, 2023a).

³ The GloBE Rules impose a Top-up Tax calculated at a jurisdictional level whenever the firm’s effective tax rate is below 15%. According to Chapter 5 of BEPS 2.0, this is computed by first subtracting the ETR from the Minimum Rate. Afterwards, this percentage is multiplied by the Excess Profit (equal to the GloBE Income minus the Substance Based Income Exclusion). Lastly, the Qualified Domestic Minimum To-up Tax is deducted (OECD, 2023a).

Lastly, although this phenomenon is theoretically and empirically confirmed, its magnitude remains intensely debated. Some authors, like Dharmapala & Riedel (2013), in their analysis of the European MNCs over the period 1995-2005, concluded that the size of the profit-shifting is somewhat smaller than what previous literature found— around 2% of the earnings are transferred to low-tax countries. Finke (2013) also corroborated this hypothesis by stating that the estimation of semi-elasticities of profit (i.e. the percentage change in profits caused by a one percentage point change in the incentive to shift profits abroad) – which is generally the approach used by researchers – might result in an upward bias. Others were less conservative. For example, Tørslov et al. (2022) reported that 35% of MNCs’ earnings globally were shifted to tax havens in 2015.

1.3. Literature about the interplay between taxation and FDI, and hypothesis development

The study of taxation in the IB literature is complex and has different perspectives. Taxation is regarded as a crucial determinant of FDI attraction, and governments seek to attract MNCs expecting to benefit from their presence, notably by bolstering tax revenues. However, this might not happen in practice. Additionally, FO affiliates might face a comparatively lower tax burden than DO firms due to advantages that the latter do not possess.

In this Section, we analyse the literature on the importance of taxation as an FDI determinant, the contribution of FDI inflows to tax revenues and the tax burden faced by FO affiliates and DO firms, which allows us to draw the main hypotheses of this study.

1.3.1. Taxation as a strategy to attract FDI

FDI is recognized to spur economic growth and development by bringing in capital, creating jobs, and disseminating knowledge and new technologies (Blomström & Kokko, 1998; Doran et al., 2024). Therefore, we frequently witness countries unequivocally opening their economies and restructuring their public policies to offer incentives to attract MNCs. However, the investment location decisions of MNCs are affected by numerous factors (e.g. market size, human capital, infrastructure quality, political stability, trade openness, domestic investment, and natural resource endowments) (Dunning & Lundan, 2008; Hines, 1999).

Although several papers have attempted to uncover the main determinants of FDI, so far, there is no consensus (Pavel et al., 2021; Wheeler & Mody, 1992; Wolff, 2007).

Relevant literature has focused on the effect of taxation on FDI attraction – whether with respect to corporate tax rates or the concessions of fiscal incentives – because theoretically, *ceteris paribus*, higher tax rates (more fiscal incentives) reduce (increase) the after-tax returns, thereby making a location less (more) attractive. Table 2 below summarizes these findings.

Many authors (Buettner & Ruf, 2007; De Mooij & Ederveen, 2003; Donath et al., 2020; Grubert & Mutti, 2000; Hartman, 1984; Huizinga & Laeven, 2008; Pavel et al., 2021), found a significant effect of taxation on FDI attraction. Devereux & Griffith (1998) and Grubert & Mutti (2000) conducted research that closely parallels that of Hartman (1984) but from an outbound perspective of U.S. FDI. Both articles examined the responsiveness of the location of investment to the host country EATR, finding it a significant factor affecting the discrete decisions of firms about where to locate. Particularly for Grubert & Mutti (2000), an increase of 1% in the after-tax return to capital (due to a lower tax rate) increased the real capital invested by 3%. More recently, Hansson & Olofsdotter (2013) drew similar conclusions for the European Union (EU) 15.

For De Mooij & Ederveen (2003, 2008), Devereux & Griffith (2002), Feld & Heckemeyer (2011), and Hines (1999), corporate taxes, specifically, also have a significant impact on FDI. Using many of these studies' results, De Mooij & Ederveen (2003) conducted a meta-analysis of the CIT rate elasticities. The authors found that the median elasticity of FDI to CIT rate was -3.3, showing that a 1% increase in the tax rate of the host economy decreases FDI by 3.3%. In 2008, these academics extended the previous article to include six new studies and reported not only a similar responsiveness but also that it might have increased over time (De Mooij & Ederveen, 2008).

Nonetheless, other studies have yielded contradictory outcomes and did not find a significant effect of taxation on FDI. Wolff (2007) found that the home and host country's top corporate STR had little effect on total FDI in the EU. Jensen (2012) did not observe any correlation between CIT rates (and their changes) and FDI inflows for 19 OECD

Table 2. Main literature describing the effect of taxation on FDI.

Study	Sample	Tax Measure	Methodology	Results	Significance
Wheeler & Mody (1991)	Macro and firm level data of U.S. manufacturing MNCs (1982-1988).	CIT' rate.	Fixed effects regression model.	Sign and significance of taxes not consistent across the sample and tests. CIT' rates might not be as detrimental as thought.	Not significant
Hartman (1984)	Firm level data of US firms (1965-1979).	After tax rate of return of domestic and foreign investments, sum of CIT' rate plus property taxes, ETR.	OLS.	Rates of return have a significant effect on FDI (for retained earnings).	Significant
Devereux & Griffith (2002)	Studies of the effect of taxation on location decision	n.a.	Literature review.	Evidence that taxes can affect FDI decisions, but its magnitude is unknown.	n.a.
Wolff (2007)	EU 25 macro level data (1994-2003).	STR.	Sample selection gravity model.	STR of home and host country did not have a significant effect on equity FDI. Taxes might affect the allocation of profits.	Not significant
De Mooij & Ederveen (2008)	31 studies of the effect of taxation on FDI.	EMTR, EATR and STR.	Meta-analysis.	Semi-elasticities of FDI to tax rates are negative and large (between 2.4 and 5.9)..	Significant
Feld & Heckemeyer (2011)	47 studies of the effect of taxation on FDI.	EMTR, BEATR, EATR.	Meta-analysis.	FDI is intensely affected by CIT', with a median tax semi-elasticity of 2.49.	Significant
Hansson & Olofsdotter (2013)	Macro-level data on EU15 countries (1986-2004).	EMTR, EATR	Gravity model.	EMTR has a negative effect on FDI inflows. Results are sensitive to methodology and the inclusion of agglomeration economies.	Significant
Donath et al. (2020)	Macro-level data on EU28 countries (2005-2017).	Marginal tax rates on corporate and individual income; Overall taxes (direct and indirect).	Pooled OLS.	Investors were sensitive to tax burden considerations only in net-capital-sender (negative) and non-Euro area countries (positive). Estimations were not significant for the full sample.	Not significant
Hintosova & Barlasova, 2021	Macro and firm level data on Slovakian firms in 2002-2008.	Volume of fiscal and financial investment incentives (€).	OLS.	Financial Incentives have a positive and statistically significant effect on FDI, but not fiscal incentives.	Not significant
Pavel et al. (2021)	Macro-level data of 10 post-socialist countries.	STR, ETR, aggressive tax planning indicators.	Fixed effects regression model.	Estimated elasticity of FDI to STR was around -1.1 and for ETR was around -1.9.	Significant

Source: Own elaboration.

countries from 1980 through 2000. According to Kinda (2014), taxation is not a key factor in attracting vertical or horizontal FDI inflows in Sub-Saharan African countries. Lastly, other authors who have focused on the effects of fiscal incentives on FDI have found them to have little or mixed impact on foreign investment (Hintosova & Barlasova, 2021; Agodo, 1978, as cited in Morisset & Pirnia, 1999; Wheeler & Mody, 1992).

Overall, the effectiveness of taxation in attracting FDI inflows is intricate. However, despite the heterogeneity of the results and the difficulties in assessing the magnitude of this relationship, there is still strong empirical support to conclude that corporate tax rates play a role in shaping FDI (Devereux & Griffith, 1998; Hansson & Olofsdotter, 2013). Even so, this relationship is affected by a broader context, relying on the specific characteristics of the host countries, types of investment and taxes, and the unique features of the MNCs. For many authors, the differences in the data sources (e.g. is the FDI data aggregated? If so, is it time series, cross-sectional or panel?), perspectives (e.g. is the study centred on developed or developing countries? Firms that are R&D intensive?), taxation measures (e.g. is it focused on CIT or indirect taxation? Which tax measure does it use?) or other control variables are some of the reasons for the diversity of findings (De Mooij & Ederveen, 2003; Donath et al., 2020; Feld & Heckemeyer, 2011; Morisset & Pirnia, 1999).

1.3.2. Effects of FDI on tax revenues

We have stated that governments expect FDI to have a positive impact on their economies, namely by increasing the domestic capital stock. Its impact on tax revenues can be direct – through an increase of taxable income, productivity, transfer of technology and creation of jobs – or indirect – through higher consumption and trade. However, the real effect is not straightforward because it is dependent on other factors (Camara, 2023). For example, the concession of investment incentives might be counterproductive if their drawbacks (e.g. loss of public revenue, eventual crowding out effect of SMEs) surpass the positive effects. Additionally, the taxes collected by governments are influenced by the extent to which firms shift their profits. Therefore, the impact of FDI on tax revenues is unpredictable, and affected by factors such as host and home country tax systems, features of the MNCs, national economic policies and environment, and competition and technology spillovers (Camara, 2023; Gaspareniene et al., 2022).

There is a substantial gap in the literature about the impact of FDI on tax revenues, with the majority of authors reporting heterogeneous results. Table 3 below summarizes these findings.

Only a limited number of authors identified an unequivocally positive and significant relationship between these variables, with most of which focusing on emerging economies (Balıkçioğlu et al., 2016; Mahmood & Chaudhary, 2013; Okey, 2013). All these papers confirm that FDI inflows had a positive effect on the tax revenues of the host countries. Groop & Kostial is, to the best of our knowledge, the only exception – finding this relationship in OECD countries.

