



# Gender Board Diversity and Corporate Tax Avoidance

Does female board participation influence the level of  
corporate tax avoidance in public firms?

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## Abstract

Whereas female board participation could be explained by the stakeholder theory, I provide some evidence for increased bottom-line profitability through corporate tax avoidance. Using a sample of U.S. publicly traded firms between 2009-2014, I find that the number of female directors is significantly associated with lower GAAP effective tax rates and uncertain tax benefit positions (UTB). However, the results must be interpreted with caution, as they do not show robustness for different measures of gender board diversity or corporate tax avoidance. Also, the UTB and the GAAP ETR do not have a similar association with gender board diversity in terms of direction. The UTB measures a riskier segment of corporate tax avoidance than the GAAP effective tax rate. Thereby, I test for the moderating effect of the strength of shareholder rights, but only find significant results for the uncertain tax benefit corporate tax avoidance measure. The effect of the number of female directors on corporate tax avoidance weakens when there are already strong shareholder rights in a firm. My results suggest female directors to influence certain levels of corporate tax avoidance. But results must be interpreted with caution as no common proxy of overall corporate tax avoidance exists. My results add evidence for the U.S. government to implement gender quota regulation and additional evidence for the importance of one common corporate tax avoidance measure in future tax research.

## 1. Introduction

In 2007, reports showed improved financial measures, as return on sales and return on equity, in many Fortune 500 firms where there is an increased number of female directors present in the board of directors.<sup>1</sup> Adding more female directors to public firms' boards, is an often and recently discussed subject all over the world. In the United States, more and more female directors voluntarily joined boards in the last decade. Nevertheless, the United States are still behind on Europe as it comes to female board participation, as the percentage of female directors on the board was only 14% in 2006 for S&P 500 companies and increased to not more than 17% in 2012.<sup>2</sup> In many countries legislation is implemented for a minimum of women on the board. Examples are the Netherlands, Spain and as most progressed Norway, where at least 40% of the directors on a board must be female. Also many corporations acknowledge the importance of a gender diverse board, as female participation cannot only enhance value to the company. Various stakeholders of a firm could also value board diversity. However, not much research is conducted as to how female directors specifically enhance firm value. This brings me to another subject of interest, also in need of additional investigation: the case of corporate tax avoidance. More than \$695 billion U.S. income taxes were avoided by Fortune 500 companies in 2015 by storing it overseas.<sup>3</sup> Also multinationals in the U.S. have been decreasing their effective tax rates since the 1950s according to Slemrod (2004). The high tax rate in the United States forces many large companies to avoid their taxes, as they perceive tax avoidance as a lucrative business to increase their bottom-line performance. How board characteristics influence the level of corporate governance is a not fully investigated topic and requires additional evidence. But, the board of directors is the main internal corporate governance mechanism to align the preferences of shareholders and management, for example on the issue of corporate tax avoidance. Therefore, the following research question for this master thesis is formulated:

*RQ: Does gender diversity in the boardroom influence the level of corporate tax avoidance?*

The association between both concepts will be empirically investigated in this thesis using a regular OLS regression. Gender board diversity will be measured using the percentage of female directors on the board and the Blau-index, whereas the level of corporate tax avoidance is operationalized using both the GAAP and cash effective tax rates. Thereby, I will also test

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<sup>1</sup> Catalyst 'The Bottom Line' – Corporate performance and women's representation on the board.

<sup>2</sup> Refer to Forbes – *Women on Boards: Moving From 'Why' to 'How'*. Based on 5,000 board seats

<sup>3</sup> Citizens for Tax Justice 'Fortune 500 Companies Hold a Record \$2.4 trillion offshore'

for the moderating effect of the strength of shareholder rights using an entrenchment index. Overall, I find a positive significant relation between gender board diversity as measured by the number of female directors and the level of corporate tax avoidance measured by the GAAP effective tax rate. Indicating female directors to influence corporate tax avoidance with the main goal to increase profits. These results hold after controlling for various firm characteristics, board characteristics and fixed year and industry effects. The level of shareholder rights does not influence the association between gender board diversity and the effective tax rates. However, the results are not robust to different measures of corporate tax avoidance. Using the uncertain tax benefit in the robustness test as corporate tax avoidance measure, the results are significant and positive for gender board diversity. Indicating female directors do influence the level of corporate tax avoidance positively. However, the uncertain tax benefit is often described as a measure of riskier tax avoidance, providing evidence that female directors are not more-risk averse than male directors. The results are important for regulators, as there is evidence in favor of gender board participation regulation. But also firms could benefit from adding female directors to the board, as it could enhance their bottom-line performance through avoiding taxes. However, the result must be interpreted with caution, as there is no common measure of overall corporate tax avoidance and the results are not robust to different proxies of gender board diversity and corporate tax avoidance.

The remainder of the paper is organized as follows: Section 2 provides the literature review explaining the rationale behind the association between gender board diversity and corporate tax avoidance. This section will also review previous tax avoidance and gender diversity literature. Section 3 will provide the hypothesis descriptions and subsequently section 4 will describe the methodology and sample selection. Section 5 will then provide an empirical analysis of the results and finally section 6 concludes my research.

## 2. Literature Review

To investigate the relation between gender board diversity and corporate tax avoidance, I will first define and provide some more insights into both concepts. It is necessary to describe the underlying rationale explaining the possible relation between gender board diversity and corporate tax avoidance, to fully understand in which manner the number of female director could influence the level of corporate tax avoidance. A theoretical framework in the first section will provide the groundwork for my analysis. Subsequently, I will discuss prior literature regarding board diversity and corporate tax avoidance.

## 2.1 Theoretical Background

Before discussing prior literature regarding board gender diversity and corporate governance, I will discuss the main theories associated with the investigated relation. These include the agency theory, the resource dependency theory, the stakeholder theory and the concepts of civic duty and the law abiding citizen. The related theories will be discussed in context of my subject and provide a theoretical background throughout the thesis.

### 2.1.1 Agency Theory

The transformation of firms throughout time eventually resulted in the requirement for a separation between ownership and control. Ownership in publicly listed firms belongs to an often widely spread group of shareholders. However, it is difficult, if not impossible for shareholders to be in charge of the day-to-day business of the firm. That is why most of the time they transfer this responsibility to management. Management is expected to behave in the best interest of the shareholders, but they often find difficulties in doing so. A classic study by Jensen & Meckling (1976) introduces the concept of agency costs, which arise when firms implement the separation between ownership and control. Jensen & Meckling (1976) explain the existence of a principal-agent relationship between shareholders and management and define the relation as “a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involved delegating some decision making authority to the agent” (p. 308). In most public firms, shareholders (principal) want to maximize their share value, while management (agent) want to maximize their own utility. Therefore, there are two assumptions arising from the agency theory: Conflict of interest between principals and agents and agents always pursuing their own interest. Jensen & Meckling (1976) elaborate on management, who not carry the burden of all costs associated with the decisions they take. It is not their own money they make decisions about.

Thereby, agency theory distinguishes between the symmetric and the asymmetric model (Caers, et al., 2006). The symmetric model describes a situation wherein both parties (principals and agents) are in possession of the same information. Thereby are the principals able to observe all behavior of the agents. On the other hand, the asymmetric model shows both parties can always achieve their optimal outcome together. The asymmetric model, introduces the concepts of moral hazard and adverse selection. Moral hazard explains that the effort of the agent cannot always be monitored by the principal. Adverse selection explains the situation when a principal is unable to know if an agent will act in line with the principal’s preferences. Introducing both concepts results in principals no longer obtaining all information regarding the agents.

Caers et al. (2006) provides to possible solutions to align preferences once again. The first is performance-based compensation schemes, where agents are only paid based on their performance. The other is introducing a monitoring device in the relation. In the shareholder-management example, the board of directors is set in place in most public companies to monitor performance and decision-making of management. Two assumptions are made in both models: The agents are risk-averse and the principals mostly risk-neutral. Referring to a corporation, this is often true.

Eisenhardt (1989) first introduced the concept of risk in the relation between principals and agents. He mentions two contracting problems arising from the shareholder-management contractual relationship. The first is the former mentioned agency problem and the problem of risk sharing. Management and shareholders might have different attitudes regarding risk. Shareholders are often more risk-averse than management, because they prefer certainty about the value of their stocks in the future. Also, management could feel external pressure for increasing short-term profits and often have limited tenure. The limited tenure could result in management not caring about future opportunities, like investments. Management could just pursue their own short-term performance, because they are leaving anyway. To solve the agency problem and decrease agency costs, the main idea behind the agency costs must be observed. Agency costs is the total sum of monitoring costs, bonding costs and a resulting residual loss. Shareholders must find a way to decrease monitoring costs or bonding costs, because this will result in lower shareholder costs. If monitoring or bonding does not occur in an efficient manner, a residual loss remains. Fama & Jensen (1983) provide an explanation to decrease the monitoring costs mentioned by Jensen & Meckling (1976). By analyzing the decision-making process of firms, the authors point out the board of directors as the best monitoring device in a public firm. Of course, boards need to function efficient and effective to properly monitor management. However, to use the agency theory as underlying theory for my study, it is necessary to complement it with additional theories. Eisenhardt (1989) explains this is necessary due to the complexity of firms and their environment.

### 2.1.2 Resource Dependency Theory

Another theory possibly explaining the correlation between gender board diversity and corporate tax avoidance is the resource dependency theory (RDT). Defined by Pfeffer & Aldrich (1976, p. 83) RDT “proceeds from the indisputable proposition that organizations are not able to internally generate either all the resources or functions required to maintain themselves, and therefore organizations must enter into transactions and relations with elements

in the environment that can supply the required resources and services.” The basic idea is thus the observation of a company when taking into account the environment. Two basic concepts of RDT are the concept of power and the dependence of resources. The main idea is that firms depend on external resources of external firms. The external firm in possession of these resources has a kind of power over the firm in need of these resources. Whereas the agency theory focuses on the monitoring function of the board of directors in overcoming agency costs, the resource dependency theory focuses on the role of the board in providing resources to a company. Current literature, like Robinson et al. (2013), acknowledge and test for both functions. RDT shows that the board of directors also provides resources to a firm, in the form of human capital. Human capital are human attributes to a firm. Including directors their knowledge, expertise and personal traits. No firm is the same and therefore every firm requires different resources. That is why the composition of the board of directors is different across firms. Boyd (1990) provides two factors which explain how dependent a firm can be of their board of directors. The first factor is the environment influencing the composition of the board of directors. The second factor is the influence of the board on a firm’s performance/ An example of an environmental factor is the level of competition. Performance of a firm could be measured using a variety of proxies. For example, profit measures financial performance. In RDT a company is assumed to be able to adjust to the changing environment around them. The adjustments result in the proper gain of resources and according to Aldrich & Pfeffer (1976) to the continuance of the firm.

Both de agency theory and the resource dependency theory explain a different role of the board in a firm. However, both could complement each other. As mentioned before by Eisenhardt (1989), the agency theory is not enough to explain the relation between board characteristics and firm performance. Hilman & Daziel (2003) state there are two functions of the board of directors: Providing incentives and monitoring. They define board capital as human capital, so the skill, knowledge and experience of the directors. Combining both theories, they argue board capital to be both associated with the monitoring of the board and the provision of resources. Different board compositions lead to differences in how effective the board overcomes the agency problems which arise between shareholders and management. Hilman & Daziel (2003) also explain the moderating factor of board incentives. For example, if a director obtains a variable bonus to increase monitoring, but he has no experience monitoring management, the relation between board capital and monitoring is weaker. Both provision of resources and



monitoring by the board are also positively associated with firm performance theorized by Hilman & Daziel (2003).

### 2.1.3 Stakeholder Theory

As stated in Francoeur et al. (2008), appointing women in the board of directors is not only of interest to shareholders, but also other stakeholders of the firm. Stakeholder theory is a theory explaining how management should organize their organizations. Stakeholders are everyone who is affected by and involved with a company. Examples of stakeholders are suppliers, the government, local community, support groups, suppliers and many more. Stakeholder theory argues continuance, but also increased financial performance of firms who take into account the preferences of their stakeholder groups. Each stakeholder pursues their own utility. The stakeholders determine what aspects of a company increase their utility and which decrease their utility. For example, certain stakeholders particularly focus on the financial performance of a company, while other shareholder tend to focus more on corporate social responsibility (CSR). Examples of the latter are environmental activists, who desire environmental friendly production from corporations.

Donaldson & Preston (1995, p. 74) define three different approaches of the stakeholder theory: “descriptive, instrumental and normative”. The descriptive approach describes the relation between concepts and reality and often investigates the relation between certain firm characteristics and stakeholders. The instrumental approach shows how concepts in the stakeholder theory can be empirically tested. And finally the normative approach explains how something can be the right or wrong thing to do, even when it does not pursue value for the firm. The normative approach often should what ‘ought to be right’ in ideal circumstances. Resulting in prescriptive reasoning for management, providing them guidelines in how to behave. An example of the latter might be pressure of external stakeholders to increase diversity in the board of directors, in names of ethnicity or gender, while there is no direct evidence it will add financial value to the firm.

