LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER
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MASTER'S FINAL WORK
DISSERTATION

Corporate Tax Avoidance and Ex Ante Equity Cost of Capital in Europe

MATILDE MAIA MENDES PULIDO

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SUPERVISION:

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Abstract

The aim of this paper is to study the longstanding relationship between corporate tax avoidance and ex ante equity cost of capital in Europe, taking into consideration country-specific characteristics, which are essential in a context of corporate tax competition amongst European countries. We find that investors' apprehend tax avoidance differently at distinct levels of tax avoidance. We provide evidence that as low-tax avoidance firms engage in greater tax avoidance, the ex ante equity cost of capital appears to decrease. On the contrary, when high-tax avoidance firms undertake greater levels of tax avoidance, the ex ante equity cost of capital appears to increase. These results imply that there is a non-linear, convex relationship between tax avoidance and ex ante equity cost of capital. Finally, we explore the impact of institutional characteristics, countries' legal origin, on the relationship between tax avoidance an ex ante equity cost of capital. Results from this additional analysis are inconclusive, thus it remains uncertain whether institutional characteristics (legal origin) have an effect on the relation between tax avoidance and cost of capital.

JEL: G10, H20, H26

Keywords: Cost of capital; Taxation; Corporate tax avoidance.

Resumo

A presente dissertação pretende analisar a relação entre o nível de planeamento fiscal e o custo de capital ex ante na Europa, tendo em consideração as características específicas de cada país dado o contexto de maior concorrência fiscal entre empresas. Os resultados obtidos mostram que os investidores têm uma percepção diferente sobre o nível de planeamento fiscal praticado consoante a evolução deste. A análise realizada evidencia que à medida que o nível de planeamento fiscal adoptado aumenta de um nível baixo (low tax avoidance) para um nível mais elevado (high tax avoidance), o custo de capital ex ante decresce. Por outro lado, os resultados mostram também que se o nível de planeamento fiscal praticado se continuar a expandir no mesmo sentido, de um nível elevado para um nível muito superior, o custo de capital ex ante aumenta. Os resultados empíricos demonstram que há uma relação não-linear e convexa entre o nível de planeamento fiscal adoptado e o custo de capital ex ante. Por último, é considerado o efeito da origem legal do país em que cada empresa está sediada na relação entre o nível de planeamento fiscal adoptado e o custo de capital ex ante. Os resultados desta análise são inconclusivos, não sendo possível isolar um efeito específico da origem legal do país em que cada empresa está sediada sobre a relação entre o nível de planeamento fiscal praticado e o custo de capital ex ante.

JEL: G10, H20, H26

Palavras-chave: Custo de capital; Fiscalidade; Planeamento fiscal.

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List of abbreviations

AT	Total assets
BETR	Book effective tax rates
BMRatio	Book-to-market ratio
Capex	Capital expenditures
CETR	Cash effective tax rates
EPS	Earnings per share
ER	Estimated ex ante equity cost of capital
EU	European Union
FEPS	Forecasted earnings per share
HML	High minus low
I/B/E/S	Institutional Brokers' Estimate System
IFRS	International Financial Reporting Standards
LCETR	Long-run cash effective tax rates
PPEGT	Gross property plant and equipment
ROA	Return on assets
SMB	Small minus big

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1 Introduction

What is the impact on the ex ante equity cost of capital when firms deviate from (and subsequently move towards) their optimal level of tax avoidance amongst European firms? The effect of corporate taxation on cost of capital and capital structure has been discussed in the literature since the seminal paper of Modigliani and Miller (1958).

Several studies are grounded in the theory of Modigliani and Miller (1958), although the relation between corporate tax avoidance and cost of capital has received little attention. Several authors have explored numerous factors that may be related with the association between tax avoidance and cost of capital, such as Moore (2012) that investigated the relationship between tax risk and firm value, and El Ghoul et al. (2011) which examined the association between tax authority enforcement and cost of equity capital. Recently, Cook, Moser and Omer (2015), in a study focused in the US, propose a nonlinear convex relationship between corporate tax avoidance and ex ante (i.e, beforehand) cost of capital: when firms with a low level of tax avoidance engage in additional tax avoidance, the firm's ex ante equity cost of capital decreases. On the other hand, when firms with a high level of tax avoidance engage in greater corporate tax avoidance, the firm's ex ante equity cost of capital increases. Somehow, Cook, Moser and Omer (2015) aim to address an optimal level of corporate tax avoidance, which minimizes the ex ante equity cost of capital, and thus enhances firm's value. Despite the significant contribution of their work to understand the longstanding relationship between corporate tax avoidance and cost of capital, that is a US-specific study, thus their conclusions may well do not hold in a context of more corporate tax competition. That is to say, investors response to changes in the level of corporate tax avoidance of European firms must take into consideration country-specific characteristics. Therefore, our study has a twofold aim. Firstly, to perform and recreate Cook, Moser and Omer

(2015) analysis to listed European firms, in order to assess whether there is a U-shaped relationship between corporate tax avoidance and ex ante equity cost of capital amongst European countries (as displayed in Figure 1). Secondly, to determine whether countries' institutional characteristics (namely, its legal origin) shape the effect exerted by tax avoidance on the ex ante equity cost of capital.

Scholes et al. (2009) infer that there are certain non-tax costs that affect firm's tax avoidance activities. These non-tax costs may be indirect and difficult to quantify monetarily, such as the opacity of financial statements along with challenging tax strategies. Investor's perception of tax avoidance can be understood as an indirect non-tax cost, such that it is a key element when examining the association among firm's tax avoidance activities and ex ante equity cost of capital. On the other hand, interest and penalties paid upon audit and fees paid to tax consultants responsible for the elaboration and implementation of the tax strategies are quantifiable and direct non-tax costs. In the words of Scholes et al. (2009: pp. 13), "Tax planning is a tax-favored activity in that the investment is tax deductible and the payoffs (reductions in tax payable) are tax exempt. The higher the taxpayer's marginal tax rate, the higher the returns for tax planning". Profitable tax avoidance strategies that allow for a decrease in a firm's tax burden are associated with complex investment decisions and transactions management, which enables for an increase of the firm's future cash flows. As cash savings from tax planning can be used to fund rewarding investment opportunities, one can forecast that these tax cash outflows will lead to greater expected future cash flows. Hence, firms mostly engage in tax avoidance activities with the aim of reducing their tax burdens and increasing their after-tax income, generating greater cash flows for the shareholders.

In this study, tax avoidance is defined following that in Hanlon and Heitzman (2010). It is understood as a decrease of a firm's explicit taxes. Therefore, firms engage in tax

avoidance strategies, such as transfer costs, earnings management and tax credit management in order decrease their explicit taxes. As firm's expectations cannot be strictly measured and often not all expectations are realized, the ex ante measure – exogenous approach – is the most appropriate measure for the cost of capital. The ex ante approach is based on the constant dividend growth model and on the consensus of financial analyst's five year earnings growth forecasts provided by I/B/E/S.

The empirical analysis uses an unbalanced dataset that comes mainly from Thomson Reuters Eikon, including I/B/E/S, and comprises 2,810 firm-level observations of firms listed on the stock exchanges of 24 European countries from 2005 to 2014.

This analysis begins by confirming the U-shaped association between tax avoidance and ex ante equity cost of capital. Next, we estimate two measures of tax avoidance to examine the relationship between tax avoidance and ex ante equity cost of capital - and tripartite our sample – low, medium and high level of tax avoidance. We infer that as tax avoidance increases from lower avoidance to higher avoidance, the ex ante equity cost of capital appears to decrease, which indicates that investors' perception of tax avoidance changes from inauspicious to auspicious. That is to say, investors recognize the benefits of tax avoidance to surpass the costs. On the other hand, as tax avoidance increases from higher avoidance to even greater levels, the ex ante equity cost of capital appears to increase, indicating that investors perceive the costs of tax avoidance to surpass the benefits. Thus, firms that exhibit low levels of tax avoidance are able to decrease ex ante equity cost of capital by undertaking greater levels of tax avoidance, whereas firms that exhibit greater levels of tax avoidance are able to decrease ex ante equity cost of capital by decreasing tax avoidance. Following La Porta et al. (1998) insights, we also analyze the effect of different legal origins (English common law, French civil law, German civil law and Scandinavian civil law) on the association

between tax avoidance and ex ante equity cost of capital. Given the current global tax competition, some firms moved their headquarters to lower tax jurisdictions. Thus, firms may exhibit differences between the country in which they operate and the country's stock exchange in which they are listed. Results from this additional analysis is inconclusive, thus it is inexplicit whether institutional characteristics (legal origin) have an impact on the effect exerted by tax avoidance on cost of capital.

Our findings make contributions to the literature in the sense that the results regarding the U-shaped relationship between tax avoidance and ex ante equity cost of capital are based on European firms whereas previous literature focus on US firms. Moreover, we assess whether the U-shaped relationship holds for different legal origins amongst European countries, and find out that such relation is inconclusive.

The remainder of the study is organized as follows: Section 2 presents the literature review and the research hypotheses. Section 3 presents the data and empirical methods used to perform the analyses. Section 4 reports our main results, and section 5 concludes the study.

2 Literature Review

2.1 Corporate tax avoidance and cost of capital

The academic literature has been paying little focus on the relation between corporate tax avoidance and cost of capital, despite the significant literature focused on capital structure. Recently, several authors have explored several factors that may be related with the association between tax avoidance and cost of capital, such as tax risk (Moore, 2012), investors' perception of tax avoidance (Cook, Omar and Moser, 2015), equity risk incentives (Rego and Wilson, 2012), reputational costs (Gallemore et al, 2014 and Graham et al, 2014), tax authority enforcement (El Ghoul et al. (2011)), among others.