Table 3. Summary of the literature studying the effect of FDI on tax revenues.

Reference	Sample	Methodology	Results	Effect of FDI inflows
Gropp & Kostial (2000)	25 OECD countries (1988-1997).	Random effects model.	Positive (negative) and significant effect of FDI inflows (outflows)	(+)
Mahmood & Chaudhary (2013)	Pakistan (1972-2010).	Autoregressive distributive lag model.	Positive and significant effect of FDI inflows on tax revenues (0.657).	(+)
Balıkçioğlu et al. (2016)	Turkey (2004-2012).	Generalized method of moments.	Positive and statistically significant effect of FDI on tax revenues(0.039).	(+)
Bayar & Ozturk (2018)	33 OECD countries (1995-2014).	Augmented mean group estimator.	Insignificant effect on full sample. Positive and significant effect for some countries and negative for others	Mixed
Gaspareniene et al. (2022)	EU countries (199-2019).	Least-squared method.	Significant and positive (negative) effect of outward (inward) FDI. No significance for the lagging effect of inward FDI.	Mixed
Camara (2023)	90 developing countries (1990-2017).	Generalized method of moments.	Positive (large) and significant effects of FDI on total tax revenue. Insignificant effect on direct tax, and on resource-exporting countries.	Mixed
Alshubiri (2024)	17 developed and 17 developing countries (2006-2020).	Generalized method of moments.	Significant positive effect of FDI inflows on tax revenues for developing countries and negative for developed countries.	Mixed

Source: Own elaboration.

Most papers reveal a complex relationship between FDI and tax revenues, with mixed results. Bayar & Ozturk (2018), found the effect of FDI inflows on tax revenues was not always significant and was positive in some countries but negative in others. For Gaspareniene et al. (2022), FDI had a statistically significant effect on the tax revenues of

EU countries. However, while the relationship with inward FDI was negative, for outward FDI the relationship was positive. Alshubiri (2024) compared this relationship in developed and developing countries controlling for time. In developed countries, FDI inflows lead to a decrease in tax revenues in the long run despite a temporary boost in the short term. Conversely, in developing countries the relationship was inverse. Lastly, Camara (2023) focused only on the role of FDI inflows in tax revenue mobilization in developing countries, concluding that FDI inflows led to a significant increase in tax revenue but not in resource-exporting countries where effects were not significant.

1.3.3. Taxation of FO, DO and MNCs

The favourable tax position of FO affiliates has been discussed extensively in public circles, especially in light of recent evidence that some of the most profitable firms globally have been using profit-shifting strategies to avoid paying taxes in their host countries – as explained in previous sections. This fact makes it logical to inquire about the differences between FO affiliates and DO firms. However, the empirical comparison of the tax payments of FO, DO MNCs and non-MNCs remains relatively understudied despite few exceptions (Buyl & Roggeman, 2019; Egger et al., 2010; Finke, 2013; Markle & Shackelford, 2012). Overall, there is some heterogeneity in the results of these studies, which might be due to using different data sources, empirical approaches, and estimation strategies that induce biases (Riedel, 2018). Table 4 below summarizes the most important studies analyzing this relationship.

Some studies focused only on the differences between FO and DO enterprises. Grubert et al. (1993) was one of the first to show the negative impact of foreign ownership on of taxable income. They concluded that American FO affiliates paid less taxes than DO enterprises, mainly due to exchange rate fluctuations and differences in size and age, but also due to transfer pricing manipulation. Egger et al. (2010) introduced propensity score matching (PSM) techniques to compare similar twin companies in the subgroups of FO affiliates and DO enterprises, treating foreign ownership as endogenous. Focusing their study on 31 European countries, they found that the tax savings effect is positive in high-tax countries and negative in low-tax countries. In simple terms, whereas in countries with a high STR, FO subsidiaries pay around 32% less profit taxes than similar DO enterprises, in low-tax countries, they pay around 75% more. This is due to profit shifting from high tax to low

Table 4. Main literature describing the relationship between taxation, ownership and *multinationality*.

Study	Analysis	Sample	Methodology	Results	Relation
Grubert et al., 1993	Explain the differences in taxable income between FO and DO	Tax return data of U.S. firms 1980-1987.	OLS (1987) and Pooled OLS model (1980-1987). Regress FO dummy on different dependent variables: taxable income, debt-asset ratio, sales margins, and exchange rates.	FO affiliates pay less taxes than their domestic counterparts, mostly due to differences in exchange rate fluctuations, size and age. Other factors, such as international transfer price manipulation also explain this.	FO < DO
Egger et. al. (2010)	Causal effects of foreign ownership on tax savings.	Firm-level data of 31 European countries (1999- 2006).	PSM with probit model. Estimation of the average treatment effect of FO ownership on tax payments, EBIT, and total debt (controlling for age and size).	FO affiliates pay, on average, 32% less taxes than comparable DO firms in a high-tax country. In lower-tax economies, the tax savings are negative, meaning that the tax payments of FO affiliates are higher.	Mixed
Dyreng et. al. (2017)	Analyse changes in corporate ETR and if it depends on ownership.	Firm-level financial and accounting data of US firms in the period 1988-2012.	Linear regression model (OLS). Dependent variable: cash ETR. Independent variables: <i>multinationality</i> status, time, total assets, R&D expenses, intangible assets, leverage, capital expenditures, advertising expenses.	Downward trend in the ETR for both DO MNCs and DO only firms. Even with international tax avoidance, MNCs have a higher cash ETR than a purely DO enterprise. The same is true for larger domestic firms. Leverage, capital and R&D expenses, and special items have a negative and significant effect on the cash ETR.	DO MNCs > DO
Hansson et. al. (2018)	Analyse if MNCs undertake profit shifting and if becoming an MNC changes their behaviour.	Census accounting data on FO and DO firms of the Swedish manufacturing sector from 1997 to 2007.	PSM with probit model to determine the probability of being MNC. Estimation of the average treatment effect of being an MNC on the tax payments, EBIT, and equity ratios. Use OLS regression to assess the effect of becoming a MNC on tax payments, equity, and debt.	For the whole sample, MNCs pay more taxes, have higher earnings and lower equity. When focusing only on MNCs with small international presence, they pay 19% less taxes, earn 27.8% less and have 6% lower equity ratios than comparable DO (indicating revenue and debt shifting). Firms that become MNCs pay, on average, 11% less taxes and earn 7% less than those that remain domestic (indicating revenue shifting).	Mixed
Buyl & Roggem an (2019)	Compare the effective tax burden of DO SMEs, large DO firms, and MNCs.	Confidential corporate tax return data of FO and DO Belgium firms for the tax year 2013.	Linear regression model. Dependent variable ETR and independent variables having an affiliate, being SME and being subject to full corporate tax rate. Other control variables are leverage, financial assets, (in) tangible assets and EBIT.	Domestic SMEs have a higher tax burden than large domestic firms (1.6 percentage points) and small (4.1 percentage points) and big MNCs (4.8 percentage points). The reduced tax rates of SMEs are insufficient to offset the advantages of engaging in international tax planning.	DO MNCs < DO SMEs

Source: Own elaboration.

tax countries – their taxable income in the latter is higher than that of local firms, thus ending up paying more taxes. Vandenbussche & Tan (2005) introduced a model that shows that FO affiliates tend to pay less taxes than Belgian DO firms due to fiscal incentives. Finally, it is also noteworthy to mention the work of Tørslov et al. (2022), which documents that FO firms report less profits (than DO) in high-tax countries and more profits in low-tax countries, indicating profit-shifting practices. He finds that while the profit-to-wage ratio of FO MNCs in Ireland (considered a low-tax country) is 800%, that ratio is 26% in the UK.

Other studies compared the tax burden of DO MNCs and remaining DO firms. Finke (2013) demonstrated that in 2007, German MNCs paid significantly less corporate income taxes than their domestic counterparts, even though the 2008 German Tax Reform decreased the opportunities for profit-shifting. Another paramount study is that of Hansson et al. (2016). Although the authors also used PSM to analyse the tax payments of Swedish firms, before, they regressed the tax payments and profits of firms on several determinants, including the ownership status of the enterprises. The results confirmed that MNCs pay less taxes than domestic firms despite making higher profits and that accountancy factors, namely earnings and equity ratio, are important determinants of tax payments. The differences in tax payments were attributed to both revenue and debt shifting. Bilicka (2019) took a slightly different approach by comparing the ratio of taxable profits to total assets between UK MNCs and DO enterprises. The study shows that MNCs report lower taxable profits than similar domestic companies, suggesting that the government is witnessing a significant tax revenue loss due to the income-shifting of these firms. Lastly, Buyl & Roggeman (2019) used a linear regression model to compare domestic SMEs with domestic MNCs in Belgium – the interest in SMEs stems from their limited engagement in tax avoidance. They reported that, even though they benefit from reduced tax rates, SMEs face a higher effective tax burden than large domestic and large DO MNCs.

Overall, most evidence points out that the tax burden of FO and DO MNCs – measured by effective tax payments, ETR, taxable profits or other proxy – is lower than that of DO firms (Grubert et al., 1993; Vandenbussche & Tan, 2005; Egger et al., 2010).

Still, some studies reached different conclusions. For Markle & Shackelford (2012), who conducted a comparative cross-country analysis of the effective tax rates faced by MNCs and DO Non-Exporters companies, these types of firms face similar effective tax

burdens. Dyreng et al. (2017) studied the evolution of the effective corporate tax rates of purely DO and DO MNCs over 25 years, finding a decrease of around 0.4 percentage points per year in the effective tax rates faced by firms. The rate of decline was similar for both types of firms, which shows that purely domestic enterprises also have opportunities to reduce their tax payments. Moreover, the average MNC had a higher cash-effective tax rate than a DO-non-exporter firm. These results suggested that not only do DO MNCs pay more taxes but also that non MNCs were able to use tax planning strategies at a local level.