Because of the heterogeneity of all stakeholder groups, corporations should be aware of all stakeholders they are involved with. But, companies should also be aware of how each stakeholder group subtracts value from how a company is doing business. Therefore, firm performance for some stakeholder groups might not be expressed in financial performance. Harrison & Wicks (2013, p. 102) define the total stakeholder value as “the total value created by the firm through its activities, which is the sum of the utility created for each of a firm’s

legitimate stakeholders.” It is often difficult to measure such other non-financial measures of stakeholder value. An example of a non-financial measure is customer happiness. Also preferences and utility which certain stakeholders derive from a certain firm might change over time.

#### 2.1.4 Civic Duty

The last theory explaining the possible relation between gender board diversity and corporate tax avoidance is the concept of civic duty. The concept is based on attitudes regarding what is right or wrong. There are multiple psychological and sociological studies investigating which characteristics of people make them more or less prudent to obey the law. The traditional view involves an economic perspective. Whereas people only obey the law, for example in the case of tax, because of the fear of detection or punishment. A rationale person who is not inflicted by these costs of fear, would report no income to the tax authorities for example. However, according to this economic model, there would be much more law breaking and tax avoidance in the United States than there really is. Introducing ethics and psychological aspects in governmental issues like tax avoidance, could change the view of government authorities as how to arrange legislation to prevent dishonest behavior from citizens.

Frey (1997) introduces the concept of civic duty in the tax literature. The basic approach before the formulation of civic duty was the pursuing of self-interest of citizens, only taking into account their economic motivations as mentioned before. Stating people do not only pay taxes because they have to, but also because they want to. Orviska and Hudson (2002, p. 83) define civic duty as “the concept that people are motivated partially by a concern, by a loyalty if you like, for the wider state or the country”. People are thus motivated out of intrinsic motivation to pay taxes and obey the law, because they feel a sense of obligation of doing something in return for their country. For example, without taxes, the government would not perform effectively, as they would have no money to provide infrastructure, fund schools or build public facilities like libraries or parks. Components of civic duty are civic skills and the tendency to act politically.

Frey (1997) suggests some governments design policies crowd out the voluntary motivation of citizens to pay their taxes. This crowding-out theory is based on the government implementing some controlling legislation to make sure citizens pay their taxes for example. Because the government does not acknowledge the altruistic behavior of citizens, but want to control their behavior, citizens are less tending to pay their taxes. The good behavior is therefore not appreciated by the government and the citizens feel controlled. A good example is increasing taxes. If the government increases taxes above a certain level, more people tend to avoid them. The crowding-out theory of civic duty can be a possible explanation how certain governmental legislation might influence citizens.

Schwartz & Orleans (1967) claim that the government must focus more on encouraging normative conscience than threatening to punish their citizens. The normative conscience is making citizens conscience of the moral obligation of paying taxes and do something in return for services the government provides their citizens. Schwartz & Orleans (1967) also provide evidence of different attitudes toward tax avoidance and sanctions across social groups, like religion and education. Governments must be thoughtful of the level of morality among citizens and decide what the best way is to incorporate ethics and sanctions in their legislation.

## 2.2 Gender Board Diversity

In this subparagraph I discuss the background of gender board diversity, focusing on traditional social research which provides evidence why there are differences in behavior, attitudes and beliefs between men and women. Subsequently, prior literature regarding gender board diversity in relation to multiple firm characteristics, like firm value and financial performance, will be reviewed.

The difference between men and women in the corporate environment is an often investigated subject, as women increasingly fulfilled higher positions in boards and management positions over time. There are differences in leadership styles between men and women. Women tend to have better communal characteristics, like being kind, helpful and sensitive. While men have more agentic characteristics, like being dominant (Eagly & Johannesen-Schmidt, 2001). The differences between both leadership styles are reflected, among other things, in the board of directors. Diversifying the board of directors in terms of gender has theoretically possible impacts on various firm characteristics. The communal characteristics of women are associated with better communication among board members and also better board participation, like attending board meetings (Adams & Ferreira, 2009). Besides communal characteristics, women possess different experiences than men, providing fresh insights and different point of views into the boardroom. Women are also more risk-averse (Jianakoplos & Bernasek, 1998) and are stricter monitors (Adams & Ferreira, 2009). However, having a more diverse board is also associated with increased costs. More insights and experience is also associated with more difficulty in reaching agreement, resulting in less effective boards.

Prior literature regarding gender board diversity often examines the relation between the number of female directors on the board and firm performance. Female directors would increase board effectiveness and this would result in higher firm performance. However, mixed evidence results from the literature. An often cited article is the one of Carter et al. (2003) and investigates the relation between general board diversity and firm value. They are especially focused on the

influence of women and other minority groups, such as Hispanics, African Americans and Asians. The authors expect these groups to add shareholder value. Evidence is required, because there is a deviation between firms in terms of why there are female directors participating in the board. One part of the firms actually values board diversity and think it enhances economic performance. The remaining firms add minorities to their board because of tokenism. Tokenism means that firms feel obliged to add minorities to their board, because they feel pressured by external stakeholders. Tokenism refers to the stakeholder theory, as companies take into account other stakeholders than shareholders and value their utility, even when not based on financial performance. Carter et al. (2003) also base their analysis on the agency theory. Hypothesizing diverse boards to be more useful monitors of management due to increased independence. However, they do emphasize this theory not completely explaining the relation they want to investigate. Using a sample of Fortune 1000 firms, the authors use a 2LS regression to control for possible reversed causality. A problem with linking board diversity to firm value is the question if increased firm value could also increase the number of women on the board and not the other way around. The results show board diversity, women and minorities, are positively associated to firm value. The authors measure firm value with Tobin's Q, which is the ratio between a firm's market value and its replacement value. Tobin's Q is an often used proxy to measure firm value or firm performance.

Another study, of Erhardt et al. (2003) examines the association between board diversity and firm performance and also find a positive association. Erhardt et al. (2003) measure board diversity as the number of female directors and directors with another ethnic background than American. However, the authors do not measure gender diversity separately from ethnical diversity. From an agency perspective, the authors argue increased diversity in the board might increase the effectiveness of the board of directors. Thus agency costs would be reduced, which results in a higher financial firm performance. They use a hierarchal regression<sup>4</sup> to measure their prediction that greater board diversity has a positive association with organizational performance. In this study, organizational performance is measured as the return on assets (ROA) and return on investment (ROI)<sup>5</sup>. Erhardt et al. (2003) also measure firm performance on two separate moments in time to control for market volatility. Results provide support for

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<sup>4</sup> Hierarchal regression is a collection of different Ordinary Least Squares (OLS) regressions, with each model adding more predictors.

<sup>5</sup> Return on Assets (ROA) is the return a firm divided by total assets. Return on Investment (ROI) is profit generated from investments divided by the total cost of the investment.

the prediction board diversity is associated with firm performance, as measured by ROA and ROI.

Other studies, like Adams & Ferreira (2007), show a negative association between the ratio of female directors on the board and operational firm performance. However, there exists a positive association when firms are in need of increased monitoring. Because a board with more female directors is associated with stricter monitoring. As a moderating variable, the authors use the deviation between weak and strong shareholder rights. Strong shareholder rights suggest democracy in a firm, where shareholders have direct influence on management to align their preferences. Firms with weak shareholder rights are dictatorship firms.<sup>6</sup> The main argument is that in dictatorship firms, adding more female directors to the board will lead to more intense monitoring of management. However, too much monitoring could occur, which could result in decreased financial performance. The study uses an OLS with a big sample of observations of 1,939 U.S. firms between the years 1996-2003. Results indicate a decrease in shareholder value if over-monitoring occurs. The authors contribute to the literature, because they prove women are not just added to the board just because society desires it from a firm. Female directors do actually add value to the firm. The authors also address endogeneity and reversed causality issues associated with board room diversity. To solve this issues, they use a robustness test on both measures and test if there are substantial differences only attributable to the fact one director is female and the other man. Adams & Ferreira (2008) use a robustness test, because results could be attributable to differences in age, experience and other personal traits.

In contrary, Francoeur et al. (2008) find no significant relation between firm performance and gender diversity in the board. They draw their sample from the 500 largest Canadian firms and only investigate publicly listed firms. The final sample consists of 230 publicly held firms. Analyzing the relation between female representatives on the board and firm performance, the authors take into account complexity and risk issues associated with firm performance. Firm performance is measured using book-to-market ratios, analyst forecast standard deviation and beta. The initial results suggest no economically significant relation between the number of women on the board and firm performance. But taking into account the complexity issues mentioned before, there is a small positive effect between the percentage of women on the board and firm performance. However, their outcomes are based on the stakeholder theory. Therefore, they explain stakeholders to attach value to female participation in the board even when they

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<sup>6</sup> Both types of firms are defined in a study of Gompers (2003) and are measured using the Gompers-index (G-index).

do not help increase firm performance. The results are also in line with the glass cliff theory. Whereas the glass ceiling theory explains women are obstructed in climbing the career ladder, the glass cliff theory points out what happens to women when they are actually hired. Ryan & Haslam (2008) reveal women are often hired in riskier jobs and obtain more negative feedback and evaluations than their male colleagues. Just like they were thrown off a 'cliff'. Caution must be taken when generalizing the results. Canadian firms might differ from U.S. firms in many ways, like corporate cultural differences, corporate governance and legislation.

Another emerging stream of literature focuses on the relation between gender board diversity and corporate social responsibility (CSR). CSR is defined as "a discretionary allocation of corporate resources toward improving social welfare that serves as a means of enhancing relationships with key stakeholders" (Bear, et al., 2010). Whereas most literature highlights the importance of the effect of female board participation on economical firm performance, this stream of literature targets the social performance. Social performance is for example the reputation. Having more women in the board of directors is often perceived as positive by a wide range of stakeholders.

Bear et al. (2010) investigate the indirect link between gender board diversity and the reputation of the firm. They expect CSR to be the mediating variable between the indirect link and investigate it by composing two hypotheses. The first expects a positive association between gender board diversity and CSR and the second between CSR and board reputation. To discover significant associations, Bear et al. (2010) use a sample of 689 companies from the Fortune's 900 Most Admired List<sup>7</sup>. To test for a mediating variable, there are three steps required. Testing the effect of the independent variable (number of female board members) on the mediator (CSR rating). Thereafter testing the effect of the independent variable on the dependent variable (firm reputation). And finally testing the effect of the mediating variable on the dependent variable. The results show a positive association between the number of female directors and the level of CSR. Suggesting women do add value in the board and are not just hired because of tokenism. Results also prove the mediating effect of CSR between the number of female board members and firm reputation. However, this effect is only significant for institutional strength ratings.<sup>8</sup>

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<sup>7</sup> Fortune's 900 Most Admired List consists of 900 firms which are rated by analysts and directors within their own industry on nine criteria. Some of the criteria are innovation, people management and global competitiveness (Bear, et al., 2010).

<sup>8</sup> CSR is divided in two components: Institutional strength ratings and technical strength. Both concepts are defined by Bear et al. (2010) as: "Institutional strength are positive actions toward diversity and community stakeholders. Technical strength are positive actions toward consumers, stockholders and employees"

So the number of female directors only influences a firm its reputation towards community and diversity stakeholders.

In summary I can say gender diversity has an impact on different concepts. Most studies are related to firm performance or firm value, but also CSR. Mixed results in all aspects of board diversity provide difficulty in predicting the results of my research a priori. Female directors might have different influences on the effectiveness of the board of directors in various contexts. Differences in time periods, control variables and statistical methods could also provide possible explanations for the various results of prior gender board diversity research. Refer to appendix C for a complete overview of the gender diversity literature.

### 2.3 Corporate Tax Avoidance

Avoiding taxes occurs on the individual level, but also on the corporate level. In public companies, tax departments are more and more often transformed into profit centers to make sure the effective tax rate of the firm is as low as possible. Many people believe companies have an ethical and civic duty to pay taxes, but not all tax avoidance is by definition illegal. Tax avoidance has received a lot of attention recently, but the subject is not that often investigated yet. Therefore, there is no generally accepted definition of tax avoidance yet in the literature, according to Hanlon & Heitzman (2010). The separation between legal and illegal corporate tax avoidance is therefore difficult to make. I will follow Dyreng et al. (2010) to define corporate tax avoidance. Dyreng et al. (2010, p. 1164) characterize tax avoidance as “anything that reduces the firm’s taxes relative to its pretax accounting income”. Hanlon & Heitzman (2010) explain in their overview of the tax literature that tax avoidance can be seen as a continuum. The left side of the continuum shows legal tax avoidance and the other end illegal tax evasion. Not taking advantage of all legal manners to obtain a lower tax liability, will result in a lower bottom-line performance. Lower bottom-line performance results in lower returns for shareholders. Shareholders will perceive this as willingly giving away tax to the government. Illegal tax evasion is associated with for example tax aggressiveness and tax havens. Tax havens are mostly jurisdictions abroad, where lower income taxes are maintained. Examples of tax havens are Ireland and the Caiman Islands. Tax aggressiveness is a state of mind of firms, which are willing to take illegal actions to lower their effective tax rates. A broad definition of tax avoidance is necessary, because there is a grey area between what kind of tax avoidance is legal and which is illegal.



