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**The Determinants of Effective Tax Rates: Firms Characteristics and  
Corporate Governance**

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Master's Thesis in Finance and Taxation

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## **Biography**

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## **Abstract**

Investors, managers and shareholders benefit from the study of what influences and determines corporate effective tax rates (ETRs) as this analysis may contribute to potential tax savings. Moreover, standard setters, regulators and policy makers have a crucial interest in identifying the main factors driving corporate taxes. Therefore, the purpose of our investigation and contribution is twofold. Firstly, we provide evidence of how ETRs are determined by firms' financial and operational characteristics. Secondly, our objective is to show the role of Corporate Governance attributes in explaining ETRs. As the literature about this topic using non-US firms is not abundant, to address these questions we select a sample of 704 non-financial firms listed on the London Stock Exchange between 2010 and 2013. We estimate our econometric model on two different ETR measures by using Generalized Least Squares (GLS) cross-section weights.

Our results show that larger and more profitable firms have higher ETRs. On the contrary, capital intensity, leverage and R&D expenses have a negative impact on ETRs. These findings are as foreseen in extant literature. Regarding ownership structure and board composition, our findings reveal that managerial ownership contributes to lower ETRs. On the other hand, more independent firms from controlling shareholders exhibit higher ETRs. Moreover, a larger number of board members and non-executive directors results in higher ETRs. Our investigation is relevant, given the importance of ETRs to firms' strategic investment decisions and due to its impact on firms' bottom line performance.

**Keywords:** Effective tax rate; Corporate Finance; Corporate Governance

**JEL Classification:** G30, H20

## Resumo

Investidores, gestores e acionistas beneficiam do estudo sobre os fatores que influenciam e determinam a taxa de imposto efetiva (ETR). A análise dos fatores que influenciam e determinam a ETR pode contribuir para significativas poupanças de imposto. Adicionalmente, analistas, políticos, legisladores e reguladores têm interesse na análise dos principais fatores da ETR. Deste modo, a nossa investigação tem dois principais objetivos. Primeiramente, pretendemos evidenciar de que forma as ETRs são determinadas pelas características financeiras e operacionais específicas de cada empresa. Em segundo lugar, o nosso propósito é realçar o papel desempenhado pelas características relacionadas com o Governo das Sociedades na explicação das ETRs. Com o intuito de analisar as questões propostas acima, selecionamos um conjunto de 704 empresas cotadas na Bolsa de Valores de Londres, pois grande parte dos estudos sobre este tema são essencialmente focados na análise das empresas norte americanas. Efetuamos a nossa análise para o período de 2010 a 2013. Na estimação do nosso modelo econométrico utilizamos duas variáveis distintas para medir a ETR. Os modelos são estimados com recurso à utilização do método Generalized Least Squares com ponderação cross-section e inclusão de variáveis binárias anuais para consideração dos efeitos fixos temporais. Os resultados obtidos evidenciam que empresas de maior dimensão e mais rentáveis apresentam maiores taxas de imposto efetivas. Opostamente, a intensidade capitalística, o endividamento e o investimento em I&D contribuem para menores ETRs. Relativamente à influência da estrutura acionista e à composição do Conselho de Administração, os nossos resultados demonstram que a detenção de ações por parte dos órgãos de gestão tem um impacto negativo na ETR. Por outro lado, uma estrutura acionista mais concentrada traduz-se em maiores taxas de imposto efetivas. Adicionalmente, empresas com Conselhos de Administração de maior dimensão e com uma maior proporção de diretores não-executivos revelam ETRs mais elevadas. A relevância da nossa investigação deve-se à importância da taxa de imposto efetiva para a tomada das decisões de investimento.

Palavras-chave: Taxa de imposto efetiva; Governo das Sociedades

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## **1. Introduction**

This paper aims at giving a contribution to the extant literature on the determinants of effective tax rates (ETRs). Our particular focus is on the impact of a firm's financial and operational specific characteristics and Corporate Governance mechanisms on ETRs.

Corporate tax rate is an instrument of fiscal policies. Ever more the choice and establishment of the statutory tax rate is on the main agenda of governments. It is well known that taxes are an important source of revenue in order to states develop their public policies. However, the willingness to increase statutory taxes in order to satisfy that purpose has been somewhat constrained by other important aspects such as the relevance of corporate taxation to the attractiveness of foreign investment. Therefore, investigations concerning the analysis of which factors may influence the taxes paid by firms are useful for regulators and policy makers and contribute to the definition of domestic tax systems.

If taxes are a significant element for macroeconomic policies they are no less important for firms' strategic decisions. As well documented by Graham (2003) effective tax rates can affect corporate decision making and other related aspects such as capital structure, payout policy and risk management. Taxes are ever more viewed as an enhancing component of bottom line firms' performance. Robinson et al. (2010) show that evaluate a firm's tax department as a "profit centre" is associated with lower effective tax rates than if it was categorized as a "cost centre". Therefore, any reduction of taxes paid contributes to an increase of earnings disclosed in the financial statements. Considering that the main purpose of firms' activity should be creating value to shareholders, actions to minimize the tax burden are in line with that objective. According to this perspective, we examine whether firms' specific characteristics are determinants of effective tax rates. We follow a similar approach to the one used by Richardson and Lanis (2007) and, more recently, by Kraft (2014) to estimate the impact of firms' characteristics on ETRs. Many studies have paid attention to the influence of firms' specific characteristics on ETRs (Gupta and Newberry, 1997; Desai and Dharmapala, 2006; Dyreng et al., 2008; Hanlon et al., 2010; Minick and Noga, 2010; Armstrong et al. 2012). Following previous literature we are interested in the influence of size, profitability, capital structure and asset mix composition on effective tax rates. We expect those variables to be related to firms' tax expense. Tax expense or tax income is defined

in the IAS 12 (IASB, 2010) as “the aggregate amount included in the determination of profit or loss for the period in respect of current tax and deferred tax”. To compute effective tax rate, in the first instance, we divide tax income to pre-tax income. As a second measure of effective tax rate we use the ratio of tax expense to cash flow from operations (Richardson and Lanis, 2007).

Apart from financial and operational performance as determinants of ETRs, the second part of our investigation focus on how Corporate Governance mechanisms influence effective tax rates, specifically, we are interested in the analysis of ownership structure and board of directors’ composition. Minick and Noga (2010) consider Corporate Governance mechanisms as explanatory variables of ETRs. They emphasize that staggered boards are associated with higher effective tax rates. Following their approach we include in our regressions the influence of board of directors’ composition and ownership structure. The main reason to consider those Corporate Governance characteristics is related to the agency problem. Decisions regarding tax management with the objective of reducing effective tax rates have impact on firms’ performance and, hence, contribute to maximize firm value which will benefit shareholders. Nevertheless, these decisions are to some extent dependent on managers’ discretion. Therefore managers may not act in the best shareholders’ interests which give potential to the presence of agency costs (Jensen and Meckling, 1976). Ownership structure, mainly, managerial ownership, is an important instrument to reduce that conflict. Jensen and Meckling (1976) suggest a positive association between managerial ownership and Corporate Governance. Florackis (2008) argues that an adequate level of managerial ownership reduces managers’ incentives for perk consumption and engagement in non-maximizing activities. On the other hand, if there is a high level of managerial ownership, managers have more opportunities to extract own benefits and to intensify the entrenchment effect. As pointed out by Desai and Dharmapala (2006) the alignment of shareholders and managers interests through promotion of tax avoidance activities might not be that valuable to shareholders as expected. Due to the difficulty of measuring the actual effects of tax avoidance activities, these activities can smokescreen managers’ rent extraction behaviour. Therefore, shareholders’ willingness to promote tax avoidance activities is weakened by that fact. The existence of controlling shareholders, due to a high stake of shares held, may also influence shareholders’ willingness to monitor

managers' decisions. Shareholders with higher participations will benefit more from higher earnings; therefore they have incentives to promote activities that contribute to the reduction of the effective tax rate (Florackis, 2008). On the other side, shareholders with a higher participation will be more exposed to potential penalties and reputational damages that may occur as a consequence of activities aiming the reduction of ETRs (Chen et al., 2010).

When we talk about the duality managers – shareholders we must include a third party in this relationship. The board of directors is an important element to characterize firms' Corporate Governance. It should develop a policy based governance system and a guidelines' framework to conduct management actions. As a result, one of its responsibilities is monitoring managers (Adams et al., 2010). Additionally, the board of directors also chooses its own composition and officers. These functions can contribute to support and promote shareholders rights and interests, on the one hand, or to facilitate managerial opportunism depending upon the level of managers' power, on the other hand. As a result, we must also consider the size and composition of board of directors as valuable characteristics to help to mitigate the agency problem.

In order to investigate the determinants of effective tax rates described above, more specifically firms' financial and operational characteristics and Corporate Governance attributes, we select a sample of non-financial firms listed on the London Stock Exchange. Our sample is constituted by 704 firms which we analyse over the period 2010-2013. With the purpose of studying the determinants of effective tax rates we estimate four regressions. The first two equations follow the model used by Richardson and Lanis (2007) and Kraft (2014); the last two equations introduce Corporate Governance mechanisms as in the Minick and Noga (2010) model. With the inclusion of Corporate Governance attributes we obtain a more complete model in order to test what affects effective tax rates. To estimate our regressions we use Generalized Least Squares (GLS) cross-section weights with time fixed effects through the inclusion of year dummy variables.

Our results show that firms' specific characteristics have influence on ETRs. Larger and more profitable firms have higher ETRs. Unlike size and profitability, there is a negative relation between leverage, capital intensity, research and development

expenses and effective tax rates. These findings are consistent with those in previous researches. Concerning Corporate Governance mechanisms, we find evidence supporting the influence of ownership concentration and board of directors' composition on ETRs. Insider ownership is associated with lower effective tax rates. On the contrary, firms with a less concentrated ownership structure evidence higher ETRs. Regarding board of directors' composition, boards with a higher dimension have higher effective tax rates. As well, the presence of non-executive directors contributes to higher effective tax rates.

