Understanding the Role of Private Equity on Board Diversity

A study based on buyouts in the U.K.

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Abstract

This study documents the impact of private equity on the board composition of buyout companies. The sample covers companies in the United Kingdom and includes observations in the timespan from 2003 until 2008. The total sample consists of 222 pre-buyout and 221 post-buyout U.K. based companies. The foundation of the study is provided by historical development of private equity and the major theories relevant for board diversity. To link board diversity and private equity involvement, this research is based on 'Age', 'Gender', 'Board Experience' and 'Industry Experience', better known as the characteristics of diversity. This research shows that the share of private equity in a firm would have very little to no effect on board diversity. However, none of the results is found to be significant.

Key words: Private Equity, United Kingdom, Buyouts, Board of Directors, Diversity, Board Diversity, Board Characteristics, Age, Gender, Board Experience, Industry Experience

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1. Introduction

Private equity owned businesses have become an increasingly important part of the business landscape (Kaplan and Strömberg, 2009). Private equity companies invest in other companies in order to maximize their own wealth and returns. This can be hard to pull off during times of crisis; history shows several booms and busts in the private equity market resulting in large differences in fund performances. The last few years however, the total number and the amount of capital raised by private equity buyouts climbed to a record. The European private equity industry seems to have recovered from the crisis, resulting in greater confidence and optimism. The private equity conditions continue to improve and the upward trend will last, according to the "Private Equity Reports 2015" by Price Waterhouse Coopers and Bain & Company. This confirms the importance of private equity to the business landscape in the foreseeable future.

The composition of the board of directors of a company results in large differences in the final decision-making process; currently modern companies are increasingly focused on the composition and consequently the level of diversity in the board (Carter et al., 2003). Butler (2012) states that the more diverse your board is, the better the results. A more diverse board can gain a better understanding of company related issues based on different skills, experiences and perspectives. The traditional corporate finance literature largely ignores the influence of managerial characteristics on financial decision making, focusing more on firm characteristics rather than managerial characteristics (Huang and Kisgen, 2013).

As stated, there is increasing attention for board diversity, also in research. Regarding the relationship between private equity and board diversity, some argue that there is not much variety in the board compositions of firms with private equity funding. It is hard for women and other minorities for example to have access to boards; you would expect that the board consists of older, white male board members. This phenomenon is also known as the "Old Boy's Network", meaning that a board will almost exclusively consist of members of this "Network" (Gamba and Kleiner, 2001). Some argue that the "Old Boy's Network" is a thing of the past, others say that it is alive and well. Is there still such a thing as an "Old Boy's Network"?

There has not been done much research on private equity involvement and the effect on the composition of the board of directors. In addition to earlier research, it will be interesting to link the private equity involvement in buyouts and the board composition, to diversity characteristics with a focus on managerial characteristics. These diversity characteristics are defined as both observable and non-observable diversity characteristics. 'Age', 'Gender', 'Board Experience' and 'Industry Experience', will be described and used as the fundamental characteristics in the research model. Most research is focuses on the performance of a firm after a private equity backed buyout. In contrast with earlier research, this study will focus on the effect of Private Equity involvement on the composition of the board of directors. Therefore a sample covering companies in the United Kingdom and including observations between 2003 and 2008 is used. All companies belong to the sample of management buyout transactions in the U.K. and provide the necessary data for this study based on 222 pre-buyout and 221 post-buyout companies.

In contrast with earlier research, this thesis makes a distinction in diversity characteristics of firms that are backed by private equity (PE-backed firms) and those that are not (non-PE-backed firms). Therefore, the central question in this research will be:

To what extent does private equity involvement increase board diversity?

This study is build up as follows; Chapter 2 discusses the existing theory relevant for this study. It starts with a brief summary of the private equity history, continues with an overview of the literature on board diversity and ends with a description of the characteristics of board diversity. Chapter 3 formulates the hypotheses regarding this research. The central research question and formulated hypotheses will be discussed. Chapter 4 describes the research method, sample selection and defines the regression analyses. Chapter 5 discusses the empirical results and tests the hypotheses. Finally, Chapter 6 covers the conclusions, limitations and suggestions for future research.