I assume in my research that shareholders prefer higher corporate tax avoidance over lower corporate tax avoidance, as they want to increase their eventual share value. Management might not have the same incentives as shareholders, as they think there is risk associated with engaging in higher tax avoidance. Risks might be litigation costs of tax avoidance or even legal proceedings. Measuring corporate tax avoidance is also difficult. The total level of tax paid to the IRS is confidential and only accessible to a few. Also different proxies measure different components of tax avoidance. Prior literature of corporate tax avoidance focuses on determinants and consequences of corporate tax avoidance. Every study measures another definition of tax avoidance. Therefore, I will discuss benefits and limitations of each study and proxy of corporate tax avoidance. By means of the literature discussed below, I will decide which proxy fits the research question of this study best.

A study investigating the determinants of corporate tax avoidance is the one of Wilson (2009). Wilson (2009) tries to identify if firm characteristics and certain financial ratios are associated with the participation in corporate tax shelters. Thereby, he also wants to identify if the quality of corporate governance influences the generation of abnormal returns during the participation in tax sheltering of a company. Wilson (2009) composes a sample of firms accused by the IRS of participating in tax shelters and compares this sample to a control sample. Corporate Tax Avoidance is measured in this article as the probability if a company is involved in aggressive tax sheltering. The most important ratios explored are the afterwards book-tax-difference<sup>9</sup> and leverage. Firm characteristics in the regressions were amongst others firm size, foreign income and aggressive financial reporting. Using a logistic regression to measure the probability of engaging in tax shelter activity, there were significant results of a positive association between the probability of engaging in a tax shelter and book-tax-differences, also when BTD is split in a temporary and permanent part<sup>10</sup>. The BTD is split, because engaging in tax sheltering could have influence on different parts of the BTD. This association implies BTDs could explain a part of corporate tax avoidance. The independent variable leverage is also negatively associated with the probability of engaging in tax sheltering. One possible explanation for this result is the shifting of debt from the balance sheet to tax shelters. When debt decreases, the equation total debt divided by total equity also decreases. However, using this sample, no evidence for this

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<sup>9</sup> Book-tax-differences is the pretax book income minus the net tax income. This difference implies a higher 'bottom-line income'.

<sup>10</sup> Wilson (2009) defines the book-tax-differences as: "Temporary Book-tax-differences are federal deferred tax expense grossed up by the applicable statutory rate and scaled by beginning total assets" Temporary book-tax-differences are driven by accruals and the assumption that managers have discretion in altering these accruals.

statement is found. Other evidence concludes there are positive abnormal returns during the whole period of engaging in a tax shelter for companies with good corporate governance. Tax shelters are thus seen as positive in the eyes of shareholders, as they receive more benefits due to the shelters. But there are certain limitations associated with this study. The sample suffers from a selection bias, because firms were not randomly selected. Only firms already accused of engaging in tax sheltering were included. Therefore, results must be interpreted with caution.

Dyreng et al. (2010) also want to investigate determinants of corporate tax avoidance. However, they specifically investigate the influence of particular employees and the individual on corporate tax avoidance, instead of common company characteristics. The intuition behind this relation is that CEOs can influence their tax department or tax directors through ‘tone at the top’. ‘Tone at the top’ refers to the idea that the higher executives, and especially the CEO and CFO, are an (good or bad) example for the behavior of the rest of the company. The authors use long term effective tax rates (ETR)<sup>11</sup> to measure corporate tax avoidance. The effective tax rates are divided in a temporary ETR and a permanent ETR to capture more intentions executives could have with regard to corporate tax avoidance. Furthermore, the authors also define corporate tax avoidance very broad to stay away from the difficult differentiation between legal and illegal tax avoidance or evasion. To measure the influence of the individual executive, a regression using panel data is executed. A panel dataset of 908 executives from 1992-2006 is used. Using OLS, the authors control for fixed year effects and fixed firm effects, which could potentially influence corporate tax avoidance. Examples of fixed effects are industry differences. Results indicate a positive association between the executive variable and the ETR, which provides an indication of the individual influence an executive has on the level of corporate tax avoidance. This study contributes to the literature in being the first to link individual executives, to corporate tax avoidance. Prior studies only take into investigate the link between firm characteristics and corporate tax avoidance. Their measure of corporate tax avoidance is relatively easy to calculate and interpret. However, also when calculating the ETR, sufficient measurement error could occur, because the total tax return of the IRS is not commonly available.

Rego & Wilson (2012) also want to investigate a determinant of corporate tax avoidance, namely equity risk incentives. They hypothesize equity risk incentives to be positively

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<sup>11</sup> Effective tax rate is the average rate of tax per dollar earnings (GAAP ETR) or cash flows (cash ETR). Measures approximately the same as the book-tax-difference, but instead of subtracting numbers, provides a ratio.

associated with tax avoidance or the riskier component of tax avoidance. The intuitive reasoning behind this relation is that equity risk incentives explain the relation between corporate tax avoidance and the rewarding of executives for their services, also defined as compensation. Rego & Wilson (2012, p. 776) reflect that: “Equity risk incentives capture the convexity of the relation between a manager’s wealth and stock price, and are measured as the change in value of a manager’s stock option portfolio for a given change in stock return volatility.” Stock options are used to decrease agency costs between management and the shareholders. The value of the option, and thus the benefit of the manager, increases when management engages in projects with net present value. To engage in these projects, they often have to take possibilities to invest in on average riskier opportunities. Risky options result in more volatile stock, which will again increase stock options.

The riskier component of tax avoidance is one of the investment opportunities that could be chosen in this article and thus associated with equity risk incentives. Tax avoidance in this article is measured by 4 different proxies to assure the robustness of the results: Discretionary permanent differences<sup>12</sup>, tax shelter prediction score, the five-year cash ETR and Unrecognized Tax Benefits (UTB)<sup>13</sup>. The results provide evidence of a positive association between tax risk and equity risk incentives, but not the other way around. There is also evidence that CEOs have more influence on the riskier component of tax avoidance than CFOs. Also no evidence was found regarding the moderating effect of corporate governance between the relation of equity risk incentives and corporate tax avoidance. A limitation of this study is that even when there are four measures used to measure tax risk, no measure actually captures the underlying construct. The proxies all measure another part of corporate tax avoidance.

Robinson et al. (2013) take a new approach in evaluating the level of tax avoidance in a firm. They are the first to divide corporate tax avoidance in tax planning and ‘risky’ tax planning, hypothesizing there are different associations in the two concepts. Thereby, it is also one of the few studies examining corporate governance components in relation to corporate tax avoidance. The focus here is on financial experts in the board of directors. Financial experts can provide specific advice regarding the level of tax avoidance in a firm and also monitor management to

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<sup>12</sup> Discretionary permanent differences are the residual of a regression, which estimates the discretionary part of tax and the non-discretionary part. For details refer to the appendix of Rego & Wilson (2012).

<sup>13</sup> Unrecognized Tax Benefits are calculated as the ending balance of the unrecognized tax benefits divided by total assets in Armstrong et al. (2015)

align preferences of both shareholders and management. Robinson et al. (2013) predict that the number of financial expertise on the audit committee is positively related to tax planning, but negatively related to riskier components of tax planning. An explanation for this prediction is the benefits shareholders are able to extract from tax planning, and thus the positive advice financial experts will give. The riskier component of tax planning, on the other hand, could have negative effects to a firm or shareholders due to increased tax risk. Tax planning is measured as the cash or GAAP effective tax rate. Risky tax planning is operationalized by Robinson et al. (2013) as “the propensity of engaging in tax shelter activity”. Using OLS to find evidence for the predictions, the authors find evidence that financial expertise has a positive effect on tax planning and a negative on risky tax planning. This positive effect is moderated by the overall level of corporate governance. This indicates for example a stronger positive effect of one financial expertise on the board extra and the level of tax planning. This is the first study to acknowledge a different relation of corporate tax avoidance across the tax avoidance spectrum. However, the risky component of tax planning and the overall strength of corporate governance is difficult to measure. Therefore, results must be interpreted with caution.

Armstrong et al. (2015) continue with the idea of Robinson et al. (2013) of having different relations between tax avoidance and board characteristics or managerial incentives across the tax avoidance distribution. They want to investigate if managerial incentives, measured for example by *vega*. Vega is defined as the reaction of managers’ value of their stock portfolio when the stock return volatility changes. Normally, when stock volatility increases, the value of the stock portfolio also increases. This is an incentive for managers to take riskier decisions and accept riskier investments. Armstrong et al. (2015) see tax avoidance as a concave function with an optimum and thus expect Vega to be positively related to tax avoidance. But they expect the relation to be stronger on the right side of the tax avoidance distribution. On the right side, where the tax avoidance level is higher, the authors assume to be more risk associated with decisions of management. Board characteristics are used to measure the relation between corporate governance and tax avoidance. Armstrong et al. (2015) believe the number of independent board members and the number of financial experts on the board are associated with corporate tax avoidance. They expect these governance mechanisms to prevent management to over- or underinvest in corporate tax avoidance and to achieve the optimal amount of tax avoidance as desired by shareholders.

To measure the differences across the tax avoidance distribution described in the hypotheses, the authors use a quantile regression. They measure corporate tax avoidance using the GAAP effective tax rate, average over 3 years, and the unrecognized tax benefits. Arguing the measures are both highly observable to the board, they acknowledge both measures contain accruals. Accruals could be another explanation why the board monitors management. The board could monitor choices of management regarding accruals and not corporate tax avoidance. Results indicate a positive relation between equity incentives and corporate tax avoidance and the quantile regression results show a stronger relation between incentives measured by vega and beta in the higher deciles of the distribution. Results regarding board characteristics provide evidence of a differential relation over the tax avoidance distribution. Indicating the number of board members and financial sophistication to help achieving the optimal amount of corporate tax avoidance. Results of both hypotheses provide evidence of agency problems which occur because shareholders and management both value the level of tax avoidance differently. The results emphasize the importance of corporate governance mechanisms and managerial incentives when trying to solve these problems. Concluding, the authors give new insights in how to examine the distribution of tax and provide additional evidence to the diverse corporate governance and tax avoidance literature.

Concluding, I can say there are many difficulties in defining and measuring the concept of corporate tax avoidance in prior literature. Every proxy has its up- and downsides. Therefore, it is necessary to be cautious when picking a valid and reliable measure. There is a vague line between legal tax avoidance and illegal tax evasions and therefore, a broad definition of corporate tax avoidance will be used in this thesis. Refer to appendix D for a complete overview of the corporate tax avoidance literature discussed in this section.

### 3. Hypothesis Development

How female representatives in the board of directors influence the level of corporate tax avoidance is questionable based on the literature review. Using the literature review and theoretical framework, I will provide expectations about the possible association between gender board diversity and corporate tax avoidance in this chapter.

#### 3.1 Gender board diversity and corporate tax avoidance

How female directors influence the board effectiveness and in their turn the level of corporate tax avoidance is questionable. Combining the agency theory and the resource dependence theory as theorized by Hillman & Daziel (2003), the board of directors has two functions: Monitoring and providing resources. Increased female directors in the board might influence

both functions compared to male directors. As evidence suggests, like Adams & Ferreira (2009), women tend to increase the monitoring function of the board of directors, due to their increased attendance at board meetings, the increase of the number of total board meetings, but they also motivate the male directors to attend more board meetings. Providing resources refers to female personal traits, experiences and skills they bring into the board of directors compared to men. Women are proven to have better communication skills than men (Eagly & Johannesen-Schmidt, 2001). The communication skills of women can result in increased communication between board members. I assume corporate tax avoidance to be a mean to increase firm value. Increased corporate tax avoidance eventually needs to result in higher financial performance. Shareholders prefer higher corporate tax avoidance over lower corporate tax avoidance. Their preferences should be aligned with management. Increased monitoring and the resources provided by female directors could help to overcome agency problems. This leads to the following first hypothesis:

**Hypothesis 1:** Gender board diversity is positively related to the level of corporate tax avoidance.

The hypothesis is stated in alternative form. However, female directors could add value to a firm, even if hypothesis 1 is not confirmed by the data analysis. As theorized by the stakeholder theory, additional female directors in the board of directors could also be of good faith to other stakeholders. Even if they do not directly add value to the company, certain stakeholders might value the idea of equal rights for women. It will also not be surprising if the predicted relation between both concepts turns out to be negative. Women are proved to perceive more civic duty than men (Orviska & Hudson, 2003). As the female directors in this cause feel the duty to pay taxes to return the favor to the government, they might not want management to increase corporate tax avoidance. Therefore, female directors might interfere and want to decrease the level of corporate tax avoidance.