Although, as previously seen at the beginning of this chapter, FO affiliates and DO MNCs tend to be more profitable due to their firm-specific advantages, on balance, most of the results find evidence that they have lower tax burdens or pay less taxes than their domestic counterparts. This is because they also have more means to avoid taxation by employing international tax-planning strategies and leveraging their bargaining power⁴. Even though we acknowledge that the direction of this relationship is not straightforward, the fact that Portugal is considered a high-tax country⁵ and thus the ideal scenario for profit-shifting led us to pose that FO firms pay less taxes than DO enterprises and DO MNCs pay less taxes than DO non-MNCs. This is because, most literature concludes that FO and DO MNCs are very similar and have the same means to decrease their tax burden and thus pay less taxes than purely domestic enterprises. We state the following assumptions.

H₁: There is a negative relationship between tax payments and foreign ownership.

H₂: There is a negative relationship between tax payments and being a DO MNC.

⁴ Besides using international tax avoidance practices, MNCs (and other large firms) have higher bargaining power than DO firms, which allows them to face a lower ETR. This favourable position results from their larger size and lower relocation costs. Egger et al. (2020) find that, in France, the largest tax breaks are given to the most profitable MNCs, leading them to pay less taxes *vis-à-vis* DO.

⁵ See Appendix 1 for a detailed description of the Portuguese tax system.

Chapter 2. Econometric analysis

Chapter 2 provides an empirical answer to the research question. Section 2.1. provides an overview of the data selection criteria alongside its descriptive statistics. Section 2.2. reports the variables and methodology employed in the study. Section 2.3. presents the estimations and results, followed by the robustness checks undertaken.

2.1. Data

The econometric investigation of the causal relationship between taxation and being a FO firm relies on the Bureau Van Dijk's SABI database, which provides the most comprehensive financial and accounting information on Portuguese companies, thus being the most suitable database for testing our hypotheses. Before the data extraction, we defined a few criteria to refine our sample and collect only the most appropriate data for our study. Firstly, we defined the timeframe of our analysis from 2010 to 2022. This was the best available time frame because, for the years before 2010 and the year 2023, there was a lack of information for many of the variables, which might have hindered the accuracy of our sample. Secondly, to avoid selection bias and extract the most representative sample of the population, we eliminated inactive firms and micro companies. To eliminate micro companies, we set the criterion of a minimum of 10 employees for the last year of analysis. This was based on the European Commission's (2005) definition of micro firms.

Our analysis distinguishes between the following types of firms: FO, DO, DO MNCs and DO non-MNCs. To identify FO affiliates, we applied a criterion that selects those firms whose foreign shareholders had altogether at least 10% of equity, *per* the OECD (2008) Guidelines. Afterwards, we used the negative form of this definition to derive the DO enterprises and further split this group by applying the criterion that identifies firms that own subsidiaries abroad and detain at least 10% of their equity. This allows us to derive two subcategories of domestic firms: DO firms with foreign subsidiaries (DO MNCs) and DO firms without foreign subsidiaries (DO non-MNCs).

Subsequently, we performed a series of processes to clean the data, thus ensuring the integrity and reliability of our dataset. Although the SABI database presents consolidated and unconsolidated accounting statements, we omitted the first type of data to ensure that each

observation pertains to an independent balance sheet (Egger et al., 2010). We detected and dropped the cases of firms established after 2022 to maintain the reliability of the age variable. Additionally, to account for the potential effects of the firms' sectors, we consolidate industries based on the primary codes of the third revision of the Portuguese Classification of Economic Activity (CAE Rev. 3) at a 2-digit level. Accordingly, the Primary sector corresponds to codes 1 to 9, Manufacturing 10 to 32, Services 33 and 45 to 82, Utilities, Waste and Related Activities 35 to 39, and Construction, Real estate and Related Activities 41 to 43. We disregard the sectors related to public administration and the activities of households as employees. Lastly, we dropped the observations with missing values for the CIT variable and all the negative values for any other variable that suffer a logarithmic transformation (Dyreng et al., 2017).

Ultimately, we created a sample comprising 47,956 Portuguese firms. The database consisted of 3,865 (8.1%) FO affiliates and 44,091 (91.9%) DO enterprises, from which 1,292 (2.9%) owned a foreign affiliate and 42,799 did not (97.1%). Table 5 below summarizes these findings. We also find it noteworthy to highlight that only 42.5% (20,402) of all firms engaged in exporting activities, the remainder 57.5% (27,554) either only imported or neither imported nor exported. Among the DO non-MNC firms, 38.8% were exporters (16,589 firms).

Table 5. Number of companies and observations for Portuguese firms (2010-2022).

No. Firms (Observations)	Firm Type		
	FO	DO	
		DO MNC	DO non-MNC
	3,865 (27,568)	1,292 (12,433)	42,799 (367,690)
		47,956 (407,691)	

Source: Own elaboration using Stata 18.

Note: The number of observations is between parentheses below the number of firms.

2.1.1. Descriptive statistics

This section provides a detailed analysis of the observations collected from the SABI database. We used the software Stata 18.0 to assess measures of central tendency – mean,

median, minimum, and maximum values – as well as dispersion – standard deviation. Tables B.1 to B.10 in Annex 1 present in a detailed form these statistics.

The mean values in Tables B.1 and B.2 show significant differences between FO affiliates and DO enterprises. On average, FO firms are 7 times older, employ 4 times more workers, own 4 times more assets, sell 6 times more, make 6 times more earnings, rely 17 times more on debt and pay 7 times more taxes than DO enterprises. Although these differences might seem substantial, they are in line with other studies (Hansson et al., 2016, 2018), and with the literature portraying the effect of the ownership structure on such economic variables (Doms & Jensen, 1998; Griffith, 1999; Bellak, 2004). Even so, there is a surprising fact since we did not expect FO affiliates to pay more taxes than DO enterprises.

As stated previously, DO MNCs and FO affiliates are thought to be similar and very different from DO non-MNCs. Thus, we compare these two types of DO firms in Table B.3 and derive similar conclusions. On average, DO MNCs employ 5 times more workers, own 13 times more assets, sell 9 times, make 12 times more earnings, and pay 9 times more taxes than DO non-MNCs.

Table B.4 compares the descriptive statistics of firms that export with those that only import or do not engage in international trade. Although there are some differences, their magnitude is relatively small. Exporter firms, on average, employ 3 times more people, rely 3 times more on debt and pay twice as many taxes as non-exporters.

Finally, we broke down the statistics according to the ownership structure of the companies and the sector in which they operate.⁶ According to Table B.5, FO and DO primary sector firms have similar differences as to the baseline comparison. However, FO affiliates pay 9 times more taxes than DO (whereas in the baseline comparison, it was 7). One significant difference is that FO affiliates rely less on debt than DO (whereas in the baseline comparison, they relied more on debt). This is also the pattern for the manufacturing and construction sectors presented in Table B.6 and B.7, respectively.

The findings for the services sector – Table B.8 – are also in line with those of the baseline comparison, presenting similar magnitudes for all variables. However, for the

⁶ In this Section, the “baseline comparison” refers to the comparison of FO and DO enterprises for the whole sample. We use this as a benchmark against which we compare the sectoral results to identify differences.

utilities sector, the scenario is the opposite. According to Table B.9, DO enterprises pay 3 times more taxes and earn twice as much as FO affiliates.

Drawing attention to Table B.10, which pertains to the descriptive statistics for the whole sample of Portuguese firms, we see that, on average, they pay 102 thousand euros in taxes and earn 547 thousand euros. We also observe that the standard deviation values for all variables, but age, are much bigger than the mean values. These might indicate potential issues related to skewness and the presence of outliers, which we address in the model's description in section 2.2.2.

In conclusion, FO affiliates present much higher levels of tax payments than Portuguese DO firms. They also sell more, own more assets and have higher earnings. This pattern is consistent across all sectors, except for the utilities in which FO firms pay less taxes. The least consistent variable across sectors is leverage. FO presents lower mean values than DO firms in the primary and construction sectors, whereas the scenario is the opposite in the remaining industries and baseline comparison. Lastly, DO MNCs earn more and pay more taxes than non-MNCs, showing their akin to FO.

2.2. Methodology

2.2.1. Variables

This section describes the variables employed in the model. Table 6 below summarizes them alongside their definition and the expected relationship with the dependent variable.

We used as the dependent variable the level of *Corporate Income Taxes* (**TAX**) paid in the related accounting period, reflecting a company's total income tax liabilities. This is the best available variable to ascertain whether there is a gap in the tax payments of DO and FO enterprises since it is an absolute variable focused only on income taxes. Although, as we discussed in Section 1.2.1, other taxation measures can be employed, this aligns with most of the related literature (Egger et al., 2010, 2020; Finke, 2013; Hansson et al., 2018).

To split the domestic enterprises into two groups (MNCs and non-MNCs), allowing us to assess the effect of the *DO Multinationality Status* on taxation, we employ another dummy variable (**DO_MNC**), which takes the value 1 when the DO firm has a foreign affiliate and 0 otherwise. According to hypothesis H₂, we expect it to have a negative sign.

Table 6. Variables' description and expected results.