Moore (2012) provide fairly compelling empirical evidence that the relationship between tax risk and firm value is concave – "firm value is increasing in tax risk at a diminishing rate until an optimal level is reached, after which firm value is decreasing" (Moore, 2012). The author used US firm-year observations ending between December 16, 2007 and July 31, 2011 that are included in the CRSP-Compustat Merged Database there is an optimal level of tax risk, leading investors to value tax risk as long as the tax savings exceed the tax costs. From this level onwards, an increase in tax risk will lead to a decrease in firm value, thus, investors will require a higher rate of return to engage in risky tax position when it comes to uncertain outcomes that may harm firm value.

Similar intuition can be found when considering investor's expectations towards an optimal level of corporate tax avoidance. Cook, Omar and Moser (2015) demonstrate that firms try to coordinate their actual levels of tax avoidance with investors' expectations (optimal level). The authors find that as the deviations from those optimal levels of tax avoidance decrease, the ex ante equity cost of capital declines. Moreover, the authors also find that the investors' perception of tax avoidance changes with the level of tax avoidance as they are concerned about the expected costs of increasing tax avoidance overstepping the expected benefits – the investor's perception of tax avoidance will vary from favorable to unfavorable as the level of tax avoidance increases.

Following Scholes et al. (2009) framework, Kim et al. (2015) find evidence that firms actually tend to converge to a certain level of tax avoidance, regardless of their initial level of tax avoidance being above or below their target level of tax avoidance. The authors suggest that firms whose actual cash effective tax rate is above their target exhibit a faster convergence towards its target level of tax avoidance when compared with firms whose actual cash effective tax rate is below their target. Moreover, Kim et

al. (2015) infer that firms with a low level of tax avoidance engage in additional tax avoidance at a faster rate when compared to the rate at which high tax avoidance firms diminish their tax avoidance. One can understand that firms face a clear tradeoff when moving towards optimal levels of tax avoidance. Furthermore, each firm has a certain optimal level of tax avoidance and this level evolves and adjusts throughout time.

Changes in cost of capital imply variations in firm's value. Nonetheless, literature argue that associations between tax avoidance and firm value may be conditional on the level of income mobility. For instance, De Simone and Stomberg (2012) consider that a firm is income mobile if it can attain sustainable tax savings from tax planning for a long period of time, investors perceive income mobile firms positively due to the overall tax burden reduction. The authors provide evidence that for income mobile firms, there is a positive relationship between tax avoidance and firm value arising from a sustainable scenario, as firms are able to retain a substantial fraction of the benefits obtained through tax avoidance. Nonetheless, tax avoidance arising from aggressive and unsustainable strategies is associated with a decrease in firm value due to the increased likelihood of facing penalties from tax authorities. Overall, the authors suggest that investors' perception of tax avoidance differs at different levels of tax avoidance. De Simone et al. (2014) find that current and long-run cash tax savings from income mobile firms are highly valued by investors when compared with those of non-income mobile firms, as lower cash effective tax rates are linked to greater Tobin's Q. The authors also infer that these income mobile firms are less risky and usually undertake long-term tax avoidance. Taken together, these findings suggest that income mobile firms efficiently engage in greater corporate tax avoidance with less risk.

Rego and Wilson (2012) infer that there is a non-linear link between equity risk incentives and higher tax risk as an increase in tax risk does not lead to immediate

greater equity risk, although equity risk incentives and higher levels of corporate tax avoidance are positively associated. Equity risk incentives and higher levels of corporate tax planning are positively associated due to investors' perception of risky tax positions as a valuable strategy to achieve higher stock return volatility that allows for an increase of stock option portfolio values. Recently, Hutchens and Rego (2015) study the relationship between risky tax positions and firm value. The authors suggest that more aggressive forms of tax avoidance are associated with greater tax risk, which leads to a higher cost of equity capital. Thus, the level of a firm's tax reserves is positively related with the cost of equity capital. The authors concluded that investors will demand a higher rate of return to engage in uncertain tax positions.

Reputational penalties are non-tax costs of corporate tax avoidance that may justify why some tax avoidance strategies are penalized by investors. Gallemore et al. (2014) provide evidence that there are no relevant reputational penalties due to tax-sheltering participation after analyzing a sample of firms publicly identified as tax-shelter users. Regarding reputational costs due to tax planning, Graham et al. (2014) survey results suggest that reputational costs are a determinant factor for firms that consider engaging in tax avoidance. Their findings provide evidence that the unfavorable impact of reputational concerns constraint the extent to which firms undertake tax avoidance. Ayers et al. (2009) and Graham et al. (2014) findings are consistent with the reasoning concerning the right side of the proposed U-shaped association between tax avoidance and ex ante equity cost of capital, as cost of capital is increasing in tax avoidance. Following Ayers et al. (2009), an increase of tax avoidance leads to greater information asymmetry, which results in higher cost of capital. Graham et al. (2014) results indicate that, from an optimal level of tax avoidance onwards, cost of capital is increasing in tax avoidance.

Wilson (2009) infer that tax-shelter firms exhibit greater abnormal returns while involved in tax shelter and these abnormal returns are associated with high-powered corporate governance. Some authors find evidence that investors may perceive positively aggressive tax reporting. For instance, Frischmann et al. (2008) demonstrate that there is a positive association between the fraction of tax reserves that allows for permanent tax savings and the additional returns generated in the first-quarter earnings announcement, suggesting that investors positively perceive aggressive tax reporting. El Ghoul et al. (2011) find that there is a negative association between tax authority enforcement and cost of equity capital as an increase in tax authority enforcement will generate a decrease in the cost of equity, thus increasing firm value. Most recently, Klassen, Lisowsky and Mescall (2016) study the association between the tax preparer type and the firm's tax aggressiveness, considering the auditor, external non-auditor and internal tax department as possible parties responsible for the firm's tax compliance function. Regarding this subject the authors find that firms require more aggressive tax positions when the party responsible for the firm's tax compliance function is an external non-auditor or the internal tax department. Also, auditor-provided tax services are associated to higher levels of tax aggressiveness. Finally, Big 4 tax preparers are related to lower levels of tax aggressiveness.

Cook et al. (2008) examine if managers differ investments in tax planning in order to decrease their effective tax rates, i.e. if a firm's earnings are managed through changes in their effective tax rates, mainly between the third and the fourth quarter. The authors investigate the effect of auditor-provided tax services and find that the amount of tax fees paid to an external auditor is directly related to a significant decrease in the effective tax rates between the third and the fourth quarter.

Erickson et al. (2004) study the tax consequences and the ex post costs of fraudulent earnings overstatement. The authors show that firms are willing to pay taxes to the IRS on fraudulently overstated financial accounting earnings. Erickson et al. (2004) infer that when a firm is indicted of overstating financial accounting earnings and there is public disclosure regarding the overstatement, managers tend to comprise those earnings on corporate tax returns.

A firm with greater accounting information quality is able to assess its cash flows more efficiently, which increases information certainty and allows for a decrease in the cost of equity capital. Allen et al. (2015) and Chen and Lin (2014) investigate the effect of financial analysts coverage on corporate tax avoidance. The evidence for the negative impact of analyst coverage on tax avoidance is clearer for firms that combine distinct factors such as weaker corporate governance, opaque information environments and greater reputational concerns. Chen and Lin (2014) find that firms which experience an exogenous reduction in the number of analysts following the firm engage in greater tax avoidance when compared to firms that do not face this exogenous reduction of analyst coverage. Allen et al. (2015) demonstrate that the negative effect of financial analysts on corporate tax avoidance suggests that financial analysts' monitoring constraints corporate tax avoidance – financial analysts diffuse firm's private information to market participants which potentially increases the probability of publicly revealing the firm's tax avoidance conduct -, such that firms that comprise more financial analysts tend to undertake less aggressive tax avoidance positions. Regarding disclosure policy and the cost of capital, Francis et al. (2005) suggest that firms that are included in industries with higher external financing requirements exhibit greater voluntary disclosure levels, with the advantage of having a lower cost of debt and equity capital arising from the

extended disclosure. Francis et al. (2005) assert that these results hold despite cross-country institutional differences in legal and financial systems.

Ayers et al. (2009) perceive information content as the mightiness of book income and estimated taxable income to resume relevant information concerning stock returns. The authors find that high tax avoidance firms disclose lower information content of taxable income to book income when compared to other firms, hence, investors impound information concerning a firm's tax avoidance level within stock price.

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2.2 Unfavorable impact of tax avoidance

In the literature there are findings inconsistent with those of Cook, Omar and Moser (2015) and Moore (2012), which suggest a U-shaped relationship between corporate tax avoidance and cost of capital. For instance, Sikes and Verrecchia (2014) demonstrate that a negative externality occurs throughout the whole economy when a relevant percentage of firms in an economy undertake tax avoidance - it will result in higher covariance risk between the market cash flows and a firm cash flow, which leads to a higher cost of capital for all firms in the economy. These results are reasonable regardless of whether each specific firm does or does not engage in tax avoidance. The authors find that, in general, the greater the percentage of firms that engage in tax avoidance the greater will be the externality's outcome. Thus, the cost of capital will increase only if a relevant percentage of firms in an economy undertake tax avoidance. Sikes (2016) perceives a negative financial externality subsequent to tax avoidance embracement: there is an overall increase in cost of capital as more firms engage in tax avoidance, even for firms that do not engage in tax avoidance. They focus on the risk partition between firms and the government through taxation.

