To what extent do women on board impact the overall firm performance?

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Abstract

This study contributes to research regarding the effect of women on board on firm performance. The data sample consists of 34,344 unique Indian companies, whereby both publicly listed as privately held firms are included. This creates a fair reflection of reality. It is found that (experienced) women improve firm performance. Once there has been looked at the effect of firm size and different interaction terms, new insights are gained. Women on board help firms grow; they positively impact firm performance, but women seem to be on boards of firms that have lower levels of sales. While zooming in on private firms specifically, it is found that the effect of size was underestimated on beforehand. Firm size, together with all its financial benefits and resources, turns out to be the deciding factor as to why public firms benefit more from (experienced) women on board than privately held firms. This study can serve as a platform to further find answers regarding gender diversity and firm performance.

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1. Introduction

In recent years, more attention has been paid to gender diversity in society, but also specifically to gender diversity in the workplace (Klarsfeld, Ng, Christiansen, Kuvaas & Booysen, 2016). Especially the Scandinavian countries have been acknowledged in the field of woman-friendly laws, gender diversity and state feminism (Borchorst & Siin, 2008). Norway was the first country worldwide that introduced a gender quota for women on board. In 2003 a new law was drafted which required that Norwegian boards of directors should consist of at least 40% women (Ahern & Dittmar, 2012). This was done, among other things, to prevent women from bumping into the glass ceiling and to ensure that firm boards are more diverse, and thereby represent the whole society.

Even though women are increasing in number among boards of corporations (Hillman, Shropshire & Cannella, 2007), we are still far away from perfect diversity in the workplace. Despite the fact that many countries work with a quota for women, it is not the case that all countries worldwide do so, and that a quota always works.

Lately, attention to gender diversity in the workplace raised in the scientific field as well. Interest increased for questions such as “What would be the effect of more women in a company?” and “What would be the effect of more women as board chairs?”.

Researchers such as Ahern & Dittmar (2012) found that woman overall have a positive effect on a firm’s value, but that the value of a firm significantly drops after a corporate’s board implements a quota for women from one day to the next. In addition to Ahern & Dittmar, many other scientists also researched the effect of gender diversity on firm performance and how female executives affect the workplace. Companies with more women in top management than average appeared to fare better than those with fewer women (Van Kuppeveld, 2020). However, these results are accompanied by very specific conditions and theoretical perspectives, such as the principal agent theory, feminism theory, resource dependence theory et cetera (Zhang, Guo & Mu, 2016).

Today, there already is a great amount of quantitative information and descriptive data for specific countries and companies on the diversity on corporate boards available (Burke & Mattis, 2013). Nonetheless, there still is a lack of availability of data for many private corporate boards (Burke & Mattis), which is why most researches have been applied to large publicly

listed firms only. Because of this, there is a need for research regarding private firm boards and governance mechanisms on their performance (Bhaskarabhatla, 2020). Therefore, the aim of this study is to create a fairer reflection of reality and include privately held firms in the analysis as well. There will be investigated whether gender diversity affects the performance of private firms just as it affects the performance of publicly listed firms. There will also be looked at other similarities and differences between those two types of firms.

The term corporate governance is also central in this study. Governance mechanisms are truly important to an entire organization. One of these mechanisms is the board of directors (Rediker & Seth, 1995). The linkage between board concentration and its composition and other governance mechanisms are important and have a huge effect on firm performance. Women are needed on corporate boards so that a fair and successful representation of reality is obtained, what again leads to more successful performance results. Since female advantages increase with age (Arfken, Bellar & Helms, 2004), variables such as age, that diversify the boards of directors, are specifically investigated in this study.

The goal of this study is to investigate to what certain extent women impact firm performance and whether this effect of gender diversity on performance is similar for privately held firms and publicly listed firms. Besides, there is also looked at the effect of size on these topics.

Firstly, there will be checked whether the dataset gives a positive relationship between women on board and firm performance in terms of sales, whereby the difference between publicly listed firms and privately held firms will be highlighted and where the underlying theories will be discussed. Secondly, there will be checked if women on board who are older and therefore have more work- and eventual board experience contribute more than younger women on the board. Here also, the differences and similarities between publicly listed firms and privately held firms will be highlighted.

The main contribution of this study is analysing data about gender diversity in the boardroom for publicly listed firms as well as privately owned firms and putting the theoretical background to empirical practice. Depending on underlying mechanisms, significant effects are found for the impact of women on board on firm performance.

The paper is structured as follows: Section 1 introduces the topic. Section 2 expands on the theoretical background and the study its public relevance. Section 3 applies to the data

collection and methodology. Then in Section 4, the steps in the analysis are presented and the results are explained. And lastly, in Section 5 the research questions are answered thoroughly, and suitable implications and recommendations are given.

2. Theoretical Framework

The theoretical framework is divided into four sections. In the first subsection the public relevance of the topic is shown, and the subject matter of gender diversity in the boardroom is clearly defined. There will be specifically elaborated on the effect of size on this. The second subsection elaborates on the differences between publicly listed firms and privately held firms and on research done before. Furthermore, it introduces some relevant terms and concepts. The third part dives deeper into specific literature related to work experience and age. In this way, distinctive features are provided to the main research model. Lastly, the main research question of this study is discussed, and by doing this, a sufficient theoretical framework is developed.

2.1.1 Public relevance

In 2003, Norway was the first country worldwide that introduced a gender quota for women on board (Ahern & Dittmar, 2012). This quota should prevent women from bumping into the glass ceiling and has to guarantee that firm boards become more diverse and represent a bigger part of society. At the time the new policy was introduced, only 9% of boards in Norway partially consisted of women yet, so there was still a long way to go. Besides Norway, also the other Scandinavian countries made social equality in the workplace a core value (Borchorst & Siin, 2008). In the late 1980s, a Scandinavian political scientist named Hernes introduced “woman friendly policies”, that appeared to be the best solutions to the challenges faced by welfare states those days.

From then on, more and more countries have established new laws regarding a mandatory quota for women on board, or a quota that is still under discussion or pending (Ahern & Dittmar, 2012). It therefore not only applies to the Nordic countries, but to many countries worldwide, that concepts such as gender diversity and good corporate governance representation do not sound strange.

Lately, women are increasing in number concerning firms’ boards of directors (Hillman, Shropshire & Cannella, 2007). However, women’s representation is very diverse across firms, which leads to diversity in the workplace still being a highly discussed topic. And besides the fact that business teams and boards appear to perform better in terms of sales and profits while

having an equal gender mix (Hoogendoorn, Oosterbeek & Van Praag, 2013), this depends on many governance mechanisms that impact the likelihood of women representation on boards of directors.

2.1.2 Gender diversity in the boardroom

Many researchers such as Ahern & Dittmar (2012) found that woman overall have a positive effect on a firm's value; female representation on boards results in big benefits for corporations. Diversity in boards of directors really does matter. Furthermore, women have made steady progress gaining board seats over the past decade (WOB, 2020). It is important, however, that all other qualities of the board members are equal. If a corporate's board implements a quota for women from one day to the next, this quota will lead to younger and less experienced boards (Ahern & Dittmar). The fact that these younger and less experienced people become a chair of the board, is accompanied by a drop in firm value. As well as the stock price, the Tobin's Q (ratio between market value and replacement value) will decrease in the long term.

On the other hand, firms that already have women as board chairs, appear to have a considerably smaller drop in stock prices (in case a board implements a quota) than firms that only have men as board chairs. This can partially be explained by the fact that boards are mostly chosen to maximize shareholder value, and once a severe constraint on the choice of directors is imposed, economically large declines in value happen (Ahern & Dittmar).

Ahern & Dittmar's study is not the only study that finds that diversity matters. Besides the fact that a higher degree of diversity on board gives a positive signal to the shareholders of the firm, this also gives a positive signal to employees (Lückerath-Rovers, 2013). Taking these different factors into account, Lückerath-Rovers finds that companies with female directors in general, perform better in terms of sales than companies without women on their boards.

These two studies were already conducted a few years ago, and up to the present day many more studies followed. Data for women on boards has been consistent for many years now, and researchers such as Cohen, Franco and Hargrave (2020) dare to state that companies led by female executives, really are more profitable. This is because board diversity leads to higher creativity, enhanced reputation, greater productivity and the ability to better capture the interest and demand of clients (Cohen, Franco & Hargrave).

Diversity is not only needed in a proper male-female distribution in boardrooms, but also in terms of age, educational experience and cultural background (Arfken, Bellar & Helms, 2004). Besides influences on the level of firm performance, the number of women serving a corporation's board is also related to a firm's social responsibility (Williams, 2003). This positively affects a firm's reputation and value in the long term as well.