### 3.2 Moderating effect of the strength of shareholder rights

As discussed before, female directors influence the level of monitoring and provide resources to a firm their board of directors. However, too much monitoring by the board could turn the positive impact of the board of directors around in a negative impact. This is defined as the concept of over-monitoring as described by Adams & Ferreira (2009). If female directors provide resources to the board of directors and increase monitoring, this will only have effect on the financial performance and corporate tax avoidance of a firm if there is a low level of overall corporate governance. Corporate governance is the framework which assures external

stakeholders of the firms to get a return on their investment (Gillian, 2006). The spill of corporate governance is the board of directors, assuring the alignment of the preferences of shareholders with management. Due to the effect of the level of overall corporate governance, the following second hypothesis is stated:

**Hypothesis 2:** The overall effectiveness of the board of directors has a positive relation to the level of corporate tax avoidance.

It is difficult to measure the level of the strength of overall corporate governance, due to the broad spectrum of corporate governance mechanisms. I will measure the overall corporate governance level, using the entrenchment-index<sup>14</sup> (E-index) as described in Bebchuk et al. (2004). The entrenchment index shows the strength of the shareholders' rights and consists of six provisions of external corporate governance mechanisms. Weak shareholder rights mean the shareholders are not able to align their preferences with management their preferences and additional monitoring by a board of directors is necessary. The first four provisions limit the voting power of shareholders: Staggered boards, limits to shareholder bylaw amendments, supermajority requirements for mergers and charter amendments. The other two provisions protect the firm against hostile take-overs: Poison-pills and golden parachutes. The entrenchment index measures the strength of corporate governance in a firm.

The limit of the voting power of shareholders makes it more difficult for shareholders to get their way and protects the board of directors to be independent. For example, staggered boards divide the board of directors in three classes. Every class has a different tenure and every year another class can be re-elected. It prevents the shareholders to replace the majority of the board. The requirement of supermajority voting requires a certain percentage of the shareholder votes to amend bylaws or allow a charter. It is quite difficult to obtain the majority of votes and therefore, such important decisions cannot easily be made by shareholders. The takeover readiness provisions prevent hostile takeovers. Poison pills are shareholder right plans, which prevent hostile takeovers. For example, a certain shareholder buys 25% of the shares in once. At that moment, a poison pill is in place, which gives the other shareholders of the firm the right to buy shares at a discount. For the acquirer, the shares are now relatively expensive and it makes it undesirable to buy the shares to acquire the firm. Another take-over readiness

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<sup>14</sup> An alternative measure of the overall corporate governance is the G-index of Gompers et al. (2003). However, Bebchuk et al. (2004) used only 6 provisions of the G-index for their E-index and did not find correlation for the remaining provisions of the G-index with firm value. Duet to this reason and data availability, I think the E-index is more appropriate here to measure the overall corporate governance level.

provision are golden parachutes. A golden parachute promises top-executives to receive a substantial benefit or bonus when they are terminated due to (hostile) takeovers or mergers. Because there are large costs associated with the golden parachutes, it could discourage hostile takeovers.

## 4. Methodology

This chapter covers the methodology used for the empirical research of this thesis. The chapter consists of a variable description, including the dependent, independent and control variables. Subsequently, I will discuss the research design used in proceeding chapters. And finally the sample selection procedure including selection criteria will be debated. Refer to appendix A for a complete variable description.

### 4.1 Variables

#### 4.1.1 Dependent Variables

The dependent variable of interest is corporate tax avoidance. Prior research analysis concluded there is difficulty measuring the concept of corporate tax avoidance, as often a distinction is made between risky tax avoidance and regular tax avoidance. As pointed out by Desai and Dharmapala (2009), tax returns must be calculated using the financial statements, because the tax income reported to the IRS in the United States is confidential. I will use the relatively simple effective tax rate to measure corporate tax avoidance, following among others Dyreng et al. (2010) and Armstrong et al. (2015). The effective tax rate will be split in the GAAP effective tax rate and the cash effective tax rate. Benefits of using the effective tax rate is the simplicity of the measure compared to other corporate tax avoidance measures. For example, measuring tax shelter likelihood (Wilson, 2009) might include a larger probability of estimation error due to model calculation complexity. According to Armstrong et al. (2015) the effective tax rate is also highly visible to the board of directors. And finally, the effective tax rate is the tax avoidance measure most often used in prior literature, due to the absence of an overall definition of the concept of corporate tax avoidance.

The GAAP effective tax rate is calculated by the total income tax expense divided by pre-tax accounting income. The cash ETR is very volatile per year. To solve this problem, the ideal solution is to calculate the cash ETR by dividing the 3-year average cash taxes paid by the 3-year average pre-tax accounting income. However, due to data availability issues I am forced to delete this variable and use the one-year cash ETR. Including both GAAP and cash ETR provides insights in different objectives the board or management might have in increasing corporate tax avoidance. Hanlon & Heitzman (2010) point out these differences of GAAP ETR



and cash ETR. GAAP ETR captures tax planning strategies using accounting accruals and affects accounting earnings. On the other hand, cash ETR is not affected by accounting accruals, but does show strategies to defer taxes.

#### 4.1.2 Independent Variable

The independent variable of interest is gender board diversity. I will use two different measures to measure board diversity. One is the number of female directors on the board. The other measure is the Blau-index, as used in Bear (2010). The Blau-index is a diversity index and measures how evenly distributed men and women are in the board of directors. It is measured as 1 minus the sum of the proportions men and women squared. The formula to calculate the Blau index is stated as follows:

$$Blau\ Index = 1 - \sum p_i^2$$

The Blau Index can take a value between 0 and 0,75. Whereas 0 means a homogenous board of directors, consisting of only men or women. 0,75 is the most heterogeneous the board of directors can be, namely 50% women and 50% men.

#### 4.1.3 Control Variables

Three categories of variables will be used to control for endogeneity concerns regarding the possible relation between gender board diversity and corporate tax avoidance. The more control variables added in the regression, the less alternative explanations remain for my possible causal relation. The categories consist of firm characteristics, board characteristics and fixed effects. For more detailed information, description and Compustat references of all variables refer to appendix A.

The first category firm characteristics consists of common control variables in the previous tax literature, which are proven to influence the level of corporate tax avoidance. These control variables are mostly time-varying aspects of the firm. Following to Robinson et al. (2013) and Dyreng et al. (2010), I include the control variables leverage (*LEV*), firm size (*FSIZE*), R&D expenditures (*RD*), market-to-book-ratio (*MTB*) and profitability, measured by return on assets (*ROA*). The market-to-book ratio is measured as the market value of the company divided by total assets minus total liabilities, which is equivalent to the book value of a firm. The market-to-book ratio (*MTB*) and the control variables of the log of sales (*SALES*) are related to earnings growth of a firm. Another example is if a firm grows and thus the return on asset (*ROA*) or the level of sales increases, the effective tax rate will increase due to increased profitability. If the

leverage ratio increases, a company could profit from tax benefits which accompany debt financing. The overall level of corporate governance is also included, measured by the E-index (*EINDEX*), because high-quality governance firms often do not need additional board monitoring to achieve more corporate tax avoidance. I control for the firm size by logging the total assets per firm.<sup>15</sup> The level of R&D expenditures must be controlled, because these expenses are directly deductible. Even a tax credit on R&D expenses is possible, explaining positive and negative associations with the ETR (Gupta & Newberry, 1997). Firm size could influence the level of corporate tax avoidance positively, because bigger firms are more effective in avoiding taxes due to economies of scale. But the bigger the firm, the more taxes they are mostly obliged to pay. Therefore, firm size could also negatively influence the level of corporate tax avoidance. The level of the leverage ratio usually negatively influences the effective tax rates, as firms can deduct their interest expenses for the IRS. The indicator variable *FOREIGN* is added due to research of Rego (2003). The indicator variable takes the value of 1 when the firm has income generated abroad. Evidence of Rego (2003) provides evidence that multinational companies have more opportunities to avoid taxes, by transferring income to for example tax haven countries, and therefore have lower effective tax rates compared to firms only operating in the U.S. market. Finally, the indicator variable *LOSS* is included, which takes a value of 1 if a firm's net income before extraordinary items is lower than 0. I expect the *LOSS* variable to be negative, as firms which generate losses could receive tax benefit in the form of loss carryforwards. Therefore, avoiding taxes is not that necessary.

The second category of control variables consists of board-level controls. Other elements or characteristics of directors could influence the level of corporate tax avoidance in a firm. Armstrong et al. (2015) prove the number of independent directors and number of financial experts to be associated with corporate tax avoidance, arguing they solve agency problems between shareholders and management regarding the level of corporate tax avoidance. Therefore, the relative number of financial experts (*FINEXPERT*) and relative number of independent directors (*INDEPENDENT*) in the board of directors are added to the regression. I also add a control for board size (*BSIZE*), as bigger boards could influence the level of tax avoidance by automatically increase monitoring or decrease due to over-monitoring or communication issues. Also, a bigger board could mostly infer more female directors. I expand

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<sup>15</sup> Logging variables helps understand them more substantively. For example, an increase in total assets for a small company might be very significant news, while for a large company with already high assets the same growth is insignificant. To understand the variable better, the log provides the variable to show the relative value instead of the absolute value.

the control variables with director age (*AGE*), because older age is often associated with an increased sense of being risk-averse. Older directors might influence the level of corporate tax avoidance negatively.

To control for fixed effects, I add dummy variables per industry and per year. The year dummies control for aggregate trends in each year. For example, variables could just increase due to inflation. The industry dummies control for possible differences across industries regarding female board participation and the level of corporate tax avoidance. Female board participation could be systematically lower in industries where female participation is from nature low, like the mining industry. The industry classification is based on the method used by Fama & French (1997) and consists of 12 different industry classifications.

#### 4.2 Research Design

The predictive validity framework (“Libby Boxes”) are presented in appendix B. The framework shows the operationalization of the conceptual relation between gender board diversity and corporate tax avoidance and also the included control variables. I will use Ordinary Least Squares regression (OLS) to measure the relation between gender board diversity and corporate tax avoidance. I will run the following regression to test hypothesis 1:

$$ETR_{i,t} = \alpha_{i,t} + \beta_1 DIVERSITY_{i,t} + \beta_2 \sum CONTROL_{i,t} + \varepsilon_{i,t}$$

In the regression, *DIVERSITY* is the independent variable measuring the level of board diversity. *DIVERSITY* consists of two different measures as described before, namely the Blau-Index (*BLAU*) and the ratio of the number of female directors compared to total board size (*FEMALE*). The direction of the coefficient of *DIVERSITY* is questionable. I expect the number of female directors and thus increased board diversity to be positively related to the effective tax rate. Women increase monitoring in the board of directors and provide useful resources to make the board behave more effectively. Therefore, following hypothesis 1, I expect the coefficient of *DIVERSITY* to be negative. An increase in the board diversity of a firm increases the level of corporate tax avoidance, but therefore it decreases the effective tax rate. The dependent variable ETR is the effective tax rate and will measure the concept of corporate tax avoidance. The ETR consists of the GAAP ETR and the cash ETR. *CONTROL* sums up all control variables, including firm specific, board and fixed effect control variables as described in the previous section. Refer to appendix A for a complete description of all variables.

To test hypothesis 2, I have to include an interaction term into the variable introducing the possible moderating effect of the entrenchment index (E-index). The regression for hypothesis 2 is stated as follows:

$$ETR_{i,t} = \alpha_{i,t} + \beta_1 DIVERSITY_{i,t} + \beta_2 EINDEX + \beta_3 DIVERSITY \times EINDEX_{i,t} + \beta_3 \sum CONTROL_{i,t} + \varepsilon_{i,t}$$

I expect the E-index to be positively related with the effective tax rate, as a better level of corporate governance provides increased board effectiveness and thus increased corporate tax avoidance to increase shareholder value. Recall that the E-index variable is a control variable in prior regression. The interaction term (*DIVERSITY x EINDEX*) shows the difference in the effect of female directors on the board on corporate tax avoidance between low and high levels of corporate governance. The coefficient of the interaction term is consequently expected to be positive, because female participation might not influence the board of directors' effectiveness if the overall corporate governance is already high. And thus female participation is expected to less strongly influence the level of corporate tax avoidance than in firms with lower corporate governance.

### 4.3 Sample selection

The first sample is derived from the ISS database, containing individual director data for the most recent fiscal years 2009-2014 for which director data was available. After aggregating and grouping the data per firm-year<sup>16</sup>, I merge the ISS director dataset with the ISS governance database, using CUSIP and fiscal year as identification for each firm-year. The merging is necessary to obtain the data to calculate the moderating variable for measuring the E-Index. The E-index consists of six provisions as explained in the previous sections. For each observation, a check is made how many provisions are present. If a provision is present, the firm obtains a score of 1. If the provision is absent a score of 0 is obtained. The E-index variable is the total score of all six provisions, with a minimum of 0 and a maximum of 6. The maximum score indicates the firm has very strong shareholder rights and thus additional board characteristics are not necessary to overcome agency problems between shareholders and management. The observations that do not match the original ISS database are deleted. Furthermore, I merge the complete ISS dataset with the Compustat dataset, again using the

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<sup>16</sup> I assume fiscal year of the ISS database to be the same as the fiscal year on Compustat, as the tutorial on the university website claims the years in the ISS database are based on fiscal years. Refer to [http://www.eur.nl/ub/en/trainingsupportportal\\_en/trainingsupportsearch\\_en/trainingsupportdetail\\_en/?view=showDetailed&id=187&q=ceo](http://www.eur.nl/ub/en/trainingsupportportal_en/trainingsupportsearch_en/trainingsupportdetail_en/?view=showDetailed&id=187&q=ceo)

CUSIP code and year as identification for each firm-year. I exclude firm-year observations with missing Compustat data for total assets and subsequently insufficient data to compute the tax dependent variables and the control variables. In line with Robinson et al. (2013) and Hoopes et al. (2012), I only include the observations for which the tax avoidance measures are within a range between 0 and 1. The resulting sample consists of 1249 firm-years with 540 distinct firms. For an overview of the sample selection process refer to table 1. In Table 2, I divide the sample in 12 industries as classified by Fama & French (1997).