2. Literature Review

This chapter lays the foundation for this study. First, it provides a brief overview of private equity. Next, the existing literature on board diversity and the relation to private equity will be described. Finally, the characteristics of board diversity ('Age', 'Gender', 'Board Experience' and 'Industry Experience') will be discussed.

2.1 Private equity

Nowadays, private equity firms have become a major part of the entrepreneurial finance landscape (Kaplan and Strömberg, 2009). In general, directors do not have sufficient resources to finance a takeover. Often there will be a private equity backed buyout in those cases. Private equity is defined as risk capital provided through a private equity fund. These funds provide capital outside the public markets and to a variety of firms, ranging from start-ups to mature quoted firms (Gilligan and Wright, 2008). Since 1980 the private equity market in the UK is growing and developing intensely. The number and magnitude of the private equity funds participating in the market grew due to regulatory changes, such as the 1981 Companies Act. After the Companies Acts of 1928, 1947 and 1948, the Companies Act of 1981 resulted in more flexibility and the private equity firms obtained more financing options (Robbie and Wright, 1996).

In the last few years, the number of deals and total capital raised by private equity buyouts climbed to a record. The European private equity industry recovered from the global financial crisis resulting in greater confidence and optimism. This upward trend will continue, at least in 2015, with outstanding market conditions for investments according to the "Private Equity Reports 2015" of Price Waterhouse Coopers and Bain & Company. Overall, history shows periods of prosperity followed by periods of adverse economic conditions, alternately resulting in booms and busts in the private equity market.

A major advantage of private equity funding is shown by Boucly et al. (2011). Companies with private equity involvement significantly outperform companies that are not backed by private equity. These private equity funds provide a solid basis for growth and create value by reducing credit constraints, resulting in more investments and a larger growth in firm size. Another great benefit is the active involvement of private equity funds; they add considerable

value by monitoring and sharing their knowhow, providing an accurate insight into the performance of the company that will help to achieve the business goals (Amess and Wright, 2012).

Many critics argue that buyouts are accompanied by job losses, Davis et al. (2011) do support this statement. Although private equity involvement results in more job losses at first, this reduction is followed by a rapid redistribution of jobs therefore it only causes a small net impact on employment. Another common concern is the risky nature of private equity. Weidig et al. (2005) confirm this statement but with a large side note. They state that the risky nature does not mean that the private equity investments are risky as well. Eventually, it is important to shed some light on the differences in private equity firms themselves. Jelic et al. (2005) show a clear change in the performance of private equity firms. Firms that are funded by prestigious private equity firms display significantly better performance.

2.2 Board Diversity

The traditional corporate finance literature largely ignores the influence of managerial characteristics on financial decision making, focusing more on firm characteristics rather than managerial characteristics (Huang and Kisgen, 2013). A fairly major governance item is the board composition; how do you determine the right board composition?. Carter et al. (2003) state that modern companies are facing a significant concern: the gender, racial and cultural composition of the board of directors. The composition will make much difference in the board's final decisions, therefore Russell Reynolds (2009) states: 'having board members who are reliable and likeminded is the most logical strategy to build a board'.

Companies are adjusting the board composition to better replicate the diversity of their clients, employees and other stakeholders. The combination of the various characteristics and expertise of the individual members will result in more understanding. This indicates the more diversified the board of directors is, the better the performance (Erhardt et al 2003, Carter et al. 2003). Additionally, Miller and del Carmen Triana (2009) show a positive relation between board diversity and innovation. In a more diverse board there will be more information present, hence this will lead to a more innovative solution.

Another argument for board diversity is the agency problem, which is a common problem within companies. This problem arises when there is a conflict of interest between the shareholders and the board of directors, which has considerable influence of the firm's behavior (Fama, 1980). Monitoring the board of directors to reduce this agency problem is one of the most common solutions (Jensen and Meckling, 1976). A more diverse board of directors has a positive effect on the companies' performance through better monitoring of the board of directors (Huse and Solberg, 2006). Explained by the fact that a more diverse board would be less affected by a "groupthink" phenomenon (Rhode and Packel, 2010, Carter et al., 2003).