Kim et al. (2011) investigates the extent to which tax avoidance leads to a future stock price crash risk and infer that there is a positive association between corporate tax avoidance and firm-specific stock price crash risk for firms with lower long-run cash effective tax rates and higher book-tax differences. As corporate tax avoidance is a useful mechanism that allows for managerial opportunistic conduct and suppresses negative operating outcomes, a firm's poor performance may remain hidden within the firm until a certain tipping point after which there is an asset price crash – eventually, investors will mistrust the quality of the firm's earnings.

Dhaliwal et al. (2006) demonstrate that "the implied cost of equity capital is increasing in leverage", which means that leverage has a positive effect in the cost of equity as long as we are at an optimal level in which the after-tax return on equity outweighs the after-tax return on debt. On the one hand, "the effect of leverage on the firm's cost of equity is decreasing in the firm's tax benefit from debt" (Dhaliwal et al. 2006), such that the corporate taxes have a negative impact on the risk premium from leverage as long as we are at an optimal level in which the after-tax return on equity outweighs the after-tax return on debt – thus, as the corporate tax benefit from the interest expense deduction increases, the effect of leverage on cost of equity decreases, the tax benefit from debt allows for a decrease in the cost if equity and increases market value. On the other hand, "the effect of leverage on the firm's cost of equity is increasing in the personal tax penalty associated with debt" (Dhaliwal et al. 2006), it occurs because investors require higher relative pretax returns when the tax on interest income increases comparatively to the tax rate on equity, to balance the outcome on an after-tax basis. This leads to a positive association between equity risk premium from leverage and personal tax penalty on interest income.

2.3 The role of institutional characteristics

For fiscal years starting after January 1st 2005 the European Union (EU) Parliament adopted the International Financial Reporting Standards (IFRS), which required consolidated and simple accounts for all EU listed firms. The adoption of IFRS aims to contribute for the convergence and harmonization among European firms and to allow for an improvement in comparability of financial statements across countries as well as in accounting quality. Despite the adoption, differences still persist across countries in terms of accounting practices, which inevitably are linked to tax issues. Thus, we explore the effect of legal origin on the association between tax avoidance and ex ante equity cost of capital. Soderstrom and Sun (2007) claim that the information asymmetry may not decrease when firms prepare their financial statements according to the IFRS, rather than to the domestic accounting standards. Information asymmetry affects accounting quality, whereas a country's legal and political system has an indirect impact on both accounting quality and tax avoidance. Legal origin has been widely studied in the literature after the seminal work of La Porta et al. (1998). Thus, the relation between tax avoidance and cost of capital may well vary according with country level characteristics such as its legal origin.

3 Hypotheses development, Data and Research Design

3.1 Research Hypotheses

This study complements prior literature by addressing the issue of whether there is a disparity in the association between the level of tax avoidance and investors' perception of tax avoidance as the level of tax avoidance varies, in a form of a U-shaped relation as presented in Figure 1.

As the academic literature has been paying little focus on the relationship between ex ante equity cost of capital and deviations from expected levels of tax avoidance in Europe, the following research question arises:

Research Question: Does the association between ex ante equity cost of capital and corporate tax avoidance vary with the level of tax avoidance amongst European firms?

Considering that investors benefit from more certain cash flows, as long as tax avoidance expected benefits exceed the expected costs the ex ante equity cost of capital may decrease. Nevertheless, when the expected costs outweigh the expected benefits, the cash flows will be less certain leading to an increase in the ex ante equity cost of capital. This forecast is tested through the following research hypotheses:

Hypothesis 1: The ex ante equity cost of capital decreases when firms engaged in lower corporate tax avoidance increase their level of corporate tax avoidance.

Hypothesis 2: The ex ante equity cost of capital increases when firms engaged in higher corporate tax avoidance increase their level of corporate tax avoidance.

Moreover, Soderstrom and Sun (2007) assert that countries' legal origin may mold the influence of tax systems of accounting quality, which may well implicitly affect investors' perceptions and cost of capital. Thus, the institutional characteristics (legal origin) might change the effect exerted by tax avoidance in the ex ante equity cost of capital. The third research hypothesis is as follows:

Hypothesis 3: The association between tax avoidance and ex ante equity cost of capital varies with countries' legal origin.

3.2 Sample Selection

The empirical analysis uses an unbalanced dataset that comes mainly from Thomson Reuters Eikon, including I/B/E/S. Sample selection comprises data from all listed firms

on the principal stock indexes of 24 European countries. Several observations were excluded due to insufficiency of data to calculate the tax avoidance measures, the measure of ex ante equity cost of capital, and the control variables. The analysis runs from 2005 to 2014, and the final sample comprises 2,810 firm-year observations of 1,057 firms listed on the stock exchanges of 24 European countries.

3.3 Measuring Ex Ante Equity Cost of Capital

Following Omer et al. (2015), *Equity cost of capital* is generated as a measure of ex ante equity cost of capital, as defined in Easton (2004). Easton (2004) aims to attain a forecast for the equity cost of capital measure (ex ante equity cost of capital).

Equity cost of capital is calculated as of December 31st following the close of the fiscal year:

$$P_t = \frac{ForecastEPS_{t+2} - ForecastEPS_{t+1}}{ER^2} \quad (1)$$

$$ER = \sqrt{\frac{ForecastEPS_{t+2} - ForecastEPS_{t+1}}{P_t}} \quad (2)$$

in which P_t is the price of the stock in December of year t; $ForecastEPS$ is the forecasted earnings per share for future period t+1 and t+2. ER is the measure of estimated ex ante equity cost of capital for t+1. Equation (1) is transformed to obtain ER. Easton (2004) demonstrates that in order to obtain ER, which is the solution of this quadratic equation, one must rely on the observed prices and forecasts of earnings and dividends. Earnings forecasts are not available for many firms because several firms do not have analysts' coverage that issue earnings forecasts. Moreover, equation (2) cannot be solved when $ForecastEPS_{t+1}$is greater than $ForecastEPS_{t+2}$. As investment decisions have to be made beforehand of knowing all of the significant information, investors must rely on expected or forecasted cost of capital instead of the actual cost of

capital. We use the ex ante approach because the ex post cost of capital would imply a world of more certainty. Further details can be found in Appendix B.

3.4 Measuring Tax Avoidance

TaxAv comprises the measures of tax avoidance: either cash effective tax rate (*CETR*), or book effective tax rate *(BETR*). Cash effective tax rate reveals the actual cash tax payments to the tax administration for a firm's certain level of pretax income. Attending Dyreng et al. (2008), *CETR* is computed as cash taxes paid each period divided by the corresponding pretax book income. All observations with negative cash taxes paid or negative pre-tax income are excluded. *CETR* with observations higher than 1 or lower than 0 are excluded. This particularly pertains to firms with negative pretax book income. As higher *CETR* prompts lower levels of tax avoidance, *CETR* is multiplied by -1, such that tax avoidance is increasing in *CETR* – this measure varies in the range between 0 and -1. *CETR* is used instead of *LCETR* because we have an unbalanced sample in this study, so it is difficult to track the cash effective tax rate over a long time period. The second measure of tax avoidance is the firm's book effective tax rate (*BETR*). *BETR*[1] is computed as tax expense divided by pretax book income. Following the same line of reasoning as in *CETR*, *BETR* is multiplied by -1, such that tax avoidance is increasing in *BETR* – this measure varies in the range between 0 and -1.

3.5 Research Design

This section describes the conducted research design. To infer the association between tax avoidance and ex ante equity cost of capital and to test the veracity of our research hypotheses, the following Ordinary Least Squares regression model[2] with robust standard errors was estimated:

[1] All observations with negative tax expense or negative pre-tax income are excluded.
[2] In order to assess the presence of multicollinearity, we used the VIF – Variance Inflation Factor - command after the regression. There is no evidence of multicollinearity among factors in the model as

$$AvgPremium_{i,c,t+1} = \alpha + \beta_1 TaxAv_{i,c,t} + \beta_2 LnAT_{i,c,t} + \beta_3 LnBMRatio_{i,c,t} +$$
$$\beta_4 B\_mkt_{i,c,t} + \beta_5 B\_smb_{i,c,t} + \beta_6 B\_hml_{i,c,t} + \beta_7 Leverage_{i,c,t} + \beta_8 PPEGT_{i,c,t} +$$
$$\beta_9 ROA_{i,c,t} + \beta_{10} Capex_{i,c,t} + \beta_{11} Forecast\_Bias_{i,c,t} + \beta_{12} Analysts_{i,c,t} + \beta_{13} TA_{i,c,t} +$$
$$\beta_{14} Trust_{c,t} + year + industry + headquarters +$$
$$e_{i,c,t} \quad (3)$$

The dependent variable *Equity cost of capital* is the ex ante equity cost of capital from Easton (2004), per firm *i*, listed in country *c*, for the year *t+1*, as described in 3.3. It is conjectured that this variable is affected by tax avoidance, measured as either *CETR* or *BETR*. We predict a U-shaped relationship between ex ante equity cost of capital and tax avoidance (measured by the coefficient β_1), suggesting that when firms with low levels of tax avoidance engage in additional corporate tax avoidance, the firm's ex ante equity cost of capital decreases (H1); whereas, when firms with high levels of tax avoidance engage in greater tax avoidance, the firm's ex ante equity cost of capital increases (H2).