**Table 1**  
**Sample Selection Process Public Firms with director information (2009-2014)**

**Public Firms with Director Data**

	No. of Firm-Years	No. of Firms
Initial sample of director data (ISS Director)	8,937	1,922
<u>Eliminate firms that:</u>		
Do not have governance data (ISS Governance)	(647)	(44)
Do not have financial data (Compustat)	(2,050)	(149)
Do not have Total Assets > 0	(1,224)	(299)
Do not have complete data available for control variables	(2,108)	(548)
Do not have complete tax data available	(1,348)	(288)
<b>Total Sample</b>	<b>1,560</b>	<b>594</b>

## 5. EMPIRICAL Results and Data Analysis

### 5.1 Descriptive Statistics

In Table 2 I compare the percentage of firms per industry to the entire Compustat database to examine if my sample is representative for the whole U.S. population. Most observations descend from the business equipment industry (17,37%) and the Other category (15,54%), which includes for example mining. In the sample there are relatively more shops and retail than in the whole Compustat database (9,83% versus 5,37%), and less in the ‘Money Finance’ classification (6,02% versus 38,42%). One should be careful generalizing the results due to differences between the sample distribution and the entire population.

**Table 2**

#### **Industry Classification for Sample based on Fama & French**

Industry classification	Firm-years	Sample %	Compustat %
Consumer Non-Durables	112	3,85%	3,10%
Consumer Durables	80	2,75%	1,57%
Manufacturing	310	10,66%	5,78%
Energy	278	9,56%	5,10%
Chemicals	77	2,65%	1,72%
Business Equipment	505	17,37%	12,01%
Telephone and Television Transmission	46	1,58%	2,23%
Utilities	80	2,75%	2,64%
Shops	286	9,83%	5,37%
Healthcare	507	17,43%	7,86%
Money Finance	175	6,02%	38,42%
Other	452	15,54%	14,20%
<b>Total Observations</b>	<b>1,560</b>		

**Note:** Industry Classification is determined by the 12 factor classification as proposed by Fama & French, based on the CIK-codes derived from Compustat. The Compustat sample in this table is derived from the year 2009, because relatively the most observations from my sample are from this year (509 observations).

Table 3 panel A presents the descriptive statistics of the sample. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percent level. Observing the statistics for the corporate tax avoidance variables, the mean of UTB is 0,01 and is similar to the mean of the same measure in Armstrong et al. (2015). The GAAP ETR measure mean is 0,23 and is thus relatively low compared to the U.S. tax rate, which is 35%. Therefore, in the sample, firms try to keep their effective tax rate relatively low. Both the cash ETR and the GAAP ETR show great differences

across firm-years. This is consistent with recent articles, which show the great dispersity of tax strategies and effective tax rates across U.S. firms and between industries.<sup>17</sup> Cash ETR shows more differences than GAAP ETR, as the actual tax cash flows are very volatile. There are on average 1,27 female directors in the board of U.S. firms, while the mean of the board is on average 9,38 directors large. This is an average of 13,5% female directors per board, which is lower than the U.S. average of 16,9% in 2014<sup>18</sup>. Assuming a growth of female board participation between 2009-2014, in the sample female participation is low compared to the entire United States. A cause could be the overrepresentation of for example energy firms in the sample. Such industries often do not represent many female directors (Adams & Ferreira, 2009). The board members of our firms have an average age of 62,57 years, with a range between 60,11 and 65, indicating, on average, directors are of higher age. On average, boards consist mostly of independent directors, as the fraction of independent directors ranges between 71% and 89% in the sample, with a mean of 79%. While on the other hand there is a wide variety in the fraction of financial experts on the board, as the 25<sup>th</sup> percentile is still 0, while the mean is 23% and the 75<sup>th</sup> percentile 33%. Many public firms thus still underestimate the benefits associated with adding financial experts to the board of directors. For example, their association with corporate tax avoidance as evidence suggests in Armstrong et al. (2015) and Robinson et al. (2013). The average E-index of the sample is 3,5, which is high compared to prior research. The average of Bebchuk et al. (2004) is 2,45 and Robinson et al. (2013) is 2,61. In our sample firms have stronger shareholder rights compared to other research.

Table 3 panel B shows the Pearson correlations of the dependent corporate tax avoidance variables, the independent variables of gender board diversity and the control variables in the main sample. The correlations describe the linear relation among the variables. As expected, are both effective tax rate measures (*GAAP\_ETR* and *CASH\_ETR*), positively correlated with each other. Also both gender diversity measures are positively correlated. The correlation between *FEMALELED* and *CASH\_ETR* is significant and negative which supports hypothesis 1. However, both measures are not correlated with the *GAAP\_ETR*, which is unsupportive for hypothesis 1. Note that both corporate tax avoidance variables are associated with sales, firm size, R&D expenditures, advertising expenditures, SG&A expenditures, intangibles and the

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<sup>17</sup> Refer to David Leonhardt - 'Who Will Crack the Code?' (New York Times, 2013)  
<http://www.nytimes.com/2013/05/26/opinion/sunday/who-will-crack-the-code.html?pagewanted=all>

<sup>18</sup> Refer to 2014 Catalyst Consensus: Women Board Directors - <http://www.catalyst.org/knowledge/2014-catalyst-consensus-women-board-directors>



indication if a firm produces a loss. It is important to control for all variables associated with the variables of interest of either gender board diversity of corporate tax avoidance.

**Table 3**  
Descriptive Statistics for sample firms

*Panel A: Descriptive Statistics*

Variable	N	Standard Deviation	25 <sup>th</sup> percentile	Mean	Median	75 <sup>th</sup> percentile
<b>Corporate Tax Avoidance</b>						
<i>GAAP ETR</i>	1,560	0.16	0.07	0.23	0,26	0,35
<i>CASH ETR</i>	1,560	0.17	0.01	0.17	0,15	0,29
<i>UTB</i>	950	0.02	0.00	0.01	0,00	0,01
<b>Gender Board Diversity</b>						
<i>BLAU</i>	1,560	0.14	0.12	0.21	0,22	0,32
<i>FEMALE</i>	1,560	1	1	1.27	1	2
<b>Board Characteristics</b>						
<i>AGE</i>	1,560	3.77	60.11	62.57	62,8	65
<i>INDEPENDENT</i>	1,560	0.1	0.71	0.79	0,82	0,89
<i>BSIZE</i>	1,560	2.2	8	9.38	9	11
<i>FINEXPERT</i>	1,560	0.13	0	0.23	0,2	0,33
<i>E-INDEX</i>	1,560	1.05	3	3.5	3	4
<b>Firm Characteristics</b>						
<i>ASSETS</i>	1,560	27,368	53.37	5,503	479	2,600
<i>FSIZE</i>	1,560	2.80	3.98	5.82	6.17	7.85
<i>SALES</i>	1,560	3.11	3.81	5.41	5.87	7.66
<i>RD</i>	1,560	0.11	0	0.04	0	0.04
<i>ADVERTISING</i>	1,560	0.03	0	0.01	0	0
<i>SG&amp;A</i>	1,560	0.57	0.06	0.32	0.17	0.38
<i>LEVERAGE</i>	1,560	0.2	0	0.17	0.11	0.27
<i>PPE</i>	1,560	0.43	0.17	0.53	0.42	0.83
<i>LOSS</i>	1,560	0.42	0	0.23	0	0
<i>MTB</i>	1,560	9.20	-48.76	2.33	1.89	3.37
<i>ROA</i>	1,560	1.46	0.01	-0.26	0.04	0.08
<i>INTANGIBLES</i>	1,560	0.20	0	0.16	0.07	0.27
<i>FOREIGN</i>	1,560	0.47	0	0.34	0	1

Note: All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> level. Descriptions and calculations of all variables are consistent with the definition in Appendix A. The sample window is between 2009-2011 in fiscal years. Assets are defined in millions of dollars.

Panel B: Correlation table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) BLAU	1										
(2) FEMALE	<b>0.9270</b>	1									
(3) CASHETR	-0.0214	<b>-0.0488</b>	1								
(4) GAAPETR	-0.0045	-0.0330	<b>0.5492</b>	1							
(5) SALES	0.0341	0.0089	<b>0.4284</b>	<b>0.4845</b>	1						
(6) EINDEX	0.0084	0.0088	0.0097	-0.0335	0.0038	1					
(7) AGE	<b>-0.0863</b>	<b>-0.0567</b>	-0.0304	<b>-0.0498</b>	-0.0823	<b>0.0522</b>	1				
(8) INDEPENDENT	<b>0.2429</b>	<b>0.2819</b>	<b>-0.0468</b>	-0.0126	-0.0044	<b>0.0896</b>	-0.0520	1			
(9) FINEXPERT	-0.0039	<b>-0.0458</b>	-0.0161	<b>-0.0505</b>	-0.0249	-0.0094	0.0258	<b>0.0627</b>	1		
(10) BSIZE	<b>0.3085</b>	<b>0.5268</b>	<b>-0.0643</b>	-0.0387	<b>-0.0533</b>	<b>0.0495</b>	<b>0.1244</b>	<b>0.2570</b>	<b>-0.1830</b>	1	
(11) FSIZE	0.0285	0.0050	<b>0.3469</b>	<b>0.4170</b>	<b>0.9357</b>	0.0084	<b>-0.0683</b>	-0.0026	-0.0100	<b>-0.0595</b>	1
(12) RD	<b>0.0695</b>	<b>0.0751</b>	<b>-0.2085</b>	<b>-0.2975</b>	<b>-0.2984</b>	-0.0148	-0.0281	<b>0.0605</b>	-0.0145	<b>0.0466</b>	<b>-0.2862</b>
(13) ADVERTISING	0.0194	<b>0.0615</b>	<b>0.0438</b>	<b>-0.0754</b>	<b>-0.0754</b>	<b>-0.0468</b>	-0.0082	-0.0091	<b>-0.0622</b>	<b>0.1019</b>	<b>-0.1439</b>
(14) SGA	0.0106	0.0336	<b>-0.2431</b>	<b>-0.3604</b>	<b>-0.3704</b>	0.0245	<b>0.0485</b>	<b>-0.0417</b>	<b>-0.0437</b>	<b>0.0823</b>	<b>-0.4808</b>
(15) LEVERAGE	0.0079	0.0155	-0.0282	<b>0.1439</b>	<b>0.1439</b>	<b>0.0432</b>	0.0393	0.0342	0.0017	<b>0.0485</b>	<b>0.1789</b>
(16) PPE	-0.104	-0.0121	-0.0337	-0.0237	0.0237	<b>0.0712</b>	0.0225	0.0266	-0.0348	-0.0017	-0.0162
(17) INTANGIBLES	<b>0.1137</b>	<b>0.0801</b>	<b>0.0852</b>	<b>0.1592</b>	<b>0.1592</b>	0.0076	-0.0405	-0.0123	<b>0.0707</b>	-0.0376	<b>0.1824</b>
(18) LOSS	<b>-0.0786</b>	<b>-0.0438</b>	<b>-0.4904</b>	<b>-0.6037</b>	<b>-0.6037</b>	0.0269	<b>0.0600</b>	0.0301	0.0385	0.0219	<b>-0.5463</b>
(19) ROA	0.0296	0.0137	<b>0.3089</b>	<b>0.4414</b>	<b>0.4414</b>	-0.0057	<b>-0.0610</b>	0.0197	<b>0.0432</b>	<b>-0.0437</b>	<b>0.4686</b>
(20) MTB	<b>0.0433</b>	0.0403	<b>0.0967</b>	<b>0.1434</b>	<b>0.1434</b>	<b>-0.0867</b>	<b>-0.0475</b>	0.0107	-0.0330	0.0048	<b>0.1344</b>
(21) FOREIGN	0.0163	-0.0185	<b>0.1613</b>	<b>0.4573</b>	<b>0.4573</b>	-0.0208	-0.0406	<b>-0.0571</b>	0.0248	-0.0210	<b>0.4618</b>

Note: The bold coefficients are significant at the > 10 percent level in a two-tailed distribution. All variable descriptions can be found in Appendix A.

