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MEN AND FINANCIAL OVERCONFIDENCE

The effect of the board of directors' gender ratio on financial and investment decision-making in the European Union

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ABSTRACT

This paper studies the effect of the board of directors' gender ratio on financial and investment decision-making in the European Union. In this thesis, a higher gender ratio means that men are overrepresented. For each dependent variable, that is to say debt, equity, and acquisitions, regressions for four models were estimated for public companies in the European Union (EU). The probability of an acquisition happening is measured as a binary variable and hence, for the first two models, logit regressions were used. All other ten regressions were estimated with the Ordinary Least Squares (OLS) approach. This thesis found a negative significant effect of the board of directors' gender ratio on the change in debt and the probability of an acquisition happening. However, this thesis found no significant effect of the board of directors' gender ratio on the change in the number of shares outstanding for a particular company. These results could imply that male directors are less overconfident or female directors are less risk-averse in the EU than expected.

Keywords: Corporate Policies, Gender Diversity, Finance

JEL codes:

D25 Intertemporal Firm Choice: Investment, Capacity, and Financing

G32 Financing Policy; Financial Risk and Risk Management; Capital and Ownership Structure; Value of Firms; Goodwill

G34 Mergers; Acquisitions; Restructuring; Voting; Proxy Contests; Corporate Governance

G41 Behavioral Finance: Role and Effects of Psychological, Emotional, Social, and Cognitive Factors on Decision Making in Financial Markets

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CHAPTER 1 Introduction

Almost 90% of the top 500 firms that were led by women in 2022 had profits that were above average (Miller, 2023). Just like that, it seems that women are defeating men in these higher positions. Miller also highlighted that in Europe and in some other regions, it is required from 2019 that women have to make up at least 35% of the board membership, but that only 43% of the firms fulfill this requirement. On the contrary, Löckenhoff et al. (2014) stated that on average, women are perceived as more open, agreeable, social, emotional and conscientious. This could indicate that women are on average more cautious, or that men are on average more overconfident. It is possible that these overconfident characteristics are also present in their role as members of the board of directors in the corporate finance setting. That is, the gender of the board members could lead to differences in the amount of debt and equity holdings, and differences in the total value of acquisitions of other businesses.

Huang and Kisgen (2013) compared the financial and investment decisions made by women and men in their role as executives of a company. They look specifically at company's CEOs and CFOs in the United States (US) mainly using a difference-in-difference framework and panel data with fixed effects. They concluded among other things that female CEOs are less likely to make acquisitions, less likely to issue debt, and less likely to exercise stock options early. However, they did not find a significant effect regarding the issue of equity. The authors of the article stated that this suggests that male CEOs are more overconfident than female CEOs regarding the corporate finance setting. In contrast, Liu et al. (2014) studied the relationship between board gender diversity and firm performance in China using a regression analysis. In their study, a higher gender ratio means that women are overrepresented. However in this thesis, a higher gender ratio means that men are overrepresented. They discovered among other things that the gender ratio, measured from the perspective of the percentage of women, of the board has a positive effect on firm performance. Nevertheless, they stated that CEO female directors have a more substantial effect on firm performance than independent female directors have. They called this the monitoring effect, since CEO female directors could more easily observe and have an impact on the firm decisions beyond their presence in the board. It is possible that this relationship has as a mediator financial and investment decisions made by the board, but the article did not

talk about this possibility. It is also possible that this effect differs between the executive's gender and the gender ratio of the board, since the CEO might be able to also step in sooner.

Furthermore, Huang and Kisgen (2013) already studied the differences in financial and investment decision-making between male and female CEOs, but solely in the United States (US). However, Houser and Williams (2021) stated that the US is immensely behind the European Union (EU) regarding gender equality, partly due to a difference in legislation and quotas. Additionally, Mac Giolla and Kajonius (2019) showed in their research that men and women differ more in terms of personality in countries with a higher degree of gender equality. Men and women seem to fall back into their traditional gender roles if gender equality in their country increases. Therefore, this research will focus on the EU instead of the US since not much research has been done on this topic with data from the EU. Additionally, this thesis will contribute to existing literature regarding the effect of board gender diversity on financial and investment decision-making. On the grounds that Liu et al. (2014) showed the effect of board gender diversity on firm performance but did not study if this was possibly caused by a difference in board gender diversity through the company's financial and investment decision-making. Furthermore, through the monitoring effect, it is possible that the results will be different if the CEO/CFO gender or the gender ratio of the board of directors is studied. Therefore, the research question this thesis will try to answer is the following: does the company's board of directors' gender ratio have an effect on financial and investment decision-making in the EU?

In concordance with prior research, the relationship between board gender diversity and financial and investment decision-making will be studied using panel data regressions with firm fixed effects. This will be done by running regressions with each time the gender ratio, measured as the percentage of men on the board of directors, as the main variable of interest. For each dependent variable, that is to say debt, equity, and acquisitions, regressions for four models were estimated for public companies in the EU. The probability of an acquisition happening is measured as a binary variable and hence, for the first two models, logit regressions were used. All other ten regressions were estimated with the Ordinary Least Squares (OLS) approach. The data for debt and acquisitions are from Compustat Global from Wharton Research Data Services (WRDS). The data for equity are from Bureau van Dijk (BVD) Amadeus from WRDS. Debt is measured as annual long-term debt in Euros, specifically debt obligations due after at least one year from the particular company's balance sheet date. Equity is measured as number of shares outstanding for a particular company and

is measured annually. Acquisition is measured as the probability of an acquisition happening. For each observation, a value of one means an acquisition of another business happened and a value of zero means no acquisition of another business happened. Both debt and equity are measured in millions and both debt and acquisitions are defined by the U.S. GAAP and Canadian IFRS Definition. For the variable for the gender ratio, data from BoardEx from WRDS will be used. Gender ratio is measured as a ratio of male directors at the Annual Report Date. The BoardEx and Compustat Global datasets will be merged to obtain all merged EU firms' data available. The datasets used will cover the 2013-2019 period, so to not include COVID-19 data, but to still acquire enough data, with annual frequency. Huang and Kisgen (2013) warned that it could be possible that financial and investment decision-making has an effect on the gender of the executive. Firms could deliberately hire women instead of men if they are aware that women and men might differ in financial and investment decision-making. In that case, there would be reversed causality. This idea is in line with the overall interpretation of their study and this thesis, and they even stated that this would indicate a recursiveness that would intensify the results. To solve this reversed causality problem, they also used an instrumental variable (IV) approach with as instrument a variable that shows the gender equality score per state. They stated that if a state is more gender equal that the headquarters in that state are more prone to have female executives. They also argued that the exclusion restriction is expected to be met, since it is not likely that the states' gender equality score has an effect on the financial and investment decision-making, unless through the direct effect of the director's gender. With the use of this instrument, the possibility of reversed causality will be ruled out. In this thesis, the IV approach as an auxiliary set of tests will also be used. The gender equality score per EU country will be used as instrument for the variable gender ratio. This score will be retrieved via the European Institute for Gender Equality, which gives the member states a score between one and one hundred, with a score of one hundred meaning full gender equality. However, one weakness of this IV approach is that the instrument is on the country-level and the other data is on the firm-level. Consequently, there will be no variation for the firms in the countries. Despite this, by using gender equality scores for multiple years, it will result in more observations and hence more precise estimations. For the 27 EU countries, gender equality scores data for 2013, 2015, 2017 and 2019 are available. It is reasonable that in the years between, the scores did not change much

and thus 2014 will be given the same score as 2013, 2016 the same as 2017, and 2018 the same score as 2017.

In contrast with Huang and Kisgen (2013), the effect of the board of directors' gender ratio on the probability of an acquisition happening and the change in debt found was not positive but rather negative or insignificant. However, this thesis did not find a significant effect on equity, as was also the case for Huang and Kisgen (2013). In total, these results could imply that male directors are less overconfident or female directors are less risk averse in the EU than expected.

CHAPTER 2 Literature review

2.1 Gender differences

Before introducing investment and financial decision-making, this subsection will first discuss gender differences and how this thesis contributes to existing literature. It was Siegfried (2021) who defined sex differences as biological differences, regarding the genetic constitution of male versus female, whereas he defined gender differences as behavioral or social differences, mainly due to gender identity. Additionally, gender differences can be studied with reference to for example differences in gender roles (Tu & Liao, 2005), gender stereotypes (Ellemers, 2018), or truly existing gender differences, which are observable (Schubert et al., 2000). Even though gender differences can be interpreted in multiple ways, the latter interpretation will be used in this thesis to study gender differences.

Additionally, certain characteristics of members of the board of directors have an impact on firm's performance (Horvath & Spirollari, 2012; Shukeri et al., 2012). Therefore, if a female has different characteristics than a male, it could influence the firm's performance. Consequently, gender differences will be a relevant factor to consider while selecting the members of the board of directors.

That male and female CEOs make different financial and investment decisions was already studied by Huang and Kisgen (2013), but that study was solely done with data from the US. Taking into account the study from Houser and Williams (2021) that stated that the US lags well behind the EU in terms of gender quality and that this is partly caused by differences in legislation and quotas. Considering that the differences regarding personality between men and women are larger in countries where the degree of gender equality is larger (Mac Giolla and Kajonius, 2019), this research will focus on the EU instead of the US, since not much research has been done on this topic with data from the EU.

In contrast, Olsen and Cox (2001) studied the gender differences in risk-taking by professional investors. They discovered that female investors weigh risk attributes, such as the probability of loss, more than male investors. They likewise came to the conclusion that while constructing their portfolios, women prioritize risk reduction more than men.

As another contribution to existing literature, this thesis will not study the differences in financial and investment decision-making for male and female CEOs, but will instead study the effect for different board of directors' gender ratios. Liu et al. (2014) showed the effect of board gender diversity on firm performance but did not study if this was possibly caused by a difference in board gender diversity through the company's financial and investment decision-

making. They also mentioned the monitoring effect, which argues that CEOs can easier observe and impact firm decisions beyond their presence in the board. Through the monitoring effect, there could be a difference in effect between CEO/CFO gender or the board of directors' gender ratio.