As prior literature endorses, several variables may affect *Equity cost of capital*. As in Gebhardt et al. (2001) research, proxies for the log of total assets (*LnAT*) and the log of the book-to-market ratio (*LnBMRatio*) are included. Regarding *LnAT*, we foresee a negative coefficient, which suggests that larger firms bear lower ex ante equity cost of capital. The three Fama-French factors (B_{MKT}, B_{SMB} and B_{HML}) are included in order to control for firm's risk. As prior literature suggests that firms comprising higher risk usually have greater ex ante equity cost of capital, one expects positive coefficients for

VIF varies between 1.05 and 3.22. We also assessed for differences in variance error terms across observations, in order to test for homoscedasticity of errors. Nevertheless, presented in Tables 4, 5 and 6 are robust standard errors. Furthermore, statistical tests were performed to assess for normality of residuals and linearity.

the three Fama-French factors. The three factors were estimated per each firm and year, through the following OLS model:

$$R_i - R_f = b_i(R_m - R_f) + s_i SMB + h_i HMl + \epsilon_i \quad (4)$$

where, R_i is the portfolio's expected rate of return, R_f is the risk free rate of return and R_m is the market portfolio's rate of monthly return. SMB (small minus big) measures the spread in returns between small capitalization over big capitalization firms, whereas HML (high minus low book-to-market ratio) measures value stocks over growth stocks. Data on all dependent variables in equation (4) was obtained from Kenneth R. French - Data Library which was computed based on portfolios of companies from 16 European countries.[3] R_i was obtained from Thomson Reuters Eikon. We estimated the three Fama-French factors for all firms in the sample, per month, grouped monthly data (by mean) per year, and added to Equation (3) the coefficients b_i, s_i, and h_i, which where further labeled as $B\_mkt_{i,t}$, $B\_smb_{i,t}$, and $B\_hml_{i,t}$, respectively.

Following Dhaliwal et al. (2006), we control for leverage (*Leverage*) which is defined as long-term debt scaled by total assets. We expect positive coefficients for *Leverage* as prior literature endorses that the cost of equity and leverage are positively related. In addition, to control for tax avoidance due to depreciation deductions we include *PPEGT*, gross property plant and equipment divided by total assets – these fixed tangible assets are expected to generate economic benefits for the firm. Nonetheless, *PPEGT*'s value is usually adjusted on an annual basis as tangible fixed assets' value decreases due to use and amortization (except land). In order to control for firm's profitability, we include the return on total assets (*ROA*). Following Hutchens and Rego (2015), we comprise control variables for analyst forecast bias (*Forecast_Bias*) and

[3] The data was obtained from the Website
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

expect positive coefficients for *Forecast_Bias* as higher analyst forecast bias gives rise to greater ex ante equity cost of capital. As pointed out by Allen et al. (2015) and Chen and Lin (2014), the number of analysts following firms play an important role tax avoidance and, consequently, in the accuracy of estimated ex ante equity cost of capital. Thus, the variable $Analyst$ captures the number of analysts providing earnings forecasts. Total Accruals (*TA*) aims to capture tax avoidance arising due to earnings management, and it is computed as earnings before taxes minus operational cash flow, scaled by year_{t-1}total assets. The only control at country level applied in the base estimation is a measure of culture of a country (defined as *Trust* in politicians). *Trust* in politicians is, according to Robinson and Slemrod (2012), the most coherent and crucial non-tax rate determinant of the variability in tax systems across countries, considering a set of 10 non-tax rate variables.

To control for absent country-level factors, we apply a fixed effect specification for country, industry and year. Given the current global tax competition, some firms moved their headquarters to lower tax jurisdictions. Thus, firms may exhibit differences between the country in which they operate and the country's stock exchange in which they are listed. Therefore, we include a fixed effect specification denoted as *Headquarters*. In order to infer these cross-country differences we perform a more comprehensive analysis concerning the effect of legal origin on the association between tax avoidance and cost of capital, by grouping countries according to their legal origin following La Porta et al. (1998). All variables are defined in Appendix A – Variable definitions.

3.6 Descriptive statistics

Table 2 presents descriptive statistics for the variables used in the empirical model. The mean (median) firm in the sample presents an ex ante equity cost of capital (*Equity cost*

of capital) of 12.29 percent (9.99 percent), congruous with Easton (2004). *Equity cost of capital* varies from 0 to 299.7 percent and it presents a standard deviation of 0.122. For the entire sample of 2,810 observations, we find that the mean (median) firm has a cash effective tax rate (*CETR*) of -28.96 percent (-18.83 percent). *CETR* varies from -0.989 to 0 and exhibits a standard deviation of 0.188. We report a mean (median) book effective tax rate (*BETR*) of 18.09 percent (14.22 percent). *BETR* varies from -1 to 0 and presents a standard deviation of 0.160. Table 3 presents the correlation matrix for the variables included in the empirical model. Our dependent variable *Equity cost of capital* is significantly correlated with *BETR* (-0.078). The correlation between *Equity cost of capital* and *CETR* is negative (-0.012) but not significant, perceivably due to the proposed non-linear association between tax avoidance and ex ante equity cost of capital. The results indicate that our tax avoidance measures are significantly, positively correlated (0.063) with one another, as expected. The positive and significant correlation between *CETR* and *BETR* implies that both measures are correlated with each other, but *CETR* and *BETR* capture, individually, a distinct understanding of corporate tax avoidance.

Table 2 exhibits a mean (median) *LnAT* of the firms is 21.75 (21.54). *LnAT* varies from 14.94 to 29.17 and it presents a standard deviation of 2.227. The natural log of the book-to-market ratio defined as *LnBMRatio*, presents a mean (median) of -0.863 (-0.816) and a standard deviation of 0.897, it varies from -5.456 to 6.772. Regarding the three Fama-French factors, *B_mkt* presents a mean (median) of 0.007 (0.006) and a standard deviation of 0.009, whereas *B_smb* and *B_hml* present 0.003 (0.002) and 0.004 (0.0005) mean (median), respectively. *B_smb* and *B_hml* display a standard deviation of 0.022 and 0.033, respectively. *Forecast_Bias* exhibits a mean (median) of -0.067 (-0.051) and a standard deviation of 0.060. It varies between -0.651 and 0.092. The variable *Analysts*

captures the number of analysts that provide earnings forecasts to the firms, its mean (median) corresponds to 13 (11) and its standard deviation is 9.604. This variable exhibits a minimum value of 1 and a maximum value of 43, 153 firms comprise 1 analyst, whereas only 1 firm has 43 analysts. The firm's total accruals, entitled as *TA*, captures tax avoidance that arises due to earnings management, it presents a mean (median) of -0.005 (-0.009) and a standard deviation of 0.074. Total accruals fluctuate between -0.551 and 0.750. The variable *Trust* exhibits a mean (median) of 4.195 (4.060) and a standard deviation of 1.173.

Additionally, Table 3 also exhibits the importance of comprising our control variables in the model as several control variables are significantly, positively correlated with *Equity cost of capital* and with one another. *Equity cost of capital* is significantly positively correlated with *LnBMRatio*, *PPEGT*, *Forecast_Bias* and *Trust. Equity cost of capital* is significantly negatively correlated with *CETR*, *BETR*, *LnAT*, *B_smb*, *B_hml*, *Leverage, ROA, Capex, Analysts* and *TA.*

4 Empirical Results

4.1 Tax Avoidance and Ex ante equity cost of capital

In Panels A and B of Table 4 we investigate whether ex ante equity cost of capital varies with the level of tax avoidance. Hypotheses 1 and 2 forecast that the relationship between tax avoidance and ex ante equity cost of capital varies along with the level of corporate tax avoidance. Hence, to test these hypotheses we tripartite our sample - the sample is divided into terciles, each containing a third of the total sample - according to each measure of tax avoidance , and analyze the association between tax avoidance and ex ante equity cost of capital for low, medium and high levels of tax avoidance.

In both Panels the dependent variable is *Equity cost of capital*, the first column corresponds to firms engaged in lower levels of tax avoidance, the second column corresponds to Medium Tax Avoidance and the third column corresponds to firms which present higher levels of corporate tax avoidance. In Panel A the tax avoidance measure is *CETR* whereas in Panel B is *BETR*.

Panel A exhibits a negative coefficient for low avoidance *CETR* and a significantly positive coefficient for high avoidance *CETR*. The negative sign for low avoidance *CETR* in column (1) indicates that the ex ante equity cost of capital decreases as tax avoidance increases, for firms with low levels of tax avoidance. The positive signal for high tax avoidance (*CETR)* in column (3) means that the ex ante equity cost of capital is increasing in tax avoidance for firms with high levels of tax avoidance. These results provide strong support for the second research hypothesis.

Panel B presents a significantly negative coefficient for low avoidance *BETR* and a significantly positive coefficient for high avoidance *BETR*. Consistent with the results for *CETR*, the negative sign for low avoidance *BETR* indicates that the ex ante equity cost of capital decreases when low avoidance *BETR* increases, for firms undertaking low levels of tax avoidance. The positive sign for high avoidance *BETR* means ex ante equity cost of capital is increasing in tax avoidance for firms undertaking high levels of tax avoidance. These results provide strong support for the first and second research hypothesis.