On the other hand, Siciliano (1996) found that the more diverse a board is, the stronger its influence is on the social performances of a firm. Social performance shows to what extent (non-profit) companies contribute to a social cause (for example charity purposes). Summarizing, the existing research on board diversity shows a positive effect on business management and performances. Hence, firms can add value by choosing for a more diverse board composition.

2.3 Board Diversity and Private Equity

As discussed, there is more and more discussion about board diversity in companies, and also in relation to private equity involvement. Crowe (2015) states: "We're all familiar with the glass ceiling on Wall Street, but in private equity that glass is exceptionally thick". And: "private equity is a boys club," said Katherine Phillips, a professor at Columbia Business School in New York. Membership of the "Good Old Boy's Network" is automatic if you are white, male and white collar. Women and people of color do not have ready access or membership in this exclusive group, which makes their career prospects less attainable (Banerjee, 2012). Gamba and Kleiner (2001) confirm that there is still such thing as an "Old Boy's Network", however the "Network" is not as strong as it appeared some years ago. McDonald (2011) shows that a membership in a white men network will result in twice as much work compared to members of a female or other minority network. Based on this belief about an "Old Boy's Network", you would expect that the board consist of older, white male board members. Many say this network is alive and well, therefore you should not expect a more divers board if there is private equity involved. This study is based on this belief, assuming that private equity involvement will result in a less diverse board of directors. However, some argue that the "Old Boy's Network" is a thing of the past.

2.3 Board Diversity Characteristics

It is important to individually research the different variables influencing board diversity. Erhardt et al. (2003) draw a distinction between the observable and non-observable diversity characteristics. 'Age' and 'Gender' are examples of observable diversity characteristics. One of the non-observable diversity characteristics is knowledge. The 'Board Experience' and 'Industry Experience' of board members is used to measure for knowledge. All characteristics used in this study will be discussed separately.

Age

In general, the average age of board members is quite high. The perception of the composition of the board of diversity is slowly changing. Former perceptions about the right composition of boards consist of older board members who previously worked in another company in the same industry. These out dated perceptions are changing which leads to a decline of average age in the board of directors (Kang et al., 2007). The value of the younger board members is an important aspect of age diversity (Walt and Ingley, 2003). The younger part of the board often is more energetic to succeed and above all is more likely to look to the future (Kang et al., 2007). Daviri and Parisi (2015) find evidence for this statement, and argue that a less mature board of directors would have a positive effect on innovation and productivity. In contrast, Bezrukova et al. (2009) suggest that age diversity in groups result in different perceptions and visions which will result in more conflicts since the different interpretations can make it harder to reach agreement. This ultimately can lead to negative consequences and lower firm performances.

Yet, Jackson et al. (1991) and Houle (1990) found a positive relationship between age diversity and business performance. According to Houle (1990) splits the board members into three different groups based on their age and find that they complement each other. The younger group is driven by energy to succeed and these beliefs are in line with the findings of Kang et al. (2007). The middle-aged group is mainly engaged in corporate responsibilities and the older group consists of old board members with lots of experience and know-how. Hence, they complement each other, resulting in a well-functioning board of directors of which a company benefits.

Gender

There has been more and more awareness about the number of women in the board of directors. Brammer et al. (2007) state that it is important to promote diversity based on a principle of equal opportunities and equal representation, since fair distribution of men and women in a board would better replicate the society (although it is not desirable to appoint board members solely based on their gender and regardless of their competences). Walt and Ingley (2003) support the social and moral arguments to increase board diversity and they argue that the supervisory bodies must be aware of the social context of increasing diversity in the boards. However, they found less support for better practices in relation to the amount of women in a board. Nevertheless, Carter et al. (2003) do show a positive relation between the presence of women in the board and operating results. Increased gender diversity results in an increase of creativity, increased problem-solving skills through different approaches and finally increased openness to other cultures.

Subsequently, Niederle et al. (2007) found no evidence for difference in performance, but state that men are more likely to take risk based on variances in their preferences in a competitive environment. Men are more willing to compete, are more overconfident and tend to take more risks. Consistent with these findings Jinakoplos and Bernasek (1998) found that women are expected to be more conservative and tend to invest less in risky assets. Based on the different perspectives of men and women, it might be a good assumption that men en women should cooperate in a competitive environment.