Measure	Variable	Stata Name	Description	Expected Signal
Taxation	Income Tax Payments	TAX	Total income tax expenses reported in the financial accounting statements in thousands of euros.	n.a.
Type of Firm	Ownership Status	FO	Binary variable: 1 if the firm is FO; 0 if is DO	(−)
	Domestic <i>Multinationality</i> Status	DO_MNC	Binary variable: 1 if the DO firm is an MNC; 0 if the DO firm is not.	(−)
	Exporter Status	EXP	Binary variable: 1 if the firm exports; 0 if the firm only imports or is purely domestic.	(+)
Size	Employment	log(EMPL)	Number of employees at the end of the year	(+)
Capital Structure	Leverage	log(LEV)	Ratio of noncurrent liabilities plus loans to total equity (%).	(−)
Age	Age	log(AGE)	Difference between the date of incorporation and the year of analysis.	(+)
Sector	Primary	PRIM	Binary variable: 1 if the firm belongs to the primary sector; 0 otherwise.	(?)
	Manufacturing	MANUF	Binary variable: 1 if the firm belongs to the manufacturing sector; 0 otherwise.	(?)
	Utilities	UTIL	Binary variable: 1 if the firm belongs to the utilities sector; 0 otherwise.	(?)
	Construction	CONST	Binary variable: 1 if the firm belongs to the construction sector; 0 otherwise.	(?)

Source: Own elaboration.

Additionally, we want to account for the differences between firms that export and those that do not. Therefore, we will also include a dummy variable (**EXP**) that takes the value 1 when the enterprise is an exporter and 0 else. Based on other authors (Hansson et al., 2016, 2018), we expect this variable to have a positive sign.

Moreover, we considered other determinants that might affect the firm's tax payments, the company's *Size* being one. To capture it, we used the number of employees (**EMPL**), which is the most stable, and thus defensible, size measure available. According to several authors (Dyreng et al., 2017; Laguir et al., 2015; Zimmerman, 1983), the relationship between a firm's size and its tax burden is positive. Considering this and the progressivity of the

Portuguese tax system⁷, which allows for the concession of reduced rates to smaller firms, we expect a positive sign of this variable.

The firm's *Age* also tends to be included as a control variable. We built the independent variable (**AGE**) on the number of years since the firm was founded and expect that younger firms pay less CIT taxes because they tend to be smaller.

A common practice in the literature is to consider the firms' *Sector* since each industry has its own environment, which affects the taxes paid. Therefore, we selected four major sectors of interest and created dummy variables based on the *CAE Rev 3. Primary Code*, at a 2-digit level, for primary (**PRIM**), manufacturing (**MANUF**), utilities (**UTIL**), and construction (**CONST**). Accordingly, each variable is set to 1 if the firm belongs to the specific sector and 0 otherwise. The services sector was left as a reference category in order to avoid multicollinearity. This choice was made based on the sector with more observations, as is usual in econometric studies. The sign of these coefficients is unpredictable due to the complexity of each environment.

Lastly, we consider the effect of the *Capital Structure* because the extent to which firms depend on debt or equity to finance their business activities might have different tax treatments. One of the main reasons is that interest costs tend to be tax-deductible, whereas dividends do not. Generally speaking, it is advantageous for MNCs to allocate debt to high-tax countries, and companies that rely more heavily on debt might pay lower taxes. The literature is broadly consensual on the fact that firms with higher leverage levels tend to have lower tax liabilities (Bilicka, 2019; Dyreng et al., 2017; Egger et al., 2010). Hence, we expect a negative relationship between leverage (**LEV**) and the dependent variable.

2.2.2. Model specification

As was mentioned in section 2.1.1, the standard deviations of the data were large in relation to the mean values. Therefore, we decided to take the double-log transformation of our Equation to be more closely in line with the assumptions underlying the classical linear model (Hansson et al., 2016). This is usually the standard procedure in econometrics to address issues of skewness and kurtosis. One important thing to consider in this type of

⁷ See Appendix 1 for a detailed description of the Portuguese tax system.

model is that the estimated coefficients represent elasticities (i.e. measure the elasticity of the dependent variable with respect to the regressor, in percentage terms) (Wooldridge, 2020).

The skewness and kurtosis tests for the **TAX** variable, performed on Stata 18.0, assumed values of 86.3 and 12,004.8, respectively. Therefore, we can clearly say that this variable is positively skewed (with the right-side tail longer than the left side) and leptokurtic (indicating the presence of more extreme values and a more peaked distribution). Conversely, the normal distribution is symmetrical (presenting 0 skewness) and mesokurtic (with a kurtosis value of 3). After its logarithmic transformation, the tests were performed again to ensure the effectiveness of this adjustment. The **log(TAX)** variable had a skewness of 0.1 and kurtosis of 3.7, similar to those of the normal distribution. We also undertook the logarithmic transformation of the remaining independent variables – except for the dummies – since they presented similar results for these tests.

The purpose of this dissertation is to examine whether FO affiliates pay more or less in taxes than their DO counterparts. Therefore, the regression model of the taxes paid by firm i at time t is given by:

$$(1) \quad \log(TAX)_{it} = \alpha + \beta_1 FO_{it} + \beta_2 DO_MNC_{it} + \beta_3 EXP_{it} + \beta_4 \log(AGE_{it}) + \beta_5 \log(EMPL_{it}) + \beta_6 \log(LEV_{it}) + \beta_7 SEC_{it} + \mu_i + \varepsilon_{it}$$

($i = 1, 2, \dots, n; t = 1, 2, \dots, 18$)

The model is estimated using a panel data set. Panel data sets are widely employed in the literature as they produce more efficient estimates by reducing the collinearity among independent variables and control for unobserved heterogeneity. More importantly, longitudinal data accounts for the evolution of the relationships over time and deals with endogeneity issues, thus providing a more comprehensive analysis (Hsiao, 2014). Our dataset is unbalanced due to a lack of observations in SABI for some years (Wooldridge, 2020).

To control for unobserved heterogeneity, panel data models use fixed or random effects. In our study, because the main independent variable (**FO**) is time-invariant, using fixed effects results in its omission due to collinearity issues. Hence, we decided to use random effects. Even so, to make sure this is more appropriate than using OLS, we perform the Breusch and Pagan Lagrangian Multiplier (LM) test. The results of the LM test led us to reject the null hypothesis, implying that there are significant random effects in the model. To

conclude, we proceeded with the GLS regression and used robust standard errors to account for potential heteroscedasticity and within-firm correlations (Hoechle, 2007; Baltagi, 2008).

2.3. Estimations and results

This section presents the estimation results of Equation (1) using Stata 18.0. and their interpretation. We started by analysing the correlation between the variables in order to check for potential correlation and multicollinearity issues. Most values in Table 7 below show a weak correlation between the variables.

The correlation between **FO** and **TAX** is weak and positive, suggesting that being an FO affiliate has a positive effect on taxes paid. This might be because these firms are more profitable (see Tables B.1 and B.2 in Annex 1), thus having more taxable income. The same happens with the correlations between **DO_MNC** and **EXP** and the dependent variable, indicating that being a DO MNC and exporting also translates into increased tax payments. We assume that this is also due to similar reasons, as these types of enterprises tend to have Ownership advantages that make them more profitable.

The correlation between **AGE** and **TAX** is positive and weak, which might be justified by the fact that older firms also tend to be more profitable, thus paying more taxes. Conversely, the correlation between **TAX** and **LEV** is negative and weak

There is a moderate (positive) correlation between **EMPL** and **TAX**, suggesting that size might be an important factor affecting the tax payments of firms. Still, since this value is only 0.5, we do not expect this to affect the robustness of our model. Additionally, we checked the robustness of our estimation by changing the models' specifications, namely by employing other size variables. This is addressed in the next section.

Amongst the independent variables, the results of Pearson's coefficients do not show any concern for correlation. Even so, we used the Variance Inflation Factor (FIV) to assess multicollinearity issues between the regressors. The individual values are very low with a mean of 1.12, which is below the threshold for this type of analysis.

Following this, we estimated our regression using GLS. The results are presented in Table 8 below. In our baseline regression (0), we used all the variables but **FO** and **DO_MNC** (the focus of our analysis) in order to see more clearly the effect of introducing

Table 7. Descriptive statistics, correlation matrix and collinearity diagnostic for the variables of Equation (1) (full sample).

	1	2	3	4	5	6	7	8	9	10	11	VIF
1. log(TAX)	1.0000											
2. FO	0.2601*	1.0000										1.10
3. DO_MNC	0.1690*	-0.0478*	1.0000									1.06
4. log(AGE)	0.2527*	0.0190*	0.0704*	1.0000								1.19
5. log(EMPL)	0.5393*	0.2125*	0.1728*	0.3342*	1.0000							1.26
6. log(LEV)	-0.2787*	-0.0974*	-0.0055*	-0.1986*	-0.0699*	1.0000						1.05
7. EXP	0.2232*	0.1590*	0.1254*	0.1228*	0.1714*	-0.0427*	1.0000					1.19
8. PRIM	-0.0144*	-0.0088*	-0.0191*	-0.0207*	-0.0216*	0.0208*	-0.0317*	1.0000				1.03
9. MANUF	-0.0095*	-0.0064*	0.0164*	0.1240*	0.1504*	0.0151*	0.2912*	-0.1054*	1.0000			1.19
10. UTIL	0.0759*	0.0084*	-0.0063*	-0.0069*	0.0488*	0.0215*	-0.0189*	-0.0171*	-0.0569*	1.0000		1.01
11. CONSTR	-0.1090*	-0.0817*	-0.0085*	-0.1071*	-0.0736*	0.0108*	-0.2136*	-0.0731*	-0.2430*	-0.0395*	1.0000	1.12
Mean	2.424221	0.0676198	0.0304961	2.604861	2.887742	3.915304	0.4708419	0.0307242	0.2593852	0.0091515	0.1443103	
Stand. Dev.	1.883148	0.2510927	0.1719482	0.9323212	1.022012	1.806873	0.4991497	0.1725698	0.4382978	0.0952251	0.3514045	
Max. Value	12.64985	1	1	5.726848	10.19836	18.42068	1	1	1	1	1	
Min. Value	-9.721166	0	0	0	0	-6.907755	0	0	0	0	0	
Mean VIF												1.12

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table 8. Results of GLS estimations for Equation (1) (full sample).