As the percentage of women in corporate boardrooms increases, women are going to play a larger role in deciding how firms will allocate their budgets in the future.

Isidro and Sobral (2015) also find a positive relation between women in corporate boards and performance. They find that women in boardrooms are positively linked to financial performance and social conformity. However, they say that women on board are not directly linked to an increasing shareholder value. Because of this, they say that women can only indirectly affect the total firm's value. Here it becomes clear that the definitions and formulations of concepts such as "firm value" and "firm performance" or "financial performance" can make major differences in the found research results. In order to investigate the overall effect of women on the board, the first hypothesis is as follows:

H1a: *Firms financially perform better when they have women on board.*

This hypothesis is a base line hypothesis and will focus on firm performance for publicly listed firms as well as privately owned firms.

It is unique that both public and private firms are included in the dataset that will be used to run a whole sample analysis to find an overall firm performance effect. Since there often is a lack of availability of data for many corporate boards, most research done before has been applied to large publicly listed firms only (Burke & Mattis, 2013).

This base line hypothesis is an addition to the field, because a large newly received Indian dataset is used and many recent years will be considered. In their 2012 study, Ahern and Dittmar already gave this as a suggestion for further research possibilities. They said it would be valuable to investigate how newly appointed female directors affect firm policies and firm values in the future. With Hypothesis 1a, Ahern and Dittmar's suggestion will be discussed in more detail.

2.1.3 The effect of firm size

There are many corporate factors that can impact the likelihood of female representation on boards. One of these factors which is very important is firm size (Hillman, Shropshire & Cannella, 2007). There are two ways to look at the effect of firm size.

On the one hand, it has been found that larger and more visible firms tend to feel more pressure to conform to social expectations (Hillman, Shropshire & Cannella). Gender diversity could be seen as one of these social expectations, and therefore it might be that these larger firms hire more women. Besides, larger firms are also expected to meet extra expectations because of their stakeholders. Nowadays, it is seen as an important requirement to have enough women on board, so this will be expected from a company its stakeholders as well. Also, there is something to be said for larger companies to have more (financial) resources to hire talented women who can take a board seat.

On the other hand, large companies are in a certain sense obliged to hire women on board, and because of this, women may have a preference to gain board seats on boards of smaller firms. This could be because women think they can make a bigger difference in smaller firms, or because they have a steeper learning curve here. Bianco, Ciavarella and Signoretti (2015) already found that specifically family-affiliated women have a preference for smaller firms. It needs to be investigated if this also holds for women in general.

These questions regarding firm size, have led to this specific topic being discussed in this study. Therefore, in this research not only the effect of growth on firm performance, but also the effect of firm size on firm performance will be examined in more detail. This effect will be measured by using the financial performance measure sales. Many other studies used sales as a measure of firm size already (Hambrick & Cannella, 2004; Sanders & Boivie, 2004).

In this study, the second part of the arguments are considered as more important, resulting in the following hypothesis:

H1b: *Female board members are more likely to occupy board seats on smaller boards.*

Besides a firm's size, firm diversification strategy, network effects and industry type, are also big factors that play a role in the likelihood of female representation on boards of directors (Hillman, Shropshire & Cannella 2007). However, women who are selected as a board member due to different quotas, must have the same qualities as men who might otherwise be

selected. Before the introduction of quotas, women appointment on board was mainly driven by family representation on board rather than by education, experience or other parts of the professional background of candidates (Bianco, Ciavarella & Signoretti, 2015). If these professional backgrounds of board members are not equal, family-affiliated women with lower education who are selected as board members, might lead to poorer firm performances (Bianco, Ciavarella & Signoretti).

According to Adams & Flynn (2005) the role of family indeed is a relevant topic when discussing diversity in the boardroom. People are led by gender role beliefs that are shared within cultures and communities (Chizema, Kamuriwo & Shinozawa, 2015). Because of this, it is sometimes thought by people that there are not enough women with the same capacities and ambitious goals as men willing to give up their family lives for a certain amount of time. However, this issue is not a problem anymore nowadays. The route to become a corporate director is way more flexible than the traditional corporate ladder was years ago (Adams & Flynn).

Bianco, Ciavarella & Signoretti studied roughly 800 Italian listed companies and found that in 2013 already over 83% of these investigated companies had at least one woman on board. Despite the fact that these numbers seem extremely positive, one must keep in mind that one single woman on board is often discharged as a token, two women on a corporation's board might not be enough to influence a firm's policy and performance significantly, but three or more women might create a change in a firm's strategy and performance (Williams, 2003), whereby a critical mass is attained. Torchia, Calabro & Huse (2011) agree that with at least three women directors on board, a significant improvement to a firm can be made, whereby it is achievable to operationalize the critical mass construct. Torchia, Calabro and Huse say that the presence or ratio of women directors is not most important to a firm, but the number of women directors and possibly other minority groups is most important.

2.2.1 Publicly listed firms vs. Privately held firms

Often, it can be difficult to test what the exact effect is of women on firm performance. One of the main reasons for this is the lack of data availability. Large, listed companies are obliged to publish their financials and figures, but nobody really knows what the ins and outs of the privately owned businesses are. Data for publicly listed firms are easier accessible and better available than data and firm financials of privately held firms. This results in skewed data, what leads to a distortion of reality. In this study it is aimed to create a fairer reflection of

reality and include both publicly listed and privately held firms in the analysis, and specifically look at similarities and differences between those two types of firms.

A publicly listed firm can be defined as a company whose shares are traded on the stock market or in the over-the-counter (OTC) market, in which market participants trade stocks, commodities and currencies (Kramer, 2020). Publicly listed companies are determined by "periodic filling and obligations under the federal securities laws" (Financial Glossary, 2011).

A company that is not publicly traded is called a privately owned firm. This means that shares of the firm are traded without using an exchange or that the company itself does not have a share structure through which it raises capital (Tuovila, 2020). The majority of these companies are small and medium-sized companies, including family-owned businesses.

There is already written a lot about these privately held firms and the differences privately and publicly held firms have, but according to many researchers there is a specific need for research regarding private firm boards and governance mechanisms on their performance (Bhaskarabhatla, 2020).

Large publicly held firms which bring women on board, are already well scrutinized firms which have plenty financial analysts who pay lots of attention to how these firms are operating and how the shareholder relationships should be maintained. Perhaps gender diversity does not move firm performance of these public firms as much as one would expect on beforehand. Therefore, it may be that women make more difference at firms that are not already doing so well and are not under the case of all these financial analysts.

2.2.2 Corporate governance mechanisms

Governance mechanisms can be defined as "a set of responses to conditions of uncertainty, dependence, and opportunism that exists in a business relationship" (IGI Global, 2021). These governance mechanisms are truly important to the organisation and functioning of a corporation.

Private firms are characterized by poorer governance on average (Fich & Shivdasani, 2007; Levit & Malenko, 2016). A large publicly listed firm has a lot of governance mechanisms, whereby board is only one of these governance mechanisms. These public firms have to meet certain standards on the role of reporting, acknowledgement and internal and external governance (Chen, Hope, Li & Wang, 2011). There are a lot of alternative governance mechanisms that discipline a large publicly listed firm, and there the presence of gender diversity may not be that strong in a study. This might be different for privately held firms,

whereby board is the "primary governance mechanism" according to Garg (2013). Also Van den Heuvel, Van Gils & Voordeckers (2006) consider the board of directors in privately held firms as one of the most imperative governance mechanisms.

Rediker and Seth (1995) found that specifically the concentration of the board members is an important governance mechanism. For publicly listed firms it possibly matters less whether a woman is present or not, because there are enough other governance pressures that influence the functioning of the firm. But if it concerns a smaller, private firm that does not have all these alternative mechanisms, the board has an important role to play, and here gender diversity might has a bigger impact. The concentration of the board is thereby related to other important questions regarding the functioning of a business and regarding governance mechanisms in general (Rediker & Seth, 1995). The differences in firm governance for privately held and publicly listed firms might lead to differences in firm performance, and that difference is aimed to be tested in this study. As a result, Hypothesis 2 is:

H2: *Privately held firms benefit more from women on board, in terms of financial performance, than publicly listed firms.*

This hypothesis looks for heterogeneous effects between publicly listed firms and privately held firms. It brings a focus on the differences in terms of women on board and whether this helps privately held firms more than publicly listed firms. Based on prior research discussed before, it is expected to find a bigger and more positive effect for privately held firms than for publicly listed firms, concerning financial performance. To understand this performance regression properly, there is also looked at the sales regression again. This shows whether women continue to work for smaller firms, as soon as it concerns private firms only.