Board Experience

Human capital is becoming a crucial asset of great importance in the development of businesses. Human capital is based on managerial board characteristics like knowledge and personal properties. A board member with more board experience is a member with more or higher quality human capital (Zingales, 2000). Drobetz et al. (2014) conclude that more board experience will have a positive relation to the value of the company. In terms of operating in a board, potential members with more board experience are more attractive and better qualified. Board members with more board experience are also more familiar with the existing regulations.

However, based on the results from Daviri and Parisi (2015), less experienced board members will be more innovative. These directors do not operate on the basis of routine, which is often accompanied by a fresh perspective on the firm's operating and capital allocation processes. A combination of both would be ideal; less experienced board members can share their innovative insights and by the means of the more experienced and qualified directors regular existing processes can be improved.

Industry Experience

Cummings (2004) states that a board with more diverse industry experience would have a positive effect on the boards' performance. A board member with different industry experience can share experiences and know-how with the board. Best practices from other work fields can be included in the current business operations, which results in added value and better performances. Consistent with these findings, Jackson et al. (1991) found that a more diverse board (more experiences outside the current industry) results in better performances. There might be some pitfalls however, Jackson et al. (1991) show some evidence that a more diversified board of directors can result in integration problems, based on the differences in industry background.

Ultimately, it is important to take into consideration that the board and industry experience will depend on the age of the director. Younger directors would probably have less industry and board experience, mainly because they simply did not have as much time to gain more experience.

3. Hypothesis Development

The focus of this section is to formulate the hypotheses of this research. This section is divided in two parts; first the central research question will be discussed, the second part consists of the formulated hypotheses.

3.1 Research Question

As already stated in the Literature Review, private equity in the UK developed strongly after 1980. Subsequently many economists have followed and investigated different views on private equity. Some argue that private equity is an "Old Boy's club", whereas others say that it is a thing of the past. Private equity firms are usually actively involved in their investments. Which raises the following question; does private equity involvement create a more diversified board of directors?

There has not been much research about private equity involvement and the effect on the composition of the board of directors. Most research is focussed on the performance of a firm after a private equity backed buyout. In this research the effect of private equity involvement on the board of directors will be investigated. In contrast with earlier research, this thesis gives a clear view of the variables on diversity of firms that are backed by private equity (PE-backed firms) and those that are not (non-PE- backed firms). Therefore, the central question in this research will be:

To what extent does private equity involvement increase board diversity?

3.2 Hypotheses

This section will consist of the formulated hypotheses, based on the most diversity characteristics used in this study. Hypotheses based on 'Age', 'Gender', 'Board Experience' and 'Industry Experience' will be described. This study explores the differences in outcome of firms that are PE-backed and those that are not (non-PE- backed firms). Based on the expectation that the "Old Boy's Network" is alive and well, PE-backed firms are more likely to have a less diverse board of directors.

Therefore, based on age diversity, we assume a board consisting of mostly older board members and consequently the private equity involvement will result in a less diverse board.
In addition, it is expected that the board will mainly consist of male directors and the composition of the board will be less diverse. Therefore, the formulated hypotheses on age and gender diversity in this research will be:

Hypothesis 1a and 1b, based on age characteristics:

Private equity involvement results in a board with older board members.

Private equity involvement results in a less diverse board based on age.

Hypothesis 2a and 2b, based on gender characteristics:

Private equity involvement results in a board with more male board members.

Private equity involvement results in a less diverse board based on gender.

Subsequently, the "Old Boy's Network" will result in older board members who should have larger networks. Based on the major network of the board members, it is expected that the board of directors recruit their members based on their own "network". One should expect more professional experience and therefore more board experience for firms with more private equity involvement. Next, the board of directors would be formed from various industries, as long as he is a member of the "Old Boy's Network". Therefore it is assumed that private equity involvement will result in a board with less experience in the current industry and this will result in a more diverse board of directors. Hence, the formulated hypotheses based on board and industry experiences in this research will be:

Hypothesis 3a and 3b, based on board experience:

Private equity involvement results in a board with more board experience.