TAX	(0)	(1)	(2)	(3)
FO		0.9235128*		0.9761663*
DO_MNC			0.8224895*	0.9419965*
log(AGE)	0.2474314*	0.2573011*	0.2460518*	0.2562253*
log(EMPL)	0.742722*	0.7228449*	0.735892*	0.7136345*
log(LEV)	-0.1707382*	-0.1686823*	-0.1710638*	-0.1689352*
EXP	0.6395007*	0.56154*	0.6038873*	0.5164056*
PRIM	-0.0506597	-0.034853	-0.0385813	-0.0201547
MANUF	-0.5911632*	-0.5539137*	-0.5836958*	-0.5431853*
UTIL	1.061093*	1.057015*	1.071926*	1.069355*
CONSTR	-0.2105054*	-0.1677723*	-0.2154005*	-0.1710298*
cons	0.1138153*	0.0944492*	0.1283982*	0.1109017*
R-squared	0.3781	0.3909	0.3828	0.3976
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

these variables in the model. Introducing the **FO** variable in regression (1) increases the model's fit (the R-squared value increases from 0.38 to 0.39). This regressor's coefficient is positive and statistically significant at a 1% level, indicating that FO affiliates pay more taxes than DO enterprises. The same is true in regression (2), showing a positive and statistically significant value of the **DO_MNC** variable. Overall, the significance, sign and magnitude of the coefficients are similar across the estimations, indicating the stability of our results.

For the estimation of our complete equation, in the last column of Table 8 above, we can see that neither H_1 nor H_2 is supported. FO affiliates pay 0.98% more taxes than Portuguese domestic firms. Although these results might be unexpected, as explained in Section 1.3.3, other authors have come to the same conclusions (Markle & Shackelford, 2009; Dyreng et al., 2017). Moreover, by analysing the statistics in Section 2.1, we can see that the Portuguese business landscape mainly consists of DO enterprises without foreign affiliates, most of which do not even export. As we have said, these firms are less productive and

profitable, so it makes sense that the relationship between foreign ownership and tax payments in Portugal is positive.

These findings do not mean that FO affiliates located in Portugal do not have better means to avoid taxation and engage in international profit shifting. This assumption might still hold. However, to prove this, we needed to conduct another type of analysis, which was not the purpose of this dissertation.

Being a DO MNC translates into a 0.94% increase in tax payments, possibly due to the same reasons as before. That is because, as seen previously, DO MNCs are more similar to FO affiliates than to DO non-MNCs because their internationalization requires them to have specific advantages that make them more profitable and productive. This, in turn, increases their taxable income, resulting in a positive coefficient of the **DO_MNC** variable.

By analysing the remaining variables in regression (3), we see that the **LEV** variable has a negative impact on taxation, indicating that firms with higher debt levels pay 0.2% less taxes. This is according to the expected since interest costs are tax-deductible. The **EXP** regressor is also positive and statistically significant in regressions, suggesting that exporter firms tend to pay 0.5 % more taxes – possibly due to the same reasons that FO affiliates and DO MNCs do since exporting requires some type of Ownership advantages. As for the sectoral impact, all the coefficients are statistically significant and negative, but for the **UTIL** sector, that is positive.

Table 9. Expected and observed relationship between the **FO** and **DO_MNC** variables and taxation.

	H ₁	H ₂
Expectations	Negative relationship between FO and TAX .	Negative relationship between DO_MNC and TAX .
Results	Positive relationship between FO and TAX .	Positive relationship between DO_MNC and TAX .

Source: Own elaboration.

Even though our results do not confirm either one of our initial hypotheses – as show in Table 9 above – they are still aligned with the literature comparing the taxation of FO and DO firms presented in Section 1.3.3 (see for instance, Dyreng et al., 2017; Egger et al. 2010, Hansson, 2016). Additionally, they are in line with the studies of Bellak (2004), Doms & Jensen (1998) and Hansson et al. (2016), which report a significant effect of *multinationality* in terms of competitiveness and profitability (which directly impacts the taxable income), and

the existence of Ownership advantages as suggested by Dunning (1977), Dunning & Lundam (2008), and Hymer (1976). It also indicates a potentially positive contribution of FDI inflows to tax revenues, implied by the fact that FO firms pay more taxes than DO enterprises, as was found by other authors (e.g. Gropp & Kostial, 2000; Mahmood & Chaudhary, 2013).

2.4. Robustness checks

We used robustness checks by changing the regressors of Equation (1) to show the accuracy of our estimates. Presenting these alternative model specifications enables us to reveal the robustness of our results and proves that all endeavours were made to present the best possible and most robust model specification. Adding and removing variables or using a subsample of analysis is the typical exercise employed in econometrics to assess the fragility of the results (Lu & White, 2014). Hence, we regress 3 new equations.

First, we include the independent variable **EBIT** (in thousands of euros), as it was used in similar studies (Hansson et al., 2016, 2018) – and expect a positive impact on the dependent variable. We choose not to include it in Equation (1) because there is a strong correlation between it and the **TAX** variable (0.9 Pearson's Coefficient) – as shown in Table B.11 of Annex 2 – and we wanted our main Equation to be the best possible. Our new Equation (2) is given by:

$$(2) \quad \log(TAX)_{it} = \alpha + \beta_1 FO_{it} + \beta_2 DO_MNC_{it} + \beta_3 EXP_{it} + \beta_4 \log(AGE_{it}) + \beta_5 \log(EMPL_{it}) + \beta_6 \log(LEV_{it}) + \beta_7 SEC_{it} + \beta_8 EBIT_{it} + \mu_i + \varepsilon_{it} \\ (i = 1, 2, \dots, n; t = 1, 2, \dots, 18)$$

Table B.12 presents the results of our estimations. The coefficient of the **FO** variable maintains its significance and sign in all regressions, although its magnitude is lower than in Equation (1). FO firms pay 0.2% more taxes than their DO counterparts. As for the **DO_MNC** variable, the coefficient is negative in regression (2) and positive but very low in regression (3) and statistically insignificant in both.

Equations (3) and (4) are similar to (1) but have as a size measure the variable **SALE** and **T_ASSET**, respectively.

$$(3) \quad \log(TAX)_{it} = \alpha + \beta_1 FO_{it} + \beta_2 DO_MNC_{it} + \beta_3 EXP_{it} + \beta_4 \log(AGE_{it}) + \beta_5 \log(SALE_{it}) + \beta_6 \log(LEV_{it}) + \beta_7 SEC_{it} + \mu_i + \varepsilon_{it}$$

$$(4) \quad \log(TAX)_{it} = \alpha + \beta_1 FO_{it} + \beta_2 DO_MNC_{it} + \beta_3 EXP_{it} + \beta_4 \log(AGE_{it}) + \beta_5 \log(T_ASSET_{it}) + \beta_6 \log(LEV_{it}) + \beta_7 SEC_{it} + \mu_i + \varepsilon_{it}$$

$$(i = 1, 2, \dots, n; t = 1, 2, \dots, 18)$$

These size measures, although sometimes used in the literature, are not as defensible as **EMPL**. The **SALE** variable (total sales in thousands of euros) is very volatile in different years and is easily affected by changes in the economic environment (e.g. recession). The **T_ASSET** (current and non-current assets in thousands of euros) regressor has a strong sectoral component that can lead to important biases (e.g. services sector companies have relatively lower total assets but might be more profitable and pay more taxes). Additionally, this variable is strongly correlated with taxation (Table B.15 of Annex 2). Hence, **EMPL** is the best regressor for this study and why we selected this proxy for company size in Equation (1). We still expect the relationship between them and the dependent variable to be positive for the same reasons presented for the **EMPL** variable. Tables B.13 and B.15 in Annex 2 provide the correlation matrix and VIF values for each Equation.

Using the **SALE** variable (Table B.14) leads us to conclude that FO firms pay 1.4% more taxes than DO, and DO MNCs pay 1.3% more taxes than the remaining firms. These results are consistent with the previous findings but have slightly higher magnitudes. When considering **T_ASSETS** (Table B.16), FO firms pay 0.36% more taxes than their domestic counterparts and DO MNCs pay 0.1% more taxes than non-MNCs. The signs and statistical significance of these coefficients remain the same, but contrary to Equation (3), their magnitude is lower than in our main results. Even so, our conclusions are verified.

Lastly, we decided to analyse whether there were any significant changes in the results before and after 2019, the year in which the BEPS Action Plan came into effect in Portugal. We did not expect to see major differences since the first phase of the Plan did not affect many firms, and it is also still early to see any significant effects. Comparing the results of Tables B.17 and B.18 in Annex 2, we see a decrease in the **FO** coefficient from 1.0 in 2010-2019 to 0.89 in the period of 2020-2022. The **DO_MNC** coefficient also decreases from 0.95 to 0.83. These differences are not substantial but might indicate that the effect of these variables on tax payments has decreased over time. However, the reduced number of years after this change warrants caution when commenting on these results.

Conclusion

This dissertation proposed to address an understudied topic in the international taxation literature by extending the analytical comparison of the relationship between tax payments and foreign ownership to the Portuguese case. Essentially, we wanted to determine whether FO affiliates paid more or less taxes than Portuguese DO firms. Our analysis started with a detailed review of the seminal literature about this relationship. We analysed, from various points of view, the interaction between ownership structure, FDI and taxation, thus providing the most comprehensive analysis of the relationship between these variables with important insights of the IB literature.

Our primary conclusion from a detailed literature review was that, overall, the existing studies provide heterogeneous results. Some authors believe taxation is a crucial determinant of the firm's investment decisions, affecting several questions, such as where to locate and which internationalization strategy to choose. Considering this true, governments have used investment incentives to attract FO affiliates and benefit from the spillovers of their advantages. However, there can be other factors more important than taxation, and the effectiveness of taxation and fiscal incentives in attracting FDI is not straightforward.