Our paper contributes to the extant literature on effective tax rates both at the theoretical and the empirical level. Our first contribution to this field of investigation regards the sample we use. To our knowledge, the literature related to the study of effective tax rates which uses firms listed on the London Stock Exchange is scarce. The majority of the studies about Corporate Governance and ETRs are largely based on USA firms. Secondly, by considering firms listed on LSE and by analysing a more recent period than other studies, we observe how and which financial and operational indicators, can impact ETRs. These determinants are also a consequence of managers' decisions. By taking this into consideration, our paper contributes to the extant literature on the influence of firms' specific characteristics on ETRs. A third contribution results from the introduction of Corporate Governance mechanisms in the explanation of effective tax rates. There is a growing body of literature concerned about the influence of Corporate Governance on ETRs. This is mainly a consequence of agency problems and its impacts on firms' performance (Jensen and Meckling, 1976). Managers may not act in the best interest of shareholders and, consequently, they can make decisions which are not value maximizing. Therefore, we must introduce in our analysis Corporate Governance attributes as these mechanisms help to control and monitor managers' actions. To the best of our knowledge, our Corporate Governance set of variables is unique. We include in our model two different dimensions related to Corporate Governance attributes, we include variables to measure ownership structure and the board of directors' composition. We use a set of four variables to test the influence of Corporate Governance on ETRs. A fourth contribution of our investigation is related to the measurement of our Corporate Governance variables. Our variables are measured year by year. The accuracy about the measurement of these variables constitutes another important contribution of our study as the majority of other studies using Corporate Governance usually consider these variables

as constant over short periods of time. To achieve this precision we needed to contact the provider of Amadeus Database as information of Corporate Governance for past years is not displayed on the information available to end users. Still concerning the variables of Corporate Governance, we add a fifth contribution as we use a variable to control firms' independence in relation to blocking shareholders by considering participations higher than 25%. According to our knowledge, the most common variables related to ownership concentration define lower limits of participation to categorize firms as independent or not. In light of the above, we contribute to the previous literature by simultaneously observing the impact of firms' characteristics and Corporate Governance mechanisms on ETR.

The remainder of this paper is organized as follows. Section 2 presents a brief review of the extant literature related with the influence of firms' financial characteristics and Corporate Governance attributes on effective tax rates. In this section we develop our set of hypothesis. Section 3 describes the variables and the sample selection process. The methodology used in this paper and univariate results are evidenced on Section 4. Results regarding our hypotheses are exhibited on Section 5. To conclude, Section 6, presents a summary of this paper.

## **2. Literature Review and Hypotheses Development**

Corporate taxation has becoming increasingly relevant to corporate financial decisions. Graham (2003) presents a set of corporate decisions that are influenced by taxes. As taxation represents a cost to a firm it necessarily affects its performance. Therefore, there has been a growing concern to find ways to reduce the firms' tax burden. Hence, a large body of literature has been developed to investigate effective tax rates (Dyrenge et al., 2008; Minick and Noga, 2010; Armstrong et al., 2012; Vieira, 2013; Kraft, 2014). When we look at corporate taxation, nominal tax rates say very little about firms' tax expense. In fact, a firm's tax expense is obtained by applying a series of deferrals and accruals to the amount resulting from the multiplication of statutory tax rate and the pre-tax income. This is caused by dissimilarities between accounting and fiscal systems which have different rules about the treatment of some items of financial statements. Such differences can be used by managers to reduce ETRs through a legal way. The objective of minimize tax expense has been labelled with diverse terms by previous researchers, for example, Desai and Dharmapala (2006) and Dyrenge et al. (2008) named it as *tax avoidance* and define it as anything that explicitly reduces taxes. Armstrong et al. (2012) and Wahab and Holland (2012) use the term *tax planning*, instead. Additionally, Minick and Noga (2010) alternatively termed it as *tax management* and clarify that it consists on "the ability to pay a low amount of taxes". The possibility to manage taxes is to some extent related with the deferred component of tax expense. However, Hanlon and Heitzman (2010) explain that strategies based on the deferred component of tax expense don't have influence on the GAAP ETR. Nonetheless, it is still important to note that due to the time value of money, firms may choose to pay a low amount of taxes at the present moment and defer the payment of the remaining taxes to the future. By applying this strategy, firms are exploring the opportunities to manage deferred taxes.

### **2.1 Firms' financial and operational specific characteristics**

Effective tax rates are determined by multiple major firms' characteristics. Firms' size is one of the characteristics expected to influence ETRs. This indicator is largely studied in the literature and almost all the investigations about effective tax rates include it as an indicator with a prediction power over ETRs. However, the direction of the relationship between firms' size and ETRs can be ambiguous. Zimmerman (1983)

documents that larger firms are associated to higher effective tax rates. This can be explained by the political cost theory. According to this theory, effective tax rates are a proxy for political cost for the reason that taxes paid are a mean of wealth transfer from firms to other social groups. Effective tax rates are also a proxy for firms' success, therefore, if larger firms are more successful than smaller firms those will be exposed to more political scrutiny. As larger firms are subject to higher scrutiny from tax authorities they have reluctance to reduce effective tax rates. Consequently, larger firms are expected to have a higher taxation burden when compared with firms which have a smaller dimension since taxes paid represent political costs which shall be borne by firms. Another competing theory argues that since larger firms have more power and more resources to manage taxes it is expected that they have lower ETRs (Siegfried, 1972). Consistent with this perspective, Dyreng et al. (2008) and Richardson and Lanis, (2007) find a negative relation between size and ETR. However, other studies report that firms' size has a positive impact on effective tax rates (Rego, 2003; Vieira, 2013; Kraft, 2014). These studies confirm the political cost theory of Zimmerman (1983). In addition, Gupta and Newberry (1997) show that firms' size and ETR are not associated when we look to this relationship over time. They studied that association with the inclusion of the Tax Reform Act of 1986. When analysing UK firms, Holland (1998) also finds mixed relations between size and ETR depending on the firms' industry classification. Hence, previous literature has not reached a consensual opinion about the association between size and effective tax rates. Therefore, we expect that firms' size influences ETRs but we do not predict the direction of this relation.

*H1a: ETRs are associated with firm size.*

The analysis of capital structure is also fundamental to investigate which factors can influence firms' effective tax rate. How a company chooses its financing resources is important due to different fiscal treatment of different means of funding. A firm may essentially decide between debt financing and equity financing. If a firm decides on equity financing, although it can be a cheaper alternative, it has a con associated since the remuneration of investors, i.e., dividends, are not deductible for tax purposes. The deductibility of interest expense leads firms to prefer debt financing rather than equity financing. As pointed out by Kraft (2014), firms' financing decisions may also contribute

to the alignment of shareholders and managers' interests. Managers of firms with higher levels of leverage are subject to the discipline of financing agreements imposed by creditors through the inclusion of limiting clauses. These restrictions reduce the leeway available to take decisions that are not value maximizing only for the purpose of extracting private benefits. Given this explanation, it is expected that more leveraged firms exhibit lower effective tax rates. Richardson and Lanis (2007) and Kraft (2014) find a significant negative relationship between leverage, used as a proxy for capital structure, and effective tax rates. Due to this advantage associated to the debt tax shield, our prediction is in line with the extant literature and, hence, we expect a negative association between debt financing and ETRs. This expectation is expressed by the following hypothesis:

*H1b: Higher leveraged firms have lower ETRs.*

Along with firms' financing decisions, investment decisions are also a characteristic that can influence effective tax rates. As pointed out by Hanlon et al. (2010), managers' investment decisions can be to some extent constrained by corporate taxes due to the uncertainty of tax payments and deductions that have to be incorporated in the calculation of an investment's present value. As well as the deductibility of interest expense, depreciations and amortizations are an important slice of firms' costs. Therefore, firms that are more capital intensive benefit more from depreciations deductibility. This is even more important since an asset economic life is usually longer than the depreciation period (Richardson and Lanis, 2007). Due to the existence of different depreciation methods, more capital-intensive firms can easier manage taxes by accelerating or deferring depreciation expense and, consequently, they can take advantage from temporary book differences. Research and development (R&D) expenses are another aspect related to firms' investment decisions which contribute to lower effective tax rates. There are many fiscal incentives through multiple jurisdictions that promote the investment in R&D. Research and development programs are conditional on tax rates and credit incentives (Hanlon et al. 2010). Accordingly to Richardson and Lanis (2007) capital intensity and R&D expenses are supposed to have a negative impact on ETRs. Moreover, these authors also control for the influence of inventory intensity on effective tax rates. However, by contrast with capital intensity and R&D expenditure, they argue

that firms with higher inventory intensity exhibit higher ETR. The consideration of capital intensity, R&D expense and inventory intensity as determinants of ETRs is not consensual among researchers. Regarding these asset mix variables, Gupta and Newberry (1997) document that both capital intensity and R&D expense have a negative and significant impact on ETR. With reference to the inventory intensity the same authors find a positive relation between a higher proportion of stocks and ETRs. They refer that the negative relation between inventory intensity and ETRs can be due to the substitution effect between inventory investment and capital investment. The results presented by Richardson and Lanis (2007) are in the same direction of the ones showed by Gupta and Newberry (1997). In reference to inventory intensity, Derashid and Zhang (2003) do not find a significant influence on ETRs but, in contrast, also show a negative association between capital intensity and ETRs. Recently, Rodríguez and Arias (2014) that study the determinants of ETR in the BRIC countries also document a positive association between inventory intensity and ETR. In contrast to these investigations, Kraft (2014) does not include asset mix variables as explanatory variables of effective tax rates. For instance, this author argues that the fiscal benefits associated to capital intensity which result in differences between book and tax accounts will be captured by the deferred component of effective tax rate. Therefore, capital intensity will not affect ETR. In opposition to Kraft (2014), we will consider the influence of asset mix variables as firms' characteristics with potential to impact and determine ETRs. As a result we formulate the three following hypotheses:

*H1c: Capital intensity has a negative impact on ETRs.*

*H1d: Inventory intensity has a positive impact on ETRs.*

*H1e: R&D has a negative impact on ETRs.*

An intuitive indicator with capacity to influence effective tax rate is firms' profitability. Specifically, when we measure profitability based on pre-tax income it is expected that more profitable firms have higher earnings and, consequently, pay more taxes. This point of view is the one most evident in the literature. A positive association between firms profitability and ETR was found by Gupta and Newberry (1997), Richardson and Lanis (2007), Minick and Noga (2010) and Armstrong et al. (2012). By

contrast, we can find authors who argue that profitable firms can benefit from tax exemptions and use tax deductions and tax credits in a more efficient manner and, as a result, these firms exhibit greater book-tax differences (Manzon and Plesko, 2002). As pointed out by Rego (2003) more profitable firms have lower costs associated to managing taxes because they have more resources to invest in tax planning activities that contribute to lower effective tax rates. Furthermore, firms with higher pre-tax income have more incentives to reduce their taxation burden and, consequently, to decrease ETRs. In accordance with the perspective of more profitable firms exhibit lower ETR, Derashid and Zhang (2003) and Kraft (2014) document a negative influence of firms' profitability on ETRs. In view of these conflicting perspectives described above, we do not predict the expected sign to the relation between firms' profitability and ETRs.