2.2.3 A positive relationship

As discussed above, researchers such as Fich & Shivadasani (2007) and Levit & Malenko (2016) found that private firms are characterized by poorer governance on average and therefore a change in board (which is one of the primary governance mechanisms) might lead to a bigger and more important difference.

According to Boyne (2002) there are more differences between public and private firms that imply that women can make a bigger difference in privately held firms than in publicly

listed firms. There might be consequences of publicness, and based on different theoretical impacts, three statistically significant differences are found. Publicly listed firms appear to be more bureaucratic, board members of public firms are less materialistic, and public firms have weaker organizational commitment (Boyne).

The first difference is somewhat relatable to the difference in the amount of governance mechanisms for private and public firms. Bureaucracy causes bad governance (Moore, 2001), and as told before; a change in board might lead to a bigger and more important difference for firms characterized by poorer governance (Levit & Malenko, 2016; Rediker & Seth, 1995). Besides, bureaucracy means more legal procedures for agreement and decision making and therefore a less flexible organization. Boyne (2002, pp. 101) says that "these characteristics reflect the lack of rewards or incentives for successful innovations". Once women have been appointed to the board, but they cannot make a difference yet due to the bureaucracy, one could say that because of this, women can make a bigger difference for privately held firms which are less bureaucratic than for publicly listed firms.

The other differences between public and private managers and board members, namely the fact that public managers are believed to be less materialistic and have weaker organizational commitment (Boyne, 2002), could also influence the degree to which privately held firms can benefit more from women. The people who choose to become a board member of a privately held firm are "less materialistic than their private counterparts and are less likely to be motivated by financial rewards" (Boyne, 2002, pp. 102). Therefore, bonuses and other perquisites are unlikely to increase team commitment or improve financial performance. This also holds for women who choose to become a board member of publicly listed firms. The weaker organizational commitment public managers have, has also something to do with a gap between rewards and motivation. There is lack of a connection between individual performance and rewards.

Managers and board members in private organizations on the other hand, are more strongly motivated by their personal economic prosperity (Boyne). This personal prosperity is also a reason for motivation for the women on board in private firms. It is commonly known that few women are selected for board positions (Burgess & Tharenou, 2002). The glass ceiling is blamed for the low number of women in company boards and recent years women are working very hard for a board position and an equal diversity number in boards.

Even though women are increasing in number among boards of corporations (Hillman, Shropshire & Cannella, 2007) an equal distribution between men and women on board is still not there yet. Because of this, personal prosperity might be even more important than ever for

women on board. This all can lead to women on board in privately held firms, making a bigger difference in firm performance.

2.3.1 Experience in the workplace

Previous research says that the absolute female advantage increases with age (Arfken, Bellar & Helms, 2004). Worldwide, elderly women exceed elderly men in quantity. Therefore, the viewpoint of women and senior women cannot be missed in a firm's strategic planning and decisions. "Any actions that could improve the growth, profitability, reputation and long-term profitability should be actions top management actively chooses to pursue" (Arfken, Bellar & Helms, 2004, pp. 184). Women are needed for a fair and successful representation of reality and for a variety of opinions. Therefore, in the third and fourth hypothesis is it aimed to show a stronger or weaker relationship, while taking a moderating variable that accounts for experience into account.

Adding experience as moderating variable, is an addition to the field again since only few studies have considered the experiences of women directors yet (Burke, 1997). According to Burke there are many benefits from experiences as worker, but also as director. Examples of these benefits of experience are: a greater knowledge of corporate governance, a broader general knowledge of business, more opportunities to participate in the top level, higher chances of development in new skills and areas of expertise, and an increasing effectiveness in jobs. As a result of the above, the following hypothesis is presented:

H3: *Gender diversity has a stronger effect on firm performance if women on board have more experience.*

A positive relationship is expected in the above hypothesis. This hypothesis intents to show that the greater the experience that women have, the bigger the effect of gender diversity on firm performance. Here, it is also aimed to test what the effect on firm size is. We want to know whether more experienced women continue to work for smaller firms.

2.3.2 Experience & Privately held firms

The fourth hypothesis will look at the difference in impact on firm performance for privately held firms, relative to publicly listed firms again. In this case, there will be specifically

looked at the difference for having more experienced women on board. The fourth hypothesis is as follows:

H4: *Privately held firms benefit more from women on board who have more experience, in terms of financial performance, than publicly listed firms.*

The differences in characteristics between board members of privately held firms compared to publicly listed firms, together with the similarities and differences in experience, can lead to remarkable results.

Firstly, because of the smaller amount of governance mechanisms at privately held firms a bigger and more important difference is expected regarding experience and firm performance.

Secondly, board members of public firms are less materialistic and have weaker organizational commitment what makes that the board of directors at public and private firms is quite different (Boyne, 2002; Cole & Mehran, 2010). At publicly listed firms the board typically has from five to twenty members, at privately held firms the board of directors is often of size one: the CEO. If the board is slightly larger, the board usually consists of the CEO's family members (Cole & Mehran). Because of this size difference, characteristics such as age and experience are expected to play a more important role in explaining board members at private firms than at public firms, and therefore have a larger effect regarding firm performance.

2.4.1 Overall effect on firm performance

Interest in diversity and corporate governance will continue to increase in the following years (Burke & Mattis, 2013). The hypotheses that will be tested in this study, aim to help finding answers to the above issues. Baseline Hypothesis 1a, 1b, and 3 intend to answer to what extent women on board improve firm performance and whether having more experienced women on board helps firms even more. The other two hypotheses test whether these effects are larger for privately held firms than publicly listed firms, based on the reasons discussed above. The five above hypotheses will be used the answer the main research question of this study:

"To what extent do women on board impact the overall firm performance?"

3. Data and Methodology

The data section will be divided into some subsections. First, the construction of the dataset is discussed and the methods which are used to merge and analyse the research material are shown. Second, the used variables for the unique board members and all the variables for different financial performance measures and control variables are defined.

In the methodology there will be a brief discussion on the methods that shows an understanding for the methodological issues. The selection process of the models that are used to test the hypotheses will be explained, just as the construction of the base model and the expanded model.

3.1 Data

3.1.1 Construction of dataset

The dataset that is created, contains information from two different Indian datasets which have been both put together by Bhaskarabhatla (2020). All data is panel data. One dataset provides information about the firm financials and one dataset provides information about the board. The datasets are highly accurate, using data from 1988 until 2018. It is recommended by others who also researched the impact of gender diversity on firm performance, such as Hoogendoorn, Oosterbeek & Van Praag (2013), to work with a large dataset and cover a broad field of the share of women and companies. In this way it can be learned whether positive effects from teams with an equal gender mix compared to the general effects of male-dominated organizations in terms of profitability, are balanced around a gender mix. Thereby, with a larger dataset it should be possible to uncover more relevant elemental mechanisms that can explain the effect of diversity on firm performance (Hoogendoorn, Oosterbeek & Van Praag).

Firms that are listed on the stock market in India are included in the dataset, even as firms that are privately owned and which are not listed on the stock market. This dataset contains approximately 6,000 publicly listed firms in India and roughly 28,000 privately held firms in India.

Dataset 1 provides information about the company code, the year the data was collected, and whether this company is listed or not, but also the date of birth, and information on whether the director is male or female is included in this dataset.

Subsequently, this dataset is merged with Dataset 2. This financial dataset provides detailed information about the identical company code, the year the data was collected, whether a company is publicly listed or privately held, and many standalone financial statements. These

financial statements can be seen as the financial performance measures of the firm and include sales, total income, total assets, compensation of employees, and profit.

To run a perfect analysis, these two datasets were merged on company code and year. For every director at a given firm, there is a draw. This means that there will be different roles per year, for a significant number of years. This data was collapsed to the firm year level. So, for a given firm in a given year, the director data consists of multiple directors who all have different roles. Some of them are men some of them are women. To be able to run different analyses, all the data needs to be adjusted at first. These adjustments including different variables creations are explained in the upcoming part.

3.1.2 Variables

Two datasets were merged based on identical company code and on year. There are 34,344 unique company code values and there are 31 years included in the variable *YEAR*. Because there is worked with panel data, there is controlled for entity, i.e., company (*CO_CODE)* and time (*YEAR*).

There are used two different dependent variables as metrics in this study. There are several descriptive variables in this dataset that can be used as a firm performance measure. In many studies the stock price and Tobin's Q (ratio between market value and replacement value) are used to measure a firm's value. However, since there is not only looked at publicly listed firms in this research, but also at privately held firms, the Tobin's Q cannot be calculated. This is because privately held firms are not listed on the stock market, and the Tobin's Q is a measure of how the market perceives. However, there are many standalone financials available, so-called accounting measures, which are convenient to work with and bring a clear focus as well. Accounting measures are often used in studies to define financial performance.