The fact that FO affiliates and DO MNCs are considerably different from DO firms is the most consensual part of the literature. These firms tend to be bigger, more productive and profitable than their domestic counterparts, yet they also have more means to avoid taxation. Notably, FO and MNCs take advantage of the differences in tax rates across countries to engage in profit-shifting practices through transfer pricing or international debt-shifting. This scenario led us to derive the hypotheses of our study: FO affiliates pay less taxes than Portuguese DO enterprises because they can better minimize their tax liabilities (H_1) and DO MNCs also pay less taxes than DO non-MNCs since they are similar to FO enterprises (H_2).

We used financial and accounting data collected from the SABI database for 2010-2022 and estimated a random effects GLS model to test this. The outputs of the descriptive statistics conducted before the estimations gave us an idea that H_1 and H_2 might not hold true in the Portuguese case. Accordingly, in Portugal, FO firms pay more taxes, have more earnings, own more assets and employ more people than DO enterprises. Similarly, DO MNCs own more assets, employ more people, have more earnings and pay higher taxes than

DO non-MNCs. Afterwards, the estimation of Equation (1) confirmed these predictions. According to the results of our study, in Portugal, FO affiliates pay 0.98% more taxes than domestic enterprises. Similarly, being a DO MNC translates into a 0.94% increase in tax payments. Although the magnitude of these findings might not be very large, the results clearly indicate a positive contribution of FDI and DO MNCs to the Portuguese economy. These insights show the value of internationalization of activities to our economic growth and the fact that Portugal is benefiting from inward and outward flows of FDI with the presence of more competitive firms.

We conducted the most robust econometric study using the best available tools, thus offering a valuable contribution to the IB literature. Even so, there are some empirical limitations to consider. Firstly, although we used the most comprehensive database available for accounting information of Portuguese firms, we faced a lack of information for many years and other variables which might affect the firm's tax payments (e.g. R&D intensity). Secondly, it would have been important to have the **DO_MNC** variable change yearly, which would have allowed us to analyse whether becoming an MNC has any effect on the tax payments of firms – this is something we could not assess since we did not have this information.

Additionally, for future research developments, we believe it is important to undertake a PSM approach and difference-in-difference techniques, which we did not use in our assessment due to time constraints. This type of statistical methodology addresses the foreign ownership's self-selection bias by comparing the tax payments of FO affiliates to similar DO firms. The underlying assumption for using these techniques, which might be considered a limitation of our study, is that firms' differences might explain the differences in tax payments. Since FO firms tend to be larger and more profitable, they might pay more taxes regardless of whether they are foreign or domestic-owned. While random effects controls for some unobserved heterogeneity across firms, self-selection bias might still be an issue. That is why some studies combine the two approaches (Hansson et al., 2016).

Appendix

Appendix 1. The Portuguese corporate tax landscape

The Portuguese tax system has had successive reforms and updates throughout the years, which have resulted in a complex taxation system for enterprises. We only describe the tax structure related to the CIT, as it is the subject of our empirical assessment.

The CIT, known in Portugal as *Imposto sobre o Rendimento das Pessoas Coletivas*, was introduced in 1989 and is levied upon the worldwide income of all resident firms or others having a permanent establishment (PE). A PE is an accounting definition aligned with the BEPS Plan, according to which a resident company is one that, wholly or partly, carries its business through a fixed place in Portugal (PWC, 2024). That encompasses both DO MNCs earning foreign income and affiliates of FO MNCs generating income in Portugal. Given the adoption of worldwide taxation, taxes paid on foreign income can be deducted from the home country's CIT liabilities. Provided that some parameters are satisfied, profits and losses of a foreign affiliate of a company resident in Portugal can be exempt from CIT to prevent double taxation (Braz et al., 2022).

Table A.1 below presents a summary of the current rates applied in the mainland and island territories of Portugal. The headline CIT rate is 21% in mainland Portugal and 14.7% in the Autonomous Regions of Madeira and Azores, and it applies to domestic or foreign entities with a Portuguese PE. However, SMEs and small-medium capitalization companies, defined *as per* the EU guidelines, as well as startups, benefit from reduced tax rates. Besides the baseline CIT rate, surtaxes can also be applied locally (*Derrama Municipal*) on the taxable income or stately (*Derrama Estadual*), on the taxable profits exceeding a certain amount. Lastly, a penalty tax known as Autonomous Taxation is applied to certain costs not directly related to the firms' activities, such as ownership of vehicles and representation expenses (Neto et al., 2023; PWC, 2024). Overall, this translated into a CIT STR (i.e. a combined CIT rate) of 31.5% in 2023 (OECD, 2024).

To ascertain CIT liability, companies follow the steps outlined next. First, the taxable income is determined via the direct method: the accounting profits and losses are adjusted for fiscal purposes to the rules of the CIT code, after which tax benefits and previous years' losses are deducted. Upon determining the taxable income, the general tax rate and

surcharges are applied. Subsequently, autonomous taxation is imposed on certain expenses, followed by deductions and tax incentives. Regarding the latter, it is worth noting that the tax liability cannot be less than 90% of what it would be in their absence. Some tax incentives that exist in Portugal are the Madeira free-trade zone regime, contractual incentives awarded for industrial investments, tax credits granted for R&D – System of Tax Incentives for Business Research and Development (SIFIDE II), the Patent Box Regime, and the Urban Property Rehabilitation Regime. As for deductions, they regard the use of equity as a source of financing by the shareholders in a framework known as *Remuneração Convencional do Capital Social* (Braz et al., 2022; Neto et al., 2023). After completing these calculations, the resulting amount is the final CIT liability paid to the Portuguese government.

Table A.1. 2024 CIT rates in Portugal.

		Rate (%)	
		Mainland	Madeira & Azores
General Rate		21	14.7
SMEs & Small Mid-Capitalization Companies (taxable income up to 50.000€)		17	11.9
Startups & SMEs or Small Mid-Caps in inland territories		12.5	8.75
	1.5 – 7.5 million € taxable income	3	2.1
State Surcharge or Regional Surtax (applied in Madeira & Azores)	7.5 – 35 million € taxable income	5	3.5
	More than 35 million € taxable income	9	6.3

Source: Own elaboration based on PWC (2024).

The CIT rate has decreased throughout the years so as not to lose competitiveness over other European countries with more loose tax systems. However, Portugal stands out as having one of the top STR and CIT receipts as a percentage of GDP of the OECD countries. This overview shows the progressivity of the Portuguese tax system, whereby the tax rates employed (i.e. the average tax burden) increase with the level of taxable corporate income⁸. According to Braz et. al. (2022), this might be mostly explained by two factors.

⁸ When the marginal tax rate of a tax system is greater than the average tax rate, we say that the tax system is progressive. We can see this through a simple example. Consider a SME A with a taxable income of 100.000€ at the end of 2024. The applicable rate is 17% up to the level of 50.000€, and the remainder 50.000€ will be taxed at the general rate of 21%. For a large firm B, whose taxable income is 40.000.000€, the general rate of 21% is applied up to 1.500.000€. The excess 38.500.000€ is subject to additional charges: 6.000.000€ is taxed

First, the introduction of the national surtax in 2010 as a part of the fiscal consolidation package aimed to reduce the excessive deficit and public debt growth and its further increase over time. Second, the concession of tax benefits, incentives, and deductions. This subject has been recently debated and analysed in Portugal, with policymakers calling for their downsize as a way to increase transparency and decrease the complexity of the system. According to a report commissioned by the state, there are at least 121 tax benefits related to CIT that are materially relevant, 50% of which have expenses that cannot be accurately quantified by the government. Hence, it is no wonder the authors concluded that large firms, which were only 0.5% of the enterprises analysed, made up 45% of the total tax revenues. Whereas micro-firms, which formed more than 80% of the sample, accounted for around 16% of total CIT taxes paid to the government (Braz et al., 2022).

at 3%, 27.500.000€ is taxed at the rate of 5%, and the remaining income is taxed at a rate of 9% (Braz et.al. 2022).

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Annexes

Annex 1. Variables' descriptive statistics

Table B.1. DO firms' descriptive statistics (2010-2022).

	Domestic Owned Firms						
	TAX (th €)	AGE (years)	EMPL	T_ASSET (th €)	SALE (th €)	EBIT (th €)	LEV (th €)
Mean	71.4	18.7	34.7	6,411.1	3,492.2	408.4	220.0
Median	9.3	15.6	15.0	919.5	316.5	51.4	50.3
Min. Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max. Value	311,717.5	266.0	26,859.0	28,000,000.0	9,473,951.0	860,672.9	3,846,641.0
Stand. Dev	1,189.0	15.6	216.2	148,928.2	56,271.7	5,833.7	8,849.7
Observations	380,123.0	380,123.0	379,978.0	380,121.0	378,301.0	380,123.0	380,070.0

Source: Own elaboration using Stata 18.0.

Table B.2. FO affiliates' descriptive statistics (2010-2022).

	Foreign Owned Firms						
	TAX (th €)	AGE (years)	EMPL	T_ASSET (th €)	SALE (th €)	EBIT (th €)	LEV (th €)
Mean	523.9	21.2	142.4	27,242.3	20,743.7	2,458.1	3,874.7
Median	70.9	17.0	33.0	4,681.4	1,413.7	345.6	14.1
Min. Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max. Value	193,445.7	307.0	16,030.0	21,000,000.0	3,737,090.0	743,327.5	100,000,000.0
Stand. Dev	3,270.8	19.9	575.5	188,862.4	99,563.2	14,596.0	602,373.2
Observations	27,568.0	27,568.0	27,548.0	27,568.0	27,339.0	27,568.0	27,563.0

Source: Own elaboration using Stata 18.0.