2.2 Investment decision-making

Sindhu and Kumar (2014) stated that in general, investment decision implies the judgment made by investors as to how, when, where and the size of the funds that will be invested in diverse channels of financial products or instruments with the intention of making profit or increasing the value. They also argued that behavioral finance research has discovered that decisions could be affected by set emotional and psychological aspects.

Even though investment decision-making is a broad topic itself, it could be seen as a part of behavioral finance in regard to companies. Jahanzeb and Saif-Ur-Rehman (2012) explained that behavioral finance studies the behavior of, among others, investors in decision-making. According to them, behavioral finance shows how diverse investors perceive and respond to the available market information. Additionally, Byrne et al. (2010) argued that the common assumption is that investment choices are explained by rational optimizing, whereas behavioral finance shows that the choices are explained by the phenomenon of behavioral biases.

Furthermore, it is important to note that mergers and acquisitions (M&A) are one of the most enormous challenges for CEOs (Alkaraan, 2015). To that end, to study the investment decision-making of members of the board of directors, only the probability of an acquisition of other businesses will be analyzed to study the effect on investment decision-making for this thesis.

Levi et al. (2014) studied the relationship between of the fraction of female directors in the board of directors and the number of M&A for S&P 1500 companies. They concluded that a higher fraction of female directors has a negative relation with the amount of M&A initiations. Additionally, they argued that this is because women are less prone to empire building and that women are less overconfident than men.

Furthermore, Chen et al. (2016) studied the relationship between female board representation and the number of acquisitions and acquisition size for S&P 1500 companies. The result of their study was that female board representation is negatively associated with both the number of acquisitions and acquisition size.

Overall, both studies imply that women will take on less acquisition bids. Even though both studies were from the US, the same relationship is expected to be found in the EU.

Hypothesis 1: The board of directors' gender ratio of a company in the EU has a positive effect on the probability of an acquisition of another business happening.

2.3 Financial decision-making

Financial decision-making is for a large part making decisions regarding capital structure, that is choosing between debt or equity (Shivdasani & Zenner, 2005). Similar to investment decision-making, financial decision-making is a part of behavioral finance (Ricciardi & Simon, 2000).

It was Modigliani and Miller (1958) who started the debate on the capital structure choice, and made the assumption that companies keep a certain absolute debt level that they maintain and that they in consequence use a passive debt management (Dierkes & Schäfer, 2017). Additionally, Modigliani and Miller (1963) introduced the *Trade-Off Theory* which states that an optimal capital structure can be achieved by trading off the costs and benefits of issuing debt and equity.

Ultimately, it was Myers and Majluf (1984) who introduced the *Pecking Order Theory* which states that companies prefer to first use internal resources, then issue debt, and lastly issue equity to finance investments (Viswanath, 1993).

2.3.1 Debt

The English Dictionary (1989) defined debt as "That which is owed or due; anything (as money, goods, or service) which one person is under obligation to pay or render to another". However, academic literature uses more specific definitions and these are rather different in terms of details. Debt can be defined as the sum of long-term debt and debt in current liabilities (Barclay et al., 2006), the sum of current liabilities and half of long-term liabilities (Allen et al., 2012) and only long-term debt (Hand, 2005). In this thesis, the definition of Hand (2005) will be followed.

Furthermore, Harris (2014) studied the relationship between board gender diversity and debt ratios for Fortune 500 companies. The result of her study was that a board where at least 25% is female has a lower debt ratio than a board with no female directors. She explained that this is due to women being more risk adverse and therefore avoiding potential bankruptcy and financial distress costs by lowering debt ratios.

Additionally, Huang and Kisgen (2013) studied the relationship between the gender of the executive and, amongst other things, the amount of debt issued for firms in the US. They concluded that female executives issue less debt than male executives. They argued that this is a result of men being more overconfident than women.

Even though both studies defined board gender diversity and were with data of the US, the same relationship is expected to be found in the EU.

Hypothesis 2: The board of directors' gender ratio has a positive effect on the change in the amount of long-term debt for a company in the EU.

2.3.2 Equity

According to Fama and French (1992), market equity is defined as a company's stock price multiplied by their common shares outstanding. Furthermore, Ohlson and Penman (2005) defined equity as common shareholders' interest. Although the definitions are from two different perspectives, that is from the company's and shareholders' perspective, the essence is the same. For the purpose of this thesis, the definition of Fama and French (1992), and therefore the company's viewpoint, will be used. However, this thesis will only study the effect on the change in the number of shares outstanding. A change in stock price would create noise in the change in equity that is not related to the possible risk aversion of women.

Evgeniou and Vermaelen (2017) studied the relationship between board gender diversity and share repurchases in the US. They concluded that there is a positive relationship between board gender diversity and share repurchases. They argued that this is due to female directors reducing agency costs of free cash flow by decreasing the amount of outstanding shares.

Furthermore, Huang and Kisgen (2013) also studied the relationship between the gender and the executive and the amount of equity issued for firms in the US. The result of their study was that there was no significant effect on the issuance of equity.

Even though both studies defined board gender diversity different than the definition of the board gender ratio used in this thesis, that the studies were for US firms instead of EU firms, and they viewed equity as share repurchase and the issuance of equity instead of the amount of equity present, the expectation is that a similar relationship will be found between board gender ratio and the amount of equity present in a company, as was found by Huang and Kisgen (2013).

Hypothesis 3: The board of directors' gender ratio has no effect on the change in the amount of equity for a company in the EU.

CHAPTER 3 Data

3.1 Sample description

For this research, the data used will consist of available financial data of publicly listed companies in the EU. Since data for the instrumental variable Gender Equality Index is only available as of 2013 and it is preferred not to include the years affected by COVID-19 pandemic through the negative effects the pandemic had on the economy (Fernandes, 2020), the datasets used will cover the 2013-2019 period. To be able to compare the financial data between companies, only one currency should be used. Therefore, all companies that did not report their annual reports in Euros were dropped. Additionally, if a company reported two annual reports for a specific fiscal year, then only the most recent one was used. Furthermore, this dataset only contains active firms. Inactive firms were dropped. Ultimately, of the 27 countries in the EU, Bulgaria, Czech Republic, Croatia, Denmark, Hungary, Poland, Latvia, Slovakia, and Sweden are not in this database. There are 5,891 firm-year combinations for 1,323 unique firms.

3.2 Variables

The independent variable *Gender Ratio* will be measured as the ratio of male directors as reported at the respective company's Annual Report Date. The data for the variable *Gender Ratio* is obtained from BoardEx Europe from WRDS. In the database of this thesis, the variable *Gender Ratio* has 5,889 observations. To make the interpretation of this variable more intuitive, the range of this variable will be transformed from [0,1] to [0,100] with a value of zero meaning that the whole board of directors is female and a value of hundred meaning that the whole board of directors is male. The database does not contain any company in which the whole board of directors is female. However, there are 1,074 companies that report to have only male directors in the board of directors.

The dependent variable *Debt* will be measured as the change in the amount of long-term debt, specifically debt obligations due after at least one year from the particular company's balance sheet date, present in a company as reported in the respective company. The variable is measured in millions and is defined by the U.S. GAAP and Canadian IFRS Definition, as is also the case for the variable *Acquisitions*. The variable was obtained from Compustat Global from WRDS. In the database of this thesis, the variable *Debt* has 4,429 observations. Surprisingly, there are companies in the database that report to have no change in the amount

of long-term debt. To be exact, 294 observations report to have no change in the amount of long-term debt. 444 observations report to have no long-term debt at all.

The dependent variable *Equity* will be measured as the change in number of outstanding shares for a particular company, and is measured annually. The variable was obtained from BVD Amadeus from WRDS. In the database of this thesis, the variable *Equity* has 4,474 observations. Unsurprisingly, there are 2,857 observations in this database that report to have no change in the number of shares outstanding. All firms have shares outstanding, since all firms are active public firms.

The dependent variable *Acquisitions* will be studied as the probability of the particular company that acquires another business. The variable was obtained from Compustat Global from WRDS. The variable will have a value of one if it did acquire another business and zero otherwise. In the database of this thesis, the variable *Acquisitions* has 5,891 observations. The number of observations is remarkably higher than the number of observations of the other two dependent variables. This is because the variable *Acquisitions* is not measured as the change in acquisitions for a year, since the variable will automatically have a period less to calculate the change in something between two periods. So the variable *Acquisitions* contains seven years of data, and *Equity* and *Debt* only six.

3.3 Control variables

It is expected that there are other variables besides the board of directors' gender ratio that have an effect on the change in the amount of debt or equity, or the probability of acquisitions happening, and are correlated with the board of directors' gender ratio. This omission of relevant control variables would lead to omitted variable bias (OVB). Therefore, variables that are correlated with the board of directors' gender ratio and have an effect on the dependent variables will be added to solve endogeneity problems. The control variables used are the following:

Tobin's Q. According to Haslam et al. (2009), there is a negative relationship between Tobin's Q and the presence of women in company boards. Furthermore, Tobin's Q could be used to measure firm performance, and a better firm performance has a positive effect on the usage of debt (Ji et al., 2019), a positive effect on stock price (Enebrand & Magnusson, 2018), hence making a company more likely to issue shares, and it is reasonable to argue that if a company performs better that there will be more opportunities to acquire other businesses. The measuring method of Levi et al. (2014) will be followed, they measured Tobin's Q as the market value of total assets divided by the book value of total assets, with the market value of

total assets calculated as the book value of total assets minus the book value of total assets plus the market capitalization. All of these variables used are from Compustat Global, except for the market capitalization, this variable was obtained from BVD Amadeus from WRDS.

Debt capacity. According to Zhu et al. (2022), there is a positive relationship between more female directors and tangible assets present in a company. Additionally, Faccio and Masulis (2005) argued that the collateral available in a company should be used as a control variable, with the argument that if a company has less tangible assets the moral hazard risk will be larger. Less tangible assets will increase the cost of debt and hence, lower the debt capacity, which will make stock be more preferred over debt. Furthermore, the probability of an acquisition of another business increases if more debt is available. For this thesis, their method of measuring collateral by dividing property, plant, and equipment (PPE) by the book value of total assets will also be used. Both variables used are from Compustat Global.

ROA. Since return on assets (ROA) is a measure of firm performance, the same correlations and effects will be assumed to hold as for Tobin's Q. ROA is measured as consolidated net income divided by total assets (Wischnevsky & Damanpour, 2008). Both variables used are from Compustat Global.