The dependent variable that will represent a firm's performance is the variable named *SALES_GROWTHRATE.* This performance measure can be constructed by taking the natural log value of sales minus the log value of sales of the previous year. Nonetheless, to really understand these performance regressions it is preferred to show the sales regressions based on size as well. Therefore, as second dependent variable a measure of firm size is selected. This variable is the logarithm of yearly sales (*LNSALES*). Sales numbers can be used as a proxy for a company's size.

All the financial indicators used, are defined in Indian rupees.

Furthermore, there are used several explanatory variables in this study. As discussed in the theoretical framework, some researchers say that one single woman on board is discharged as a token, and that it certainly takes a few women to make a significant improvement to a firm (Williams, 2003; Torchia, Calabro & Huse, 2011). Others say that women in general already have a positive effect on firm performance, but if there are three or more female directors an even bigger impact can be made (Liu, Wei & Xie, 2014). Because of these different theories, it has been decided to work with three different explanatory variables in this study. All these variables measure women on board in a different way. The three explanatory variables are as follows:

Table 1. Definition of explanatory variables; female on board

N^0	Name of Variable	Definition
1	DFEMALE	Female on board (yes/no)
2	NFEMALE	Number of females on board
3	PFEMALE	Percentage of female on board

The above explanatory variables in combination with other variables are used as interactions to show the effect of women on board for a specific type of company or a specific type of characteristic. One of these variables that is used for an interaction term is the dummy variable *PRIVATE*. This variable indicates whether a company is privately owned or not (yes/no). Since there is worked with a fixed effect model, *PRIVATE* as a dummy variable on its own does not get estimated and will be omitted. Because of this, the variable is irrelevant as control variable. However, several interactions with the variable *PRIVATE* will still be estimated.

Another interaction term that has been created is the interaction between women on board and age. The variable *DOB* gives information about the date of birth of a board member, and this variable is transformed into the variable *AGE*. Furthermore, there is a triple interaction created for *WOMEN*, *AGE* and *PRIVATE.* All discussed interaction terms can be seen in Table 2, just as all the control interaction terms used for the triple interaction in Hypothesis 4.

Table 2. Definition of interaction terms

N^0	Name of Interaction	Definition
1	PRIFEM	Female on board * Privately owned firm
2	AGEFEM	Age * Female on board
3	AGEFEMPRIV	Age * Privately owned firm * Female on board
4	AGEPRI	Age * Privately owned firm

Lastly, the used control variables are discussed. At first, there is controlled for the logarithm of the total number of board members of each company. This variable is called *LNBOARD*. In general, there is always aimed to control for as much as possible, and therefore the regressions with *SALES_GROWTHRATE* as dependent variable have an extra control variable. In the second type of regressions, sales (which is a measure of firm size) is estimated. In a regression where firm size is used as dependent variable, there is no need to control for firm size as well. On the other hand, if sales growth rate is measured, then it is recommended to control for size.

The regressions (can be found in the methodology part) that have *LNSALES* as dependent variable, measure the effect on size, but the regressions that have *SALES_GROWTHRATE* as dependent variable, have to control for the effect of size. Another reason why it is important to control for a company's firm size here, is because size plays a large role with regard to board heterogeneity (as is explained in the theoretical background). "Larger and more successful firms tend to attract more talented individuals which results in a larger pool of female candidates at a senior management level" (Radulovic, 2019, pp. 12). The variable *COMSIZE* is used for this. This variable was created by taking the natural logarithm of a company's standalone total assets. By doing this, a company's total assets can be interpreted as percentage changes in the dependent variable, which simplifies and clarifies the model (Stack Exchange, 2011).

3.2 Methodology

While investing the relationship between women on board and a firm's financial performance, several steps are determined. Firstly, the effect of women on board in general is assessed, while using a fixed effects (FE) model as econometric method.

In this study there is worked with panel data. This is a sample at a given time, over a longer followed period of time. It gives one the possibility to control for variables one cannot observe or measure, or to control for variables that change over time but not across entities (Torres-Reyna, 2007). If there are reasons to believe that differences across entities influence the dependent variable, the random effects (RE) model should be used. However, if this is not the case, and if one is interested in the impact of the variables over time, the FE model is preferred. This FE model also controls for unobserved heterogeneity.

First, the dataset is set as a panel dataset, and subsequently a panel regression is run. By controlling for FE, company fixed effects are included. However, by including FE, there is only

controlled for company fixed effects. Therefore, there still needs to be controlled for year fixed effects as well.

Furthermore, because there is looked at repeated observations of the same company, financial measures of a company today are not completely independent from financial measures of the same firm next year. Because of this, there needs to be clustered for the fact that these observations are measured for the same company.

Several FE models will be run, starting with a base model. The other models run, will expand the base line model and look for heterogeneous effects between publicly listed firms and privately held firms.

3.2.1 Construction of the base model

At first the base model is defined. This model looks at the relationship between women on board and financial firm performance.

$$FirmPerformance_{it} = \beta_0 + \beta_1 DFEMALE_{it} + \beta_2 X_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

FirmPerformance represents the dependent variable or so-called outcome variable. The variable *SALES_GROWTHRATE* is used to measure this effect. To really understand this performance variable, there is also looked at a size measure. This size measure is the variable *LNSALES.* Both dependent variables are measured for a certain company (i), for a certain year (t).

β_1 is the coefficient for the explanatory variable. There are used three different explanatory variables in all the hypotheses, which are expressed as *FEMALE*. These explanatory variables have been discussed in the data part previously, and are: *DFEMALE*, *NFEMALE* and *PFEMALE*. *X* stands for the control variables, whereby β_2 stands for its coefficient. Since the model with *SALES_GROWTHRATE* has one extra control variable (*LNBOARD*), the two models which are run for Hypothesis 1a and Hypothesis 1b time are slightly different.

In both base line regressions α_i is the unknown intercept for each entity, γ_t controls for year fixed effects and ε_{it} is the error term. The above results in an FE model that is modelled as the following for the first hypothesis:

H1a: $SALES\_GROWTHRATE_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 LNBOARD_{it} + \beta_3 COMSIZE_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

Hypothesis 1a can be rejected if β_1 is positive and significant.

If women indeed tend to work for smaller firms, and firm performance is increasing, it could be said that this is due to the fact that these women are working for small firms and in small firms it is easier to generate growth. To be sure that the effect on firm performance is related to women on board and not size, the base line model also tests the effect on firm size in the following model:

H1b: $LNSALES_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 LNBOARD_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

In order to investigate whether the impact women have on board is different in publicly listed firms and privately held firms, a subsampled model is created. All the models are built up gradually. The second hypothesis has the same formulation as the two base line hypotheses, but furthermore there is an interaction created for private companies and female board members. This interaction is created for every unique explanatory variable, resulting in three different interactions terms. To answer Hypothesis 2, there will also be made use of the two different dependent variables again. All the three interactions will be tested separately in both regressions, resulting in this formulation for the second hypothesis:

H2: $SALES\_GROWTHRATE_{it} = \beta_0 + \beta_1 PRIFEM_{it} + \beta_2 FEMALE_{it} + \beta_3 LNBOARD_{it} + \beta_4 COMSIZE_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

H2: $LNSALES_{it} = \beta_0 + \beta_1 PRIFEM_{it} + \beta_2 FEMALE_{it} + \beta_3 LNBOARD_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

A significant difference between the interaction term and the base explanatory variable on its own, would confirm a distinctive influence of women on board in relationship with privately held firms.

3.2.2. The expanded model

In the expanded model the explanatory variable transforms into an interaction between female and age. This explanatory variable is named *AGEFEM*. Here as well, an interaction is created for every unique female category, resulting in three different interaction terms. All the three interactions are tested separately. Hypothesis 3 is formulated as the following:

H3: $SALES\_GROWTHRATE_{it} = \beta_0 + \beta_1 AGEFEM_{it} + \beta_2 FEMALE_{it} + \beta_3 AGE_{it} + \beta_4 LNBOARD_{it} + \beta_5 COMSIZE_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

Here again it would be the case that the hypothesis can be rejected if $\beta 1$ is positive and significant.