Table B.3 Domestic MNCs and non-MNCs' descriptive statistics (2010-2022).

	Domestic Multinationals			Domestic non-Multinationals		
	Mean	Stand. Dev.	Observations	Mean	Stand. Dev.	Observations
TAX (th €)	511.5	3,899.0	12,433.0	56.5	970.0	367,690
AGE (years)	25.9	20.7	12,433.0	18.5	15.3	367,690
EMPL	149.5	669.6	12,406.0	30.8	180.9	367,572
T_ASSET (th €)	60,722.6	678,713.5	12,433.0	4,574.6	85,153.8	367,690
SALE (th €)	24,929.5	251,782.4	12,396.0	2,765.9	33,319.7	365,905
EBIT (th €)	3,603.9	21,014.3	12,433.0	300.4	4,460.3	367,690
LEV (th €)	152.3	1,185.2	12,433.0	222.1	8,995.2	367,635

Source: Own elaboration using Stata 18.0.

Table B.4. Exporters and non-Exporters descriptive statistics (2010-2022).

	Exporters			Non-Exporters		
	Mean	Std. Dev	Observations	Mean	Std. Dev	Observations
TAX (th €)	138.2	1,529.1	191,958.0	69.9	1,341.6	215,733.0
AGE (years)	20.9	17.0	191,958.0	17.1	14.8	215,733.0
EMPL	52.4	259.1	191,832.0	32.7	257.2	215,694.0
T_ASSET (th €)	9,734.0	191,547.3	191,956.0	6,116.4	105,059.1	215,733.0
SALE (th €)	7,047.2	73,175.2	191,290.0	2,520.0	45,825.3	214,350.0
EBIT (th €)	721.7	6,804.1	191,958.0	391.6	6,815.0	215,733.0
LEV (th €)	688.7	228,280.4	191,934.0	270.0	11,606.0	215,699.0

Source: Own elaboration using Stata 18.0.

Table B.5. Primary sector FO and DO firms' descriptive statistics firms (2010-2022).

	Primary Sector					
	Foreign Owned			Domestic Owned		
	Mean	Stand. Dev	Observations	Mean	Stand. Dev	Observations
TAX (th €)	366.8	3,374.1	691.0	40.6	239.4	11,835.0
AGE (years)	18.2	17.6	691.0	17.4	16.5	11,835.0
EMPL	55.5	143.1	691.0	24.5	40.1	11,835.0
T_ASSET (th €)	14,733.9	67,984.7	691.0	3,832.1	11,481.2	11,835.0
SALE (th €)	7,172.3	37,392.5	687.0	2,048.8	6,504.0	11,770.0
EBIT (th €)	1,648.2	12,096.0	691.0	261.8	1,742.2	11,835.0
LEV (th €)	234.5	1,176.5	691.0	306.1	7,930.3	11,831.0

Source: Own elaboration using Stata 18.0.**Table B.6.** Manufacturing sector FO and DO firms' descriptive statistics firms (2010-2022).

	Manufacturing Sector					
	Foreign Owned			Domestic Owned		
	Mean	Stand. Dev	Observations	Mean	Stand. Dev	Observations
TAX (th €)	639.3	3,493.9	6,862.0	70.1	643.0	98,887.0
AGE (years)	27.2	24.1	6,862.0	21.9	16.9	98,887.0
EMPL	161.4	318.0	6,852.0	36.6	67.3	98,831.0
T_ASSET (th €)	28,102.3	74,669.8	6,862.0	4,996.6	48,137.4	98,887.0
SALE (th €)	35,516.4	131,914.2	6,815.0	4,880.1	76,559.7	98,528.0
EBIT (th €)	3,085.3	14,055.1	6,862.0	395.4	4,113.7	98,887.0
LEV (th €)	345.7	13,440.9	6,862.0	169.9	2,030.7	98,880.0

Source: Own elaboration using Stata 18.0.

Table B.7. Construction sector FO and DO firms' descriptive statistics firms (2010-2022).

	Construction Sector					
	Foreign Owned			Domestic Owned		
	Mean	Stand. Dev	Observations	Mean	Stand. Dev	Observations
TAX (th €)	273.1	814.5	1,039.0	38.4	369.9	57,795.0
AGE (years)	19.2	16.6	1,039.0	14.4	11.3	57,795.0
EMPL	85.0	123.8	1,039.0	27.2	135.6	57,777.0
T_ASSET (th €)	12,532.6	25,885.8	1,039.0	3,453.3	39,954.6	57,793.0
SALE (th €)	1,654.1	6,200.6	1,033.0	390.9	6,961.9	57,567.0
EBIT (th €)	1,360.1	3,923.3	1,039.0	211.3	2,202.6	57,795.0
LEV (th €)	145.1	1,078.5	1,039.0	183.2	2,695.7	57,783.0

Source: Own elaboration using Stata 18.0**Table B.8.** Services sector FO and DO firms' descriptive statistics firms (2010-2022).

	Services Sector					
	Foreign Owned			Domestic Owned		
	Mean	Stand. Dev	Observations	Mean	Stand. Dev	Observations
TAX (th €)	504.1	3,294.2	18,642.0	64.2	1,098.6	208,209.0
AGE (years)	19.4	18.2	18,642.0	18.5	15.6	208,209.0
EMPL	142.5	670.2	18,632.0	35.5	277.2	208,141.0
T_ASSET (th €)	28,209.1	224,419.2	18,642.0	6,511.0	183,025.9	208,209.0
SALE (th €)	17,055.8	89,405.4	18,472.0	3,292.2	43,946.4	207,061.0
EBIT (th €)	2,320.3	15,338.1	18,642.0	401.3	5,775.5	208,209.0
LEV (th €)	5,571.4	732,509.6	18,637.0	248.6	11,636.7	208,180.0

Source: Own elaboration using Stata 18.0.

Table B.9. Utilities sector FO and DO firms' descriptive statistics firms (2010-2022).

	Utilities Sector					
	Foreign Owned			Domestic Owned		
	Mean	Stand. Dev	Observations	Mean	Stand. Dev	Observations
TAX (th €)	364.4	688.5	334.0	1,217.4	8266.8	3,397.0
AGE (years)	17.4	9.6	334.0	15.6	10.6	3,397.0
EMPL	106.5	260.9	334.0	92.1	255.2	3,394.0
T_ASSET (th €)	27,249.9	76,676.8	334.0	100,767.0	569,720.8	3,397.0
SALE (th €)	10,170.6	67.362,0	332.0	33,171.9	251,524.7	3,375.0
EBIT (th €)	2,354.4	5,617.4	334.0	5,085.6	33,994.6	3,397.0
LEV (th €)	840.4	10,539.0	334.0	250.3	1,029.9	3,396.0

Source: Own elaboration using Stata 18.0.

Table B.10. All Portuguese firms' descriptive statistics (2010-2022).

	All Portuguese Firms						
	TAX (th €)	AGE (years)	EMPL	T_ASSET (th €)	SALE (th €)	EBIT (th €)	LEV (th €)
Mean	102.0	18.9	42.0	7,819.7	4,654.9	547.0	467.1
Median	10.3	16.0	15.0	996.7	334.9	56.6	47.9
Mini. Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max. Value	311,717.5	307.0	26,859.0	28,000,000.0	9,473,951.0	860,672.9	100,000,000.0
Stand. Dev	1,433.3	15.9	258.3	152,049.5	60,331.4	6,811.8	156,869.9
Observations	407,691.0	407,691.0	407,526.0	407,689.0	405,640.0	407,691.0	407,633.0

Source: Own elaboration using Stata 18.0.

Annex 2. Robustness checks

Table B.11. Descriptive statistics, correlation matrix and collinearity diagnostic for the variables of Equation (2) (full sample).

	1	2	3	4	5	6	7	8	9	10	11	12	VIF
1. log(TAX)	1.0000												
2. FO	0.2601*	1.0000											1.13
3. DO_MNC	0.1690*	-0.0478*	1.0000										1.08
4. log(AGE)	0.2527*	0.0190*	0.0704*	1.0000									1.19
5. log(EMPL)	0.5393*	0.2125*	0.1728*	0.3342*	1.0000								1.66
6. log(LEV)	-0.2787*	-0.0974*	-0.0055*	-0.1986*	-0.0699*	1.0000							1.10
7. log(EBIT)	0.8953*	0.2487*	0.1930*	0.2761*	0.5634*	-0.2190*	1.0000						1.72
8. EXP	0.2232*	0.1590*	0.1254*	0.1228*	0.1714*	-0.0427*	0.2323*	1.0000					1.21
9. PRIM	-0.0144*	-0.0088*	-0.0191*	-0.0207*	-0.0216*	0.0208*	0.0069*	-0.0317*	1.0000				1.03
10. MANUF	-0.0095*	-0.0064*	0.0164*	0.1240*	0.1504*	0.0151*	0.0319*	0.2912*	-0.1054*	1.0000			1.21
11. UTIL	0.0759*	0.0084*	-0.0063*	-0.0069*	0.0488*	0.0215*	0.0829*	-0.0189*	-0.0171*	-0.0569*	1.0000		1.02
12. CONSTR	-0.1090*	-0.0817*	-0.0085*	-0.1071*	-0.0736*	0.0108*	-0.1487*	-0.2136*	-0.0731*	-0.2430*	-0.0395*	1.0000	1.13
Mean	2.424221	0.0676198	0.0304961	2.604861	2.887742	3.915304	4.099303	0.4708419	0.0307242	0.2593852	0.0091515	0.1443103	
Stand. Dev.	1.883148	0.2510927	0.1719482	0.9323212	1.022012	1.806873	1.832309	0.4991497	0.1725698	0.4382978	0.0952251	0.3514045	
Max. Value	12.64985	1	1	5.726848	10.19836	18.42068	13.66547	1	1	1	1	1	
Min. Value	-9.721166	0	0	0	0	-6.907755	-11.51293	0	0	0	0	0	
Mean VIF													1.23

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.12. Results of GLS estimations for Equation (2) (full sample).