Small. Hillman et al. (2007) stated that there is a positive relationship between firm size and board gender diversity. Additionally, firm size has a positive effect on the usage of debt (Hashmi et al., 2020), positive effect on equity issuance (Brigham & Smith, 1967), and a positive effect on the number of acquisitions (Harris & Shimizu, 2004) and hence a positive effect on the probability of an acquisition happening. Following the method of Fonseca and Van Doornik (2022), a dummy variable called *Small* will be used for companies smaller than the median company. This size is measured as the number of employees in thousands.

Sector. Naveed et al. (2021) concluded that different industries face different challenges and that therefore, different industries create a different effect for board gender diversity on corporate social performance. It is reasonable to assume that this is also the case for change in debt, change in shares outstanding, and the probability of acquisitions of other business happening, instead of corporate social performance. The potential effects of the different industries will be captured by the categorical variable sector. The variable used for sector is from BoardEx Europe.

EPS. Since earnings per share (EPS) is a measure of firm performance, the same correlations and effects will be assumed to hold as for EPS. EPS is measured as the consolidated, including extraordinary items EPS. The variable used for EPS is from Compustat Global.

Cash holdings. According to Atif et al. (2019), there is a negative relationship between board gender diversity and a company's cash holdings. As stated in the section Theoretical Framework, it was Myers and Majluf (1984) who introduced the *Pecking Order Theory* which states that companies prefer to first use internal resources, then issue debt, and lastly issue equity to finance investments (Viswanath, 1993). Therefore, it is expected that cash holdings will have a negative effect on the usage of debt and equity. However, cash holdings has a positive effect on the number of acquisitions (Chen et al., 2020) and hence on the probability of an acquisition happening. The measuring method of Levi et al. (2014) will be followed, they measured cash holdings as the sum of cash and short term investments divided by total assets. Both variables used are from Compustat Global.

3.4 Descriptive statistics

Table 1 shows the summary statistics of the variables used in the regressions. Remarkable is the variables *ROAs* and *EPS'* large negative outliers. However, there was not a reason to drop these observations. Additionally, the lowest percentage of men in boards of directors is 20% and with an average of around 76.9%. Furthermore, it is notable that almost 41% of the firm-year combinations acquired at least one business. Additionally, the standard deviation of the variable *Equity* is relatively high compared to the mean. However, it was already mentioned that 2,857 of the 4,474 report to have no change in equity. If the natural logarithm of *Equity* is taken to lower the standard deviation, those 2,857 observations will be dropped. Therefore, the relatively high standard deviation will be disregarded. In addition, it is important to note that the mean and standard deviation of the variable *Sector* cannot be interpreted, since it is a categorical variable. However, it can be seen that the dataset used for this thesis contains 38 different sectors.

Table 1: Summary statistics

	Obs.	Mean.	Std. Dev.	Min.	Max.
Debt	4429	117.8039	968.5587	-12416	25248
Equity	4474	8.712524	168.7935	-783.1982	8602.944
Acquisitions	5891	.4099474	.4918654	0	1
Gender Ratio	5889	76.91357	15.58439	20	100
Small	5891	.4725853	.4992902	0	1
ROA	5791	-.0005996	.2223895	-6.229167	.6780942
Debt Capacity	5310	.2128652	.1921644	0	.9833441
EPS	5763	2.672981	24.01179	-213.9444	1075.714

Tobin's Q	5849	1.761524	2.617119	.15625	135.8771
Cash Holdings	5134	.1594189	.1598884	0	.980653
Sector	5891	20.47598	10.63049	1	38
Number of Directors	5890	9.386587	4.466755	1	30

Notes: This table shows the summary statistics for the data. The dataset contains 5,891 active public firms in the EU between 2013 and 2019.

CHAPTER 4 Method

In this section, the methodological approaches taken to analyze the effect the independent variable *Gender Ratio* on the dependent variables *Debt*, *Equity*, and *Acquisitions* will be described. First, the model specification will be discussed. Thereafter, the main assumptions of the models and some relevant statistics to evaluate the assumptions will be presented.

4.1 Model specification

For all the dependent variables *Debt* and *Equity,* four models will be estimated using the Ordinary Least Squares (OLS) and IV approach for panel data via the statistical software package Stata. The first model will be estimated with standard OLS regressions. For robustness, the second model will be a firm fixed effects model with cluster–robust standard errors. Hereby, time in-variant omitted variable bias (OVB) will be ruled out, since firm fixed effects requires all variation to occur within the particular firm.

Furthermore, for the third model, an IV approach will be used. This is on the basis of the warning of Huang and Kisgen (2013). They warned that it could be possible that financial and investment decision-making has an effect on the gender of the executive, so that there would be reversed causality. Therefore they used an IV approach with as instrument a variable that shows the gender equality score per state. They stated that if a state is more gender equal that the headquarters in that state are more prone to have female executives. They also argued that the exclusion restriction is expected to be met, since it is not likely that the states' gender equality score has an effect on the financial and investment decision-making, unless through the direct effect of the director's gender. With the use of this instrument, the possibility of reversed causality will be ruled out. In this thesis, the gender equality score per EU country will be used as instrument for the variable gender ratio. This score will be retrieved via the European Institute for Gender Equality, which gives the member states a score between one and one hundred, with a score of one hundred meaning full gender equality. For the 27 EU countries, gender equality scores data for 2013, 2015, 2017 and 2019 are available. It is reasonable that in the years in between, the scores did not change considerably and thus 2014 will be given the same score as 2013, 2016 the same as 2017, and 2018 the same score as 2017. Furthermore, the fourth model will also be a firm fixed effects model with cluster–robust standard errors but now with the IV approach described above.

However, the estimation for the models for the variable *acquisitions* is more complex. Since the variable *Acquisitions* is a binary variable, the company can only acquire or not

acquire another business, the methodology of the estimation will be different than for the continuous variables *Debt* and *Equity*. Consequently, the first two models for the dependent variable *Acquisitions* will be estimated by logit regressions with the first model being a standard logit regression and the second model a firm fixed effects model with cluster–robust standard errors. However, Stata does not have a command to estimate logit regressions with the IV approach. To still be able to use the IV for the variable *Acquisitions*, the third and fourth model will be estimated using Linear Probability Models (LPM), in the same manner as the third and fourth model of the dependent variables *Debt* and *Equity* will be estimated. The LPM is not as optimal as the logit, since the LPM is not limited to numbers between zero and one as is the case with logit. The control variables above will be added to the four models for all three dependent variables regressions.

The first and third models (1) are specified with the following equation. $Y_{i,t}$ is the decision variable of interest (*Debt* or *Equity*) for firm i in year t. $GenderRatio_{i,t}$is the gender ratio for firm in year t. The first model is measured using an OLS approach and the third model is measured using an IV approach. γ is the vector for the control variables X for firm i in year t.

$$Y_{i,t} = \beta_0 + \beta_1 Gender\ Ratio_{i,t} + \gamma X_{i,t} + u_{i,t} \quad (1)$$

The second and fourth models (2) are specified with the following equation. Since both models have firm fixed effects, φ will represent firm fixed effects. The second model is measured using an OLS approach and the fourth model is measured using an IV approach.

$$Y_{i,t} = \beta_0 + \beta_1 Gender\ Ratio_{i,t} + \varphi_i + \gamma X_{i,t} + v_{i,t} \quad (2)$$

For the third and fourth model of the regressions that have the variable *Acquisitions* as dependent variable, the same applies as mentioned above. However, for the first and second model with *Acquisitions*, not the OLS approach but the logit approach will be used. Everything else stays the same.

Furthermore, it is possible that the size of the board matters too. It might be for example that a board with 80% male directors that have a total five directors is not the same as a board with 80% male directors that have a total of 20 directors. Therefore, four new regressions, whereby the variable *Gender Ratio* will be normalized with respect to board size, by dividing the variable by the number of directors of a board of directors to analyze this, will also be run to test if the results then change.

4.2 Assumptions

An important assumption is homoskedasticity of the errors with $Var(u_i) = \sigma^2 < \infty$. In the case that this assumption is violated, the standard errors will be larger. This means that the distribution of the coefficients and the default standard errors will not be valid for the hypothesis tests. It is important to note that the second and fourth models already have cluster–robust standard errors. To test if the assumption of homoskedasticity holds for the first and third models, separate White tests will be performed on the first models, and the same results will be assumed to hold for the third models, since Stata, the statistical software used, is not able to perform a White test in combination with the IV approach.

Additionally, Stata does not have the ability to test for heteroskedasticity with logit regressions. Consequently, the assumption of homoskedasticity of the errors for the first model with *Acquisitions* as dependent variable will have to be assumed hold. For the third model with *Acquisitions* as dependent variable, the White test will be performed but then without the IV.

Another important assumption is that the sampling distribution of the sampling means will follow a Normal distribution, with $u_i \sim N(0, \sigma^2)$. Following the Central Limit Theory, it is expected that that the number of observations is sufficiently large to assume normality of errors.

In the previous paragraph, I mentioned that for the second and fourth models of the three independent variables, firm fixed effects will be used. However, it is possible that random effects will be more efficient than firm fixed effects. To test this, a Hausman test will be performed on the standard OLS regressions of the first model for the regressions to differentiate between firm fixed effects and random effects.

In addition, another important assumption is the no endogeneity assumption or exogeneity assumption, with $Cov(x_{i,}u_i) = 0$. Often times, this is caused by leaving out relevant variables causing OVB. Therefore, control variables are added and an IV approach for the third and fourth model is used. However, it is not possible to test if there is not still exogeneity after. If the exogeneity assumption is indeed violated, the estimates will be biased and any conclusion drawn with them are not valid.

Furthermore, one weakness of the instrumental variable *Gender Equality Index* is that the instrument is on the country-level and the rest of the data is on the firm-level. Consequently, there will be no variation for the firms in the countries. It was already concluded in the previous paragraph that the restrictions assumption is likely to be met.

However, the relevance condition requires a sufficient amount of correlation between the instrumental variable *Gender Equality Index* and the dependent variable of interest *Gender Ratio*. Fortunately, this condition can be tested in Stata with the first stage, which includes an F-test.