The model used for Hypothesis 3 that has *LNSALES* as dependent variable can show whether more experienced women tend to go to smaller firms and help them grow. The specification of this model is given below:

H3: $LNSALES_{it} = \beta_0 + \beta_1 AGEFEM_{it} + \beta_2 FEMALE_{it} + \beta_3 AGE_{it} + \beta_4 LNBOARD_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

The final model includes a triple interaction with women on board, their age, and firms being private or not. All the used variables are included, which leads to these final two models:

H4: $SALES\_GROWTHRATE_{it} = \beta_0 + \beta_1 AGEFEMPRIV_{it} + \beta_2 AGEFEM_{it} + \beta_3 PRIFEM_{it} + \beta_4 AGEPRI_{it} + \beta_5 FEMALE_{it} + \beta_6 AGE_{it} + \beta_7 LNBOARD_{it} + \beta_8 COMSIZE_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

A significant positive effect for this triple interaction would confirm the distinctive influence of female on board, together with a company being private, together with the effect of age. To test whether more experienced women also work at smaller sized privately held firms, the triple interaction is also applied to the model with *LNSALES* as dependent variable:

H4: $LNSALES_{it} = \beta_0 + \beta_1 AGEFEMPRIV_{it} + \beta_2 AGEFEM_{it} + \beta_3 PRIFEM_{it} + \beta_4 AGEPRI_{it} + \beta_5 FEMALE_{it} + \beta_6 AGE_{it} + \beta_7 LNBOARD_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$

4. Analysis and Empirical Results

In this section the results are shown and the steps in the analysis are clearly presented. The results reflect the analysis steps and their conclusions whether or not to reject the hypotheses. Various robustness checks confirm the findings. Where applicable, alternative explanations of the results are discussed.

In the appendix section A1 the descriptive statistics can be seen and in Table A2 the correlations among the variables are shown. With regard to the correlations, some findings appear to be high. High correlations can indicate that variables have a strong relationship with each other, but high correlations can also arise if there is endogeneity due to omitted variables. After all, correlation is different from causation. In chapter 4.3 there is touched upon endogeneity and controlled for it where possible. Furthermore, some correlations are high because of the fact that there is worked with interaction terms. Since it makes sense that these correlations are high, there is no concern for these variables in terms of correlation.

The analysis is based on a sample that includes 34,344 companies and 252,106 company-year observations. The companies that are measured in this analysis, have on average four people on board, of which 0.7 are female. The people who gain a seat in the board are on average 51 years old.

4.1 Results for Hypothesis 1a, 1b, and 2

The results of OLS estimates for base line Hypothesis 1a and 1b can be seen in Table 3. Hypothesis 1a and 1b analyze the effect of women on board on financial firm performance. The results have been gathered by using three explanatory variables and two different dependent variables.

The coefficient estimates for *NFEMALE* (β_1 =0.0237), *DFEMALE* (β_1 =0.0448) and *PFEMALE* (β_1 =0.0707) are all positive and statistically significant (p<0.01) for the run regressions with *SALES_GROWTHRATE* as dependent variable. This indicates that women on board positively influence firm performance. In other words, this means that firms which have women on board perform better than firms that have only men on board. These results support Hypothesis 1a.

Table 3. Results for Hypothesis 1a and 1b

	SALES_GROWTHRATE			*LNSALES*		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
NFEMALE	0.0237***			-0.0552***		
	(0.00604)			(0.0150)		
DFEMALE		0.0448***			-0.0821***	
		(0.00839)			(0.0195)	
PFEMALE			0.0707***			-0.444***
			(0.0262)			(0.0674)
LNBOARD	0.0335***	0.0316***	0.0401***	0.363***	0.363***	0.352***
	(0.00782)	(0.00781)	(0.00756)	(0.0178)	(0.0177)	(0.0172)
COMSIZE	0.0557***	0.0559***	0.0560***			
	(0.00492)	(0.00492)	(0.00493)			
Constant	0.0265	0.0257	0.0210	0.798***	0.799***	0.827***
	(0.0388)	(0.0388)	(0.0389)	(0.106)	(0.106)	(0.106)
Observations	206,224	206,224	206,224	252,098	252,098	252,098
Company clusters	31,566	31,566	31,566	34,344	34,344	34,344
R-squared	0.036	0.036	0.036	0.072	0.072	0.073
Company FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors cluster

On the other hand, the coefficient estimates for *NFEMALE* (β_1 =-0.0552)*, DFEMALE* (β_1 =-0.0821) and *PFEMALE* (β_1 =-0.444) are all negative and statistically significant (p<0.01), for the run regressions with *LN_SALES* as dependent variable. As mentioned before, *LN_SALES* is a measure of size. This means that these results indicate that women seem to be on boards of firms that have lower levels of sales. In other words, this means that firms that have female board members, are smaller in size on average. These results lend support for Hypothesis 1b.

These results together are telling us that firms that have female board members are smaller in size and they grow faster. To find out whether women really trigger this positive effect, or whether it is because smaller firms tend to grow faster in general because they have large growing potential, is something that needs to be figured out in the coming hypotheses.

In Hypothesis 2, it is predicted that the effect of women on board is bigger for privately held firms than for publicly listed firms. This means that the interaction term of *FEMALE* and *PRIVATE* is expected to be positive and statistically significant. In Table 4 it can be seen that the coefficient estimates are all statistically negative and significant (p<0.01). The coefficient estimates are *PRIFEM* (β_1 =-0.0970)*, PRIFEMD* (β_1 =-0.0135) and *PRIFEMP* (β_1 =-0.256). These results are exactly opposite of the expectations and therefore the results are inconsistent

with Hypothesis 2. Since these negative results are significant, privately held firms appear not to be the ones that benefit more from women on board in terms of financial performance, but publicly listed firms seem to be the ones.

The effect of size is also included and measured in the regressions run for Hypothesis 2. In Table 4 it can be seen that women are on boards of private firms that have higher levels of sales. In other words, this means that private firms which are larger, tend to have more women on board in relative terms. These results are significant (p<0.01) for all three explanatory variables *PRIFEM* (β_1=0.126), *PRIFEMD* (β_1=0.196) and *PRIFEMP* (β_1=0.738).

Table 4. Hypothesis 2

	SALES_GROWTHRATE			*LNSALES*		
VARIABLES	(7)	(8)	(9)	(10)	(11)	(12)
NFEMALE	0.0724***			-0.0552***		
	(0.00787)			(0.0150)		
DFEMALE		0.0448***			-0.177***	
		(0.00839)			(0.0284)	
PFEMALE			0.0707***			-0.877***
			(0.0262)			(0.126)
PRIFEM	-0.0970***			0.126***		
	(0.0103)			(0.0277)		
PRIFEMD		-0.0135***			0.196***	
		(0.0144)			(0.0354)	
PRIFEMP			-0.256***			0.738***
			(0.0524)			(0.143)
LNBOARD	0.0336***	0.0326***	0.0397***	(0.0277)	0.361***	0.352***
	(0.00783)	(0.00781)	(0.00757)	(0.0178)	(0.0177)	(0.0172)
COMSIZE	0.0564***	0.0567***	0.0565***			
	(0.00492)	(0.00492)	(0.00493)			
Constant	0.0465	0.0257	0.0210	0.798***	0.799***	0.827***
	(0.0389)	(0.0388)	(0.0389)	(0.106)	(0.106)	(0.106)
Observations	206,224	206,224	206,224	252,098	252,098	252,098
Company clusters	31,566	31,566	31,566	34,344	34,344	34,344
R-squared	0.037	0.037	0.036	0.072	0.072	0.073
Company FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors cluster

Based on the extensive theoretical background it was expected that privately held firms would benefit more from women on board than publicly listed firms. This was mainly due to the amount of different governance mechanisms, which led to the thought that women could make a greater impact at smaller, private companies that have fewer governance mechanisms. Besides the aspect of governance mechanisms, there is also touched upon the effect of firm size

on firm performance in this study, but this effect of size was considered as less important. After running the regressions for Hypothesis 2, one could say that size appears to be more important than perceived, and that it is predominant.

Publicly listed firms benefit more from women in terms of financial performance, and this probably has to do with the fact that these larger firms have more resources to hire talented women and integrate them in the company and the board. Because of this, publicly listed firm benefit more from female on board.

This size effect is also reflected in the second part of the regressions where it is showed that private firms which are larger, have more women on board. Here it is observed that larger privately held firms have more women on board. This can be because these larger private firms have more to offer these women on board in terms of higher salaries, bonuses, network possibilities and access to resources. Furthermore, larger private firms have more resources to hire suitable and talented women on board.

4.2 Results for Hypothesis 3 and 4

After running several regressions to test the different hypotheses, the results as showed in Table 5 were found for Hypothesis 3.