*H1f: Firms' profitability is associated with ETRs.*

## **2.2 The influence of Corporate Governance**

Some of the financial and operational indicators described above are a consequence of managers' decisions. The main purpose of managers' actions and choices should be maximizing firm value by constantly seeking value maximizing projects and efficient operational processes. Financial and investment decisions are to some extent the result of management discretion, consequently, firms may face agency conflicts between shareholders and managers' interests (Jensen and Meckling, 1976). These decisions have influence on the determinants of firms' financial and operational characteristics, therefore, the relation between those characteristics and effective tax rates are somewhat the result of managers' decision power. As effective tax rate is also a key factor of firms performance, managers also have to pay attention to this variable and include it in their decisions. Attempts to lower ETR are valuable to shareholders because it increases the result available to shareholders' remuneration. However, managers may manage taxes not with the intention of lower effective tax rates. As pointed out by Desai and Dharmapala (2006), managing taxes may be costly to shareholders because managers can disguise the pursuing of self-interest activities through the objective of lowering taxes. Despite our main focus isn't tax avoidance activities, it is intuitive that when we talk about effective tax rate the objective is its reduction. Therefore, along with financial and operational determinants of ETRs, Corporate Governance mechanisms must be included

in the regressions of firms' ETR. There is a large body of literature that studies the influence of Corporate Governance on effective tax rates (Chen et al., 2010; Minick and Noga, 2010; Armstrong et al., 2012; Wahab and Holland, 2012; Badertscher et al., 2013; Vieira, 2013).

The separation of ownership and control is one of the main reasons to the existence of agency problems (Jensen and Meckling, 1976). As referred above managers may not be interested in lowering effective tax rates in order to increase shareholders' wealth for the reason that this does not directly affect their own wealth. One governance mechanism that incentives the alignment of managers' interests with those of shareholders and, therefore, helps to reduce agency problems is managerial ownership. As pointed out by Florackis (2008), this alignment effect is achieved through the minimization of managers' incentives to perk consumption or pursuing of projects with negative returns. Ozkan and Ozkan (2004) state that as the cost of managers actions will also be borne by them, this may constrain their willingness to allocate resources to non-value maximizing activities. If managers hold a significant proportion of shares, reducing ETR will also benefit them and, consequently, they have incentives to make financial decisions that contribute to the reduction of effective tax rates. By contrast to this perspective, Badertscher et al. (2013) argue that management-owned firms have fewer incentives to manage taxes by reducing them because managers-owners are averse to invest in risky activities. In our study we are just concerned about tax management activities that take advantage of different accounting and fiscal rules and not activities that can be considered as tax evasion or illegal. As a result, in our investigation we do not consider actions to reduce ETR as being risky, therefore, we do not follow the perspective of Badertscher et al. (2013). Although managerial ownership contributes to align incentives, there is an opposite theory about the effect of managerial ownership on value maximizing activities. Researchers who have studied this topic also refer that after a certain level of managerial ownership, managers have enough power to act according their own interests (Fraile and Fradejas, 2014). In the presence of higher managerial ownership, non-managers shareholders may have difficulties in monitoring managers' behaviour because managers can exert more control and won't care about the monitor and pressure exerted by outside shareholders (Ozkan and Ozkan, 2004). Therefore, high levels of managerial ownership contribute to the entrenchment effect and reduce the threat of removal caused by inefficient management.

By studying the relationship between managerial ownership and agency costs, Florackis (2008) finds that after a ten percent level of managerial ownership there is a positive impact on agency costs that corroborate the entrenchment effect. Huang et al. (2010) also find that shareholder monitoring will be effective only if managerial ownership won't be too much high to induce the entrenchment effect.

The analysis of ownership structure as part of Corporate Governance mechanisms should also take into account ownership concentration. Concentrated ownership is also an alternative way to reduce agency problems. According to Florackis (2008), shareholders with small participations have little incentives to monitor management, but if they own a significant stake of shares they will have interest in actively and effectively monitor management. Shareholders bear all the costs related to monitoring activities, therefore, just a large proportion of ownership will justify that they actively monitor management. By this way, managerial discretion is refrained and, thus, helps to mitigate agency problems between shareholders and managers (Ozkan and Ozkan, 2004). However, the reduction of agency problems through ownership concentration can be compromised due to another agency conflict. Firms with shareholders holding a large stake of shares may face agency problems between large and minority shareholders. This is particularly relevant because large shareholders have enough power to engage in activities which allow them to extract private benefits at the expense of minority shareholders (Shleifer and Vishny, 1997). Controlling shareholders would have more incentives to induce managers to reduce effective tax rates since their benefits resulting from more elevated earnings would also be higher. Chen et al. (2010) observe the relationship between tax aggressiveness and ownership structure by analysing the behaviour of family owned firms. On the one hand, concentrated family owners benefit from tax management activities due to tax savings; on the other hand, tax aggressiveness has costs associated like penalties, price discounts imposed by minority shareholders and the loss of reputational capital. For these reasons they find family firms, with higher ownership concentration, to be less aggressive than non-family firms. In addition to the potential of managerial ownership to reduce agency problems depending on the level of insider ownership (alignment effect versus entrenchment effect), ownership concentration may also exert a positive influence. As pointed by Fraile and Fradejas (2014), ownership concentration can influence the shareholders' willingness to actively

monitor managers' behaviour. In light of the above, we can find two competing theories. Ownership concentration can contribute to value maximizing activities and to reduce agency problem, or to accentuate agency conflicts between large shareholders and minority shareholders. Considering the above theories we expect ownership structure to be associated with effective tax rates either through insider ownership or ownership concentration but since there is not a consensus in literature we do not predict the sign of the relation. As a result, we present the following hypothesis:

*H2: Ownership structure is associated with ETRs.*

Another important Corporate Governance mechanism that influences the relationship between managers and shareholders is the board of directors. Adams et al. (2010) refer that directors are agents of shareholders. In consequence, the board of directors should incentive actions that contribute to the ultimate objective of any firm: create value to shareholders. Fama and Jensen (1983) characterize the board of directors as a decision system. They argue that the board of directors has important powers such as to hire, fire and compensate managers and also the power to ratify and monitor important decisions. We expect good Corporate Governance mechanisms to have a positive impact on the reduction of effective tax rates through the reduction of agency conflicts. Therefore, if the board of directors is regarded as a mechanism to diminish those conflicts as a result of its monitoring role, we also have to include the board of directors in the relation between Corporate Governance and effective tax rates. The most studied board of directors' characteristics as important Corporate Governance mechanisms are its size and composition. According to prior research, board size can be positively or negatively associated to Corporate Governance effectiveness (Wahab and Holland, 2012). The positive effect of board size results from the fact that larger boards benefit more from the diversity of its directors. Larger boards of directors can take advantage of the skills, expertise and experience of its members. This variety of skills contributes to a better advice about strategic decisions since larger boards can have a broader perspective about economic environment and can easier identify business opportunities (Pearce and Zahara, 1991). Other researchers document the negative consequences of a larger board of directors. Eisenberg et al. (1998) highlight the problems that arise from increase board dimension. Communication and coordination problems accentuate as the number of board

members increases. Additionally, larger boards have a reduced ability to control management. In the presence of larger boards it is also more difficult to achieve consensus about decisions which can difficult the implementation of important investment opportunities. Yermack (1996) analyses the relation between board size and firm value. He finds that firms with smaller boards have higher value.

Although it is important to consider the number of directors as a measure of Corporate Governance, it is no less relevant to observe the board composition. An important characteristic of the board of directors' composition is the classification of directors as non-executive (outside) or executive (inside) directors. As stated by Florackis (2008) board of directors with a higher proportion of non-executive directors are more effective monitors of management team. In fact, he emphasizes that turnover of inefficient management increases as the proportion of non-executive directors increases. Ozkan and Ozkan (2004) also argue that outside directors are appointed with the purpose of acting in the best shareholders' interest. Therefore, they expect that a higher proportion of non-executive directors contribute to improve the decision making process by the board of directors and to defend the shareholders' interest as non-executive directors must be impartial. Fama and Jensen (1983) state that outside directors can act as mediators of internal managers' disagreements; outside directors can control corporate top managers' competition. By this way, they help to reduce agency problems. The same authors also assert that as non-executive directors compensation is not influenced by company performance they have more incentives to effectively monitor management. Particularly, the good performance of non-executive directors should be rewarded by the market. An opposite argument claim that non-executive directors are less informed about the firm and prefer avoid confronts instead of actively monitor managers (Florackis, 2008). Hence, insider directors are regarded as important members of board of directors because they have valuable information about the corporation. However, management dominated boards will easily ignore shareholders' interests due the difficulty to limit the discretion of individual managers to pursue their own interests (Lanis and Richardson, 2011). Therefore, there is propensity to argue that non-executive directors are more effective to mitigate agency problems due to their independence, professional knowledge and experience (Wahab and Holland, 2012). However, this is not consensual. As result of the previously explained, we expect that board of directors have enough power to exert

influence on effective tax rate since it is expected that they help to reduce agency conflicts and, hence, preserve shareholders' interests. Due to the pros and cons associated to board size we do not make a prediction about the influence of this variable on ETRs. However, with respect to board composition, we expect that more independent boards contribute to monitor managers and, consequently, contribute to lower ETRs due to a more efficient management of tax burden. Hence, we formulate two additional hypotheses:

*H3a: Board size is associated with ETRs.*

*H3b: A large proportion of non-executive directors is associated with lower ETRs.*