These findings indicate that at low levels of tax avoidance investors recognize that the expected benefits of increasing tax avoidance might overstep the expected costs, whereas at high levels of tax avoidance investors appear to recognize that the expected costs of increasing tax avoidance surpass the expected benefits. Consistent with hypotheses 1 and 2, these findings suggest that investors perceive tax avoidance

differently at different levels of tax avoidance, which is consistent with Cook, Moser and Omer (2015) findings.

In Panel A, *LnBMRatio* presents significant and positive coefficients, suggesting that firms that reveal both greater growth opportunities often exhibit higher ex ante equity cost of capital. The coefficients on *B_smb* Fama-French factor are positive and statistically significant, as expected, revealing that firms that bear greater risk exhibit higher ex ante equity cost of capital. The coefficient on *Leverage* is generally positive, which suggests that firms with higher leverage exhibit higher ex ante equity cost of capital. *PPEGT* and *Capex* are included in order to control for firm activities that may affect tax avoidance measures, the coefficients on *PPEGT* and *Capex* are generally positive and significant. *Forecast_Bias* exhibits negative and statistically significant coefficients. The coefficients on the variable *Analysts* are generally negative which suggests that there is a negative association between ex ante equity cost of capital and the number of analysts providing earnings forecasts. That is to say, the ex ante equity cost of capital decreases as the number of analysts providing earnings forecasts increases. Allen et al. (2015) findings are consistent with that of ours – more analysts following decrease information asymmetry, and thus the implied cost of equity capital. The coefficients on the variable *TA*, Total Accruals, are also negative and statistically significant, indicating that there is a negative association between ex ante equity cost of capital and total accruals. This is consistent with prior literature that supports the idea that managing tax expense is a direct mechanism of earnings management that allows managers to meet earning's targets.

Panel B presents significant and positive coefficients for *LnBMRatio*, suggesting that firms that reveal both greater growth opportunities often exhibit higher ex ante equity cost of capital. The coefficients on *B_mkt* and *B_smb* Fama-French factors are negative

and significant for low levels of tax avoidance and positive and statistically significant for high levels of tax avoidance, as expected, revealing that firms that bear greater risk exhibit higher ex ante equity cost of capital. The coefficients on *Capex* are generally positive and significant. The coefficients on the variable *TA*, Total Accruals, are also negative and statistically significant, indicating that there is a negative association between ex ante equity cost of capital and total accruals.

4.2 The Role of Legal Origin

In Table 5, Panels A and B we investigate whether countries' legal origin has an impact on the effect exerted by tax avoidance on the ex ante equity cost of capital, considering low and high levels of tax avoidance separately. Hypothesis 3 forecasts that the association between tax avoidance and ex ante equity cost of capital varies with countries' characteristics, namely legal origin. Hence, to test this hypothesis we divide our sample in two parts according to each measure of tax avoidance (for *CETR* in Panel A and for *BETR* in Panel B), and analyze the impact of four legal origins (English common law, French civil law, German civil law and Scandinavian civil law) on the association between tax avoidance and ex ante equity cost of capital for low and high levels of tax avoidance. In contrast to the approach in Table 4, the sample in Table 5 is only divided into two parts due to a small sample size.

In both panels the dependent variable is *Equity cost of capital* and the columns are organized by legal origin according to each level of tax avoidance (low and high). In Panel A the tax avoidance measure is *CETR* whereas in Panel B is *BETR*.

Dividing the sample according to each firm's legal origin lead to a reduction of the number of observations in each regression, which affects the regressions' explanatory power. Thus, several coefficients are not statistically significant when the tax avoidance measure is *CETR* whereas some coefficients are statistically significant when the tax

avoidance measure is *BETR*. This means that it is not possible to clearly isolate the effect of legal origin on the relationship between tax avoidance and cost of capital. Nevertheless, with awareness that the effect exerted by legal origin on the association between tax avoidance and cost of capital is uncertain, we proceed with the analysis of the regressions' coefficients.

Firms based in countries using English common law present a negative coefficient for low avoidance *CETR* and a positive coefficient for high avoidance *CETR*, as is displayed in Panel A. Although the coefficients are not statistically significant, the coefficients' signs are consistent with hypotheses 1 and 2, the ex ante equity cost of capital decreases when low avoidance *CETR* increases and the ex ante equity cost of capital increases when high avoidance *CETR* increases. Firms based in countries using German civil law and in countries using Scandinavian civil law present similar results to firms based in countries using English common law. In Panel B we find an inverse association, the ex ante equity cost of capital increases when low avoidance *BETR* increases and decreases when high avoidance *BETR* increases. For firms based in countries using French civil law, the ex ante equity cost of capital increases when firms engaged in both low and high levels of tax avoidance increase its levels of corporate tax avoidance, using *CETR* as tax avoidance measure. Using BETR as tax avoidance measure, we find that firms based in countries using French civil law present negative signs for low and high avoidance *BETR* indicating that the ex ante equity cost of capital decreases when low and high avoidance *BETR* increases. Firms based in countries using German civil law and in countries using Scandinavian civil law present similar results to firms based in countries using French civil law.

These findings indicate that the country's institutional characteristics change the effect exerted by tax avoidance in the ex ante equity cost of capital and that each legal origin

affects differently the association between tax avoidance and ex ante equity cost of capital. Consistent with hypothesis 3, these findings suggest that the association between tax avoidance and ex ante equity cost of capital varies with countries' legal origin. Nevertheless, as several coefficients are not statistically significant, it is not possible to clearly isolate the effect of legal origin on the relationship between tax avoidance and cost of capital.

4.3 Robustness Check

Additionally, in Table 6 we perform a robustness check of the results. We used the main model and excluded 92 observations considered as outliers due to excessive cost of capital. We used standard deviation to detect these 92 outliers, any observation that exhibits more than two standard deviations is considered an outlier. Table 6 presents the OLS estimation results using *CETR* and *BETR* as tax avoidance measure in Panels A and B, respectively. The coefficients are robust and plausible when compared to Table 4 coefficients, indicating structural validity of the model.

5 Conclusion

Following the significant and recent contribution of El Ghoul et al. (2011), Moore (2012) and Cook, Moser and Omer (2015) to understand the longstanding relationship between corporate tax avoidance and ex ante equity cost of capital for the US, this study examines the association between corporate tax avoidance and ex ante equity cost of capital in Europe, though taking into consideration country-specific characteristics, which are essential in a context of more corporate tax competition.

Our results suggest that investors' perception of tax avoidance appear to change at different levels of tax avoidance. We provide evidence that as tax avoidance increases from low avoidance to high avoidance, the ex ante equity cost of capital appears to

decrease, which indicates that investors' perception of tax avoidance changes from unfavorable to favorable, this is to say that investors recognize the benefits of tax avoidance to surpass the costs. On the other hand, when firms that undertake high levels of tax avoidance engage in greater tax avoidance the ex ante equity cost of capital appears to increase, indicating that investors perceive the costs of tax avoidance to surpass the benefits. These results imply that the relationship between tax avoidance and ex ante equity cost of capital is U-shaped.

Additionally, we investigate whether the countries' institutional characteristics (legal origin) might change the effect exerted by tax avoidance in the ex ante equity cost of capital, conjecturing that the association between tax avoidance and ex ante equity cost of capital may well vary with countries' legal origin (English common lay, French civil law, German civil law and Scandinavian civil law). Our results indicate that the country's institutional characteristics change the effect exerted by tax avoidance in the ex ante equity cost of capital and that each legal origin affects differently the association between tax avoidance and ex ante equity cost of capital.

Our results support Cook, Moser and Omer (2015) analysis. Firstly, our results indicate that ex ante equity cost of capital changes with investors' perception of tax avoidance. Secondly, we provide evidence that there is a nonlinear, convex relationship between tax avoidance and ex ante equity cost of capital. Finally, we infer that firms that engage in either too much (above median level) or not enough (below median level) tax avoidance exhibit greater ex ante equity cost of capital, suggesting that firms may seek to adjust their actual tax avoidance levels with these expected levels.

Our findings make contributions to the literature in the sense that the results regarding the U-shaped relationship between tax avoidance and ex ante equity cost of capital are based on European firms whereas previous literature focus on US firms. Moreover, we

try to understand whether such relation varies with countries legal origin, although it is uncertain whether institutional characteristics (legal origin) have an impact on the effect exerted by tax avoidance on cost of capital because several coefficients are not statistically significant. Therefore, it is not possible to clearly isolate the effect of legal origin on the relationship between tax avoidance and cost of capital.