Table continues on next page

Variables	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(12) RD	1									
(13) ADVERTISING	<b>0.0512</b>	1								
(14) SGA	<b>0.1662</b>	<b>0.3070</b>	1							
(15) LEVERAGE	-0.0053	<b>-0.0652</b>	<b>-0.0928</b>	1						
(16) PPE	<b>-0.0886</b>	-0.0228	<b>-0.0833</b>	<b>0.1266</b>	1					
(17) INTANGIBLES	<b>-0.0425</b>	-0.0291	<b>-0.0982</b>	<b>0.1482</b>	<b>-0.4114</b>	1				
(18) LOSS	<b>0.3186</b>	<b>0.1020</b>	<b>0.3129</b>	<b>0.0134</b>	<b>0.1005</b>	-0.1309	1			
(19) ROA	<b>-0.3122</b>	<b>-0.2239</b>	<b>-0.6318</b>	0.0294	<b>0.0649</b>	<b>0.0733</b>	<b>0.1710</b>	1		
(20) MTB	<b>-0.0443</b>	-0.0207	<b>-0.1180</b>	-0.1080	<b>-0.0561</b>	-0.0106	<b>-0.1044</b>	<b>0.1710</b>	1	
(21) FOREIGN	-0.0340	<b>-0.0679</b>	<b>-0.1414</b>	-0.0393	<b>-0.1828</b>	<b>0.2181</b>	<b>-0.3242</b>	<b>0.1554</b>	<b>0.815</b>	1

Note: The bold coefficients are significant at the > 10 percent level in a two-tailed distribution. All variable descriptions can be found in Appendix A.

## 5.2 Regression Results

Table 4 panel A and B present the regression results for the multivariate regressions testing hypothesis 1. Hypothesis 1 expects board diversity to be positively related to corporate tax avoidance. The number of female directors on the board must be negatively related to the effective tax rates. The regressions executed in both panels are overall significant, as the F-test shows us significant results at the <0.001 percent level. Panel A shows the results using BLAU as main independent variable and Panel C indicates the results using the number of female directors (FEMALELED) as main independent variable. All regressions are estimated using three different models. First using the cash ETR as dependent variable, subsequently the GAAP ETR as variable and the third model, as a sensitivity test, uses the uncertain tax benefit (*UTB*) to assure robustness among the results. The results of the *UTB* variable will be discussed in section 5.3. Consistent with hypothesis 1, are all coefficients of both BLAU and FEMALELED in panel A and B negatively associated with lower GAAP and cash effective tax rate. However, only the results in panel B and the GAAP effective tax rate are significant. These results are significant at the >5 percent level. The coefficient of FEMALELED and GAAP\_ETR is -0.009, which can be interpreted as one additional female director in the board room decreases the cash effective tax rate (average tax rate per dollar income) with 0.009. Female directors thus do influence the level of corporate tax avoidance, but only the GAAP ETR. The GAAP ETR reflects tax accounting accruals and affects bottom-line profitability. The results suggest that female directors might be more focused on corporate tax avoidance through profitability than through increased cash flows. Because both effective tax rates reflect different tax avoidance strategies. The difference could also be due to the volatility of the cash ETR. An average cash ETR could be included in future research to exclude this possible reasoning.

Using BLAU as alternative measure for gender board diversity does not provide the same results. However, this provides some support for hypothesis 1, that female directors increase the level of corporate tax avoidance and help overcome agency costs by increased monitoring of the board of directors and providing additional resources. However, in the correlation table no significant association between the GAAP ETR and BLAU or FEMALELED was found. Therefore, inferences must be made with caution. There is a possibility that the relation between the level of corporate tax avoidance and number of female directors is determined by another variable not included in the regression. Other significant variables which have the direction as

expected and which are significant for both the cash ETR and the GAAP ETR are firm size, sales, the level of R&D expenses, the leverage ratio and the indicator variable for loss.

**Table 3**  
**OLS Multivariate Regression Results (H1)**

*Panel A: OLS Results with BLAU as independent variable*

Variables	CASH_ETR	GAAP_ETR	UTB
<i>BLAU</i>	-0.022 (0.446)	-0.035 (0.182)	0.018*** (0.000)
<i>SALES</i>	0.032*** (0.000)	0.029*** (0.000)	-0.001 (0.218)
<i>EINDEX</i>	0.003 (0.465)	-0.004 (0.246)	0.000 (0.601)
<i>AGE</i>	0.001 (0.282)	-0.000 (0.799)	-0.000 (0.132)
<i>INDEPENDENT</i>	-0.026 (0.470)	0.006 (0.846)	-0.004 (0.510)
<i>FINEXPERT</i>	-0.020 (0.507)	-0.042 (0.118)	0.013*** (0.004)
<i>BSIZE</i>	-0.003* (0.081)	-0.000 (0.814)	0.000 (0.834)
<i>FSIZE</i>	-0.021*** (0.000)	-0.018*** (0.000)	0.002** (0.021)
<i>RD</i>	-0.084** (0.043)	-0.140*** (0.000)	0.0176 (0.022)
<i>ADVERTISING</i>	0.3200** (0.016)	0.172 (0.164)	-0.017 (0.421)
<i>SGA</i>	-0.009 (0.340)	-0.025*** (0.003)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.061*** (0.002)	-0.052*** (0.004)	-0.006* (0.078)
<i>PPE</i>	-0.023 (0.261)	-0.004 (0.702)	-0.001 (0.520)
<i>INTANGIBLES</i>	0.042* (0.052)	0.033 (0.102)	-0.005 (0.140)
<i>LOSS</i>	-0.046*** (0.000)	-0.089*** (0.000)	0.006*** (0.001)
<i>ROA</i>	0.006 (0.105)	0.003 (0.326)	0.002*** (0.001)
<i>MTB</i>	-0.000 (0.883)	0.000 (0.326)	-0.000 (0.833)
<i>FOREIGN</i>	0.026*** (0.009)	-0.015 (0.103)	0.003** (0.040)
<b>R<sup>2</sup></b>	<b>0.259</b>	<b>0.3318</b>	<b>0.0984</b>
<b>F-test value</b>	<b>17.12***</b> <b>0.000</b>	<b>24.09***</b> <b>0.000</b>	<b>4.03***</b> <b>0.000</b>
<b>Observations</b>	<b>1,560</b>	<b>1,560</b>	<b>950</b>

Note: \*p<0,1; \*\* p<0,05; \*\*\* p<0.01 using two-tail probabilities, to allow for effects that have possibly been inevitable. OLS regressions are performed using GAAP\_ETR and CASH\_ETR as dependent variables. UTB is added for my sensitivity test. In every regression, year and industry dummies are added. However, these variables are not included in the table. P-values are added in parentheses. The UTB dependent variable is mentioned separately, because it provides evidence for the sensitivity analysis.

Panel B: OLS results with *FEMALE* as independent variable

Variables	<i>CASH_ETR</i>	<i>GAAP_ETR</i>	<i>UTB</i>
<i>FEMALE</i>	-0.005 (0.269)	-0.009** (0.032)	0.005*** (0.000)
<i>SALES</i>	0.033*** (0.000)	0.029*** (0.000)	-0.001 (0.282)
<i>EINDEX</i>	0.003 (0.522)	-0.004 (0.245)	0.000 (0.409)
<i>AGE</i>	0.001 (0.266)	-0.000 (0.861)	-0.000 (0.301)
<i>INDEPENDENT</i>	-0.019 (0.595)	0.002 (0.950)	-0.001 (0.241)
<i>FINEXPERT</i>	-0.021 (0.471)	-0.038 (0.162)	0.0124*** (0.005)
<i>BSIZE</i>	-0.002 (0.292)	0.001 (0.543)	-0.001** (0.034)
<i>FSIZE</i>	-0.022*** (0.000)	-0.017*** (0.000)	0.002** (0.035)
<i>RD</i>	-0.082** (0.048)	-0.131*** (0.001)	0.016** (0.034)
<i>ADVERTISING</i>	0.324** (0.015)	0.178 (0.147)	-0.022 (0.292)
<i>SGA</i>	-0.009 (0.323)	-0.025*** (0.004)	0.006*** (0.001)
<i>LEVERAGE</i>	-0.063*** (0.001)	-0.059*** (0.001)	-0.004 (0.148)
<i>PPE</i>	-0.013 (0.248)	-0.004 (0.654)	-0.001 (0.427)
<i>INTANGIBLES</i>	0.043** (0.049)	0.032 (0.115)	-0.007** (0.031)
<i>LOSS</i>	-0.046*** (0.000)	-0.090*** (0.000)	0.006*** (0.001)
<i>ROA</i>	0.006 (0.103)	0.003 (0.291)	0.003*** (0.001)
<i>MTB</i>	-0.000 (0.875)	0.000 (0.683)	-0.000 (0.806)
<i>FOREIGN</i>	0.025*** (0.010)	-0.015 (0.104)	0.003** (0.020)
<b>Adjusted R<sup>2</sup></b>	<b>0.2590</b>	<b>0.3368</b>	<b>0.1218</b>
<b>F</b>	<b>17.14***</b> <b>(0.000)</b>	<b>24.2***</b> <b>0.000</b>	<b>4.86***</b> <b>(0.000)</b>
<b>N</b>	<b>1,560</b>	<b>1,560</b>	<b>950</b>

Note: \*p<0,1; \*\* p<0,05; \*\*\* p<0.01 using two-tail probabilities, to allow for effects that have possibly been inevitable. OLS regressions are performed using *GAAP\_ETR* and *CASH\_ETR* as dependent variables. *UTB* is added for my sensitivity test. In every regression, year and industry dummies are added. However, these variables are not included in the table. P-values are added in parentheses. The *UTB* dependent variable is mentioned separately, because it provides evidence for the sensitivity analysis.

Also inconsistent with my expectations is the coefficient of the indicator variable of foreign income (*FOREIGN*) in both panel A and panel B. *FOREIGN* is positively associated with the level of cash ETR and significant at the >1 percent level. Public firms operating abroad actually have a higher tax rate than firms not operating abroad. And therefore these firms avoid less taxes. Consistent with the expectation is the significant coefficient of firm size. Larger firms do avoid more taxes. Also the level of leverage and R&D expenses have a significant negative coefficient in both models of panel A and B as expected. These results are consistent with Dyreng (2010) and Robinson et al. (2007). The idea behind leverage is that tax expenses are deductible for tax purposes and therefore, the effective tax rate will be lower. R&D expenses are instantly deductible in the tax expense, even when in the long run, it will provide benefits for the company. The indicator for a loss in a firm-year is also as expected negatively and significantly associated with the level of GAAP ETR.

Table 5 panel A and B present the results regarding hypothesis 2, testing the possible moderating effect of the overall E-index in the regression. However, the interaction term in both regressions is not significant. The influence of female directors on the board is not stronger or weaker depending on the overall level of corporate governance as measured by the E-index. These results are inconsistent with evidence provided by Adams & Ferreira (2007). They argue female directors to only increase monitoring of the board of directors to overcome agency costs when shareholder rights are low. But, the entrenchment index just consists of 6 provisions and alternative measure of corporate governance could lead to different answers. Hypothesis 2 is therefore rejected. The rejection of hypothesis 2 provides evidence that the influence of female directors on corporate tax avoidance does not depend on a firm's strength of shareholder rights

**Table 4**  
**OLS Multivariate Regression Results with interaction term (H2)**

*Panel A: OLS Regression Using BLAU as independent variable and interaction-term*

Variables	<i>CASH_ETR</i>	<i>GAAP_ETR</i>	<i>UTB</i>
<i>BLAU</i>	-0.166* (0.065)	0.064 (0.439)	0.049*** (0.000)
<i>BLAU * EINDEX</i>	0.039 (0.110)	-0.032 (0.171)	-0.009** (0.028)
<i>SALES</i>	0.0329*** (0.000)	0.029*** (0.000)	-0.001 (0.201)
<i>EINDEX</i>	-0.005 (0.451)	0.001 (0.820)	0.002** (0.028)
<i>AGE</i>	0.001 (0.190)	0.000 (0.957)	-0.000 (0.138)
<i>INDEPENDENT</i>	-0.033 (0.350)	-0.007 (0.810)	-0.005 (0.366)
<i>FINEXPERT</i>	-0.0122 (0.679)	-0.037 (0.175)	0.013*** (0.003)
<i>BSIZE</i>	-0.003* (0.100)	0.000 (0.949)	0.000 (0.726)
<i>FSIZE</i>	-0.022*** (0.000)	-0.017*** (0.000)	0.002** (0.017)
<i>RD</i>	-0.077* (0.065)	-0.136*** (0.000)	0.017** (0.025)
<i>ADVERTISING</i>	0.333** (0.013)	0.161 (0.188)	-0.021 (0.330)
<i>SGA</i>	-0.009 (0.341)	-0.025*** (0.003)	0.007*** (0.001)
<i>LEVERAGE</i>	-0.063*** (0.001)	-0.055*** (0.002)	-0.006* (0.080)
<i>PPE</i>	-0.013 (0.256)	-0.005 (0.631)	-0.001 (0.454)
<i>INTANGIBLES</i>	0.045** (0.041)	0.031 (0.124)	-0.006* (0.099)
<i>LOSS</i>	-0.046*** (0.000)	-0.092*** (0.000)	0.006*** (0.001)
<i>ROA</i>	0.006* (0.096)	0.003 (0.358)	0.003*** (0.001)
<i>MTB</i>	-0.000 (0.941)	0.000 (0.668)	-0.000 (0.820)
<i>FOREIGN</i>	0.0256*** (0.009)	-0.015* (0.089)	0.003** (0.027)
Adjusted R <sup>2</sup>	<b>0.2641</b>	<b>0.3378</b>	<b>0.1006</b>
F	<b>16.89***</b> <b>(0.000)</b>	<b>23.59***</b> <b>(0.000)</b>	<b>4.00***</b> <b>(0.000)</b>
N	<b>1,560</b>	<b>1,560</b>	<b>950</b>

Note: \*p<0,1; \*\* p<0,05; \*\*\* p<0.01 using two-tail probabilities, to allow for effects that have possibly been inevitable. OLS regressions are performed using GAAP\_ETR and CASH\_ETR as dependent variables. UTB is added for my sensitivity test. In every regression, year and industry dummies are added. However, these variables are not included in the table. P-values are added in parentheses. The UTB dependent variable is mentioned separately, because it provides evidence for the sensitivity analysis.