CHAPTER 5 Results & Discussion

5.1 Assumptions

White tests were performed on the first models. The p-value for the first model regression with the dependent variable *Debt* is 1 and hence, the null hypothesis is not rejected and these errors are homoscedastic. However, the p-value for the first model regressions with the dependent variable *Equity* and *Acquisitions* are 0 and $5.2e^{-73}$, respectively, and consequently, the null hypothesis is rejected at the 5% significance level for both and these errors for both regressions are heteroskedastic. Therefore, White robust standard errors will be used for the regressions of the first and third models that have *Equity*, and for the regressions of the third models that have *Acquisitions* as dependent variables.

As mentioned in the Method section, Hausman tests were performed on the regressions of the first model regressions to determine if firm fixed effects or random effects should be used. The p-values for the regressions with variables *Debt*, *Equity*, and *Acquisitions* are 0.0000, 0.0259, and 0.0000, respectively. Hence, the null hypothesis is rejected at a 5% significance level for all three regressions. Therefore, random effects will be inconsistent and firm fixed effects should be used for all regressions of the second and fourth model.

Additionally, all first stages of the IV regressions of the third and fourth model were significant at the 5% level. This implies that the instrumental variable is relevant and consequently, the relevant condition holds.

5.2 Debt regressions

Table 2 contains the results for the regressions that have *Debt* as dependent variable. It is noticeable that all of the R^2 are quite low. The highest R^2 of the three models is the 0.027 for the first model. Meaning that only 2.7% of the variance in the change of debt is explained by the variables used for the first model. The model with the lowest R^2 is the second model, which has cluster–robust standard errors, with an R^2 of 0.011. However, it is important to note that for the second and fourth model, the sector variables are omitted because of perfect multicollinearity with the usage of firm fixed effects. It could be that a part of the variance in change of debt explained is lost because of the omission of the sector dummies. Additionally, Stata shows no R^2 for the fourth model. This is also noticeable for some models in the other regression tables. It could be possible that those R^2 are negative with IV regressions, meaning that the particular model does not follow the data trend and that a horizontal line would fit better. This would imply that those models are of poor quality. Model 4 has in table 2, 3, and

4 a missing R^2 and, out of caution, will be ignored and not interpreted for all of those three tables.

The most surprising element of the table is that the coefficient of *Gender Ratio* is negative and significant at the 1% significance level for the first and third model, even though the expectation that was formulated in the second hypothesis was that *Gender Ratio* has a positive effect on *Debt*. However, these negative signs would imply that more men directors in the board of directors results in a lower change of debt. The most reasonable argument for this result is that most research in this field has been conducted in the US. It is possible that women in the EU take more risks than women in the US. Nevertheless, the coefficients of *Gender Ratio* is insignificant for the second model. It could be argued that the effect becomes weaker because of little within-firm variations with regard of the proportion of female directors, since it can be seen in table 1 that the average percentage of men in the board of directors was around 76.9%. The coefficient of the variable *Gender Ratio* for the first model, the model with the highest R^2, is -2.950. This would mean that, if indeed all assumptions hold, the change in the amount of debt present in a particular company in the EU would decrease with 2,950,000 Euros on average if there were 1% more male directors in their board of directors, ceteris paribus. This might seem relatively small compared to the total amount of long-term debt of 1,409,711,000 Euros and the 117,803,900 Euros that the active public companies in the EU increased their long-term debt on average with in a year between 2013 and 2019. However, if a board of directors that has only male directors changes to a board of directors that has no male directors, the increase in the change in the amount of long-term would already account for approximately 20.9% of the total amount of long-term debt present in a company on average and around 2.5 times the average increase in the amount of long-term debt present in a company in a year, ceteris paribus. Additionally, the third model has a coefficient of -8.819. This would imply that the effect of an increase or decrease in the board of directors' gender ratio would be even larger. Nevertheless, the coefficients of the first and third model differ by a relatively large amount. It is hard to pinpoint the exact effect of an increase or decrease in the board of directors' gender ratio, but the effect at least seems to be not only statistically significant, but also financially significant.

According to these results, the second hypothesis that stated that the board of directors' gender ratio has a positive effect on the change in the amount of long-term debt for a company in the EU, is rejected, since the relationship seems to be either negative or insignificant.

The second has only one variable with a significant coefficient and that is *Debt Capacity*, for which I already expected it to be positive. For both the first and third model, the variable *Small* is negative and significant at the 1% significance level. It was already expected that it would be a negative relationship. In addition, the variable *Cash Holdings* is negative and significant at the 5% for the first and third model. This is also in line with the expectations. Apparently, for this population with these variables, some control variables are not significant.

Table 2: Regression results Debt

	Debt			
	Model 1 OLS	Model 2 OLS + fixed effects	Model 3 IV	Model 4 IV + fixed effects
Panel A: Regression coefficients				
Gender Ratio	-2.950***	-1.592	-8.826***	-27.128***
	(1.108)	(1.542)	(3.132)	(7.298)
Small	-144.019***	-11.155	-108.576***	52.019
	(37.246)	(36.600)	(41.159)	(47.486)
ROA	9.692	-68.358	9.099	-94.117*
	(87.485)	(51.139)	(87.306)	(54.972)
Debt Capacity	79.724	1966.307***	100.326	1686.172***
	(103.566)	(518.544)	(103.863)	(502.516)
EPS	-0.338	-1.421	-0.511	-1.432
	(0.819)	(1.073)	(0.822)	(1.087)
Tobin's Q	-4.276	-9.569	-2.575	-10.399
	(10.954)	(6.873)	(10.964)	(7.281)
Cash Holdings	-308.187**	419.219	-299.170**	362.114
	(130.460)	(308.261)	(130.270)	(318.733)
Aerospace & Defence	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Automobiles & Parts	495.044**	0.000	513.062***	0.000
	(194.624)	(.)	(194.432)	(.)
Beverages	-13.302	0.000	-34.954	0.000
	(215.773)	(.)	(215.601)	(.)
Business Services	23.459	0.000	31.664	0.000
	(196.353)	(.)	(195.992)	(.)
Chemicals	57.470	0.000	64.885	0.000
	(198.625)	(.)	(198.252)	(.)

Clothing & Personal Products	146.725	0.000	156.937	0.000
	(193.496)	(.)	(193.166)	(.)
Construction & Building Materials	-1.228	0.000	35.575	0.000
	(185.263)	(.)	(185.792)	(.)
Consumer Services	-74.863	0.000	-81.028	0.000
	(320.858)	(.)	(320.214)	(.)
Containers & Packaging	-116.808	0.000	-101.558	0.000
	(249.701)	(.)	(249.304)	(.)
Diversified Industrials	-35.108	0.000	28.505	0.000
	(213.172)	(.)	(215.087)	(.)
Electricity	258.200	0.000	284.804	0.000
	(211.709)	(.)	(211.690)	(.)
Electronic & Electrical Equipment	-0.503	0.000	33.666	0.000
	(188.520)	(.)	(188.903)	(.)
Engineering & Machinery	-59.707	0.000	-2.396	0.000
	(185.789)	(.)	(187.598)	(.)
Food & Drug Retailers	124.682	0.000	119.869	0.000
	(224.895)	(.)	(224.446)	(.)
Food Producers & Processors	-24.154	0.000	29.298	0.000
	(196.232)	(.)	(197.635)	(.)
Forestry & Paper	-63.209	0.000	19.244	0.000
	(224.402)	(.)	(227.686)	(.)
General Retailers	13.800	0.000	37.431	0.000
	(198.895)	(.)	(198.836)	(.)
Health	137.870	0.000	150.332	0.000
	(191.729)	(.)	(191.436)	(.)
Household Products	-18.136	0.000	-17.601	0.000
	(214.063)	(.)	(213.624)	(.)
Information Technology Hardware	46.674	0.000	63.085	0.000
	(192.337)	(.)	(192.116)	(.)
Leisure & Hotels	48.537	0.000	72.126	0.000
	(194.989)	(.)	(194.944)	(.)
Leisure Goods	-41.323	0.000	-37.297	0.000
	(266.199)	(.)	(265.660)	(.)
Media & Entertainment	26.573	0.000	32.458	0.000
	(188.082)	(.)	(187.719)	(.)
Mining	24.764	0.000	145.783	0.000

	(265.277)	(.)	(271.525)	(.)
Oil & Gas	5.034	0.000	37.162	0.000
	(199.055)	(.)	(199.291)	(.)
Pharmaceuticals and Biotechnology	250.221	0.000	246.729	0.000
	(188.701)	(.)	(188.322)	(.)
Private Equity	-157.954	0.000	-145.181	0.000
	(1024.334)	(.)	(1022.251)	(.)
Publishing	12.114	0.000	70.223	0.000
	(257.656)	(.)	(258.755)	(.)
Real Estate	-84.848	0.000	-90.511	0.000
	(286.440)	(.)	(285.866)	(.)
Renewable Energy	25.613	0.000	85.153	0.000
	(204.985)	(.)	(206.708)	(.)
Software & Computer Services	30.200	0.000	67.118	0.000
	(183.349)	(.)	(183.897)	(.)
Speciality & Other Finance	-75.450	0.000	-52.160	0.000
	(238.317)	(.)	(238.111)	(.)
Steel & Other Metals	-92.389	0.000	-53.805	0.000
	(209.407)	(.)	(209.861)	(.)
Telecommunication Services	246.007	0.000	280.176	0.000
	(195.183)	(.)	(195.526)	(.)
Transport	92.293	0.000	120.393	0.000
	(195.228)	(.)	(195.330)	(.)
Utilities - Other	-136.542	0.000	-109.586	0.000
	(211.193)	(.)	(211.188)	(.)
Wholesale Trade	-158.067	0.000	-146.455	0.000
	(484.948)	(.)	(483.987)	(.)
Investment Companies			0.000	
			(.)	
Constant	379.748**	-235.442	772.620***	1733.476***
	(190.167)	(201.878)	(272.777)	(587.360)
Panel B: Regression statistics				
Number of observations	3867	3867	3867	3867
R^2	0.027	0.011	0.020	
P-value F-statistic model	0.000	0.000	0.000	1.000

Notes: Panel A shows the results of the estimation of the regressions that have the variable *Debt* as dependent variable. The first row displays the four models, with the first model using the OLS approach, the second model

using the OLS approach with fixed effects, the third model using the IV approach, and the fourth model using the IV approach with fixed effects. The first column shows the independent variables and the remainder of the columns show the estimated coefficients with their respective standard errors in brackets. * represents a significance at the 10% significance level, ** at the 5% significance level, and *** at the 1% significance level. Panel B shows the regression statistics, including the Number of observations, R^2, and the P-value F-statistic model.