In Hypothesis 3, the effect of age for female directors on firm performance is predicted. To test Hypothesis 3 properly, interaction terms with *AGE* and *FEMALE* are included. All three interaction terms are positive and significant (p<0.05). The coefficients are as follows: *AGEFEM* (β_1 =0.000949), *AGEFEMD* (β_1 =0.00148) and *AGEFEMP* (β_1 =0.00192). Despite the fact that these coefficients are fairly small, these results imply that gender diversity has a stronger effect on firm performance if women on board have more experience. These results are consistent with Hypothesis 3. The effect of size is measured here as well. The only coefficient that is significant (p<0.01), is the coefficient for the interaction term of *AGE* with *PFEMALE* (β_1 =-0.00632). This tells us that the higher the percentage of experienced women on board, the smaller the firm size. With this, it can be said that experienced women continue to work for smaller firms. This provides a broad and in-depth insight in the earlier results found. The results for Hypothesis 1a and 1b already showed that women have a positive impact on firm performance, and that women tend to work for smaller firms. Some might say that because of the fact that women are working for smaller firms, and performance is increasing, it is because of the size of the small firm that there is growth. It could be debatable whether women really provide this growth effect or whether size does this. However, because of the negative

effects on the interaction terms, it can be seen that women with experience still seem to go into small firms and help them grow.

Table 5. Hypothesis 3

	SALES_GROWTHRATE			*LNSALES*		
VARIABLES	(13)	(14)	(15)	(16)	(17)	(18)
NFEMALE	-0.0272**			-0.0272	-0.0272**	
	(0.0133)			(0.0236)	(0.0133)	
DFEMALE		-0.0344			-0.0571	
		(0.0211)			(0.0386)	
PFEMALE			-0.0258			-0.138
			(0.0593)			(0.128)
AGE	-	-	-			
	0.00141***	0.00149***	0.00112***	0.00169***	0.00160***	0.00208***
	(0.000231)	(0.000246)	(0.000225)	(0.000386)	(0.000413)	(0.000392)
AGEFEM	0.000949**			-0.000508		
	*					
	(0.000214)			(0.000372)		
AGEFEMD		0.00148***			-0.000445	
		(0.000351)			(0.000627)	
AGEFEMP						-
			0.00192*			0.00632***
			(0.00107)			(0.00211)
LNBOARD	(0.000231)	(0.000246)	(0.000225)	(0.000386)	(0.000413)	(0.000392)
	(0.00783)	(0.00782)	(0.00758)	(0.0178)	(0.0177)	(0.0172)
COMSIZE	0.0560***	0.0562***	0.0563***			
	(0.00492)	(0.00492)	(0.00493)			
Constant	0.0837**	0.0873**	0.0649	0.733***	0.738***	0.744***
	(0.0399)	(0.0401)	(0.0399)	(0.106)	(0.106)	(0.107)
Observations	206,224	206,224	206,224	252,098	252,098	252,098
Company clusters	31,566	31,566	31,566	34,344	34,344	34,344
R-squared	0.037	0.037	0.036	0.072	0.072	0.073
Company FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors cluster

The results for the last hypothesis can be seen in Table 6. In Hypothesis 4 it is investigated whether the triple interaction term with *AGE*, *FEMALE*, and *PRIVATE* is positive or not. While looking at the coefficient estimates, it can be seen that *AGEFEMPRIV* (β_1 =-0.000780), *AGEFEMDPRIV* (β_1 =-0.00103) and *AGEFEMPRIVP* (β_1 =-0.00477) are all negative, and that two of the three estimates are significant (p<0.10).

Table 6. Hypothesis 4

	SALES_GROWTHRATE			*LNSALES*		
VARIABLES	(19)	(20)	(21)	(22)	(23)	(24)
NFEMALE	-0.000118			-0.0550		
	(0.0237)			(0.0509)		
DFEMALE		0.00532			-0.0975	
		(0.0313)			(0.0708)	
PFEMALE			-0.0553			0.155
			(0.119)			(0.323)
PRIFEM	-0.0526*			0.0530		
	(0.0280)			(0.0567)		
PRIFEMD		-0.0762*			0.0731	
		(0.0415)			(0.0823)	
PRIFEMP			-0.0241			-0.242
			(0.137)			(0.346)
AGE	-	-	-			
	0.00146***	0.00158***	0.00118***	0.00199***	0.00205***	0.00300***
	(0.000321)	(0.000334)	(0.000313)	(0.000750)	(0.000771)	(0.000759)
AGEFEM	0.00132***			-0.00124		
	(0.000382)			(0.000856)		
AGEFEMD		0.00181***			-0.00144	
		(0.000513)			(0.00115)	
AGEFEMP			0.00544**			-0.0218***
			(0.00226)			(0.00613)
AGEPRI	0.000222	0.000370	8.24e-05	-0.000669	-0.00109	-0.00147
	(0.000448)	(0.000477)	(0.000441)	(0.000914)	(0.000948)	(0.000917)
AGEFEMPRIV	-0.000780*			0.00136		
	(0.000463)			(0.000935)		
AGEFEMDPRIV		-0.00103			0.00233*	
		(0.000705)			(0.00135)	
AGEFEMPPRIV			-0.00477*			0.0207***
			(0.00257)			(0.00642)
LNBOARD	0.0326***	0.0314***	0.0374***	0.364***	0.363***	0.356***
	(0.00785)	(0.00783)	(0.00760)	(0.0178)	(0.0177)	(0.0172)
COMSIZE	0.0566***	0.0569***	0.0570***			
	(0.00492)	(0.00492)	(0.00493)			
Constant	0.0991**	0.0995**	0.0748*	0.715***	0.722***	0.721***
	(0.0402)	(0.0404)	(0.0402)	(0.106)	(0.106)	(0.106)
Observations	206,224	206,224	206,224	252,098	252,098	252,098
Company clusters	31,566	31,566	31,566	34,344	34,344	34,344
R-squared	0.037	0.037	0.036	0.072	0.072	0.073
Company FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors cluster

In Hypothesis 2, we already saw that publicly listed firms appear to benefit more from women on board than privately held firms. Now, the same holds for firms which benefit more from more experienced women. Against the expectations, publicly listed firms benefit more from women on board who have more experience, in terms of firm performance, than privately

held firms. Therefore, Hypothesis 4 cannot be rejected. In other words, older women have a negative impact on firm performance for privately held firms. Private companies in general, benefit more from younger women who have less experience compared to older women, but perhaps have a more recent and relevant educational background, and are more capable of thinking out of the box.

In terms of *LN_SALES* as size measure, it can be seen that all coefficients are positive and two coefficients are significant (p<0.10), namely: *AGEFEMDPRIV* (β_1 =0.00233) and *AGEFEMPRIVP* (β_1 =0.0207). This implies that privately held firms with experienced female board members are larger in size. In other words, larger privately held firms have more experienced or older women on board. This signifies that older and experienced women prefer to work for larger privately held firms, or that larger privately held firms hire more experienced women because they have more resources to do so, for example.

4.3 Endogeneity

To support the above findings and statements, a broader approach is adopted, and robustness checks and alternative models are run. While using panel data, there might be a concern of unobserved heterogeneity and endogeneity. In this study, unobserved heterogeneity is not a problem since the used FE model controls for this. The FE model does this by time-demeaning all data, i.e., taking within-individual differences over time (Riumallo-Herl, 2019). In this way there is controlled for all (un)observed time invariant characteristics, and all observed time variant characteristics (Riumallo-Herl). By using an FE model in this study, there is controlled for company fixed effects. In addition, there is controlled for year fixed effects in this research.

Yet, there might still be an issue with endogeneity. To control for endogeneity, there can be made use of different robustness checks. In this study, both a one-period lagged variables approach and an instrumental variable (IV) approach are discussed. The one-period lagged variables approach is run and the results can be seen in Table A3. Regarding the IV approach, there were no suitable IVs in this study, but other IVs used in literature are discussed to progress future studies.

Endogeneity may occur when the zero conditional mean assumption cannot hold. This can be the case when the functional form is incorrect, or when there is a correlation with other

unobserved factors that are part of the error term (García-Gómez, 2019). This is a concern when there is omitted variable bias or when there is reverse causality.