Panel B: OLS results with interaction term with *FEMALED* as independent variable and interaction term

Variables	<i>CASH_ETR</i>	<i>GAAP_ETR</i>	<i>UTB</i>
<i>FEMALED</i>	-0.022* (0.088)	.008 (0.475)	0.009*** (0.000)
<i>FEMALED * EINDEX</i>	0.005 (0.168)	-0.005 (0.11)	-0.001*** (0.007)
<i>SALES</i>	0.0315*** (0.000)	0.029*** (0.000)	-0.001 (0.279)
<i>EINDEX</i>	-0.003 (0.637)	0.002 (0.768)	0.002** (0.011)
<i>AGE</i>	-.001 (0.233)	-0.000 (0.879)	-0.000 (0.282)
<i>INDEPENDENT</i>	-0.030 (0.394)	0.002 (0.960)	-0.007 (0.186)
<i>FINEXPERT</i>	-0.016 (0.587)	-0.038 (0.163)	0.013*** (0.004)
<i>BSIZE</i>	-0.002 (0.237)	0.001 (0.532)	-0.001** (0.036)
<i>FSIZE</i>	-0.020*** (0.000)	-0.017*** (0.000)	0.002** (0.030)
<i>RD</i>	-0.077* (0.064)	-0.134*** (0.000)	0.016** (0.032)
<i>ADVERTISING</i>	0.336** (0.012)	0,166 (-.175)	-0.03 (0.187)
<i>SGA</i>	-0.008 (0.372)	-0.025*** (0.004)	0.010*** (0.001)
<i>LEVERAGE</i>	-0.067*** (0.001)	-0.059*** (0.001)	-0.044 (0.150)
<i>PPE</i>	-0.012 (0.273)	-0.005 (0.603)	-0.015 (0.375)
<i>INTANGIBLES</i>	0.043** (0.050)	0.030 (0.131)	-0.007** (0.022)
<i>LOSS</i>	-0.047*** (0.000)	-0.090*** (0.000)	0.006*** (0.001)
<i>ROA</i>	0.006* (0.089)	0.003 (0.317)	0.003*** (0.001)
<i>MTB</i>	-0.000 (0.915)	0.000 (0.694)	-0.000 (0.765)
<i>FOREIGN</i>	0.0265*** (0.007)	-0.0149** (0.098)	0.003** (0.020)
<b>Adjusted R<sup>2</sup></b>	<b>0.2616</b>	<b>0.3375</b>	<b>0.1279</b>
<b>F</b>	<b>16,72***</b> <b>(0.000)</b>	<b>23,61***</b> <b>(0.000)</b>	<b>4,96***</b> <b>(0.000)</b>
<b>N</b>	<b>1,550</b>	<b>1,550</b>	<b>950</b>

Note: \* p<0,1; \*\* p<0,05; \*\*\* p<0.01 using two-tail probabilities, to allow for effects that have possibly been inevitable. OLS regressions are performed using *GAAP\_ETR* and *CASH\_ETR* as dependent variables. *UTB* is added for my sensitivity test. In every regression, year and industry dummies are added. However, these variables are not included in the table. P-values are added in parentheses. The *UTB* dependent variable is mentioned separately, because it provides evidence for the sensitivity analysis.

### 5.3 Sensitivity Analysis

As a robustness test I use the uncertain tax benefit<sup>19</sup>, as defined by Armstrong et al. (2015). I use this measure, because it is argued that the UTB is also highly visible to the board of directors. The UTB is measured as the uncertain tax benefit account divided by total assets.<sup>20</sup> The UTB is a contingent liability and consists of the level of uncertain tax positions. The majority of the tax benefit which is ‘more-likely-than-not’ to be realized, is already recognized. The UTB is the remaining part. And also because of data availability, there is no possibility to track down the participation of firms in tax havens of the sample. Also tax shelter participation and the book-tax-difference are both subject to measurement errors, but also noise. And finally UTB is easy to calculate and to derive from the financial statements for each firm-year.

Table 3 panel A and B and Table 4 Panel A and B also present the results of the sensitivity test in the third column of the results. However, results must be interpreted with caution, as the adjusted R squared is relatively low in the analysis compared to the main regressions using the effective tax rates as dependent variable. Not everything of the UTB is thus explained by the variables in the regression. Unfortunately, the results derived from the ETR regressions are not robust to the alternative measure of corporate tax avoidance. In the main regressions of table 2 panel A and B, the uncertain tax benefit is highly significant and positive for both measures of gender board diversity (*BLAU* and *FEMALE*). Indicating the use of this measure of corporate tax avoidance, female directors positively influence the level of corporate tax avoidance. Also the level of financial experts on the board of directors is positively associated with the level of corporate tax avoidance in UTB. Both are significant at the >0.01 percent level. Both coefficients (*FEMALE* and *FINEXPERT*) emphasize the importance of specific characteristics of the board of directors to overcome agency problems between shareholders and management. Armstrong et al. (2015) argue financial experts to be better monitors of the board, plus they provide their financial expertise as resource. As they probably know more about corporate tax avoidance and how it occurs than other directors. The difference between the significant negative GAAP ETR measure and the significant positive ETR measure can be explained by the different kinds of corporate tax avoidance both measure. A decreasing GAAP

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<sup>19</sup>I measure UTB as the Compustat measure TXTUBEND divided by total assets and shows the tax benefit which will be realized with reasonable certainty for uncertain tax positions. The measure is based on the new FASB interpretation of accounting rules FIN48. Refer to [http://www.fasb.org/project/uncertain\\_tax\\_positions.shtml](http://www.fasb.org/project/uncertain_tax_positions.shtml)

<sup>20</sup> There are alternative measures of the uncertain tax benefit position. For example, in Robinson et al. (2012) and Rego & Wilson (2012). However, due to data availability issues and an increased probability of measurement error, I use the relatively simple UTB measure from the research of Armstrong et al. (2015).

ETR means an increase of corporate tax avoidance. The GAAP ETR can only be affected by management or the company by influencing the tax expense. An example as how this is possible is permanently moving income streams abroad or influencing the tax contingency.

However, the UTB is an uncertain tax position. There is a possibility, this tax contingency must be paid back to the IRS upon audit. If the UTB increases, a company avoids more taxes, because they believe to obtain more tax benefit. This benefit could eventually if realized be deducted from the tax expense or tax liability. Robinson et al. (2013) and Rego & Wilson (2003) explain the UTB is a proxy for risky tax planning. Because there is a reasonable probability the firm has to pay back the amount to the IRS. Increasing the UTB is however, one method to influence the GAAP ETR eventually, as it could influence the tax expense on realization. The GAAP ETR is thus also the result of less risky tax avoidance activities, while UTB shows a big tax risk for a company. Female directors and financial experts on the board of directors are then more risk seeking than regular directors. Women being more risk-averse than men is one of the reasons, as for example discussed in Schubert et al. (1999), the glass-ceiling still exists. These results provide opposing evidence suggesting that there is little reason to keep female directors out of the boardroom.

Yet, also the UTB results must be interpreted with caution. UTB is, according to Hanlon & Heitzman (2010), also not a pure measure of corporate tax avoidance. The Uncertain Tax Benefit is namely prone to subjectivity of management. As the UTB is an aggregate measure of different tax accounts, it could also be influenced by accounting choices of accruals not necessarily trying to affect the level of corporate tax avoidance. The results after including the interaction term in table 4 panel A and B shows significant negative results for the interaction term *FEMALEDEXINDEX* and *BLAUXINDEX*. The value of the negative coefficients indicates the effect of female directors on the level of corporate tax avoidance to be less positive when the level of corporate governance as measured by the E-Index is already high. These results provide evidence for hypothesis 2.

## 6. CONCLUSIONS

I investigate the association between gender board diversity and corporate tax avoidance. Expanding previous gender diversity research by investigating a more specific topic, which could enhance bottom-line performance, namely corporate tax avoidance. I investigate the relation by testing the association between the number of female directors in the board against the cash and GAAP effective tax rate. Subsequently, I add an interaction term in the regressions to test for the moderating effect of the overall level of corporate governance in a firm. And finally I execute a robustness test on the results, using the uncertain tax benefit as an alternative proxy of corporate tax avoidance.

Consistent with female directors positively influencing board effectiveness through decreasing agency costs and providing useful additional resources to the board, I find female directors to positively influence the level of corporate tax avoidance, as measured by the GAAP effective tax rate. This provides evidence of female directors only having influence on activities of management, which influence the level of tax expense and not the level of tax cash flows. Ways management can decrease tax expense are for example moving segments of the company permanently abroad or influencing the tax contingency. While affecting the actual taxes paid could be decreased through more accelerated depreciation. However, female directors do not influence corporate tax avoidance as measured by the cash effective tax rate and there is also no association between the Blau-index and both tax avoidance measures, which is inconsistent with my expectations. Results are thus not similar using different measures of gender board diversity. Results must therefore be interpreted with caution.

Also, I do not find evidence of a moderating effect of the overall level of corporate governance between the association of gender board diversity and tax avoidance as measured using the effective tax rates. The results are not robust to an alternative measure of corporate tax avoidance, namely the uncertain tax benefit (UTB). The association between gender board diversity and corporate tax avoidance is positive and significant using the UTB as corporate tax avoidance measure in both the Blau-Index and Female Directors regression. The interaction term is also significant, but negative. The direction of the relation between female directors and UTB and female directors and GAAP ETR contradict each other, because GAAP ETR and UTB measure a different segment of corporate tax avoidance. UTB measures the uncertain tax position of a company. The UTB is subject to discretion from management and is an aggregate of uncertain tax benefit positions. The positive significant relation between UTB and gender board diversity shows the number of female directors to increase to level of corporate tax

avoidance. Management could decide to increase the UTB. Management could have two reasons to do so. First management could aspire to avoid more taxes, because they estimate the tax benefits too high. However, because the UTB is attributable to uncertain tax position, there is the possibility a firm has to pay it back to the IRS. Therefore, UTB is a riskier kind of corporate tax avoidance than the GAAP ETR. If the UTB is on the contrary realized, the amount of UTB can be deducted from the tax expense or tax liability. Which could result in a lower GAAP ETR, due to decreased tax expenses. A lower GAAP ETR shows increased tax avoidance, as firms want the amount of tax expense per dollar income to be as low as possible. The GAAP ETR is thus also the result of less risky tax avoidance activities, while UTB shows a big tax risk for a company. Here female board participation positively influences the level of corporate tax avoidance. The positive relation is weaker for companies with already strong overall corporate governance. This is consistent with the prediction that female directors add more value when there is need for improved monitoring in a firm to better align preferences of shareholders with management.

However, there are certain limitations regarding this study. First, only big U.S. public companies are included in the sample. Future researchers must include private firms to not only obtain evidence for non-conforming corporate tax avoidance, but also conforming corporate tax avoidance. Also my results are not compared across the corporate tax avoidance distribution. As Armstrong et al. (2015) provide evidence there might be different associations between board characteristics and corporate tax avoidance. To obtain better insights, the whole distribution should be taken into account in future research. Also not all alternative explanations of the associations are excluded due to data availability. A broader spectrum of control variables could result into different associations between corporate tax avoidance and gender board diversity. Also the validity of the corporate tax avoidance measures is doubtful. All three measures do not provide similar results and all measure another fragment of corporate tax avoidance. The absence of a common corporate tax avoidance measure makes it difficult to compare various research and to evaluate the results. It is necessary to provide one common corporate tax avoidance measure to improve future tax avoidance research.