5.3 Equity regressions

Table 3 contains the results for the regressions that have *Equity* as dependent variable. It is noticeable that all of the R^2 are quite low, as was the case for the first three models in table 2. The highest R^2 of the three models is the 0.023 for the first model. Meaning that only 2.3% of the variance in the change of equity is explained by the variables used for the first model. The model with the lowest R^2 is the second model, which has cluster–robust standard errors, with an R^2 of 0.009. As already mentioned, model 4 will not be interpreted because of a missing R^2. However, it is important to note that for the second model, the sector variables are omitted because of perfect multicollinearity with the usage of firm fixed effects. It could be that a part of the variance in change of debt explained is lost because of the omission of the sector dummies.

For table 3, the most remarkable observation is that none of the four models has a significant coefficient for the variable *Gender Ratio*, except for the third model which has a coefficient that is significant at the 10% level and is thus hardly significant. Consequently, it is better not to interpret the coefficients, since the insignificance implies that the coefficients are not sufficiently different from 0, that is no effect. However, the insignificance could be caused by the way the variable *Equity* is measured, since it is measured as the change in the company's outstanding shares. It was already mentioned that there are 2,857 observations that reported to have no change in equity.

According to these results, the third hypothesis that stated that the board of directors' gender ratio has no effect on the change in the amount of equity for a company in the EU, is not rejected.

It is also interesting that none of the variables have any coefficients that are significant at the 5% level, except for the sector *Electricity* for the first and third models, and the sector *Publishing* for the first model. The sign of the *Sector* variables are not interpretable, since they are compared to a reference *Sector*, so interpreting it would not mean anything.

Table 3: Regression results Equity

	Equity			
	Model 1	Model 2	Model 3	Model 4
	OLS	OLS + fixed effects	IV	IV + fixed effects
Panel A: Regression coefficients				
Gender Ratio	0.388	1.071	-0.457*	-1.416
	(0.237)	(1.050)	(0.267)	(1.030)
Small	-3.965	-14.668*	1.130	-8.533
	(3.156)	(8.845)	(2.247)	(6.565)
ROA	-16.727	-39.227	-16.868	-41.721
	(14.051)	(41.140)	(14.221)	(42.570)
Debt Capacity	-9.655	-112.038	-6.743	-139.338
	(17.990)	(202.847)	(18.784)	(201.157)
EPS	0.015	0.003	-0.010	0.002
	(0.020)	(0.008)	(0.017)	(0.007)
Tobin's Q	0.317	2.267	0.552	2.189
	(1.431)	(3.378)	(1.422)	(3.430)
Cash Holdings	-16.685*	-5.920	-15.426*	-11.543
	(9.316)	(41.138)	(9.344)	(40.778)
Aerospace & Defence	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Automobiles & Parts	-4.460	0.000	-1.937	0.000
	(3.828)	(.)	(3.764)	(.)
Beverages	-2.854	0.000	-5.965	0.000
	(3.247)	(.)	(3.627)	(.)
Business Services	-1.702	0.000	-0.704	0.000
	(3.397)	(.)	(3.805)	(.)
Chemicals	-2.844	0.000	-1.768	0.000
	(4.135)	(.)	(4.164)	(.)
Clothing & Personal Products	-4.030	0.000	-2.545	0.000
	(3.282)	(.)	(3.721)	(.)
Construction & Building Materials	-0.428	0.000	4.869	0.000
	(4.670)	(.)	(4.607)	(.)
Consumer Services	-2.817	0.000	-3.691	0.000
	(3.743)	(.)	(4.108)	(.)
Containers & Packaging	-5.695	0.000	-3.489	0.000
	(5.508)	(.)	(5.253)	(.)
Diversified Industrials	-13.844*	0.000	-4.686	0.000

	(7.654)	(.)	(7.414)	(.)
Electricity	34.591**	0.000	38.432**	0.000
	(16.691)	(.)	(16.420)	(.)
Electronic & Electrical Equipment	-6.234*	0.000	-1.306	0.000
	(3.280)	(.)	(4.048)	(.)
Engineering & Machinery	-5.643	0.000	2.596	0.000
	(4.312)	(.)	(4.448)	(.)
Food & Drug Retailers	111.774	0.000	111.089	0.000
	(118.647)	(.)	(118.188)	(.)
Food Producers & Processors	-3.290	0.000	4.302	0.000
	(5.159)	(.)	(4.885)	(.)
Forestry & Paper	-0.386	0.000	11.496	0.000
	(10.587)	(.)	(9.239)	(.)
General Retailers	-5.469	0.000	-2.061	0.000
	(3.365)	(.)	(3.636)	(.)
Health	-3.133	0.000	-1.329	0.000
	(3.714)	(.)	(3.873)	(.)
Household Products	-2.595	0.000	-2.512	0.000
	(3.324)	(.)	(3.579)	(.)
Information Technology Hardware	-1.880	0.000	0.494	0.000
	(3.368)	(.)	(3.904)	(.)
Leisure & Hotels	-1.605	0.000	1.808	0.000
	(5.627)	(.)	(5.381)	(.)
Leisure Goods	-3.193	0.000	-2.606	0.000
	(3.511)	(.)	(3.700)	(.)
Media & Entertainment	-2.024	0.000	-1.177	0.000
	(4.244)	(.)	(4.600)	(.)
Mining	-6.424	0.000	10.980	0.000
	(6.764)	(.)	(7.692)	(.)
Oil & Gas	5.391	0.000	10.029	0.000
	(8.356)	(.)	(8.030)	(.)
Pharmaceuticals and Biotechnology	-1.023	0.000	-1.518	0.000
	(3.622)	(.)	(3.907)	(.)
Private Equity	-6.009*	0.000	-4.170	0.000
	(3.400)	(.)	(3.392)	(.)
Publishing	-9.732**	0.000	-1.862	0.000
	(4.288)	(.)	(5.983)	(.)

Real Estate	-0.394	0.000	-1.200	0.000
	(6.740)	(.)	(7.157)	(.)
Renewable Energy	42.850	0.000	51.433*	0.000
	(28.836)	(.)	(29.744)	(.)
Software & Computer Services	-4.239	0.000	1.003	0.000
	(3.172)	(.)	(4.716)	(.)
Speciality & Other Finance	-9.134*	0.000	-5.770	0.000
	(5.471)	(.)	(5.138)	(.)
Steel & Other Metals	-4.315	0.000	1.242	0.000
	(5.621)	(.)	(4.798)	(.)
Telecommunication Services	18.296	0.000	23.055	0.000
	(15.970)	(.)	(16.559)	(.)
Transport	-2.968	0.000	0.916	0.000
	(5.345)	(.)	(4.924)	(.)
Utilities - Other	-14.365	0.000	-10.476	0.000
	(12.437)	(.)	(12.135)	(.)
Wholesale Trade	-3.713	0.000	-2.019	0.000
	(6.754)	(.)	(6.507)	(.)
Investment Companies			0.000	
			(.)	
Constant	-18.022	-46.757	38.538**	144.947
	(17.019)	(115.767)	(18.500)	(119.477)
Panel B: Regression statistics				
Number of observations	3853	3853	3853	3853
R^2	0.023	0.009	0.012	
P-value F-statistic model	0.023	0.229	0.003	1.000

Notes: Panel A shows the results of the estimation of the regressions that have the variable *Equity* as dependent variable. The first row displays the four models, with the first model using the OLS approach, the second model using the OLS approach with fixed effects, the third model using the IV approach, and the fourth model using the IV approach with fixed effects. The first column shows the independent variables and the remainder of the columns show the estimated coefficients with their respective standard errors in brackets. * represents a significance at the 10% significance level, ** at the 5% significance level, and *** at the 1% significance level. Panel B shows the regression statistics, including the Number of observations, R^2, and the P-value F-statistic model.

5.4 Acquisitions regressions

Table 4 contains the results for the regressions that have *Acquisitions* as dependent variable. Stata provided the R^2 for only the third model. This R^2 is with 0.144 quite low, as was the

case for the other dependent variable's regressions, but is slightly higher than those. The R^2 of 0.144 means that 14.4% of the variance in the probability of an acquisition is explained by the variables used for the first model. For the two logit models, the first and second model, the Akaike information criterion (AIC) and Bayesian information criterion (BIC) of them are compared to choose the best model. The second model has a lower AIC and BIC than the first model, and is therefore the best model of the two, since they show the information lost. However, Stata cannot use the Margins command with the combination of logit and fixed effects. So for the interpretation of the magnitude of the two logit regressions, only the first model can be used. As already mentioned, model 4 will not be interpreted because of a missing R^2.

As with the expectations for the regressions with *Debt* and *Equity* as dependent variable, it was expected that *Gender Ratio* would have a positive effect on the variable *Acquisitions*. However, the coefficient for *Gender Ratio* is negative and significant with a significance level of 1% and 5%, the former for the first and second model and the latter for the third model. The method of interpreting the coefficients the LPM is the same as with the OLS approach. However, the interpretation of the logit coefficients is rather complex, since it is not possible to just interpret the coefficients.

As mentioned above, for the interpretation of the logit coefficients, those of the first model will be studied. The coefficient will be evaluated at the mean with the Margins command. This results in a coefficient of -0.0025459. This would mean that, if indeed all assumptions hold, a 1% increase in the male directors in the board of directors of a particular company in the EU leads to a 0.255% decrease on average in the probability of an acquisition happening, ceteris paribus. If a board of directors that has only male directors changes to a board of directors that has no male directors, it would be a 25.5% increase on average in the probability happening, ceteris paribus.

For the third model, the interpretation is less complex, since with a LPM we can directly interpret the coefficients in the table. The coefficient for the third model is -0.009. This would mean that, if indeed all assumptions hold, a 1% increase in the male directors in the board of directors of a particular company in the EU leads to a 0.9% decrease on average in the probability of an acquisition happening, ceteris paribus. If a board of directors that has only male directors changes to a board of directors that has no male directors, it would be a 90% increase on average in the probability happening, ceteris paribus. Nevertheless, the coefficients of the first and third model differ by a relatively large amount. It is hard to

pinpoint the exact effect of an increase or decrease in the board of directors' gender ratio, but the effect at least seems to be not only statistically significant, but also financially significant.