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7 Appendix

7.1 Appendix A – Variable definitions

Table 1 - Variable Definitions

Variable	Source	Definition
Equity cost of capital	c	Ex ante equity cost of capital from Easton (2004), calculated as of December 31 following the close of the fiscal year. See Appendix B.
TaxAv	a	Cash effective tax rate (*CETR*), Book effective tax rate (*BETR*)
CETR	a	*CETR* is computed as cash taxes paid each period divided by the corresponding pretax book income. All observations with negative cash taxes paid or negative pre-tax income are excluded. *CETR* with observations higher than 1 or lower than 0 are excluded.
LCETR	a	Long-run cash effective tax rate, measured as the sum of cash tax paid over a five-year horizon, divided by pre-tax earnings over the same period.
BETR	a	*BETR* is computed as tax expense divided by pretax book income. All observations with negative tax expense or negative pre-tax income are excluded.
LnAT	c	The natural log of the firm's assets (*AT*).
LnMVE	a	Log of market value of equity, in which market value of equity is derived from year end stock price.
LnBMRatio	c	The natural log of the book-to-market ratio is computed as book value of equity divided by market value of equity.
B_mkt *B _hml* *B_smb*	b	The Fama and French (1993) risk factors are computed by regressing a firm's annual stock returns. See chapter 3.4.
PPEGT	c	Gross Property Plant and Equipment (*PPEGT*) scaled by beginning of the year total assets (*AT*).
Leverage	a	Financial leverage, measured as long-term debt over lagged total assets.
ROA	c	Return on Assets, computed as pre-tax income (*PI*) divided by total assets (*AT*).
Capex	c	Total capital expenditures for the fiscal year (*Capex*), scaled by beginning total assets (*AT*).
Forecast_Bias	c	An estimate of IBES analysts EPS forecast bias, calculated as the prior year earnings per share forecast from IBES minus this year's net income, scaled by beginning of the year total assets.
Analysts	a	The variable *Analysts* captures the number of analysts providing earnings forecasts.
TA	c	Total Accruals, aims to capture tax avoidance arising due to earnings management, it is computed as earnings before taxes minus operational cash flow, scaled by year_{t-1} total assets.

Trust	c	Cultural variable concerning trust in politicians, following Robinson and Slemrod (2012).
Legal Origin	c	Legal origin following La Porta et al. (1998). Legal origin is equal to 1 if the origin is English common law, 2 if the origin is French civil law, 3 if the origin is German civil law and 4 if the origin is Scandinavian civil law.
i		Firm
c		Country in which the firm is listed
t		Year of data

[a] Thomson Reuters DataStream / Eikon

[b] Annual Fama and French (1993) factors are available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f- f_factors.html.

[c] Thomson Reuters DataStream / Eikon and own calculations

7.2 Appendix B – Cost of capital measure

Equity cost of capital is generated as a measure of ex ante equity cost of capital, as defined in Easton (2004). *Equity cost of capital* is calculated as of December 31st following the close of the fiscal year:

$$P_t = \frac{ForecastEPS_{t+2} - ForecastEPS_{t+1}}{ER^2} \quad (1)$$

$$ER = \sqrt{\frac{ForecastEPS_{t+2} - ForecastEPS_{t+1}}{P_t}} \quad (2)$$

in which P_t is the price of the stock in December of year t; $ForecastEPS$ is the forecasted earnings per share for future period t+1 and t+2. ER is the measure of estimated ex ante equity cost of capital for t+1. Equation (1) is transformed to obtain ER.

$$ER = \sqrt{\frac{ForecastEPS_{t+2} - ForecastEPS_{t+1}}{P_t}}$$

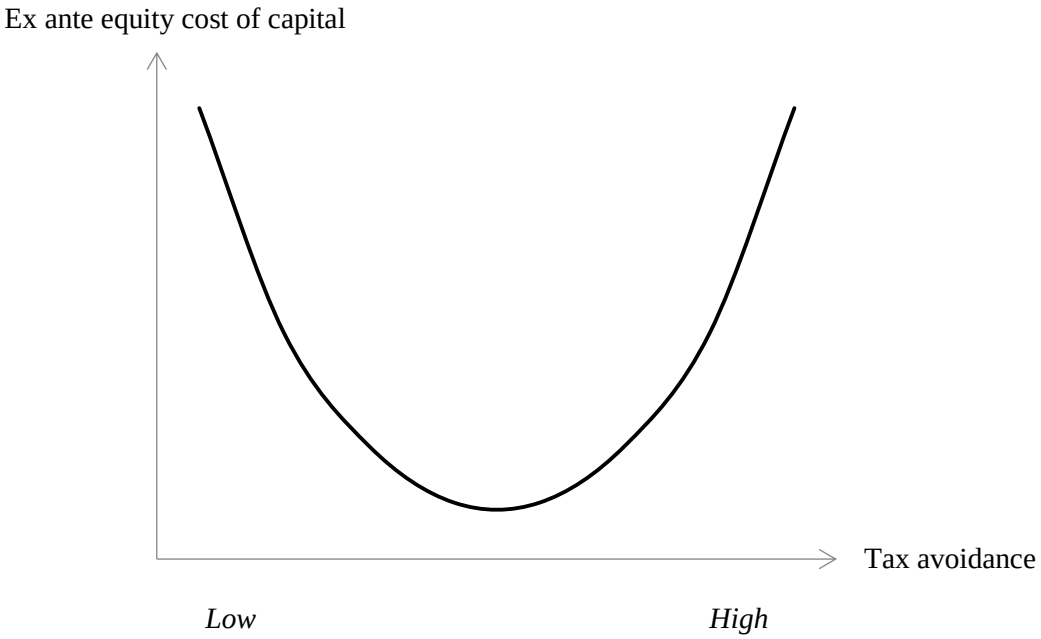
Where

P_t	is the price of the stock in December of year t
$FEPS$	is the forecasted earnings per share for future period t+1 and future period t+2
ER	estimated ex ante equity cost of capital

7.3 Appendix C – Figures

Figure 1 - U-shapped relation betweeen corporate tax avoidance and ex ante equity cost of capital

The U-shaped association between tax avoidance and ex ante equity cost of capital is presented in the figure below. It states that when firms with a low level of tax avoidance engage in additional tax avoidance, the firm's ex ante equity cost of capital decreases. On the other hand, when firms with a high level of tax avoidance engage in greater corporate tax avoidance, the firm's ex ante equity cost of capital increases.



7.4 Appendix D - Tables

Table 2 – Descriptive Statistics

Variable	N	Min	25th Pctl	50th Pctl	75% Pctl	Max	Mean	Std Dev
Equity cost of capital	2,810	0	0. 058	0. 099	0. 155	2.997	0. 123	0. 122
CETR	2,810	-0.989	-0.387	-0. 264	-0.158	0	-0.290	0.188
BETR	2,810	-1	-0.246	-0.142	-0.072	0	-0.181	0.160
LnAT	2,810	14.94	20.18	21.54	23.17	29.17	21.75	2.227
LnBMRatio	2,810	-5.456	-1.360	-0.816	-0.289	6.772	-0.863	0.897
B_MRK	2,810	-0.099	0.002	0.006	0.011	0.068	0.007	0.009
B_SMB	2,810	-0.116	-0.009	0.002	0.013	0.478	0.003	0.022
B_HML	2,810	-0.431	-0.012	0.001	0.015	0.223	0.004	0.033
Leverage	2,810	0	0.026	0.130	0.251	0.700	0.159	0.145
PPEGT	2,810	-0.027	0.052	0.164	0.318	1.391	0.219	0.207
ROA	2,810	-88.18	3.289	5.761	9.384	155.73	7.338	7.459
Capex	2,810	-0.423	-0.065	-0.037	-0.020	0.022	-0.048	0.044
Forecast_Bias	2,810	-0.651	-0.087	-0.051	-0.029	0.092	-0.067	0.060
Analysts	2,810	1	5	11	20	43	12.98	9.604
TA	2,810	-0.551	-0.042	-0.010	0.024	0.750	-0.005	0.074
Trust	300	1.5	3.446	4.060	5.309	6.208	4.195	1.173

Notes:

Equity cost of capital is the ex ante equity cost of capital from Easton (2004). *CETR* is computed as the firm's cash taxes paid divided by pretax income less special items. *BETR* is computed as the firm's income tax expense divided by pretax income less special items. *LnAT* is the natural log of the firm's total assets. *LnBMRatio* is computed as the log of the book value of equity divided by the market value of equity. *B_mkt*, *B_smb*, *B_hml* are estimates from de Fama and French three-factor model, these factors are included in order to control for risk. Leverage is long-term debt scaled by total assets. *PPEGT* is gross property plant and equipment scaled by beginning total assets. *ROA* assesses the firm's return on its assets, it is computed as net income divided by beginning assets. *Capex* assesses total capital expenditures for the fiscal year scaled by beginning total assets. *Forecast_Bias* measures the bias in I/B/E/S analysts estimated measured as the prior year's one year ahead earnings per share minus current year actual earnings per share, all scaled by beginning total assets. The variable *Analysts* captures the number of analysts providing earnings forecasts. Total Accruals, *TA*, aims to capture tax avoidance arising due to earnings management, it is computed as earnings before taxes minus operational cash flow, scaled by $year_{t-1}$total assets. *Trust* is a cultural variable concerning trust in politicians, following Robinson and Slemrod (2012). *Trust* presents 300 observations, as this variable exhibits one observation per year and per country. See Appendix A for variable definitions.