By doing a RESET test it is found that the run models do not lack any important nonlinearities. This means that the models are well-specified. However, there is still a concern that female on board not only influence firm performance (measured in *SALES_GROWTHRATE* and *LNSALES*), but that firm performance also influences the presence of female on board. To control for this reverse causality, the base line model is re-run while using a one-period lagged variables approach, whereby the explanatory variable *FEMALE* is lagged. The results of this lagged model can be seen in appendix section A3. Just like the OLS estimates, all the coefficients of the explanatory *FEMALE* variables (β_1 =0.0263, β_1 =0.0435, β_1 =0.0876) are significant (p<0.01) and positive for the regressions that have *SALES_GROWTHRATE* as dependent variable. The coefficient estimates of the explanatory variables (β_1 =-0.00374, β_1 =-0.0120, β_1 =-0.348) for the regressions that have *LNSALES* as dependent variable also match the previous OLS estimates, since all of them are negative, and two of the three coefficients are significant (p<0.01). The one-period lagged variables approach is consistent with the results found for the OLS FE model, which determines that the previous findings are robust and that firms that have female board members are smaller in size but grow faster. However, since instead the lagged explanatory variables have a direct causal effect on the dependent variable, lagged variables possibly increase bias relative to OLS (Wang & Bellamare, 2019).

Another approach to overcome possible collinearity, is the IV approach. This approach addresses collinearity while using the two-stage least squares (2SLS/TSLS) method. While taking a variable that potentially influences the independent variable, but definitely has no effect on the dependent variable, the base line models can be re-run. In other words, for this specific study this includes that a variable should be chosen that is correlated with women on board, but uncorrelated with firm performance. IVs are correlated with the endogenous variable if they are strong and relevant (García-Gómez, 2019). To check whether these instruments can be seen as strong, one should observe the first stage F-statistics. If these statistics are below ten, the instruments are weak, and the higher these statistics, the better the IVs. If the IVs are uncorrelated with any unobserved determinants, the instruments can be seen as valid.

The first stage equation for the 2SLS method would look as follows:

Stage 1: $FEMALE = \pi_0 + \pi_1 X + \pi_2 IV + v_2$

In this stage, *FEMALE* represents women on board, *X* stands for the control variables, *IV* for the instrumental variable, and v_2 obtains the residuals which are potentially correlated with the error term. Once this regression would show a significant correlation between *FEMALE* and *IV,* the second stage would be performed.

Stage 2: $FirmPerformance_{it} = \beta_0 + \beta_1 FEMALE + \beta_2 X + \delta_1 v_2 + \varepsilon$

In the second stage *FirmPerformance* represents the outcome variable, β_1 is the coefficient for the explanatory variable *FEMALE, X* stands for the control variables, the significance of δ_1 is tested regarding the residuals, and ε is the error term. Once the results for δ_1 are significantly different from zero, there is evidence that there is endogeneity in the model and that the estimated effect is biased (García-Gómez, 2019). In this case the 2SLS method is preferred over the OLS method regarding the analysis, so that the likelihood of endogeneity decreases.

Variables of personal characteristics and institutional rules are generally most often examined in literature studies on the use of IVs (Pokropek, 2016). In this research all usable variables of personal characteristics are included as control variables. Variables of institutional rules are not included in the dataset. Accordingly, there are no suitable variables in this study to execute an IV approach. Once there is access in the future to those data, doors are opened for future studies research.

In addition, a variable that is commonly used as a source of exogenous variation in gender diversity is the number of female connections of male directors (Sila, Gonzalez & Hagendorff, 2016). The principle behind this is that one cause for few women on board is that many women do not have the type of professional network that male directors have access to. This IV has been used in many studies regarding gender diversity (e.g., Adams & Ferreira, 2009; Gregory-Smith, Main & O'Reilly III, 2014; Levi & Zhang, 2014).

In this study external male and female connections are not available, but with an eye to the future, a dataset that includes these external connections can progress further research regarding robustness checks and alternative models.

5. Discussion and Conclusion

In the discussion and conclusion, there will be given explanations for the various findings and results based on existing literature. This leads to a thorough answer for the research question. The robustness of the conclusions is also discussed, and the main outcomes are presented. Lastly, there is touched upon some shortcomings and possible further improvements.

5.1 Discussion

In this paper, it is aimed to assess to what extent women on board impact the overall firm performance. To investigate this, a newly created dataset is used, including publicly listed firms and privately held firms located in India. First, it is checked whether there is a positive relationship between women on board and firm performance in terms of sales. Second, the difference between publicly listed firms and privately held firms is highlighted. Just like many other studies, this paper finds evidence that gender diversity and firm performance are positively correlated. To understand this positive effect on firm performance properly, there is also looked at the effect on size, measured as the natural log of sales. Focusing on both publicly listed and privately held firms together, it can be said that women on board have a positive impact on firm performance. The results are also telling us that firms that have female board members are smaller in size but grow faster. In this study, evidence is found that growth is really provided by women on board, and not by the effect of size because small firms might have large growing potential.

Our study contributes to the somewhat more complex research on the relationship between firm performance for privately held firms specifically, and women on board. Various factors that influence firm performance have been reviewed. There is touched upon a variety of governance mechanisms that specifically impact a private company's firm performance, and the effect of a company's size is taken into account. The effect of governance mechanisms was considered most important. Since small privately held firms have less governance mechanisms on average (Chen, Hope, Li & Wang, 2011), and the board of directors is considered as the primary governance mechanism for privately held firms (Garg, 2013), it was expected that the effect of gender diversity is stronger for private firms. Furthermore, small privately held firms were expected to benefit more from women on board than publicly listed firms.

The findings suggest that there is a significant relationship between privately held firms and firm performance, however this result is not positive but negative. This means that privately held firms appear not to be the ones that benefit more from women on board in terms of financial

performance, but publicly listed firms seem to benefit more from them. To understand these results better, there is also looked at the effect on size again. Regarding the effect of size, our findings suggest that women are on boards of private firms that have higher levels of sales. In other words, this means that private firms which are larger, tend to have more women on board.

These findings can partially be explained by the fact that the effect of size seems to be more important than thought on beforehand. The fact that publicly listed firms benefit more from women on board in terms of financial performance, probably has to do with the fact that these public firms are larger and have more (financial) resources to hire talented women and integrate them properly in the company. This effect of size, what entails certain resources, higher salaries, bonuses and network possibilities, appears to be predominant on firm performance.

The effect of size also predominates in the second part of this research question, where it is showed that private firms which are larger, have more women on board. This can be because these larger private firms have more to offer these women on board, or because they have more resources to hire suitable and talented women on board. After all, publicly held firms are often well scrutinized firms that have lots of financial resources to conform to maintain shareholder relationships and to conform to social expectations (Hillman, Shropshire & Cannella, 2007).

In the second part of this study, there is investigated whether having women on board who are older, and therefore have more work and eventual board experience, help more than having younger women on board. Prior research already proved that absolute female advantages increase with age (Arfken, Bellar & Helms, 2004), and our findings are in line with this statement. Experienced, older women are positively affecting firm performance. Regarding the effect of size, there is found a negative relationship between firm size and experienced women on board. This implies that it can be said that experienced women continue to work for smaller firms. These results provide initial evidence that women on board working for smaller firms, really impact firm performance in a positive way, and that firm performance is not impacted because these firms are small, and it is easy and straightforward to improve sales and growth. Women with experience still seem to go into small firms on purpose, and help these firms grow.

Lastly, this study examined whether privately held firms benefit more from women on board who have more experience, than publicly listed firms. To investigate this, there is also looked at growth and firm size again. Based on literature, it was expected that the effect of governance mechanisms would predominate, resulting in a positive relationship between

experienced women on board and privately held firms. Just as in the first part of this study where the differences between publicly listed firms and privately held firms were highlighted, publicly listed firms appear to benefit more from experienced women on board than privately held firms here as well. In terms of size, it is found that women with experience tend to be on boards of private firms that have higher levels of sales. This means that private firms which are larger, tend to have more experienced women on board. Again, this can be explained by the fact that these larger private firms feel more (social) pressure to hire women, or because they have more resources to hire talented women on board.

All these results together, gain new insights to answer the research question that was as follows:

"To what extent do women on board impact the overall firm performance?"

In general, our study contributes to the literature on gender diversity. Women on board have a positive impact on firm performance. The same holds for experienced women and firm performance, since this study found evidence for a positive relationship between these two variables. Furthermore, while really trying to understand these relationships between women on board and firm performance and seeing how the results make sense, new insights could be gained. Besides this overall sales effect, the size effect is also taken into account in this study. These two effects together lead to new visions and additions to the field. Firms that have women on board grow faster but are smaller in size. While looking at different interaction terms, there was found evidence that once women are older, they continue to work for smaller firms. In other words, women seem to consciously choose to sit on boards of smaller companies and help these companies grow faster. Women on board exert impact on firm performance in a very conscious way.

Furthermore, regarding the differences between publicly listed firms and privately held firms, the effect of size gains new insights again. Against our predictions, publicly listed firms appear to benefit more from (experienced) women on board than privately held firms. When specifically looking at private companies, in most cases women prefer to take a seat on board for large private companies. Large and public companies in general have more resources to hire (experienced) women. Once firms have these resources and knowledge to take advantage of the positive effect of gender diversity, women can make a great impact.