According to these results, the first hypothesis that stated that the board of directors' gender ratio of a company in the EU has a positive effect on the probability of an acquisition of another business happening, is rejected.

Remarkable is that the coefficients for *Debt Capacity* are negative and significant for all four models, even though the expectation was that more tangible assets would increase the probability of an acquisition happening. The same negative and significant coefficients could be seen for *Cash Holdings*. Here, the expectation was that an increase in cash available would increase the probability of an acquisition happening. However, Hünermund (2021) stated that it is impossible to find all relevant control variables and that using less control variables could be fine. Additionally, he stated that this would make the interpretation of the control variables' coefficients lose their substantive meaning, since they now embody a complicated weighting of multiple causal influence variables.

In table 2 and 3, the sector variables were omitted for the second and fourth model, but in this table 4, that is only the case for the fourth model. Apparently, the firm fixed effects of the logit regression of the second model has no perfect collinearity with the sector variables, and are therefore not dropped. Surprisingly, table 4 has more significant coefficients than table 2 and 3. This could be, because table 4 has a higher number of observations.

Table 4: Regression results Acquisitions

	Acquisitions			
	Model 1 Logit	Model 2 Logit + fixed effects	Model 3 IV	Model 4 IV + fixed effects
Panel A: Regression coefficients				
Gender Ratio	-0.010***	-0.011**	-0.009***	0.002
	(0.002)	(0.004)	(0.001)	(0.002)
Small	-1.243***	-1.697***	-0.246***	-0.058
	(0.071)	(0.158)	(0.017)	(0.038)
ROA	2.133***	3.134***	0.167***	0.068**
	(0.328)	(0.576)	(0.029)	(0.028)
Debt Capacity	-1.852***	-2.811***	-0.347***	-0.210**
	(0.205)	(0.482)	(0.042)	(0.106)
EPS	0.002	-0.000	0.000	-0.000***

	(0.002)	(0.002)	(0.001)	(0.000)
Tobin's Q	-0.081***	-0.092*	0.001	0.003
	(0.029)	(0.053)	(0.003)	(0.004)
Cash Holdings	-2.173***	-3.491***	-0.421***	-0.283***
	(0.283)	(0.563)	(0.044)	(0.086)
Aerospace & Defence	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Automobiles & Parts	0.386	0.566	0.117	0.000
	(0.355)	(0.991)	(0.089)	(.)
Beverages	-0.016	-0.248	-0.018	0.000
	(0.391)	(1.076)	(0.099)	(.)
Business Services	1.100***	1.652*	0.237***	0.000
	(0.363)	(0.995)	(0.088)	(.)
Chemicals	0.441	0.522	0.113	0.000
	(0.361)	(1.010)	(0.089)	(.)
Clothing & Personal Products	-0.243	-0.797	-0.044	0.000
	(0.354)	(0.990)	(0.088)	(.)
Construction & Building Materials	0.501	0.565	0.162*	0.000
	(0.336)	(0.945)	(0.085)	(.)
Consumer Services	1.569**	2.070	0.277**	0.000
	(0.647)	(1.517)	(0.124)	(.)
Containers & Packaging	0.583	0.844	0.153	0.000
	(0.462)	(1.315)	(0.112)	(.)
Diversified Industrials	0.713*	0.930	0.234**	0.000
	(0.390)	(1.093)	(0.096)	(.)
Electricity	0.465	0.431	0.129	0.000
	(0.384)	(1.096)	(0.097)	(.)
Electronic & Electrical Equipment	0.353	0.254	0.116	0.000
	(0.343)	(0.956)	(0.086)	(.)
Engineering & Machinery	-0.002	-0.304	0.069	0.000
	(0.337)	(0.946)	(0.086)	(.)
Food & Drug Retailers	1.092***	1.614	0.247**	0.000
	(0.422)	(1.173)	(0.096)	(.)
Food Producers & Processors	0.428	0.311	0.150*	0.000
	(0.356)	(0.994)	(0.091)	(.)
Forestry & Paper	0.114	-0.211	0.129	0.000
	(0.416)	(1.148)	(0.106)	(.)
General Retailers	0.411	0.403	0.113	0.000

	(0.363)	(0.999)	(0.091)	(.)
Health	0.393	0.476	0.104	0.000
	(0.353)	(0.981)	(0.087)	(.)
Household Products	-0.177	-0.637	-0.036	0.000
	(0.393)	(1.076)	(0.094)	(.)
Information Technology Hardware	0.103	-0.171	0.042	0.000
	(0.353)	(0.983)	(0.088)	(.)
Leisure & Hotels	1.002***	1.150	0.245***	0.000
	(0.356)	(0.989)	(0.089)	(.)
Leisure Goods	0.620	0.864	0.142	0.000
	(0.485)	(1.238)	(0.121)	(.)
Media & Entertainment	0.867**	1.199	0.193**	0.000
	(0.343)	(0.960)	(0.086)	(.)
Mining	-1.681**	-2.734*	-0.094	0.000
	(0.695)	(1.512)	(0.106)	(.)
Oil & Gas	0.311	0.218	0.106	0.000
	(0.366)	(1.017)	(0.091)	(.)
Pharmaceuticals and Biotechnology	0.369	0.138	0.079	0.000
	(0.351)	(0.964)	(0.086)	(.)
Private Equity	0.000	0.000	-0.504***	0.000
	(.)	(.)	(0.090)	(.)
Publishing	-0.862	-1.906	-0.081	0.000
	(0.546)	(1.395)	(0.104)	(.)
Real Estate	0.154	-0.313	0.041	0.000
	(0.543)	(1.442)	(0.116)	(.)
Renewable Energy	0.763**	0.997	0.215**	0.000
	(0.382)	(1.019)	(0.094)	(.)
Software & Computer Services	0.818**	0.926	0.217**	0.000
	(0.334)	(0.931)	(0.085)	(.)
Speciality & Other Finance	0.439	0.220	0.119	0.000
	(0.441)	(1.161)	(0.107)	(.)
Steel & Other Metals	-0.081	-0.509	0.021	0.000
	(0.384)	(1.069)	(0.095)	(.)
Telecommunication Services	0.956***	1.248	0.239***	0.000
	(0.359)	(1.002)	(0.089)	(.)
Transport	0.097	-0.132	0.056	0.000
	(0.355)	(0.990)	(0.089)	(.)

Utilities - Other	-0.050	-0.437	0.018	0.000
	(0.383)	(1.091)	(0.095)	(.)
Wholesale Trade	-0.592	-0.833	-0.132	0.000
	(0.924)	(2.549)	(0.210)	(.)
Investment Companies			0.000	
			(.)	
Constant	1.598***	2.209**	1.271***	0.463***
	(0.351)	(0.941)	(0.123)	(0.140)
Panel B: Regression statistics				
Number of observations	5002	5002	5004	5004
R^2			0.144	
P-value F-statistic model	0.000	0.000	0.000	1.000
AIC	5980.224	5059.049	.	.
BIC	6260.481	5345.823	.	.

Notes: Panel A shows the results of the estimation of the regressions that have the variable *Acquisitions* as dependent variable. The first row displays the four models, with the first model using the logit approach, the second model using the logit approach with fixed effects, the third model using the IV approach with LPM, and the fourth model using the IV approach with LPM and fixed effects. The first column shows the independent variables and the remainder of the columns show the estimated coefficients with their respective standard errors in brackets. * represents a significance at the 10% significance level, ** at the 5% significance level, and *** at the 1% significance level. Panel B shows the regression statistics, including the Number of observations, R^2, and the P-value F-statistic model, the AIC, and BIC.

5.5 Normalized gender ratio

As mentioned, it is possible that the size of the board matters too. Consequently, all twelve regressions from above were run again, but now with the normalized gender ratio with respect to board size. The results for the regressions that have Debt and Acquisitions as dependent variable did not sufficiently differ from the results above. However, Hausman tests were performed on the regressions of the first model regressions to determine if firm fixed effects or random effects should be used. The p-value for the regression that has the variables *Equity* as dependent variable is 0.1319. Hence, the null hypothesis is not rejected at a 5% significance level. Although, both fixed and random effects will then be consistent, random effects will be more efficient and should therefore be used. Consequently, the results are different for the regressions that have the variable *Equity* as dependent variable. The results are shown in table 4, which is in Appendix A. Most notable, is that the coefficients of the variable *Gender Ratio* for the first and second model is now positive and significant at the

10% and 5% significance level, respectively. However, the fourth model stays not significant and the third model was originally significant at the 10% significance level but is not significant anymore. Unfortunately, the coefficients are not really interpretable, since it has a different value for not only a different gender ratio but also for a different board size. Furthermore, the first and second model have the same coefficients, but only different standard errors. This could be a sign of a true balanced dataset.

However, Stata provided the R^2 for only the first model. This R^2 is with 0.022 still quite low, as was the case for the other dependent variable's regressions. The R^2 of 0.022 means that 2.2% of the variance in the change of equity is explained by the variables used for the first model.

CHAPTER 6 Conclusion

In this thesis, the effect of the board of directors' gender ratio on financial and investment decision-making was studied. Past research, in particular the research of Huang and Kisgen (2013), found a positive effect of the board of directors gender ratio on the issuance of debt and the number of acquisitions, and an insignificant effect on the issuance of equity. However, prior research was mainly conducted on data containing only datasets of firms in the US. By using data of firms in the EU, the question whether the same results are obtained from datasets of firms in the EU instead of the US can be answered. The research question of this thesis is therefore the following: does the company's board of directors' gender ratio have an effect on financial and investment decision-making in the EU?