TAX	(0)	(1)	(2)	(3)
FO		0.2043653*		0.2043604*
DO_MNC			-0.0279634	0.0000858
log(AGE)	0.010305*	0.0139005*	0.0102804*	0.0138855*
log(EMPL)	0.165694*	0.1604218*	0.1659751*	0.1604186*
log(LEV)	-0.0753065*	-0.0747221*	-0.075286*	-0.0747264*
log(EBIT)	0.8069015*	0.805296*	0.807044*	0.8053053*
EXP	0.1860718*	0.1706438*	0.1871684*	0.1706307*
PRIM	-0.1756415*	-0.172176*	-0.1760807*	-0.17218*
MANUF	-0.234886*	-0.2273292*	-0.2351168*	-0.2273253*
UTIL	0.1154995*	0.117609*	0.1148583*	0.1175968*
CONSTR	0.1248675*	.1335187*	0.1250861*	0.13351*
cons	-1.226171*	-1.225634*	-1.227195*	-1.225599*
R-squared	0.8027	0.8032	0.8027	0.8032
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.**Note:** *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.13. Descriptive statistics, correlation matrix and collinearity diagnostic for the variables of Equation (3) (full sample).

	1	2	3	4	5	6	7	8	9	10	11	VIF
1. log(TAX)	1.0000											
2. FO	0.2601*	1.0000										1.06
3. DO_MNC	0.1690*	-0.0478*	1.0000									1.04
4. log(AGE)	0.2527*	0.0190*	0.0704*	1.0000								1.11
5. log(SALE)	0.4615*	0.1862*	0.1034*	0.2276*	1.0000							1.29
6. log(LEV)	-0.2787*	-0.0974*	-0.0055*	-0.1986*	-0.0937*	1.0000						1.06
7. EXP	0.2232*	0.1590*	0.1254*	0.1228*	0.2756*	-0.0427*	1.0000					1.22
8. PRIM	-0.0144*	-0.0088*	-0.0191*	-0.0207*	0.0063*	0.0208*	-0.0317*	1.0000				1.04
9. MANUF	-0.0095*	-0.0064*	0.0164*	0.1240*	0.1487*	0.0151*	0.2912*	-0.1054*	1.0000			1.21
10. UTIL	0.0759*	0.0084*	-0.0063*	-0.0069*	0.0312*	0.0215*	-0.0189*	-0.0171*	-0.0569*	1.0000		1.01
11. CONSTR	-0.1090*	-0.0817*	-0.0085*	-0.1071*	-0.3309*	0.0108*	-0.2136*	-0.0731*	-0.2430*	-0.0395*	1.0000	1.21
Mean	2.424221	0.0676198	0.0304961	2.604861	6.545915	3.915304	0.4708419	0.0307242	0.2593852	0.0091515	0.1443103	
Stand. Dev.	1.883148	0.2510927	0.1719482	0.9323212	2.55247	1.806873	0.4991497	0.1725698	0.4382978	0.0952251	0.3514045	
Max. Value	12.64985	1	1	5.726848	16.06406	18.42068	1	1	1	1	1	
Min. Value	-9.721166	0	0	0	-11.51293	-6.907755	0	0	0	0	0	
Mean VIF												1.12

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.14. Results of GLS estimations for Equation (3) (full sample).

TAX	(0)	(1)	(2)	(3)
FO		1.319635*		1.384841*
DO_MNC			1.164111*	1.304774*
log(AGE)	0.5154629*	0.5137007*	0.5080393*	0.504852*
log(SALE)	0.2139592*	0.2072529*	0.2121414*	0.2046822*
log(LEV)	-0.1659436*	-0.1639585*	-0.1667299*	-0.1647316*
EXP	0.4756079*	0.3863025*	0.4252758*	0.3258822*
PRIM	-0.2094816*	-0.2048511*	-0.1952449*	-0.1885755*
MANUF	-0.498482*	-0.4688213*	-0.4934459*	-0.4615867*
UTIL	1.19166*	1.183945*	1.198925*	1.191958*
CONSTR	0.370313*	0.399802*	0.345351*	0.3726781*
cons	0.3374722*	0.3197361*	0.3604492*	0.3467832*
R-squared	0.2794	0.3110	0.2935	0.3286
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.15. Descriptive statistics, correlation matrix and collinearity diagnostic for the variables of Equation (4) (full sample).

	1	2	3	4	5	6	7	8	9	10	11	VIF
1. log(TAX)	1.0000											
2. FO	0.2601*	1.0000										1.12
3. DO_MNC	0.1690*	-0.0478*	1.0000									1.09
4. log(AGE)	0.2527*	0.0190*	0.0704*	1.0000								1.30
5. log(T_ASSET)	0.7218*	0.2412*	0.2166*	0.4368*	1.0000							1.52
6. log(LEV)	-0.2787*	-0.0974*	-0.0055*	-0.1986*	-0.1037*	1.0000						1.05
7. EXP	0.2232*	0.1590*	0.1254*	0.1228*	0.2833*	-0.0427*	1.0000					1.23
8. PRIM	-0.0144*	-0.0088*	-0.0191*	-0.0207*	0.0200*	0.0208*	-0.0317*	1.0000				1.03
9. MANUF	-0.0095*	-0.0064*	0.0164*	0.1240*	0.0861*	0.0151*	0.2912*	-0.1054*	1.0000			1.18
10. UTIL	0.0759*	0.0084*	-0.0063*	-0.0069*	0.1017*	0.0215*	-0.0189*	-0.0171*	-0.0569*	1.0000		1.03
11. CONSTR	-0.1090*	-0.0817*	-0.0085*	-0.1071*	-0.1526*	0.0108*	-0.2136*	-0.0731*	-0.2430*	-0.0395*	1.0000	1.12
Mean	2.424221	0.0676198	0.0304961	2.604861	6.981415	3.915304	0.4708419	0.0307242	0.2593852	0.0091515	0.1443103	
Stand. Dev.	1.883148	0.2510927	0.1719482	0.9323212	1.618562	1.806873	0.4991497	0.1725698	0.4382978	0.0952251	0.3514045	
Max. Value	12.64985	1	1	5.726848	10.19836	17.14904	1	1	1	1	1	
Min. Value	-9.721166	0	0	0	0	-11.51293	0	0	0	0	0	
Mean VIF												1.17

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.16. Results of GLS estimations for Equation (4) (full sample).

TAX	(0)	(1)	(2)	(3)
FO		0.3500508*		0.3584177*
DO_MNC			0.0571087*	0.1132149 *
log(AGE)	-0.0691276*	-0.0609225*	-0.0688597*	-0.0601858*
log(T_ASSET)	0.8556012*	0.8447087	0.854683*	0.8426171*
log(LEV)	-0.1908355*	-0.189495	-0.1908438*	-0.1894778*
EXP	0.1491113*	0.1268388	0.1472329*	0.1225917*
PRIM	-0.3512978*	-0.3422739	-0.3501442*	-0.3397673*
MANUF	-0.3332821*	-0.3223292	-0.3329519*	-0.3214159*
UTIL	-0.074398*	-0.0608112	-0.0721981*	-0.0561064
CONSTR	0.0502087*	0.0626513	0.0495626*	0.0616652*
cons	-2.709968*	-2.678185	-2.705085*	-2.667702*
R-squared	0.5697	0.5720	0.2935	0.5722
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.17. Results of GLS estimations for Equation (1) (2010-2019).

TAX	(0)	(1)	(2)	(3)
FO		0.9503345*		1.008403*
DO_MNC			0.8270573*	0.9501221*
log(AGE)	0.2751059*	0.2838886*	0.2731685*	0.2820963*
log(EMPL)	0.7488664*	0.7256898*	0.739798*	0.7135365*
log(LEV)	-0.1638452*	-0.1612994*	-0.164376*	-0.1617487*
EXP	0.6167509*	0.5420474*	0.5797598*	0.4951142*
PRIM	-0.0326008	-0.0210629	-0.0195723	-0.0054294
MANUF	-0.6076444*	-0.5701133*	-0.5983664*	-0.5570765*
UTIL	1.022074*	1.020607*	1.036819*	1.03764*
CONSTR	-0.2961768*	-0.257083*	-0.3035347*	-0.2632385*
cons	0.0176816	0.007526	0.0391655	0.0326774*
R-squared	0.3806	0.3943	0.3862	0.4021
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

Table B.18. Results of GLS estimations for Equation (1) (2019-2022).

TAX	(0)	(1)	(2)	(3)
FO		0.8305439*		0.8869536*
DO_MNC			0.7136472*	0.8380414*
log(AGE)	0.1381885*	0.1546227*	0.1323928*	0.1489157*
log(EMPL)	0.8685471*	0.8270023*	0.8522898*	0.8049463*
log(LEV)	-0.2228381*	-0.2173876*	-0.2232208*	-0.2174562*
EXP	0.5957331*	0.5378162*	0.5696272*	0.5032827*
PRIM	-0.086856**	-0.0746124***	-0.0781535***	-0.0635825
MANUF	-0.5907837*	-0.5576511*	-0.5816448*	-0.5446416*
UTIL	1.046653*	1.059484*	1.063826*	1.080626*
CONSTR	-0.0984622*	-0.0602581*	-0.1027551*	-0.0627238*
cons	0.246142*	0.2665299*	0.302755*	0.3348335*
R-squared	0.3721	0.3810	0.3754	0.3856
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Source: Own elaboration using Stata 18.0.

Note: *** statistically significant at 10% level; ** at 5% level; * at 1% level.