5.2 Further improvements

As with any scientific research, also for this study there are some possible further improvements that can be made. Despite the conscious decision to include both publicly listed and privately held firms in this study, it could be a limitation that these companies are yet too different in size, standalone sales and board compositions, and are therefore not that suitable for comparison. Corporate governance mechanisms change over time. Uhlaner, Wright and Huse (2007, pp. 239) describe corporate governance in privately held firms as "involving dimensions relating to accountability, monitoring and enabling management to exercise enterprise." If the governance mechanisms and their possible effects differ even within these private companies, it may be difficult and even unattainable to measure the effects of public and private companies together.

Another possible implication could be that age, measured in absolute years, appears not to be such an ideal measurement variable for experience. This study assumes: the older, the better. Experience increases with age. However, one could also expect a U-shape relationship with age and firm performance, instead of a positive relationship. This U-shape relation could possibly be included in future studies regarding the effect of women on board on firm performance to progress further research.

Third, there can always be made improvements regarding further research once there are possibilities to expand the dataset in a proper way. In this study there is worked with a large dataset for recent years for many companies. It is unique that so much data was available for privately held companies. However, this dataset would gain even more insights if the dataset was larger, and more variables were covered. In this way, there could be controlled for more variables, or more in-depth research could be done. As touched upon in chapter 4.3, endogeneity tests and robustness checks could also be improved once more data is available.

5.3 Conclusion

The main contribution of this study was analysing new data about gender diversity in the boardroom for publicly listed firms as well as privately owned firms and putting different theoretical backgrounds to empirical practice. This study focused on 34,344 Indian companies and analysed data from 1988 until 2018.

Women on board and gender diversity are popular and heavily discussed topics these days. First, this study seems to be totally in line with the results earlier found, but once there is looked at the effect of size and different interaction terms, many new insights are gained. It can

be concluded from the analysis that women on board positively affect firm performance, but negatively affect firm size. Women on board help firms grow, they impact the overall firm performance, but women seem to be on boards of firms that have lower levels of sales. The same results are observed for experienced women, which provides evidence that experienced women continue to work for smaller firms and help them grow.

This study also contributes to the academic world by extending the current literature by looking at the differences between publicly listed firms and privately held firms. Here, the empirical results emphasize the importance of governance mechanisms, and specifically firm size. The effect of firm size seems to be underestimated in previous literature, because in the end this turns out to be the deciding factor as to why publicly listed firms benefit more from (experienced) women on board than privately held firms. The same is observed for large private companies versus small private companies.

Although the fact that there are always options to improve further research by creating a larger dataset or using better variables, this research has already established a small part of the overall answer to the question: “To what extent do women on board impact the overall firm performance?”. This paper can serve as a platform to extend the answers to this research question regarding firm performance for both publicly listed as privately held firms.

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7. Appendix

Table A1. Overview of the data

VARIABLES	N	Mean	Std. Dev.	Min	Max
Dependent Variables					
SALES_GROWTHRATE	206.263	0.08	0.86	-10.62	11.46
LNSALES	252,098	1.21	2.83	-6.50	11.38
Independent Variables					
NFEMALE	252,106	0.44	0.69	0	7
DFEMALE	252,106	0.34	0.48	0	1
PFEMALE	252,106	0.11	0.19	0	1
PRIFEM	252,106	0.30	0.63	0	7
PRIFEMD	252,106	0.23	0.42	0	1
PRIFEMP	252,106	0.08	0.17	0	1
BOARDSIZE	252,106	4.05	2.41	1	50
LISTED	252,106	0.35	0.48	0	1
AGE	252,106	50.71	12.61	12	99
AGEFEM	252,106	22.18	36.74	0	490
AGEFEMD	252,106	17.52	25.40	0	99
AGEFEMP	252,106	5.43	9.35	0	88
AGEPRI	252,106	32.75	25.89	0	99
AGEFEMPRIV	252,106	15.09	32.61	0	490
AGEFEMDPRIV	252,106	11.53	21.87	0	99
AGEFEMPPRIV	252,106	4.02	8.72	0	88
Control Variables					
LNBOARD	252,106	1.23	0.60	0	3.91
COMSIZE	252,106	1.96	2.18	-6.50	11.46

The descriptive statistics are based on a sample of 34,344 companies

Table A2. Correlation Table

#	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Dependent Variables																				
1	*SALES_GROWTHRATE*	1.00																			
2	*LNSALES*	0.17	1.00																		
	Independent Variables																				
3	*NFEMALE*	-0.01	-0.00	1.00																	
4	*DFEMALE*	-0.01	-0.00	0.87	1.00																
5	*PFEMALE*	-0.05	-0.11	0.83	0.81	1.00															
6	*PRIFEM*	0.01	-0.05	0.80	0.64	0.72	1.00														
7	*PRIFEMD*	0.01	-0.06	0.67	0.73	0.70	0.88	1.00													
8	*PRIFEMP*	0.00	-0.11	0.68	0.63	0.85	0.87	0.86	1.00												
9	*BOARDSIZE*	0.01	0.31	0.29	0.27	-0.02	0.11	0.07	-0.08	1.00											
10	*LISTED*	-0.03	0.11	-0.06	-0.03	-0.12	-0.37	-0.42	-0.36	0.13	1.00										
11	*AGE*	-0.04	0.11	-0.00	0.01	-0.07	-0.05	-0.05	-0.07	0.18	0.06	1.00									
12	*AGEFEM*	-0.01	0.02	0.95	0.83	0.76	0.74	0.62	0.61	0.32	-0.03	0.17	1.00								
13	*AGEFEMD*	-0.01	0.03	0.82	0.95	0.73	0.58	0.67	0.56	0.31	-0.00	0.20	0.87	1.00							
14	*AGEFEMP*	-0.01	-0.10	0.81	0.80	0.96	0.70	0.68	0.81	0.01	-0.11	0.10	0.83	0.80	1.00						
15	*AGEPRI*	0.02	-0.09	0.04	0.02	0.09	0.33	0.38	0.31	-0.10	-0.93	0.23	0.07	0.05	0.13	1.00					
16	*AGEFEMPRIV*	0.00	-0.04	0.76	0.62	0.68	0.96	0.84	0.82	0.12	-0.36	0.08	0.78	0.62	0.72	0.38	1.00				
17	*AGEFEMDPRIV*	0.00	-0.04	0.64	0.70	0.66	0.84	0.96	0.81	0.08	-0.40	0.09	0.66	0.71	0.70	0.43	0.88	1.00			
18	*AGEFEMPPRIV*	-0.00	-0.10	0.66	0.61	0.81	0.84	0.84	0.96	-0.06	-0.35	0.05	0.66	0.60	0.85	0.36	0.87	0.85	1.00		
	Control Variables																				
19	*LNBOARD*	0.01	0.27	0.30	0.29	0.01	0.14	0.11	-0.04	0.92	0.09	0.17	0.32	0.31	0.04	-0.05	0.15	0.12	-0.03	1.00	
20	*COMSIZE*	0.05	0.78	0.01	0.01	-0.15	-0.07	-0.09	-0.17	0.41	0.17	0.16	0.04	0.05	-0.12	-0.13	-0.06	-0.07	-0.15	0.36	1.00

The descriptive statistics are based on a sample of 34,344 companies

Table A3. Results for lagged model Hypothesis 1a and 1b

	SALES_GROWTHRATE			*LNSALES*		
VARIABLES	(25)	(26)	(27)	(28)	(29)	(30)
L.NFEMALE	0.0263***			-0.00374		
	(0.00617)			(0.0154)		
L.DFEMALE		0.0435***			-0.0120	
		(0.00848)			(0.0198)	
L.PFEMALE			0.0876***			-0.348***
			(0.0261)			(0.0712)
LNBOARD	0.0367***	0.0361***	0.0404***	0.336***	0.337***	0.337***
	(0.00764)	(0.00763)	(0.00755)	(0.0185)	(0.0185)	(0.0185)
COMSIZE	0.0555***	0.0556***	0.0560***			
	(0.00493)	(0.00493)	(0.00493)			
Constant	0.0260	0.0253	0.0200	0.765***	0.765***	0.787***
	(0.0388)	(0.0388)	(0.0389)	(0.0945)	(0.0945)	(0.0948)
Observations	206,224	206,224	206,224	252,098	252,098	252,098
Company clusters	31,566	31,566	31,566	34,575	34,575	34,575
R-squared	0.036	0.036	0.036	0.067	0.067	0.067
Company FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors cluster