Table 3 - Model Variables and Tax Avoidance Measures Correlation Matrix

	Equity cost of capital	CETR	BETR	LnAT	LnBMRatio	B_mkt	B_smb	B_hml	Leverage	PPEGT	ROA	Capex	Forecast_Bias	Analysts	TA	Trust
Equity cost of capital	1.000															
CETR	-0.012	1.000														
BETR	**-0.078**	**0.063**	1.000													
LnAT	-0.037	-0.031	-0.018	1.000												
LnBMRatio	**0.287**	0.001	**-0.096**	**0.166**	1.000											
B_mkt	**0.092**	**-0.037**	**-0.043**	**0.047**	-0.018	1.000										
B_smb	-0.008	0.018	**-0.049**	**-0.121**	-0.033	**-0.181**	1.000									
B_hml	**-0.050**	0.019	**-0.050**	-0.034	-0.006	**-0.421**	**0.227**	1.000								
Leverage	-0.007	0.015	-0.010	**0.200**	**0.051**	-0.033	-0.011	**-0.038**	1.000							
PPEGT	**0.054**	-0.026	**0.103**	0.027	**0.063**	-0.014	0.016	-0.024	**0.256**	1.000						
ROA	**-0.178**	**0.049**	**0.188**	**-0.205**	**-0.437**	0.014	-0.015	**-0.038**	**-0.237**	-0.005	1.000					
Capex	-0.026	0.006	**0.043**	**0.234**	**-0.044**	-0.018	0.031	0.021	-0.020	**-0.110**	0.014	1.000				
Forecast_Bias	**0.128**	**-0.109**	**-0.245**	**0.244**	**0.487**	0.006	0.028	**0.047**	**0.268**	-0.004	**-0.792**	-0.019	1.000			
Analysts	**-0.174**	**-0.110**	**-0.057**	**0.663**	**-0.116**	0.018	**-0.162**	**-0.070**	**0.135**	0.004	-0.009	**-0.085**	0.031	1.000		
TA	**-0.059**	0.032	**0.129**	**-0.076**	**-0.049**	-0.030	0.003	**0.049**	**-0.129**	**-0.175**	**0.210**	**0.055**	**-0.336**	**-0.064**	1.000	
Trust	**0.072**	**0.053**	**0.041**	-0.017	**-0.092**	**0.057**	**0.042**	**-0.110**	0.027	**-0.089**	**0.101**	**0.081**	**-0.109**	**-0.072**	-0.030	1.000

Notes:
Bolded correlations denote significance at 5%. See Appendix A for variable definitions.

Table 4 – OLS Regression Results

Panel A: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: CETR)				
	Prediction	Low Tax Avoidance	Medium Tax Avoidance	High Tax Avoidance
CETR	**-/?/+**	**-0.018**	**0.110**	**0.223*** **
		(0.022)	**(0.065)**	**(0.085)**
LnAT	-	-0.001	-0.007	-0.008
		(0.003)	(0.008)	(0.005)
LnBMRatio	+	0.022***	0.065*	0.006
		(0.005)	(0.036)	(0.007)
B_mkt	+	0.565	-0.269	0.584
		(0.358)	(0.763)	(0.441)
B_smb	+	0.490***	-0.618	0.248
		(0.182)	(1.014)	(0.169)
B_hml	+	0.119	-0.152	0.093
		(0.133)	(0.358)	(0.193)
Leverage	+	0.041	0.065	-0.104***
		(0.027)	(0.059)	(0.033)
PPEGT	?	-0.053**	0.057	0.061**
		(0.023)	(0.035)	(0.027)
ROA	+	-0.001	-0.000	-0.008
		(0.002)	(0.000)	(0.005)
Capex	?	-0.050	0.383***	0.027
		(0.084)	(0.097)	(0.123)
Forecast_Bias	+	-0.059	-0.309*	-0.424
		(0.174)	(0.174)	(0.376)
Analysts	-	-0.001**	-0.001	-0.001
		(0.001)	(0.001)	(0.001)
TA	-	-0.010	-0.154**	-0.122
		(0.056)	(0.073)	(0.084)
Trust	?	-0.004	-0.009	0.003
		(0.008)	(0.010)	(0.011)
Constant		0.153**	0.375*	0.317***
		(0.076)	(0.225)	(0.122)
Year Effects		YES	YES	YES
Country Effects		YES	YES	YES
Industry Effects		YES	YES	YES
Observations		925	947	773
R-squared		0.368	0.294	0.271

Table 4 – OLS regression results

Panel B: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: BETR)				
	Prediction	Low Tax Avoidance	Medium Tax Avoidance	High Tax Avoidance
BETR	**-/?/+**	**-0.112*** **	**0.032**	**0.341*** **
		(0.031)	**(0.078)**	**(0.126)**
LnAT	-	-0.009	-0.002	-0.005
		(0.007)	(0.003)	(0.004)
LnBMRatio	+	0.056	0.027***	0.024***
		(0.039)	(0.005)	(0.006)
B_mkt	+	-0.909	1.182***	0.573
		(0.846)	(0.450)	(0.406)
B_smb	+	-0.330	0.323*	0.409**
		(0.818)	(0.188)	(0.208)
B_hml	+	-0.308	0.194	0.200
		(0.231)	(0.165)	(0.158)
Leverage	+	0.007	0.004	-0.002
		(0.034)	(0.025)	(0.025)
PPEGT	?	0.047	0.001	0.030
		(0.072)	(0.018)	(0.027)
ROA	+	-0.008	-0.000	-0.001
		(0.005)	(0.000)	(0.002)
Capex	?	0.005	0.213**	0.165
		(0.179)	(0.100)	(0.121)
Forecast_Bias	+	-0.913	-0.088	-0.038
		(0.593)	(0.103)	(0.211)
Analysts	-	-0.000	-0.001	-0.001
		(0.001)	(0.001)	(0.001)
TA	-	-0.069	-0.116*	-0.046
		(0.084)	(0.070)	(0.060)
Trust	?	0.007	-0.000	-0.010
		(0.014)	(0.007)	(0.010)
Constant		0.308	0.167**	0.267***
		(0.218)	(0.074)	(0.091)
Year Effects		YES	YES	YES
Country Effects		YES	YES	YES
Industry Effects		YES	YES	YES
Observations		827	978	840
R-squared		0.302	0.310	0.292

Notes:

The results are from the estimation of equation $Equity\ cost\ of\ capital_{i,c,t+1} = \alpha + \beta_1 CETR_{i,c,t} + \beta_2 LnAT_{i,c,t} + \beta_3 LnBMRatio_{i,c,t} + \beta_4 B\_mkt_{i,c,t} + \beta_5 B\_smb_{i,c,t} + \beta_6 B\_hml_{i,c,t} + \beta_7 Leverage_{i,c,t} + \beta_8 PPEGT_{i,c,t} + \beta_9 ROA_{i,c,t} + \beta_{10} Capex_{i,c,t} + \beta_{11} Forecast\_Bias_{i,c,t} + \beta_{12} Analysts_{i,c,t} + \beta_{13} TA_{i,c,t} + \beta_{14} Trust_{c,t} + year + industry + headquarters + e_{i,c,t}$ using *CETR* as tax avoidance measure and equation $Equity\ cost\ of\ capital_{i,c,t+1} = \alpha + \beta_1 BETR_{i,c,t} + \beta_2 LnAT_{i,c,t} + \beta_3 LnBMRatio_{i,c,t} + \beta_4 B\_mkt_{i,c,t} + \beta_5 B\_smb_{i,c,t} + \beta_6 B\_hml_{i,c,t} + \beta_7 Leverage_{i,c,t} + \beta_8 PPEGT_{i,c,t} + \beta_9 ROA_{i,c,t} + \beta_{10} Capex_{i,c,t} + \beta_{11} Forecast\_Bias_{i,c,t} + \beta_{12} Analysts_{i,c,t} + \beta_{13} TA_{i,c,t} + \beta_{14} Trust_{c,t} + year + industry + headquarters + e_{i,c,t}.$ using *BETR* as tax avoidance measure. In both Panels the dependent variable is *Equity cost of capital*, the first column corresponds to firms engaged in lower levels of tax avoidance, the second column corresponds to Medium Tax Avoidance and the third column corresponds to firms which present higher levels of corporate tax avoidance. See Appendix A for variable definitions. Robust t-statistics in parentheses, ***p<0.01, ** p<0.05, * p<0.1.

Table 5 - The Role of Legal Origin

Panel A: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: CETR)								
	English		*French*		*German*		*Scandinavian*	
	Low	High	Low	High	Low	High	Low	High
CETR	**-0.016**	**0.089**	**0.016**	**0.040**	**-0.034**	**0.008**	**-0.050**	**0.098**
	(0.014)	**(0.087)**	**(0.027)**	**(0.074)**	**(0.038)**	**(0.150)**	**(0.043)**	**(0.072)**
LnAT	0.000	0.006	0.004	0.007	-0.007	-0.030**	-0.009	0.008
	(0.001)	(0.005)	(0.004)	(0.006)	(0.007)	(0.012)	(0.006)	(0.006)
LnBMRatio	-0.000	-0.004	0.013*	-0.004	0.019*	0.134*	0.036***	0.034***
	(0.001)	(0.009)	(0.007)	(0.015)	(0.011)	(0.078)	(0.009)	(0.007)
B_mkt	0.553	0.103	0.183	1.688**	1.271***	0.407	1.398	1.235*
	(0.415)	(0.466)	(0.472)	(0.698)	(0.485)	(0.911)	(0.919)	(0.646)
B_smb	0.392	0.176	0.754***	0.356	0.548**	-1.304	0.133	0.332
	(0.281)	(0.292)	(0.272)	(0.337)	(0.260)	(1.160)	(0.335)	(0.312)
B_hml	0.029	-0.396	0.113	0.412	0.105	-0.826*	0.428	0.507**
	(0.067)	(0.269)	(0.201)	(0.277)	(0.210)	(0.422)	(0.341)	(0.233)
Leverage	-0.001	0.003	-0.063*	-0.059*	0.034	-0.059	0.067	-0.024
	(0.013)	(0.031)	(0.036)	(0.034)	(0.041)	(0.071)	(0.049)	(0.034)
PPEGT	0.007	0.006	-0.016	0.057*	-0.048	0.005	-0.040	0.049
	(0.010)	(0.025)	(0.029)	(0.031)	(0.040)	(0.057)	(0.041)	(0.034)
ROA	0.000	0.000	-0.000	0.000	-0.001	-0.013***	0.002	0.004
	(0.000)	(0.001)	(0.000)	(0.003)	(0.001)	(0.004)	(0.003)	(0.004)
Capex	0.012	-0.231*	0.070	0.307***	0.074	-0.051	0.067	-0.020
	(0.046)	(0.132)	(0.147)	(0.113)	(0.169)	(0.415)	(0.120)	(0.118)
Forecast_Bias	-0.000	0.137	0.042	-0.037	0.142	-1.591**	0.348	0.359
	(0.033)	(0.117)	(0.107)	(0.297)	(0.133)	(0.620)	(0.360)	(0.522)
Analysts	-0.000	-0.001	-0.002*	-0.003***	-0.000	0.003	0.001	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
TA	0.002	0.082	-0.113**	-0.071	-0.130	-0.101	0.247**	-0.125*
	(0.021)	(0.085)	(0.057)	(0.098)	(0.101)	(0.139)	(0.116)	(0.068)
Trust	0.790	0.014	-0.018	-0.015	-0.021	0.009	-0.012	-0.011
	(0.727)	(0.438)	(0.020)	(0.018)	(0.024)	(0.038)	(0.011)	(0.014)
Constant	-3.292	-0.153	0.167	0.032	0.347*	0.820***	0.374***	0.059
	(3.027)	(1.802)	(0.114)	(0.147)	(0.202)	(0.314)	(0.126)	(0.148)
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	147	156	374	364	383	374	316	307
R-squared	0.145	0.095	0.318	0.148	0.243	0.385	0.317	0.298