### **3. Variables Definition and Sample Selection**

#### **3.1. Variables Definition**

##### **3.1.1. Tax Variables**

We are interested in studying the determinants of effective tax rates as well as the influence of Corporate Governance variables on ETRs. Consequently, effective tax rate is our dependent variable. Due to differences between financial balance sheet and tax balance sheet, tax expense is not composed only by current tax expense but also by deferred tax expense. As expressed in IAS 12.5 (IASB, 2010) “tax expense (tax income) is the aggregate amount included in the determination of profit or loss for the period in respect of current tax and deferred tax”. The latter component accounts for all differences in the calculation of financial and taxable profit which may result from temporary differences and/or the use of tax losses or tax credits. Many authors have considered different ETR measures in their studies. Regarding the numerator of the ratio used to compute the effective tax rate, Gupta and Newberry (1997) and Rego (2003) are some of the authors that use only current tax expense in the numerator. However, we believe that the inclusion of deferred tax expense in the numerator will produce more accurate results as deferred expense also reflects the influence of firms’ specific characteristics on their tax burden. Therefore, our study is in line with Richardson and Lanis (2007), Chen et al. (2010), Minick and Noga (2010), Armstrong et al. (2012) and Kraft (2014), for instance. Similar to the numerator, the choice of the ratio’s denominator is not objective. As pointed out by previous researchers (Gupta and Newberry, 1997 and Richardson and Lanis, 2007) we can select taxable income, financial income or cash flow from operations as denominator. Nevertheless, as mentioned by the same authors, taxable income is not a good measure because if both the numerator and the denominator are calculated after tax adjustments, we wouldn’t be able to observe the impact of tax preferences on effective tax rates. Consequently, we will compute our effective tax rate considering both pre-tax income and cash flow from operations as denominators. Our cash flow from operations measure is defined as the sum of profit for the period and depreciation and amortization expense. We also use cash flow from operations in the denominator because this variable reflects important tax preferences related with firms’ size and asset mix which can lead to tax reduction. In fact, as Zimmerman (1983) states, when we use cash flow from

operations in the denominator we can control for differences which may result from different accounting methods. In light of the above our effective tax rate measures are as follows:

$$ETR1 = \frac{Total\ Tax\ Expense_{it}}{Pre - Tax\ Income_{it}}$$

$$ETR2 = \frac{Total\ Tax\ Expense_{it}}{Cash\ Flow\ from\ Operations_{it}}$$

where  $i$  denotes the firm and  $t$  denotes the year. In order to control for any potential bias in our study and following Gupta and Newberry (1997) and Kraft (2014), we applied some restrictions to our ETRs values. We restricted our ETRs to lie between 0% and 100%. If total tax expense is negative we defined ETR as 0%. This restriction takes in consideration the possibility of tax refunds. On the other hand, if pre-tax income or cash flow from operations is negative and the total tax expense is positive, we set ETR1 or ETR2 to 100%, respectively. More recent studies consider long-run effective tax rate measures (Dyreng et al., 2008; Minick and Noga, 2010; Vieira, 2013). Dyreng et al. (2008) introduce the long-run ETR in order to study corporate tax avoidance arguing that annual ETR has some limitations. They claim that the main limitation of annual ETR is its year-to-year variability. Notwithstanding this limitation, due to our sample period we will build our study based on a one-year measure. Moreover, our focus is mainly to understand which firms' specific financial and operational characteristics and Corporate Governance attributes can impact ETR. As our primary concern is not investigate tax avoidance activities that results in lower ETR, we believe that annual effective tax rate also attends our main purpose.

### **3.1.2. Independent Variables**

#### **3.1.2.1. Firms' specific variables**

To examine the financial and operational determinants of effective tax rates we concentrate our analysis mostly in four hypotheses related to firms' size, leverage, asset

structure and profitability. To account for firms dimension we use the variable SIZE which is computed as the natural logarithm of total assets. This variable is largely used in papers related to the study of effective tax rates (Gupta and Newberry, 1997; Richardson and Lanis, 2007; Minick and Noga, 2010; Vieira, 2013). To evaluate the influence of debt tax shield on ETRs we use the variable LEV which is the ratio between long term debt and shareholders' equity. Chen et al. (2010), Huang et al. (2010) and Armstrong et al. (2012) are some of the authors that include a proxy for leverage in their researches. Regarding assets structure we describe three different hypotheses related with three different ratios. We start by interpreting the influence of capital intensity on ETRs resulting from depreciation and amortization expense; therefore, we define the variable CAP\_INT as the ratio between net property, plant and equipment and total assets. In opposition to firms' capital intensity, we include the variable INV\_INT as an explanatory variable of ETRs. This variable is expected to have a substitution effect with capital intensity. Our inventory intensity variable is defined as the ratio of total inventories to total assets. To take into consideration the effect of the investment tax shield associated to R&D expenses, we use the variable R&D\_INT. It is defined as R&D expense divided by total sales. These asset mix variables are frequently used in literature (Gupta and Newberry, 1997; Derashid, and Zhang, 2003; Richardson and Lanis, 2007; Minick and Noga, 2010; Rodríguez and Arias, 2014). Firms' profitability is commonly used as a variable with explanatory power of ETRs. For this reason, we also include in our study the variable ROA which is defined as the ratio between pre-tax income and total assets. Return on Assets is used in studies related to ETR such as Armstrong et al. (2012), Vieira (2013) and Kraft (2014).

In addition to the above variables related to firms' financial and operational characteristics, many studies have used market-to-book ratio as a firm-specific characteristic that may have an explanatory power on effective tax rates (Chen et al., 2010; Armstrong et al., 2012; Kraft, 2014). Through the inclusion of this variable we control for firms' growth potential. We define MB as market capitalization divided by shareholders' funds. As Minick and Noga (2010) and Vieira (2013) we also include D\_EARN which is a dummy variable equals to one if a firm has positive earnings and equals to zero if not. As explained by those authors we need to control for negative earnings as they may bias our analysis.

### 3.1.2.2. Corporate Governance Variables

Another set of hypotheses is developed in light of the influence of Corporate Governance mechanisms on effective tax rates. Corporate Governance characteristics can also influence firms' financial decisions and, as a result, may have impact on ETRs. In order to take into account Corporate Governance aspects, we analyse ownership structure and board of directors' composition. The first variable used is INS\_OWN which is measured as the ratio between closely held shares and common shares outstanding. According to Datastream database, the variable closely held shares represents the number of "shares held by insiders. It includes officers, directors and their immediate families, shares held in trust, shares of the company held by any other corporation (except shares held in a fiduciary capacity by banks or other financial institutions), shares held by pension/benefit plans and shares held by individuals who hold 5% or more of the outstanding shares". This variable is also used by Huang et al. (2010) and Vieira (2013). However, other authors have used institutional ownership instead of insider ownership (Desai and Dharmapala, 2009 and Wahab and Holland, 2012). Following Florackis (2008), in conjunction with the variable for insider ownership, we also include the variable OWN\_CONC which is a dummy variable equals to one if no shareholder holds more than 25% of outstanding shares and equals to zero, otherwise. We compute ownership concentration based on the Independence Indicator of Amadeus Database which attributes a classification of A, B, C, D or U to companies according to the degree of independence of a company with regard to its shareholders.<sup>1</sup> The limit of 25% of shareholders' participations is more ambitious than the ones frequently used in literature. Other important dimension we must consider when studying the influence of Corporate Governance mechanisms relates to board of directors' composition. We start with the inclusion of the variable BOARD which designates the total number of current board members. The dimension of board of directors is a variable extensively used in literature (Yermack, 1996; Eisenberg et al., 1998; Minick and Noga, 2010; Lanis and Richardson, 2011; Wahab and Holland, 2012). Alongside with board of directors' dimension we also analyse its composition. We expect that board independence can influence ETRs. Therefore, we include in our analysis the number of non-executive board members to

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<sup>1</sup> The Independence Indicator of Amadeus database is defined with more detail in the Appendix.

capture that effect. The variable used is NON\_EXEC which represents the ratio of total number of non-executive directors to total number of directors. The distinction between insiders and outsiders directors is also made by Florackis (2008), Lanis and Richardson (2011) and Wahab and Holland (2012). All our Corporate Governance variables are measured year by year. Despite most of studies consider these variables constant during more than one year, we computed all variables year by year in order to obtain more precise and rigorous estimations. As the information available to compute these variables displayed on the database relates to the current year, to obtain year values for the variables OWN\_CONC, BOARD and NON\_EXEC we needed to contact the provider of Amadeus Database. Otherwise, we would not be able to obtain the values for these variables year by year as they are not available to database end users.

### **3.2. Sample Selection**

Table 1 describes our sample selection process. Our investigation is based on the analysis of firms listed on the London Stock Exchange (LSE) for the period between 2010 and 2013. We start the construction of our sample by considering all LSE listed firms with data available on Amadeus Database. This selection results in a sample of 1531 firms. Except for the variable insider ownership, all our remaining variables are from Amadeus Database. We obtain insider ownership by collecting the number of closely held shares and total common shares outstanding from DataStream Database. Due to the use of two different databases we need to assure that the firms obtained from one database match exactly the firms obtained from the other. In order to guarantee that the firms of Amadeus Database and the firms of DataStream Database are exactly the same we make the match between both databases by using the International Securities Identification Number (ISIN number) which is unique for each firm. Through the use of this code we assure that there is no inconsistency in our sample and that the use of two databases has no impact on the accuracy and rigor of our results. Through this matching procedure between Amadeus Database' variables and DataStream Database' variable the sample is reduced to 1195 firms. After this process we also exclude 4 firms that are in "insolvency process" or "dormant" status, therefore we just keep firms with an "active" status. Additionally, we constrain our sample by excluding all firms with unavailable information about our two measures of effective tax rates. The total number of firms

which meet our sample selection criteria is 745. Regarding industry classification, we categorize the firms of our sample according to the Fama and French (1997) 48 industry classifications. We exclude all firms that fall into the following five classifications: “Banks” (5 firms), “Insurance” (2 firms) and “Trading” (34 firms). After all exclusions, our final sample contains 704 firms for 4 years which represents 2816 firm year observations.

Table 2 summarizes all variables used in our study, how they are computed, their sources and the expected sign of their estimated coefficients.