To be able to answer this research question, for each dependent variable, *debt*, *equity*, and *acquisitions*, regressions for four models were estimated for public companies in the EU. *Acquisitions* is a binary variable and hence, for the first two models logit regressions were used. All other ten regressions were estimated with the OLS approach.
Even though there were some significant *Gender Ratio* coefficients observed for regressions with the dependent variables *acquisitions* and *debt*, the results were not completely in accordance with previous research and the three hypothesis stated in this thesis. The first two hypotheses of positive significant effects of the board of directors' gender ratio on the probability of an acquisition happening and the change in debt, were rejected because of negative significant or insignificant effects. The third hypothesis of no significant effect of the board of directors' gender ratio on change in equity was not rejected. In total, these results could implicate that male directors are less overconfident or female directors are less risk averse in the EU than expected. As an illustration, Christine Lagarde, the first female president of the European Central Bank, has been increasing interest rates to an all-time high at its fastest pace ever to fight inflation (Canepa & Koranyi, 2023), which shows her risk tolerance compared to her three male predecessors.

However, there are some limitations with this research. The possibility still exists that some or all *Gender Ratio* estimators are endogenous and in that event, the estimates will be biased and any conclusion drawn with them are not valid. Although control variables were added and the IV approach was used for the second and fourth model, the exogeneity condition could still be violated. It is possible that some relevant variables were left out and that would cause OVB. In addition, it could be possible that the exclusion restriction of the IV approach was partly violated. This would make the IV weak. Furthermore, it was already

mentioned that the method used to measure *Equity* could have caused the insignificance, and that in reality the effect could be positively or negatively significant. These are all important notes to keep in mind for future research on this topic.

REFERENCES

Alkaraan, F. (2015). Strategic Investment Decision-Making Perspectives. In *Advances in Mergers and Acquisitions* (pp. 53–66). https://doi.org/10.1108/s1479-361x20150000014004

Allen, D. T., Powell, R., & Singh, A. K. (2012). Beyond reasonable doubt: multiple tail risk measures applied to European industries. *Applied Economics Letters*, *19*(7), 671–676. https://doi.org/10.1080/13504851.2011.593496

Atif, M., Liu, B. Y. H., & Huang, A. (2019). Does board gender diversity affect corporate cash holdings? Journal of Business Finance & Accounting, 46(7–8), 1003–1029. https://doi.org/10.1111/jbfa.12397

BVD Amadeus. (n.d.). [Dataset]. Wharton Research Data Services (WRDS). https://wrds-www.wharton.upenn.edu/pages/get-data/bureau-van-dijk/amadeus/stock-annual/

Barclay, M. J., Smith, C. W., & Morellec, E. (2006). On the Debt Capacity of Growth Options*. *The Journal of Business*, *79*(1), 37–60. https://doi.org/10.1086/497404

BoardEx. (n.d.). [Dataset]. Wharton Research Data Services (WRDS). https://wrds-www.wharton.upenn.edu/data-dictionary/boardex_eur/

Brigham, E. F., & Smith, K. (1967). Cost of Capital to the Small Firm. The Engineering Economist, 13(1), 1–26. https://doi.org/10.1080/00137916708928761

Byrne, A., Blake, D., & Mannion, G. (2010). Pension Plan Decisions. *Review of Behavioral Finance*, *2*(1), 19–36. https://doi.org/10.1108/19405979201000002

Canepa, F., & Koranyi, B. (2023, June 15). ECB in no mood to pause after lifting rates to 22-year high. Reuters. https://www.reuters.com/markets/rates-bonds/ecb-raise-rates-further-even-economy-stutters-2023-06-14/

Chen, G., Crossland, C., & Huang, S. (2016). Female board representation and corporate acquisition intensity. *Strategic Management Journal*, *37*(2), 303–313. https://doi.org/10.1002/smj.2323

Chen, J., Gao, Y., Li, Q., & Zeng, Y. (2020). Cash holdings, M&A decision and risk premium. Physica D: Nonlinear Phenomena, 537, 122571. https://doi.org/10.1016/j.physa.2019.122571

Compustat Global - Fundamentals Annual. (n.d.). [Dataset]. Wharton Research Data Services. https://wrds-www.wharton.upenn.edu/pages/get-data/compustat-capital-iq-standard-poors/compustat/global-daily/fundamentals-annual/

Dierkes, S., & Schäfer, U. (2017). Corporate taxes, capital structure, and valuation: Combining Modigliani/Miller and Miles/Ezzell. *Review of Quantitative Finance and Accounting*, *48*(2), 363–383. https://doi.org/10.1007/s11156-016-0554-4

Ellemers, N. (2018). Gender Stereotypes. *Annual Review of Psychology*, *69*(1), 275–298. https://doi.org/10.1146/annurev-psych-122216-011719

Enebrand, A., & Magnusson, T. (2018). Dividend policy and its impact on firm valuation : A study of the relationship between dividend policy and stock prices on the Swedish market. DIVA. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1215968&dswid=-1295

Evgeniou, T., & Vermaelen, T. (2017). Share buybacks and gender diversity. *Journal of Corporate Finance*, *45*, 669–686. https://doi.org/10.1016/j.jcorpfin.2017.06.005

Faccio, M., & Masulis, R. W. (2005). The Choice of Payment Method in European Mergers and Acquisitions. Journal of Finance, 60(3), 1345–1388. https://doi.org/10.1111/j.1540-6261.2005.00764.x

Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *Journal of Finance*, *47*(2), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Fernandes, N. O. (2020). Economic Effects of Coronavirus Outbreak (COVID-19) on the World Economy. *Social Science Research Network*. https://doi.org/10.2139/ssrn.3557504

Fonseca, J., & Van Doornik, B. F. N. (2022). Financial development and labor market outcomes: Evidence from Brazil. Journal of Financial Economics, 143(1), 550–568. https://doi.org/10.1016/j.jfineco.2021.06.009

Gender Equality Index. (n.d.). European Institute for Gender Equality. Retrieved March 29, 2023, from https://eige.europa.eu/gender-equality-index/2022

Hand, J. R. M. (2005). The Value Relevance of Financial Statements in the Venture Capital Market. *The Accounting Review*, *80*(2), 613–648. https://doi.org/10.2308/accr.2005.80.2.613

Harris, C. K. (2014). Women Directors on Public Company Boards: Does a Critical Mass Affect Leverage? *Business and Economics Faculty Publications*. https://digitalcommons.ursinus.edu/bus_econ_fac/29/

Harris, I. C., & Shimizu, K. (2004). Too Busy To Serve? An Examination of the Influence of Overboarded Directors. Journal of Management Studies, 41(5), 775–798. https://doi.org/10.1111/j.1467-6486.2004.00453.x

Hashmi, S. S., Gulzar, S., Ghafoor, Z., & Naz, I. (2020). Sensitivity of firm size measures to practices of corporate finance: evidence from BRICS. Future Business Journal, 6(1). https://doi.org/10.1186/s43093-020-00015-y

Haslam, S. A., Ryan, M. K., Kulich, C., Trojanowski, G., & Atkins, C. (2009). Investing with Prejudice: the Relationship Between Women's Presence on Company Boards and Objective and Subjective Measures of Company Performance. British Journal of Management. https://doi.org/10.1111/j.1467-8551.2009.00670.x

Hillman, A. J., Shropshire, C., & Cannella, A. A. (2007). Organizational Predictors of Women on Corporate Boards. Academy of Management Journal, 50(4), 941–952. https://doi.org/10.5465/amj.2007.26279222

Houser, K. A., & Williams, J. B. (2021). Board Gender Diversity: A Path to Achieving Substantive Equality in the United States. *Wm. & Mary L. Rev., 63*, 497–560.

Horvath, R., & Spirollari, P. (2012). Do the Board of Directors' Characteristics Influence Firm's Performance? The U.S. Evidence. *Prague Economic Papers*, *21*(4), 470–486. https://doi.org/10.18267/j.pep.435

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, *108*(3), 822–839. https://doi.org/10.1016/j.jfineco.2012.12.005

Hünermund, A. P. (2021, September 6). Don't Put Too Much Meaning Into Control Variables. https://p-hunermund.com/2019/04/28/dont-put-too-much-meaning-into-control-variables/

Jahanzeb, A., & Saif-Ur-Rehman. (2012). Implication of Behavioral Finance in Investment Decision-making Process. *Information Management and Business Review*, *4*(10), 532–536. https://doi.org/10.22610/imbr.v4i10.1009

Ji, G., Kim, D. H., & Ahn, K. (2019). Financial Structure and Systemic Risk of Banks: Evidence from Chinese Reform. Sustainability, 11(13), 3721. https://doi.org/10.3390/su11133721

Levi, M. D., Li, K., & Zhang, F. (2014). Director gender and mergers and acquisitions. *Journal of Corporate Finance*, *28*, 185–200. https://doi.org/10.1016/j.jcorpfin.2013.11.005

Liu, Y., Wei, Z., & Xie, F. (2014). Do women directors improve firm performance in China? *Journal of Corporate Finance*, *28*, 169–184. https://doi.org/10.1016/j.jcorpfin.2013.11.016

Löckenhoff, C. E., Chan, W., McCrae, R. R., De Fruyt, F., Jussim, L., De Bolle, M., Costa, P. T., Sutin, A. R., Realo, A., Allik, J., Nakazato, K., Shimonaka, Y., Hřebíčková, M., Graf, S., Yik, M., Ficková, E., Brunner-Sciarra, M., De Figueora, N. L., Schmidt, V., . . . Terracciano, A. (2014). Gender Stereotypes of Personality. *Journal of Cross-Cultural Psychology*, *45*(5), 675–694. https://doi.org/10.1177/0022022113520075

Mac Giolla, E., & Kajonius, P. J. (2019). Sex differences in personality are larger in gender equal countries: Replicating and extending a surprising finding. *International Journal of Psychology*, *54*(6), 705–711. https://doi.org/10.1002/ijop.12529

Miller, L. (2023). Women board members increase after diversity push. ESG Clarity. https://esgclarity.com/female-board-leadership/

Modigliani, F., & Miller, M. H. (1958). *The Cost of Capital, Corporation Finance and the Theory of Investment on JSTOR*. https://www.jstor.org/stable/1809766

Modigliani, F., & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. The American Economic Review, 53(3), 433–443. http://www.jstor.org/stable/1809167

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221. https://doi.org/10.1016/0304-405x(84)90023-0

Naveed, K., Voinea, C. L., Ali, Z., Rauf, F., & Fratostiteanu, C. (2021). Board Gender Diversity and Corporate Social Performance in Different Industry Groups: Evidence from China. Sustainability, 13(6), 3142. https://doi.org/10.3390/su13063142

Ohlson, J. A., & Penman, S. H. (2005). Debt vs. Equity: Accounting for Claims Contingent on Firms' Common Stock Performance with Particular Attention to Employee Compensation Options. *Debt Vs. Equity: Accounting for Claims Contingent on Firms' Common Stock Performance With Particular Attention to Employee Compensation Options*. https://doi.org/10.7916/d80p15t4

Olsen, R. G., & Cox, C. M. (2001). The Influence of Gender on the Perception and Response to Investment Risk: The Case of Professional Investors. The Journal of Psychology and Financial Markets, 2(1), 29–36. https://doi.org/10.1207/s15327760jpfm0201_3

Oxford University Press. (1989). Debt. In *Oxford English Dictionary, Second Edition*. Retrieved May 11, 2023, from https://www.oed.com/oed2/00058415;jsessionid=9236577091D0B425BDC10EF0D5A2ED14#:~:text=1.,money%20or%20a%20material%20thing.