Table 5 - The Role of Legal Origin

Panel B: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: BETR)								
	English		*French*		*German*		*Scandinavian*	
	Low	High	Low	High	Low	High	Low	High
BETR	**0.010**	**0.069**	**-0.064***	**-0.048**	**-0.152****	**-0.067**	**-0.041**	**-0.072**
	(0.011)	**(0.111)**	**(0.033)**	**(0.126)**	**(0.067)**	**(0.121)**	**(0.035)**	**(0.169)**
LnAT	0.003	0.002	0.002	0.009	-0.031**	-0.013**	-0.001	-0.004
	(0.002)	(0.004)	(0.004)	(0.006)	(0.012)	(0.007)	(0.006)	(0.005)
LnBMRatio	-0.001	-0.000	-0.001	0.011	0.150**	0.019*	0.035***	0.041***
	(0.001)	(0.008)	(0.008)	(0.014)	(0.075)	(0.010)	(0.008)	(0.007)
B_mkt	0.269	0.574	0.349	1.452**	-0.841	1.359*	0.469	2.511***
	(0.197)	(0.649)	(0.494)	(0.663)	(1.104)	(0.784)	(0.663)	(0.810)
B_smb	0.146	-0.225	0.566**	0.219	-1.662	0.666***	0.168	0.959***
	(0.103)	(0.499)	(0.261)	(0.425)	(1.182)	(0.239)	(0.312)	(0.335)
B_hml	0.016	-0.182	0.256	0.305*	-1.382**	-0.051	0.164	0.863***
	(0.028)	(0.266)	(0.233)	(0.169)	(0.547)	(0.239)	(0.242)	(0.324)
Leverage	-0.003	0.044	-0.022	-0.062*	-0.074	0.009	0.061	0.006
	(0.007)	(0.033)	(0.039)	(0.034)	(0.074)	(0.053)	(0.047)	(0.035)
PPEGT	-0.005	-0.015	0.040	0.037	-0.044	-0.070*	-0.078**	0.047
	(0.006)	(0.022)	(0.034)	(0.034)	(0.069)	(0.041)	(0.034)	(0.035)
ROA	0.000	0.001	0.000	-0.002	-0.005	-0.005	-0.001	0.005
	(0.000)	(0.001)	(0.001)	(0.002)	(0.004)	(0.005)	(0.003)	(0.005)
Capex	-0.035	-0.284*	0.322**	0.199	-0.366	0.027	-0.031	0.051
	(0.026)	(0.148)	(0.156)	(0.127)	(0.360)	(0.341)	(0.134)	(0.098)
Forecast_Bias	-0.008	0.140	0.085	-0.287	-0.703	-0.351	-0.049	0.582
	(0.034)	(0.110)	(0.130)	(0.236)	(0.708)	(0.528)	(0.356)	(0.610)
Analysts	-0.001	-0.001	-0.003***	-0.003**	0.003	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
TA	-0.008	0.063	-0.098	-0.024	0.112	-0.096	0.064	-0.013
	(0.014)	(0.093)	(0.066)	(0.118)	(0.146)	(0.115)	(0.090)	(0.084)
Trust	0.080	0.456	-0.005	-0.030	0.071	-0.015	-0.004	-0.016
	(0.164)	(0.833)	(0.018)	(0.021)	(0.048)	(0.027)	(0.012)	(0.012)
Constant	-0.379	-1.941	0.112	0.052	0.630**	0.473**	0.205	0.293**
	(0.694)	(3.459)	(0.112)	(0.154)	(0.259)	(0.216)	(0.145)	(0.136)
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	149	155	359	379	375	382	312	311
R-squared	0.083	0.148	0.261	0.186	0.409	0.139	0.246	0.358

Notes:
English stands for English common law, French stands for *French* civil law, *German* stands for German civil law and *Scandinavian* stands for Scandinavian civil law. See Appendix A for variable definitions.
Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 6 – Robustness Check

Panel A: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: CETR)				
	Prediction	Low Tax Avoidance	Medium Tax Avoidance	High Tax Avoidance
CETR	**-/?/+**	**-0.010**	**0.021**	**0.092***
		(0.017)	**(0.042)**	**(0.048)**
LnAT	-	0.003	0.002	0.000
		(0.002)	(0.002)	(0.003)
LnBMRatio	+	0.010***	0.013***	0.012***
		(0.004)	(0.003)	(0.004)
B_mkt	+	0.386	0.363	0.295
		(0.271)	(0.260)	(0.322)
B_smb	+	0.274*	0.285**	0.259**
		(0.150)	(0.131)	(0.116)
B_hml	+	0.194**	0.177	0.029
		(0.098)	(0.132)	(0.129)
Leverage	+	0.015	-0.004	-0.055***
		(0.019)	(0.018)	(0.018)
PPEGT	?	-0.031*	0.012	0.031**
		(0.018)	(0.015)	(0.012)
ROA	+	-0.000	0.000	-0.001
		(0.000)	(0.000)	(0.001)
Capex	?	-0.043	0.271***	0.120**
		(0.076)	(0.067)	(0.052)
Forecast_Bias	+	0.063	-0.014	-0.040
		(0.063)	(0.043)	(0.070)
Analysts	-	-0.002***	-0.002***	-0.001***
		(0.000)	(0.000)	(0.001)
TA	-	-0.027	-0.089**	-0.020
		(0.038)	(0.039)	(0.035)
Trust	?	0.000	-0.000	-0.007
		(0.007)	(0.005)	(0.007)
Constant		0.082	0.101**	0.178***
		(0.052)	(0.050)	(0.068)
Year Effects		YES	YES	YES
Country Effects		YES	YES	YES
Industry Effects		YES	YES	YES
Observations		894	921	742
R-squared		0.346	0.416	0.331

Table 6 – Robustness Check

Panel B: OLS regression results (dependent variable: Equity cost of capital, tax avoidance: BETR)				
	Prediction	Low Tax Avoidance	Medium Tax Avoidance	High Tax Avoidance
BETR	**-/?/+**	**-0.057*** **	**0.098***	**0.111**
		(0.017)	**(0.057)**	**(0.083)**
LnAT	-	0.004*	-0.000	-0.002
		(0.002)	(0.002)	(0.002)
LnBMRatio	+	0.002	0.011***	0.023***
		(0.003)	(0.003)	(0.003)
B_mkt	+	-0.012	0.883***	0.253
		(0.265)	(0.325)	(0.322)
B_smb	+	0.251*	0.181	0.303**
		(0.132)	(0.130)	(0.135)
B_hml	+	0.049	0.122	0.207*
		(0.104)	(0.130)	(0.109)
Leverage	+	-0.017	0.012	-0.027*
		(0.019)	(0.017)	(0.016)
PPEGT	?	-0.004	0.011	0.004
		(0.021)	(0.015)	(0.013)
ROA	+	-0.000	-0.000	-0.001
		(0.000)	(0.000)	(0.001)
Capex	?	0.062	0.112	0.193***
		(0.084)	(0.074)	(0.052)
Forecast_Bias	+	0.119*	0.057	-0.118*
		(0.072)	(0.056)	(0.062)
Analysts	-	-0.002***	-0.001***	-0.001*
		(0.000)	(0.000)	(0.000)
TA	-	-0.021	0.007	-0.083**
		(0.040)	(0.040)	(0.034)
Trust	?	0.008	-0.005	-0.006
		(0.007)	(0.006)	(0.007)
Constant		0.027	0.160***	0.202***
		(0.056)	(0.056)	(0.055)
Year Effects		YES	YES	YES
Country Effects		YES	YES	YES
Industry Effects		YES	YES	YES
Observations		803	945	809
R-squared		0.410	0.372	0.319

Notes:
92 observations were considered as outliers due to excessive cost of capital and were excluded from the main model. Standard deviation was used to detect these 92 outliers, any observation that exhibits more than two standard deviations was considered an outlier. See Appendix A for variable definitions. Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1.