**Table 1:** Sample selection process

<b>Details</b>	<b>Number of firms</b>
Listed firms on the London Stock Exchange from Amadeus Database	1531
Match between Amadeus Database and DataStream Database	(336)
Firms with a non "Active" status	(4)
Firms with at least one year of ETRs information not available	(446)
Financial firms	(41)
Final sample	704
Number of firm year observations	2816

This table explains our sample construction process.

**Table 2:** Variables, definition, databases and expected signs of estimated coefficients

<b>Variable</b>	<b>Definition</b>	<b>Database</b>	<b>Predicted Sign</b>
<b>Tax Variables</b>			
ETR 1	Tax expense / Pre-tax income	Amadeus	
ETR 2	Tax expense / Cash flow from operations	Amadeus	
<b>Firm Specific Variables</b>			
SIZE	Log (total assets)	Amadeus	+/-
LEV	Long-term debt / Shareholders equity	Amadeus	-
CAP_INT	Net property, plant and equipment / Total assets	Amadeus	-
INV_INT	Total inventories / Total assets	Amadeus	+
RD_INT	R&D expense / Total sales	Amadeus	-
ROA	Pre-tax income / Total assets	Amadeus	+/-
MB	Market capitalization / Shareholders funds	Amadeus	
D_EARN	Equals to 1 if earnings > 0; 0 otherwise	Amadeus	
<b>Corporate Governance Variables</b>			
INS_OWN	Closely held shares / Common shares outstanding	DataStream	+/-
OWN_CONC	Equals to 1 if no shareholder holds more than 25% of outstanding shares; 0 otherwise	Amadeus	+/-
BOARD	Number of current directors	Amadeus	+/-
NON_EXEC	Number of non-executive directors / Number of directors	Amadeus	-

This table summarizes all variables used in this paper, their definition, source and expected sign of estimated coefficients.

## **4. Methodology and Univariate Analysis**

### **4.1. Methodology**

In order to test the hypotheses developed in section 2, in this section we explain the methodology used.

Our data set has a panel structure; therefore we apply a panel data model with the aim of achieving best estimation results. Baltagi (2003) points out some of the main advantages of using panel data models. In fact, panel data can control for individual heterogeneity and allow identifying and measuring effects that are not detectable using other data models. Also, it has the benefits of reducing the collinearity and allowing for more degrees of freedom while being more efficient. In this sense, through a panel data structure we can control for unobservable effects that are present in cross-section and time dimensions. With panel data the most commonly estimated models are fixed effects models and random effects models. Fixed effects models have the ability to control for omitted variables bias as long as these variables are time-invariant. Therefore, fixed effects models also control for the effect of time-invariant differences between the individuals. On the other hand, random effects models distinguish from fixed effects models because unobserved variables are assumed to be uncorrelated with observed variables. Consequently, the error term is not correlated with explanatory variables.

With the purpose of determining whether random or fixed effects should be considered, we perform the Hausman test. The result allows us to reject the null hypothesis of equal coefficients and, thus, the fixed effects model is more appropriate. We have also detected the presence of heteroskedasticity in the residuals. To test for heteroskedasticity we perform the White test. Taking into consideration the characteristics of the data used, we estimate our regressions using Generalized Least Squares (GLS) cross-section weights with a fixed effect model for time through the inclusion of year dummy variables. Due to firm individual heterogeneity we can control for discrepant individual variance by using a GLS model and, as a result, we obtain more efficient coefficient estimations. We include year dummies to control for time effects due to unexpected variation or special events that could affect the dependent variable, through

this way the time effects included in the error term can be removed. In order to mitigate the effect of influential observations on results, each independent variable was winsorized at 1% and 99% levels.

To test the first set of hypotheses regarding the firms' specific characteristics that influence ETRs, we present two regressions models. These two models only differ in the tax variable used, ETR1 or ETR2. These models are our initial point of investigation. The first two regressions models are as follows:

$$ETR1_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 CAP\_INT_{it} + \beta_4 INV\_INT_{it} + \beta_5 RD\_INT_{it} + \beta_6 ROA_{it} + \beta_7 MB_{it} + \beta_8 D\_EARN_{it} + Year\ Indicators + \varepsilon_{it} \quad (4.1)$$

$$ETR2_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 CAP\_INT_{it} + \beta_4 INV\_INT_{it} + \beta_5 RD\_INT_{it} + \beta_6 ROA_{it} + \beta_7 MB_{it} + \beta_8 D\_EARN_{it} + Year\ Indicators + \varepsilon_{it} \quad (4.2)$$

where  $i$  relates to each firm ( $i=1\dots N$ ) and  $t$  relates to each year (2010-2013), the error term is represented by  $\varepsilon_{it}$ . As previously explained, ETR1 is computed as the ratio between tax expense and pre-tax income and ETR2 is calculated as tax expense scaled by operational cash flow. Apart from firms' financial and operational specific determinants, we also include in the regression two control variables, MB and D\_EAR.

In a second phase, we test how Corporate Governance mechanisms can influence effective tax rates. Therefore, we include in our regressions Corporate Governance variables related to ownership structure and board composition. This second set of equations is as follows:

$$ETR1_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 CAP\_INT_{it} + \beta_4 INV\_INT_{it} + \beta_5 RD\_INT_{it} + \beta_6 ROA_{it} + \beta_7 MB_{it} + \beta_8 D\_EARN_{it} + \beta_9 INS\_OWN_{it} + \beta_{10} OWN\_CONC_{it} + \beta_{11} BOARD_{it} + \beta_{12} NON\_EXEC_{it} + Year\ Indicators + \varepsilon_{it} \quad (4.3)$$

$$ETR2_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 CAP\_INT_{it} + \beta_4 INV\_INT_{it} + \beta_5 RD\_INT_{it} + \beta_6 ROA_{it} + \beta_7 MB_{it} + \beta_8 D\_EARN_{it} + \beta_9 INS\_OWN_{it} + \beta_{10} OWN\_CONC_{it} + \beta_{11} BOARD_{it} + \beta_{12} NON\_EXEC_{it} + Year\ Indicators + \varepsilon_{it} \quad (4.4)$$

where  $i$  relates to each firm ( $i=1\dots N$ ) and  $t$  relates to each year (2010-2013), the error term is represented by  $\varepsilon_{it}$ . Tax variables and firms' specific variables are the same of the first two models. Additionally, we include in both regressions four new variables to test the impact of Corporate Governance on ETRs.

## 4.2 Univariate Results

Summary descriptive statistics for both dependent and explanatory variables for the period 2010-2013 are reported in Table 3. The aggregate average for ETR1 (ETR2) is 24.5% (19.8%) which represents almost one quarter of the pre-tax earnings of the firms. As our sample comprises firms listed on the London Stock Exchange, the mean value of ETR1 is in line with the value for statutory corporate tax rate in United Kingdom which decreased from 28%, in 2010, to 23%, in 2013. As expected, our sample consists mainly of large firms as total assets present an approximately mean (maximum) value of € 3,000 million (€250,000 millions). Also, the majority of our sample consists of capital intensive firms with non-current assets representing more than 50% of total assets. Conversely, the proportion of inventories on total assets is reduced; its average is below 10%. Regarding the influence of R&D intensity, on average, it has a low value (6%). However, it was observed a maximum value of 78.9%, indicating a large disparity in terms of the use of R&D incentives. Market value is, on average, almost two and half times the book value evidencing higher market capitalization of our sample firms. Approximately, 77% of the reported earnings before taxes were positive during our sample period. As regards Corporate Governance variables and concerning the ownership structure, we can observe that about 29% of total outstanding shares of our sample's firms are closely held. This value varies between 91% to firms with shares almost totally held by insiders, and 0% to firms with no insider participation. The dummy variable OWN\_CONC has an average value of 67.4% which means that firms are mainly independent from controlling shareholders or that no shareholder holds more than 25% of firms' shares. In relation to board of directors, our sample's firms have on average a board of directors composed by 12 directors. The board of directors dimension ranges from 4 to 37 directors. Non-executive directors constitute almost 40% of the total board of directors' members.

**Table 3:** Descriptive statistics

<b>Variables</b>	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Standard Deviation</b>
ETR1	0.245	0.211	1	0	0.269
ETR2	0.198	0.149	1	0	0.239
ASSETS	3,021,243,110	132,916,581	256,689,165,202	348,832	16,073,591,238
LEV	0.424	0.135	5.874	0	0.841
CAP_INT	0.547	0.565	0.968	0.014	0.238
INV_INT	0.094	0.035	0.732	0	0.133
RD_INT	0.064	0.019	0.789	0	12.756
ROA	0.031	0.055	0.312	-0.677	15.377
MB	2.495	1.562	23.789	-11.74	3.940
D_EARN	0.768	1	1	0	0.422
INS_OWN	0.287	0.233	0.913	0	0.266
OWN_CONC	0.674	1	1	0	0.469
BOARD	11.7	10	37	4	6.365
NON_EXEC	0.399	0.4	0.808	0	0.160

Table 3 summarizes univariate statistics for both tax variables and explanatory variables. ETR1 is computed as the ratio between total tax expense and pre-tax income. ETR2 is defined as the ratio between total tax expense and cash flow from operations. ASSETS is total assets in euros, LEV is long term debt divided by shareholders equity, CAP\_INT is net property, plant and equipment scaled by total assets, INV\_INT is total inventories divided by total assets, RD\_INT is R&D expense scaled by total sales, ROA is pre-tax income divided by total assets, MB is market capitalization divided by shareholders funds, D\_EARN is a dummy variable set to one if earnings before taxes are positive and zero otherwise, INS\_OWN is closely held shares scaled by common shares outstanding, OWN\_CONC is a dummy variable equals to one if no shareholder holds more than 25% of total shares outstanding and zero otherwise, BOARD is the number of current directors and NON\_EXEC is the number of non-executive directors divided by total number of directors. The sample comprises 704 firms for the period 2010-2013 which represents 2816 firm-year observations.