Ricciardi, V., & Simon, H. K. (2000). What is behavioral finance? *Business, Education & Technology Journal*, *2*(2), 1–9. https://papers.ssrn.com/Sol3/papers.cfm?abstract_id=256754

Schubert, R., Gysler, M., Brown, M. M., & Brachinger, H. W. (2000). Gender specific attitudes towards risk and ambiguity: An experimental investigation. *Economics Working Paper Series, 00/17*. https://doi.org/10.3929/ethz-a-004106791

Sindhu. K. P, & Kumar, S. R. (2014). Influence of Risk Perception of Investors on Investment Decisions: An Empirical Analysis. *Journal of Finance and Bank Management*. http://jfbmnet.com/journals/jfbm/Vol_2_No_2_June_2014/2.pdf

Shivdasani, A., & Zenner, M. (2005). How To Choose a Capital Structure: Navigating the Debt-Equity Decision. *Journal of Applied Corporate Finance, 17*(1), 26–35. https://doi.org/10.1111/j.1745-6622.2005.025_1.x

Shukeri, S. N., Shin, O. W., & Shaari, M. S. (2012). Does Board of Director's Characteristics Affect Firm Performance? Evidence from Malaysian Public Listed Companies. *International Business Research*, *5*(9). https://doi.org/10.5539/ibr.v5n9p120

Siegfried, J. M. (2021). Sex and Gender Differences in Lung Cancer and Chronic Obstructive Lung Disease. *Endocrinology*, *163*(2). https://doi.org/10.1210/endocr/bqab254

Tu, S.H., & Liao, P.S. (2005). Gender Differences in Gender-Role Attitudes: A Comparative Analysis of Taiwan and Coastal China on JSTOR. *Journal of Comparative Family Studies*, *36*(4), 545–566. https://www.jstor.org/stable/41604034

Viswanath, P. V. (1993). Strategic Considerations, the Pecking Order Hypothesis, and Market Reactions to Equity Financing. *Journal of Financial and Quantitative Analysis*, *28*(2), 213. https://doi.org/10.2307/2331287

Wischnevsky, J. D., & Damanpour, F. (2008). Radical strategic and structural change: occurrence, antecedents and consequences. International Journal of Technology Management, 44(1/2), 53. https://doi.org/10.1504/ijtm.2008.020698

Zhu, C., Husnain, M., Denis, P. A., Khan, M. S., & Ali, W. (2022). Gender Diversity and Firms' Sustainable Performance: Moderating Role of CEO Duality in Emerging Equity Market. Sustainability, 14(12), 7177. https://doi.org/10.3390/su14127177

APPENDIX A NORMALIZED GENDER RATIO

Table 5: Regression results Equity for normalized Gender Ratio

	Equity			
	Model 1	Model 2	Model 3	Model 4
	OLS	OLS + random effects	IV	IV + random effects
Panel A: Regression coefficients				
Gender Ratio Normalized	0.853*	0.853**	-9.885	-9.248
	(0.516)	(0.386)	(6.706)	(8.855)
Small	-5.755	-5.755	46.244	38.045
	(4.035)	(4.559)	(31.760)	(39.936)
ROA	-15.916	-15.916	-26.937	-26.637*
	(13.627)	(9.924)	(19.947)	(15.255)
Debt Capacity	-7.472	-7.472	-18.112	-30.462
	(18.794)	(11.750)	(19.382)	(19.131)
EPS	0.016	0.016	-0.142	-0.067
	(0.021)	(0.093)	(0.106)	(0.125)
Tobin's Q	0.435	0.435	0.311	0.300
	(1.404)	(1.244)	(1.731)	(1.611)
Cash Holdings	-16.027*	-16.027	-17.035	-14.453
	(9.225)	(14.814)	(12.248)	(20.226)
Aerospace & Defence	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Automobiles & Parts	-2.453	-2.453	-13.132	-12.651
	(3.456)	(22.077)	(12.127)	(35.273)
Beverages	-2.378	-2.378	-26.366	-24.595
	(3.353)	(24.448)	(18.249)	(42.544)
Business Services	-2.815	-2.815	16.970	14.778
	(3.299)	(22.287)	(16.893)	(37.944)
Chemicals	-1.187	-1.187	-15.820	-14.488
	(3.815)	(22.500)	(13.917)	(37.012)
Clothing & Personal Products	-2.956	-2.956	-7.889	-5.644
	(3.433)	(21.914)	(10.706)	(33.900)
Construction & Building Materials	2.349	2.349	-1.978	-1.080
	(4.209)	(20.967)	(10.593)	(32.554)
Consumer Services	-2.123	-2.123	-15.918	-14.438
	(3.652)	(36.341)	(15.960)	(54.511)
Containers & Packaging	-5.530	-5.530	5.153	2.998

	(5.263)	(28.280)	(13.326)	(44.002)
Diversified Industrials	-9.514	-9.514	-11.059	-11.292
	(6.838)	(24.104)	(11.845)	(37.356)
Electricity	38.259**	38.259	14.305	19.382
	(16.224)	(23.986)	(23.484)	(41.953)
Electronic & Electrical Equipment	-4.739	-4.739	4.939	5.643
	(3.159)	(21.341)	(11.699)	(34.299)
Engineering & Machinery	-2.405	-2.405	4.489	3.712
	(3.508)	(21.012)	(10.545)	(32.839)
Food & Drug Retailers	111.526	111.526***	110.684	95.082**
	(118.628)	(25.470)	(119.492)	(39.350)
Food Producers & Processors	-0.720	-0.720	10.833	10.129
	(4.383)	(22.216)	(12.531)	(35.285)
Forestry & Paper	5.662	5.662	-1.756	1.477
	(8.925)	(25.355)	(14.155)	(39.886)
General Retailers	-5.191	-5.191	11.011	9.949
	(3.256)	(22.527)	(14.636)	(36.896)
Health	-2.759	-2.759	2.961	2.700
	(3.650)	(21.713)	(10.578)	(33.867)
Household Products	-2.233	-2.233	-6.308	-6.737
	(3.319)	(24.244)	(11.214)	(37.193)
Information Technology Hardware	-1.055	-1.055	2.285	3.228
	(3.414)	(21.780)	(10.491)	(33.888)
Leisure & Hotels	-0.069	-0.069	0.339	1.362
	(5.214)	(22.078)	(11.403)	(33.902)
Leisure Goods	-3.471	-3.471	3.418	5.466
	(3.483)	(30.148)	(15.194)	(45.411)
Media & Entertainment	-0.692	-0.692	-12.564	-11.974
	(4.480)	(21.305)	(12.268)	(34.000)
Mining	-4.062	-4.062	66.863	57.412
	(6.118)	(30.041)	(48.448)	(69.767)
Oil & Gas	7.090	7.090	12.516	11.739
	(7.940)	(22.535)	(13.707)	(34.795)
Pharmaceuticals and Biotechnology	0.678	0.678	-23.601	-21.809
	(3.838)	(21.400)	(18.353)	(37.390)
Private Equity	-4.772	-4.772	-9.700	-11.674
	(3.145)	(116.007)	(9.949)	(133.740)

Publishing	-9.808**	-9.808	36.667	35.972
	(4.276)	(29.478)	(34.382)	(60.759)
Real Estate	-4.341	-4.341	40.692	36.569
	(8.178)	(32.481)	(32.037)	(58.211)
Renewable Energy	46.333	46.333**	52.132	51.849
	(28.855)	(23.183)	(32.974)	(36.081)
Software & Computer Services	-3.922	-3.922	22.402	21.037
	(3.246)	(20.783)	(20.223)	(39.539)
Speciality & Other Finance	-9.833*	-9.833	18.421	9.450
	(5.609)	(27.005)	(21.956)	(45.556)
Steel & Other Metals	-1.345	-1.345	-6.602	-5.167
	(4.538)	(23.703)	(11.353)	(36.945)
Telecommunication Services	20.617	20.617	18.927	20.525
	(15.840)	(22.109)	(18.350)	(34.146)
Transport	-0.181	-0.181	-12.807	-9.831
	(4.615)	(22.126)	(13.420)	(35.474)
Utilities - Other	-10.921	-10.921	-31.786	-28.241
	(12.049)	(23.923)	(21.298)	(41.084)
Wholesale Trade	-2.621	-2.621	-6.567	-4.414
	(6.398)	(54.921)	(11.691)	(89.700)
Investment Companies			0.000	
			(.)	
Constant	1.254	1.254	85.704	85.133
	(6.106)	(20.069)	(53.761)	(77.856)
Panel B: Regression statistics				
Number of observations	3853	3853	3853	3853
R^2	0.022		.	
P-value F-statistic model	0.022	0.000	0.975	0.902

Notes: Panel A shows the results of the estimation of the regressions that have the variable *Equity* as dependent variable and with the variable *Gender Ratio* normalized with respect to the board size. The first row displays the four models, with the first model using the OLS approach, the second model using the OLS approach with random effects, the third model using the IV approach, and the fourth model using the IV approach with random effects. The first column shows the independent variables and the remainder of the columns show the estimated coefficients with their respective standard errors in brackets. * represents a significance at the 10% significance level, ** at the 5% significance level, and *** at the 1% significance level. Panel B shows the regression statistics, including the Number of observations, R^2, and the P-value F-statistic model.