This study adds to the literature in several ways. I add evidence to the corporate tax avoidance literature as to why certain companies engage more in corporate tax avoidance than others and emphasize the importance of corporate governance. The level of corporate governance, according to my results, is important as to how certain board characteristics affect the level of corporate tax avoidance. However, it depends which kind of tax avoidance is involved. Also

the difficulty of defining one overall measure of corporate tax avoidance is emphasized, as two different measures already provide such different results. Also it provides additional evidence to the U.S. government in the debate around corporate tax avoidance regulation. The absence of board diversity regulation could be revised, as results indicate the importance of female board participation. From an ethical and economic point of view female board participation can be important to firms. My results indicate that female board participation could overcome agency costs due to increased monitoring and the contribution of additional resources to the board of directors. Furthermore, it provides some evidence as to how female directors add value to a firm, even if they do not explicitly contribute to bottom-line firm performance. The stakeholder theory provides an explanation as to why female board participation is always important. Because stakeholders of a company value diversity. Both indicating the U.S. must progress in implementing female director quota regulation.

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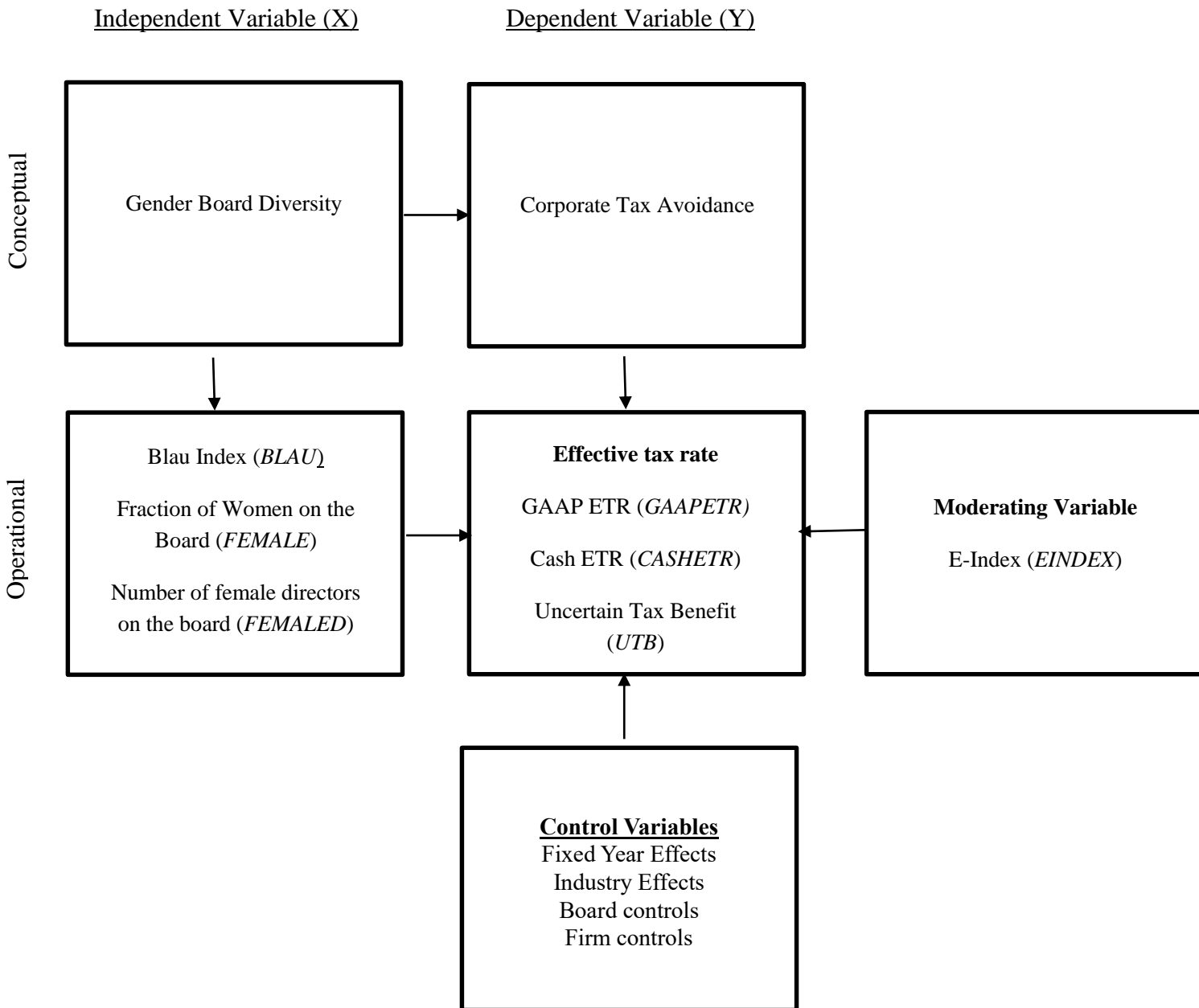
## Appendix

### Appendix A: Variable Description

Variable name	Variable Definition
<i>BLAU</i>	Blau-Index which describes how evenly distributed male and female directors are on the board. The formula is as follows, where $p$ is the proportion female or male directors: $1 - \sum p_i^2$
<i>FEMALE</i>	Total number of female directors in the board of directors.
<i>GAAP_ETR</i>	Total income tax expense (TXT) divided by pretax accounting income (PI) minus special items (SPI)
<i>CASH_ETR</i>	Total income tax expense (TXPD) divided by pretax accounting income (PI)
<i>UTB</i>	The ending balance of the uncertain tax benefit (TXTUBEND) divided by total assets (TA)
<i>FSIZE</i>	Logarithm of total assets (TA)
<i>R&amp;D</i>	Logarithm of total R&D expenditures (XRD). If missing reset to 0.
<i>LEVERAGE</i>	Total debt (LT) divided by total assets (TA)
<i>LOSS</i>	Indicator variable. Net income before extraordinary items (IBC) is <0 LOSS has a value of 1. Net income before extraordinary items >0 value of 0
<i>MTB</i>	Market-to-book ratio of equity, the market value of a firm (MKVALT) divided by the book value of equity, which is calculated by subtracting total liabilities (TL) from total assets (TA)
<i>PPE</i>	Gross Property, Plant and Equipment (PPEGT) divided by total assets (TA)
<i>FOREIGN</i>	Indicator variable, takes the value of 1 when the firm has income generated abroad (PIFO) >0 and a value of 0 if not. If pifo is missing reset to 0.
<i>ROA</i>	Return on Assets, pretax net income (IBC) divided by total assets (TA)
<i>INDEP</i>	Ratio of independent directors relative to total board size
<i>FIN</i>	Ratio of financial experts on the board relative to total board size
<i>BFSIZE</i>	Total number of directors in the board of directors
<i>AGE</i>	Average age of the board of directors per firm
<i>INDUSTRY</i>	Dummy variable for each industry classification. Divided in 12 classifications following Fama & French (1997)
<i>DUMYEAR</i>	Dummy variables for each sample-year (2009-2014)
<i>SG&amp;A</i>	If missing, reset to 0. Selling, general and advertising expenses (XSGA) scaled by total assets (TA).
<i>ADVERTISING</i>	Total advertising expenses (XAD) divided by total assets (TA). If missing, reset to 0.
<i>INTANGIBLES</i>	Total number of intangibles (INTAN) scaled by total assets (TA)

Note: All variables are described with their compustat pneumatic between parentheses, except for the board characteristic variables and governance index variable (*EINDEX*) which are deducted from the ISS database.

## Appendix B: Predictive Validity Framework



**Appendix C: Prior Literature Gender Board Diversity**

<i>Study Reference</i>	<i>Sample and data source</i>	<i>Number of observations</i>	<i>Gender Board Diversity</i>	<i>Main Empirical Hypotheses</i>	<i>Method / Independent Variable / Results</i>
<b>Carter (2003)</b>	Fortune 1000 firms board of director data / 1997 / Significant Data for Directors 1999: Board Policies and Governance Trends	797 firms with complete data	Number of women on the board / Dummy women on the board (0/1) Number of minorities (Hispanics, African-American, Asian) / Dummy minorities on the board (0/1)	H1: Increased board diversity is positively related to firm value	2SLS (Women on the board) Tobin's Q (+)  2SLS (Minority on the board) Tobin's Q (+)
<b>Erhardt et al. (2003)</b>	Large public companies in various industries / Fortune	112 firms with complete data	Percentage of females on the board of directors	H1: Greater demographic diversity among board members increases organizational performance	Hierarchical regression (Board Diversity) Return on Assets (+) Return on Investment (+)
<b>Adams &amp; Ferreira (2007)</b>	S&P 500, S&P MidCaps, S&P SmallCap collected by the IIRC for the period 1996-2003	86,714 director-firm-years, in 8,253 firm years of data on 1,939 firms	Ratio of number of females on the board of directors	H1: Women have a positive effect on board governance H2: Gender diversity has a positive effect on market valuation and operating performance H3: Gender diversity has a stronger effect on market valuation and operating performance when there are weak shareholder rights	OLS (Fraction Female Directors) H1: Attendance Problems (+) Fraction Equity-based Pay (+) Number of Board Meetings (+)  OLS (Fraction Female Directors) H2: Tobin's Q (-) ROA (-)  OLS (Gindex * Fraction Female Directors) H3: Tobin's Q (+) ROA (+)
<b>Francoeur et al. (2008)</b>	FP500 / Catalyst	230 publicly held firms	Percentage of women on the board / Divided in low and high percentage	H1: There is no relation between female representation on a firm's financial results	Weighted-least-squares (High Percentage Female Directors) High beta (+) High Book-to-market (+) High Analyst Forecast Standard Deviation (+)

<b>Bear et al. (2010)</b>	Ratings firm reputation / Fortune 2009 list of the World's Most Admired Companies	Ratings firm reputation for 689 firms	Count of female directors	H1: CSR Strength ratings are positively associated with corporate reputation H2: The number of women board members is positively associated with CSR strength ratings H3: CSR strength ratings mediate the relationship between the number of female board members and corporate reputation	OLS (CSR) H1: Corporate Reputation as measured by fortune 2009 list (+)  OLS (# female board members) H2: CSR strength (+)
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**Appendix D: Prior Literature Corporate Tax Avoidance**

<i>Study Reference</i>	<i>Sample and data source</i>	<i>Number of Observations</i>	<i>Tax Avoidance</i>	<i>Main Empirical Hypotheses</i>	<i>Method and Results</i>
<b>Wilson (2009)</b>	Companies accused of tax shelter activities form previous research and from the Factiva Database.	59 public corporations accused of tax shelter activities	The probability of participating in tax sheltering. Measured by a dummy variable.	H1: There is a positive / negative relation between certain firm characteristics / determinants and the incidence of tax sheltering. H2: Companies with better corporate governance exhibit positive abnormal returns during the period of tax sheltering participation.	Logit (Tax Shelter Firm 0/1) Book-tax-difference (+) Permanent Book-tax-differences (BTD) (+) Temporarily BTD (-) Leverage (-)
<b>Dyreg et al. (2010)</b>	Executive information from ExuComp	908 executives between 1992-2006.	GAAP ETR and CASH ETR, both split in permanent and temporary.	H1: Executives play a role in determining the level of tax avoidance that firms undertake.	OLS (ETR) EXEC (+)
<b>Robinson et al. (2013)</b>	Director profiles of 2001-2009 / The Corporate Library Variable information / Compustat	11,645 observations for 2,947 unique firms after criteria	<u>Effective tax rate:</u> (GAAP) ETR (Cash) CETR <u>Risky Tax Planning:</u> Tax shelter likelihood (HIHAVEN) Tax shelter prediction model (SHWDEC) Uncertain Tax Benefits (UTBHAT)	H1: The level of tax planning will be positively associated with the level of accounting-specific expertise of the board members on the audit committee. H2: The level of risky tax planning will be negatively associated with the level of accounting-specific expertise of the board members on the audit committee.	H1: OLS (ETR / CETR) Accounting Experts (-) H2: Logistic Regression (SHWDEC / UTBHAT) Accounting Experts (-)

<b>Rego &amp; Wilson (2012)</b>	UTB: S&P 400 and S&P 500 firms 10K-filings of fiscal years 2007-2009	18,240 CEO-year observations matched with available tax information	Corporate Tax Aggressiveness measured by Unrecognized Tax Benefits (UTB).	H1: Larger CEO and CFO equity risk incentives are positively associated with more risky tax avoidance	H1: Two-Stage Least Squares (UTB) Equity based incentives (+)
<b>Armstrong et al. (2015)</b>	All firms listed in Compustat for fiscal years 2007-2011	Sample between 3,137 and 4,128 firm year observations (depending on measure of tax avoidance)	<i>TaxPosition</i> measured by two different proxies. Using the three-year average GAAP Effective Tax Rate (ETR) and Unrecognized Tax Benefit (UTB).	H1: Risk taking equity incentives have a positive relation with tax avoidance and the effect should be higher (lower) in the right (left) tail of the tax avoidance distribution. H2: There is a positive (negative) relation between board characteristics and corporate tax avoidance in the left (right) tail of the tax avoidance distribution.	Quantile Regression (Tax Position) H1: Risk taking equity incentives (+) H2: Board characteristics (+/-)