Table 4 presents the distribution of the firms of our sample according to the 48 Fama and French (1997) industry classification codes. It also presents average effective tax rates by industry for our sample period, 2010-2013. One quarter of our sample is constituted by firms which fall into the category of “Business Services” (178 firms). “Retail” and “Petroleum & Natural Gas” are the next largest categories, however, with a much smaller number of firms, 43 and 34, respectively. There are 8 categories which have an average ETR1 greater than 30%. The highest ETR1 is found in the category “Petroleum & Natural Gas” (43.5%). The category “Precious Metals” also has an ETR1 above 40%. These two latter categories also have the highest ETR2, 35.5% and 33.7%, respectively. On the opposite side, the lowest ETR1 belongs to “Medical equipment” category (11.9%). There are 5 more categories with an average ETR1 below 20%: “Utilities”, “Electrical Equipment”, “Toys & Recreation”, “Real Estate” and “Soda”.

**Table 4:** Industry composition and average ETRs by industry

<b>Industry (per Fama and French 1997)</b>	<b>Number of firms</b>	<b>% of total firms</b>	<b>Average ETR1</b>	<b>Average ETR2</b>
Agriculture	10	1.4%	0.239	0.215
Food	8	1.1%	0.233	0.184
Soda	4	0.6%	0.196	0.196
Toys & Recreation	4	0.6%	0.160	0.094
Fun & Entertainment	13	1.8%	0.376	0.154
Printing & Publishing	14	2.0%	0.225	0.143
Household Consumer goods	13	1.8%	0.215	0.189
Medical Equipment	13	1.8%	0.119	0.099
Pharmaceutical Products	18	2.6%	0.204	0.170
Chemicals	14	2.0%	0.223	0.207
Rubber & Plastic	7	1.0%	0.276	0.210
Construction Materials	18	2.6%	0.231	0.223
Construction	26	3.7%	0.236	0.243
Steel Works	5	0.7%	0.218	0.176
Machinery	17	2.4%	0.253	0.204
Electrical Equipment	10	1.4%	0.151	0.127
Aircraft	4	0.6%	0.202	0.138
Precious Metal	14	2.0%	0.406	0.337
Non-Metalling and Metal Mining	15	2.1%	0.342	0.305
Coal	4	0.6%	0.336	0.249
Petroleum & Natural Gas	34	4.8%	0.435	0.355
Utilities	10	1.4%	0.140	0.110
Telecom Communications	18	2.6%	0.264	0.164
Personal Services	6	0.9%	0.300	0.180
Business Services	178	25.3%	0.213	0.180
Computers	18	2.6%	0.330	0.206
Electronic Equipment	30	4.3%	0.205	0.167
Lab Equipment	8	1.1%	0.308	0.209
Business Supplies	8	1.1%	0.294	0.201
Transportation	20	2.8%	0.241	0.192
Wholesale	24	3.4%	0.294	0.234
Retail	43	6.1%	0.253	0.201
Restaurants, Hotels	19	2.7%	0.235	0.161
Real Estate	33	4.7%	0.180	0.188
Other *	24	3.4%	0.201	0.153

Table 4 categorizes our sample according to 48 Fama and French (1997) industry classification codes. \*Other industries include those industries that represent 3 or less firms of total sample: Beer and Liquor, Tobacco Products, Apparel, Healthcare, Textiles, Fabricated products, Automobiles and Trucks, Shipbuilding and Railroad Equipment, Shipping Containers and Other. ETR1 is computed as the ratio between total tax expense and pre-tax income. ETR2 is defined as the ratio between total tax expense and cash flow from operations.

Table 5 shows Pearson's correlations between tax variables, ETR1 and ETR2, and all explanatory variables. As expected our tax variables are positively correlated for the reason that they only differ in their denominator. Regarding ETR1 we can observe a positive correlation between ETR1 and ASSETS consistent with a positive impact of firm size on effective tax rates, which supports the political cost theory. Also, ROA and MB are positively correlated with ETR1 implying that firms' profitability and growth can contribute to higher effective tax rates. On the subject of R&D intensity, it exhibits a negative relationship with ETR1 evidencing the positive effect of R&D expenses' deductibility on effective tax rates. In terms of the ownership structure, on the one hand, INS\_OWN is inversely correlated to ETR1 evidencing the positive effect of managerial ownership on the reduction of ETRs. On the other hand, firms with a less concentrated ownership structure seem to have higher ETR1. As regards the dimension of board of directors it is documented that more board members have a positive influence on ETR1. Regarding Pearson's correlations between ETR2 and all explanatory variables we can observe similar results to those observed to ETR1. Considering correlations between explanatory variables, we observe that capital intensity displays a positive correlation with total assets highlighting that larger firms tend to be also more capital intensive. CAP\_INT and INV\_INT are strongly negatively related corroborating the substitution effect between them. More leveraged firms are also more capital intensive firms. Larger and more profitable firms have larger board of directors. On the contrary, larger boards are negatively correlated with the percentage of closely held shares. Taking into consideration the stake of shares hold by insiders, we can verify that it has a negative relationship with firms' independence from controlling shareholders. Bearing in mind the relatively low values of correlation's coefficients we can assume that multicollinearity is not an issue in our sample.

**Table 5:** Pearson's correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
ETR1 (1)	1													
ETR2 (2)	0.661	1												
ASSETS (3)	0.112	0.033	1											
LEV (4)	0.098	0.085	0.088	1										
CAP_INT (5)	0.045	-0.043	0.258	0.200	1									
INV_INT (6)	0.081	0.114	-0.113	0.002	-0.480	1								
RD_INT (7)	-0.164	-0.160	-0.106	-0.160	-0.268	-0.163	1							
ROA (8)	0.111	0.203	0.077	-0.001	0.085	0.147	-0.392	1						
MB (9)	0.003	0.093	-0.038	0.443	-0.146	0.027	-0.016	0.079	1					
D_EARN (10)	0.004	0.096	0.046	0.044	0.061	0.113	-0.285	0.731	-0.008	1				
INS_OWN (11)	-0.123	-0.100	-0.184	-0.158	-0.265	0.080	0.055	-0.144	-0.067	-0.112	1			
OWN_CONC (12)	0.049	0.079	-0.033	0.053	0.068	-0.004	-0.117	0.106	0.048	0.074	-0.323	1		
BOARD (13)	0.161	0.118	0.559	0.199	0.347	-0.067	-0.170	0.223	0.017	0.170	-0.378	0.054	1	
NON_EXEC (14)	0,059	0.041	-0.017	0.067	-0.016	-0.017	0.073	-0.017	0.093	-0.064	-0.025	-0.015	-0.236	1

Table 5 presents the Pearson's correlations for all variables used in this study. ETR1 is computed as the ratio between total tax expense and pre-tax income. ETR2 is defined as the ratio between total tax expense and cash flow from operations. ASSETS is the total assets in euros, LEV is long term debt divided by shareholders equity, CAP\_INT is net property, plant and equipment scaled by total assets, INV\_INT is total inventories divided by total assets, RD\_INT is R&D expense scaled by total sales, ROA is pre-tax income divided by total assets, MB is market capitalization divided by shareholders funds, D\_EARN is a dummy variable equals to one if earnings before taxes are positive and zero otherwise, INS\_OWN is closely held shares scaled by common shares outstanding, OWN\_CONC is a dummy variable equals to one if no shareholder holds more than 25% of total shares outstanding and zero otherwise, BOARD is the number of current directors and NON\_EXEC is the number of non-executive directors divided by total number of directors. The sample comprises 704 firms for the period between 2010 and 2013 which represents 2816 firm-year observations.

## 5. Results

### 5.1. Multivariate analysis

#### 5.1.1. Results for firms' specific characteristics

In order to test which firms' specific characteristics influence effective tax rates, we estimate equations (4.1) and (4.2) using the Generalized Least Squares (GLS) cross-section weights with year dummies to control for time effects. These two equations constitute our initial point of analysis. Thereafter, in the next subsection, we will present our complete model with the inclusion of the Corporate Governance variables by estimating equations (4.3) and (4.4).

Columns 1 and 2 of Table 6 exhibit regressions results for both ETR1 and ETR2, respectively. As previously explained, these two tax variables only differ in the denominator's choice. ETR1 is computed by using pre-tax income in the denominator. Alternatively, ETR2 is calculated using cash flow from operations as denominator. We expect the results on ETR2 to be more reliable because through the use of cash flow from operations we can control for different accounting methods related to firm size (Zimmerman, 1983). Regression coefficient for the variable SIZE evidence a positive and significant association with ETR1 ( $\beta=0.0467$ ,  $t=26.3377$ ) and, as well, with ETR2 ( $\beta=0.0300$ ,  $t=10.9552$ ). These results are consistent with previous findings of Zimmerman (1983), Rego (2003), Minick and Noga (2010) and Kraft (2014). Therefore, larger firms have higher corporate effective tax rate, which supports the political cost theory. This theory argues that high tax rates are a mean of wealth transfer to State in order to redistribute it to social groups. They are also a proxy of firms' success. These results are consistent with hypothesis *H1a* as there is a significant relationship between SIZE and ETR1 and between SIZE and ETR2. Regarding the influence of firms' leverage on effective tax rate, we expect a negative coefficient. We find a positive and insignificant relationship between LEV and ETR1 ( $\beta=0.0060$ ,  $t=1.4193$ ). Conversely, regarding the relationship between ETR2 and LEV we find a negative and significant coefficient ( $\beta=-0.0105$ ,  $t=-2.8509$ ). This finding is consistent with the rationale that firms prefer debt financing rather than equity financing due to the interest deductibility associated to the former (Richardson and Lanis, 2007 and Kraft, 2014). For that reason, we can observe

that the debt tax shield associated to the choice of debt financing contributes to lower effective tax rate. Additionally, the discrepancy between the results achieved may be related to the computation of our tax variables. As explained above, ETR2 takes into consideration differences between dissimilar accounting methods. Therefore, concerning the relationship between the variables LEV and ETR2 we find support for our hypothesis *H1b*. To test the impact of firms' investment decisions on ETRs we take into account firms' asset structure. The first variable used to measure this effect is capital intensity, CAP\_INT, which reveals a negative and significant coefficient in the first regression ( $\beta = -0.0828$ ,  $t = -8.7957$ ) and, also, in the second one ( $\beta = -0.1103$ ,  $t = -6.6256$ ). These results are consistent with hypothesis *H1c* supporting that more capital intensive firms have a lower effective tax rate as a result of the deductibility of depreciations and amortizations expenses. Such evidence is in line with the findings of Gupta and Newberry (1997), Richardson and Lanis (2007) and Rodríguez and Arias (2014). On the opposite side of capital intensity, there are researchers who argue that inventory intensity exhibits a substitution effect to capital intensity. Therefore, we propose a positive sign for the coefficient of INV\_INT. In fact, our results support our prediction, there is a positive and significant relationship between inventory intensity and ETR1 ( $\beta = 0.0819$ ,  $t = 4.8444$ ) and between INV\_INT and ETR2 ( $\beta = 0.1266$ ,  $t = 4.4173$ ). Our results are consistent with those of Gupta and Newberry (1997) and Richardson and Lanis (2007) but not with Derashid and Zhang (2003) that do not find a significant relationship between inventory intensity and ETR. As a result, our hypothesis *H1d* is corroborated. Another important component of investment decisions, also studied by authors like Gupta and Newberry (1997) and Richardson and Lanis (2007), regards the investment on Research & Development. Since there are important fiscal incentives related to R&D expenses, it is expected a negative association between RD\_INT and our tax variables. As expected, we find a negative and significant coefficient for RD\_INT in the first regression ( $\beta = -0.0025$ ,  $t = -31.8080$ ). Concerning the variable ETR2 we also find a negative and significant relationship between ETR2 and RD\_INT ( $\beta = -0.0013$ ,  $t = -5.2534$ ). These results confirm hypothesis *H1e*. Therefore, our hypotheses regarding asset mix variables are all corroborated. Our last hypothesis related to firms' financial specific characteristics is about firms' profitability. We use the variable ROA as a proxy for that indicator. Our results show a positive and significant relationship between firms' profitability and ETR1 ( $\beta = 0.0022$ ,

$t= 8.6835$ ). The results for ETR2 are in the same direction of the ones for ETR1 ( $\beta= 0.0025$ ,  $t= 9.7946$ ). These positive associations are consistent with Richardson and Lanis (2007), Minick and Noga (2010) and Armstrong et al. (2012). These can be simply explained for the reason that more profitable firms have higher earnings and, consequently, pay more taxes. However, Derashid and Zhang (2003) and Kraft (2014) find opposite results which can rely on the assumption that more profitable firms also have more resources to manage taxes in a reducing way. These results confirm our hypothesis *H1f* as we find a significant association between ROA and our two tax variables. In order to account for the influence of firms' growth potential, we include the variable MB and we find a negative relationship between MB and ETR1 ( $\beta= -0.0020$ ,  $t= -2.4833$ ). This result is inconsistent with the one found by Derashid and Zhang (2003). These authors argue that firms with a higher market capitalization and, consequently, more growth potential, exhibit higher effective tax rate. Contrary to ETR1, we find support for this theory when we look to the relationship between MB and ETR2 ( $\beta=0.0056$ ,  $t=6.1741$ ).

Overall, except for firms' leverage, all results found for relations between firms' financial and operational characteristics and ETR1 are in line with our expectations. Moreover, we can observe an adjusted R-squared of 89.89%, which means that ETR1 variation can be explained in almost 90% by our explanatory variables. Additionally, our estimation output presents a value for prob F-statistic of 0.000, thus our variables are jointly significant. Concerning the results of equation (4.2), all explanatory variables evidence the expected sign. Therefore, taking into consideration ETR2 as our tax variable, all our hypotheses about the influence of firms' financial and operational specific characteristics are corroborated. This result evidences that the findings related to the second regression are more elucidative about the influence of firms' financial and operational characteristics on ETRs. Regarding equation (2) we find that our data fits our model in 65.60% (adjusted R-squared). In addition, our regression is globally significant as prob F-statistic is equal to 0.000. Overall, we observe that firms' financial specific characteristics have impact on effective tax rates.

In the next subsection we will analyse the influence of Corporate Governance attributes on effective tax rates. Therefore, equations (4.3) and (4.4) present our complete

model by including Corporate Governance variables in order to determine which factors can have a significant impact on ETRs.

**Table 6:** Estimation results for the impact of firms' financial and operational specific characteristics on ETRs

Firm characteristics	ETR1 (1)	ETR2 (2)
C	-0.0873*** (-4.4719)	-0.0536** (-2.2553)
SIZE	0.0467*** (26.3377)	0.0300*** (10.9552)
LEV	0.0060 (1.4193)	-0.0105*** (-2.8509)
CAP_INT	-0.0828*** (-8.7957)	-0.1103*** (-6.6256)
INV_INT	0.0819*** (4.8444)	0.1266*** (4.4173)
RD_INT	-0.0025*** (-31.8080)	-0.0013*** (-5.2534)
ROA	0.0022*** (8.6835)	0.0025*** (9.7946)
MB	-0.0020** (-2.4833)	0.0056*** (6.1741)
D_EARN	-0.0634*** (-4.8368)	-0.0138 (-1.0655)
Year dummies	YES	YES
R-squared	0.90022	0.660426

(Table 6 is continued in the next page)

**Table 6 continued:**

Adjusted R-squared	0.898891	0.655904
F-statistic	677.4756	146.0417
Prob (F-statistic)	0.0000	0.0000
Total panel (unbalanced) observations	838	838

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Table 6 presents the estimation of equations (4.1) and (4.2) where the dependent variables are ETR1 or ETR2, respectively, and explanatory variables are firms' financial and operational specific characteristics. ETR1 is computed as the ratio between total tax expense and pre-tax income. ETR2 is defined as the ratio between total tax expense and cash flow from operations. SIZE is the natural logarithm of total assets, LEV is long term debt divided by shareholders equity, CAP\_INT is net property, plant and equipment scaled by total assets, INV\_INT is total inventories divided by total assets, RD\_INT is R&D expense scaled by total sales, ROA is pre-tax income divided by total assets, MB is market capitalization divided by shareholders funds, D\_EARN is a dummy variable equals to one if earnings before taxes are positive and zero otherwise. Both regressions were estimated using Generalized Least Squares (GLS) cross-section weights with a fixed effect for time through the inclusion of year dummy variables. All independent variables were winsorized at 1% and 99%. \* means 10% individual significance, \*\* means 5% individual significance and \*\*\* means 1% individual significance. In parenthesis are observed t-statistic values.

### 5.1.2. Results for the influence of Corporate Governance

Along with financial and operational indicators, Corporate Governance attributes may influence firms' effective tax rates. Interactions between managers, shareholders, members of board of directors and stakeholders are decisive regarding investments' choices. As a result, investments' decisions influence ETRs due to their impact on firms' financial specific characteristics. Also, managing taxes is a matter ever more relevant as it has impact on firms' cash flow. Therefore, shareholders and board members, who may act in the best interest of the shareholders, can exert influence on the behaviour of effective tax rates through their governing decisions. With the objective of studying the effect of Corporate Governance attributes on ETRs, we estimate equations (4.3) and (4.4) using Generalized Least Squares (GLS) cross-section weights with a fixed effect model for time. These two models represent our complete model by combining firms' financial and operational characteristics, which were analysed in the previous section, and Corporate Governance attributes.

Table 7, columns 1 and 2, show regressions results for our tax variables, ETR1 and ETR2, respectively, by taking into consideration both firms' financial specific characteristics and Corporate Governance mechanisms. In relation to the firms' specific characteristic, the results of column 1 and 2 are in line with those reported in Table 6. Therefore, all the coefficients exhibit the predicted sign, corroborating all hypotheses about this set of variables. This is particularly evident on column 2 of Table7 when we consider ETR2 as our proxy of effective tax rate. Regarding Corporate Governance variables, we distinguish between two different dimensions: ownership structure and board of directors' composition. The agency theory consists on a well-studied conflict between managers and shareholders (Jensen and Meckling, 1976). Managers may pursue goals and investments that are not value maximizing only with the aim of achieving benefits to themselves (Desai and Dharmapala, 2006). By this reason, ownership structure can contribute to attenuate or emphasize that conflict. The variable INS\_OWN exhibits a negative and statistically significant coefficient in relation to ETR1 ( $\beta=-0.0463$ ,  $t=-5.7126$ ) and, as well, in relation to ETR2 ( $\beta=-0.0431$ ,  $t=-3.7313$ ). As control and ownership are usually separated, this gives potential to the existence of agency conflicts. Insider ownership helps to reduce this conflict as managers are also shareholders and,

therefore, they will be more averse to implement decisions or to invest in non-value maximizing activities. As lower effective tax rates contributes to higher net earnings and, consequently, to higher value to shareholders, the negative relationship found is consistent with this point of view. This interests' alignment effect between managers and shareholders is also in accordance with Ozkan and Ozkan (2004) and Florackis (2008). However, after a certain level of insider ownership we may have problems associated to the entrenchment effect as insider shareholders won't be worried about the monitoring effect of non-managers shareholders. Ownership concentration is another related measure of ownership structure. This measure is present in our analysis through the variable OWN\_CONC which shows a positive and significant relationship with ETR1 ( $\beta=0.0086$ ,  $t=2.3409$ ). Considering the results of column 2, we also find a positive and significant relationship between OWN\_CONC and ETR2 ( $\beta=0.0120$ ,  $t=2.2415$ ). Bearing in mind the definition of our ownership concentration variable, OWN\_CONC, we can conclude that firms with a less concentrated ownership structure exhibit higher effective tax rates. Many authors argue that high levels of ownership may induce shareholders to actively monitor managers since non-value maximizing decisions will have significant impact to majority shareholders. For that reason, ownership concentration acts as a mechanism to reduce agency conflicts. Conversely, our results show that more independent firms have higher effective tax rates. This can be explained due to the lack of incentive to minority shareholders actively monitor management actions and management' efficiency. We should also keep in mind that our variable used to measure OWN\_CONC has a threshold of 25% to categorize firms as independent or not. Most studies consider lower limits of concentration and, therefore, the conflicts of agency between minority and large shareholders may not be a problem in those studies. Our hypothesis *H2* predicts the existence of an association between ownership structure and ETRs. Considering the results above explained, in relation to the variables INS\_OWN and OWN\_CONC, we find that our hypothesis is confirmed for both insider ownership and ownership concentration dimensions as there is a significant association between these variables and ETR1 and ETR2, respectively.

We analyse the influence of Corporate Governance mechanisms on effective tax rates also through board of directors' size and composition. The variable BOARD exhibits a positive and significant relationship with ETR1 ( $\beta=0.0015$ ,  $t=4.9555$ ). The

results related to ETR2 are in the same direction ( $\beta=0.0017$ ,  $t=3.4213$ ). These results mean that larger boards are associated with higher effective tax rates. One possible explanation is based on the assumption that as board size increases it is more difficult to achieve consensus between board members (Eisenberg et al., 1998). Board of directors should act as agents of shareholders (Adams et al., 2010). Therefore, in the presence of larger boards, as coordination becomes a problem, it is also more difficult to invest in activities that reduce ETRs. Considering these results, we find evidence to support our hypothesis *H3a* as there is a significant association between board size and effective tax rates, ETR1 and ETR2. Along with board dimension, the composition of board of directors is also an important attribute which can exert influence on ETRs. This attribute is measured by the variable NON\_EXEC which exhibit a positive and significant relationship with ETR1 ( $\beta=0.0911$ ,  $t=7.9499$ ) and, also, with ETR2 ( $\beta=0.0581$ ,  $t=3.7355$ ). Our findings are contrary to extant literature. Minick and Noga (2010) and Lanis and Richardson (2011) find that more independent boards, with a higher proportion of non-executive board members, can manage taxes in a reducing way more effectively as they contribute to reduce conflicts of agency. This theory is supported by the argument that non-executive directors will defend shareholders' interests more actively due to their experience and expertise. Thus, we do not find evidence to corroborate our hypothesis *H3b* that predict a negative coefficient to the variable NON\_EXEC. However, our result is consistent with the argument that non-executive directors do not have incentives to actively monitor managers as they are less informed about firms' policies and, therefore, they will prefer a passive role in order to avoid confronts with management team (Florackis, 2008).

Both regressions have a prob F-statistic of 0.000 meaning that both models are globally significant. Therefore, equation (1) and (2) confirm the importance and influence of Corporate Governance mechanisms to determine effective tax rates.

Overall, Table 6 and Table 7 show some of firms' specific characteristics that may affect and determine firms' effective tax rates. We find evidence about the influence of firms' financial characteristics on ETRs. These characteristics are the result of managers' investment decisions which may be motivated or not by the objective of lowering taxes. Therefore, indicators such as firms' capital intensity and firms' capital structure may

influence or be influenced by that objective. As investment decisions are to some extent dependent of managers' discretion we should take into consideration the mechanisms that regulate and monitor relations between managers and shareholders. Our results support the relevance of Corporate Governance mechanisms to determine effective tax rates either by considering ownership structure or board of directors. In summary, we observe that effective tax rates can be explained with regards to financial indicators and Corporate Governance attributes.

**Table 7:** Estimation results for the impact of firms' financial and operational specific characteristics and Corporate Governance on ETRs

Firm characteristics	ETR1 (1)	ETR2 (2)
C	-0.0069 (-0.3035)	0.0127 (0.4181)
SIZE	0.0281*** (11.1335)	0.0169*** (4.2898)
LEV	0.0043 (1.0182)	-0.0097** (-2.5692)
CAP_INT	-0.0904*** (-6.9722)	-0.1192*** (-6.8911)
INV_INT	0.1012*** (4.6332)	0.1408*** (4.6431)
RD_INT	-0.0023*** (-14.4454)	-0.0015*** (-6.6242)
ROA	0.0017*** (6.4355)	0.0024*** (9.0649)
MB	-0.0010 (-1.4697)	0.0043*** (4.8847)
D_EARN	-0.0329** (-2.3402)	-0.0039 (-0.3066)

(Table 7 is continued in next page)

**Table 7 continued:**

INS_OWN	-0.0463*** (-5.7126)	-0.0431*** (-3.7313)
OWN_CONC	0.0086** (2.3409)	0.0120** (2.2415)
BOARD	0.0015*** (4.9555)	0.0017*** (3.4213)
NON_EXEC	0.0911*** (7.9499)	0.0581*** (3.7355)
Year dummies	YES	YES
R-squared	0.779492	0.643316
Adjusted R-squared	0.775384	0.636669
F-statistic	189.7112	96.7931
Prob(F-statistic)	0.000000	0.000000
Total panel (unbalanced) observations	821	821

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Table 7 presents the estimation of equations (4.3) and (4.4) where the dependent variables are ETR1 or ETR2, respectively, and explanatory variables are firms' financial specific characteristics and Corporate Governance characteristics. ETR1 is computed as the ratio between total tax expense and pre-tax income. ETR2 is defined as the ratio between total tax expense and cash flow from operations. SIZE is the natural logarithm of total assets, LEV is long term debt divided by shareholders equity, CAP\_INT is net property, plant and equipment scaled by total assets, INV\_INT is total inventories divided by total assets, RD\_INT is R&D expense scaled by total sales, ROA is pre-tax income divided by total assets, MB is market capitalization divided by shareholders funds, D\_EARN is a dummy variable equals to one if earnings before taxes are positive and zero otherwise, INS\_OWN is closely held shares scaled by common shares outstanding, OWN\_CONC is a dummy variable equals to one if no shareholder holds more than 25% of total shares outstanding and zero otherwise, BOARD is the number of current directors and NON\_EXEC is the number of non-executive directors divided by total number of directors. Both regressions were estimated using Generalized Least Squares (GLS) cross-section weights with a fixed effect for time through the inclusion of year dummy variables. All independent variables were winsorized at 1% and 99%. \* means 10% individual significance, \*\* means 5% individual significance and \*\*\* means 1% individual significance. In parenthesis are observed t-statistic values.

## 6. Conclusions

Corporate effective tax rate is ever more on the main agenda of managers when making their strategic decisions. The activities of tax reduction may contribute to important cash savings which will benefit shareholders and all remaining stakeholders. As a consequence, the analysis of investment decisions should take into consideration effective tax rate instead of the statutory tax rate. By this reason, this study provides some added value to existing literature by investigating how effective tax rates are affected by firms' financial and operational characteristics and, moreover, by Corporate Governance mechanisms.

In order to examine what affects ETRs we use a sample of 704 firms listed on the London Stock Exchange during the period 2010-2013. Our data is organized in a panel data structure. To measure effective ETRs we use two different variables. Our first ETR measure is obtained as the ratio between tax expense and pre-tax income. The second measure differs from the first because in the denominator we use cash flow from operations instead of pre-tax income.

Following a similar approach to Richardson and Lanis (2007) and Kraft (2014), we start our study by examining the impact of financial and operational indicators on ETRs. Our results show that larger firms have higher ETRs confirming the political cost theory (Zimmerman, 1983). Firms with a more capital intensive asset structure evidence lower effective tax rates due to the effect of depreciations. By reason of the substitution effect between capital intensity and inventory intensity, the latter evidences a positive impact on ETRs (Gupta and Newberry, 1997). The deductibility for tax purposes of R&D expenses also reduces ETRs. The tax shield associated to leverage also contributes to lower ETRs of more leveraged firms. Along with firms' dimension, firms' profitability has a positive influence on ETRs.

We further develop our model by studying the influence of Corporate Governance attributes on ETRs. Following a similar approach to the one of Minick and Noga (2010) we analyse the effect of ownership structure and board of directors' composition on ETRs. We put together on our econometric models firms' financial indicators and Corporate Governance measures. Corporate Governance can act as a controlling

mechanism to attenuate agency problems between managers and shareholders (Jensen and Meckling, 1976). We observe that a higher proportion of insider ownership contributes to lower ETRs corroborating the alignment effect attributed to managerial ownership. We also find that more independent firms, meaning those without the presence of controlling shareholders have less incentive to monitor managers actions and, therefore, these firms evidence higher ETRs. Regarding board of directors, our findings exhibit that larger boards are related to higher ETRs. This result can be explained because as the board size increases it is more difficult to achieve consensus opinions which weakens the monitoring power of the board of directors. Additionally, a higher number of non-executive board members contributes to increase ETRs.

Our research adds some insights to the extant literature by providing evidence about how and what affects and determines effective tax rates. Firstly, we use a different sample than the large majority of previous studies. Research studies based on the analysis of European firms are scarce. By focusing on non-financial firms listed on the London Stock Exchange our results provide evidence on the impact of firms' financial characteristics on ETRs. Moreover, we enlarge literature related to Corporate Governance and its influence on ETRs. We combine four Corporate Governance variables related to two different dimensions, ownership structure and board composition. In contrast with most of the studies, our variables have the advantage of being measured year by year. Particularly, the variable used to measure the ownership concentration is more ambitious than those of prior investigations as we do not account for participants smaller than one quarter to categorize a firm as independent or not from controlling shareholders. Our findings may be useful to tax researchers interested in studying effective tax rates and to their analysis of which factors can drive ETRs. Managers and investors are also interested in this study as effective tax rates influence firms performance and, consequently, may influence their remuneration and wealth. As well, policy makers, standard setters and regulators have to take into account the factors and indicators that impact ETRs on the analysis and definition of tax systems, thus our study contribute to their knowledge about it. Despite the significance of our results, our investigation has some limitations. Firstly, we are analysing a short sample period. Secondly, due to the sample period we use, we focus our research on current effective tax rate. It would be interesting if future research observed how long-run ETRs proposed by Dyreng et al. (2008) are influenced by the

same indicators using a similar sample. Another, improvement that can be made is related to the use of a measure of ETR capable of capturing tax avoidance activities such as cash effective tax rate.

## 7. Appendix

This appendix describes how we compute the variable used to measure concentration ownership, OWN\_CONC. We base its computation on the Independence Indicator available at the Amadeus Database. This indicator represents the degree of independence of a company with regard to its shareholders.

To each company is assigned a classification A, B, C, D or U according to the following rules:

- **A:** if none of known recorded shareholders have more than 25% of total or direct ownership; "A" companies are called “Independent companies”.
- **B:** if none of known recorded shareholders have a total or direct ownership percentage over 50% but there are one or more shareholders with an ownership percentage above 25%.
- **C:** is attached to any company with a recorded shareholder with a total ownership over 50%.
- **D:** is allocated to any company with a recorded shareholder with a direct ownership of over 50%.
- **U:** is allocated to companies that do not fall into the categories A, B, C or D - indicating an “unknown” degree of independence.

The variable OWN\_CONC is equal to one if a company is classified as “A” and is equal to zero, otherwise. By this way, we consider the influence of independent companies on effective tax rates.

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