Private equity involvement results in a less diverse board based on board experience.

Hypothesis 4a and 4b, based on industry experience:

Private equity involvement results in a board with less industry experience.

Private equity involvement results in a more diverse board based on industry experience.

4. Research Method

The focus of this study is to capture if private equity does affect board diversity. The first section in this chapter on the research methods describes the database used for retrieving the necessary data and sample selection. The second part consists of a description of the OLS regressions used to elaborate on the evolution of the composition of the board of directors.

4.1 Sample selection and data

The entire dataset consists of companies in the United Kingdom and includes observations between 2003 and 2008. All companies belong to the sample of management buyout transactions in the U.K. Companies that are active in the financial sector are excluded.

The data is processed using the statistical software program Stata 13. To ensure that the final sample consists of variables at the right level, all the information about the board of directors is aggregated to the firm level. The final dataset provides the necessary data for this study and consist of 222 pre-buyout and 221 post-buyout companies. Table 1 presents the descriptive statistics.

4.2 Regression analyses

This section describes the multivariate Ordinary Least Squares regression (OLS). The dependent variable in this study is 'Board Diversity'. The independent variables 'Age', 'Gender', 'Board Experience' and 'Industry Experience' are used as measurements of board diversity. The first regression is written as follows:

$$Y(Board\ Diversity)_{it} = \alpha_{0,it} + \beta 1 PE\ Dummy + \varepsilon_{it}$$

where:

$$\alpha_{0,it}\ refers\ to\ a\ constant$$

$$\varepsilon_{it}\ refers\ to\ an\ random\ error\ term$$

However, it is important to check for the robustness of the results. To check for robustness 'Year' and 'Industry' fixed effects are added to the regression since the board characteristics change over time and differ across industries. The 'Year' fixed effects also control for omitted variable bias. Lemmon et al. (2008) conclude that the failure to include this firm-specific effect creates a serious omitted variable bias. Consequential the second regression is as follows:

$$Y(Board\ Diversity)_{it} = \alpha_{0,it} + \beta 1P\ Dummy + \lambda_t + \gamma_i + \varepsilon_{it}$$

where:

$$\alpha_{0,it}\ refers\ to\ a\ constant$$
$$\lambda_t\ refers\ to\ Year\ fixed\ effects$$
$$\gamma_i\ refers\ to\ Industry\ fixed\ effects$$
$$\varepsilon_{it}\ refers\ to\ an\ random\ error\ term$$

Additionally, the effect of private equity involvement is tested using the percentage of private equity actually involved since it can be expected that a greater share of private equity involvement will result in more influence in the composition of the board of directors.

Furthermore, the variables 'Company Age', 'Company Size' and 'Board Size' are used as control variables. There might be significant differences between younger or older companies and large versus small firms. Lastly, the variable 'Board Size' is used to control for the changes in the size of the board of directors, since larger boards are more likely to have a more diversified board. This regression is also checked for robustness by adding 'Year' and 'Industry' fixed effects. Resulting in the last regression:

$$Y(Board\ Diversity)_{it} = \alpha_{0,it} + \beta 1PE\ Dummy + \beta 2\ Company\ Age + \beta 3\ Company\ Size + \beta 4\ Board\ Size + \lambda_t + \gamma_i + \varepsilon_{it}$$

where:

$$\alpha_{0,it}\ refers\ to\ a\ constant$$
$$\lambda_t\ refers\ to\ Year\ fixed\ effects$$
$$\gamma_i\ refers\ to\ Industry\ fixed\ effects$$
$$\varepsilon_{it}\ refers\ to\ an\ random\ error\ term$$

4.3 Descriptive statistics

Table 1 presents a description of all the variables used in the regression models. Furthermore, table 2 presents the descriptive statistics of the variables being used in this study. It provides some information about the way the variables will behave over time. The 'Board Diversity' variables are represented by the pre-buyout and post-buyout situation and the percentage change between these two is shown.

The 'Gender' variables do show a remarkable difference. The amount of women in the board of directors shows a decline; the pre-buyout share of women is 12.8%, whereas the post-buyout share is 7.9%. Consequently, the percentage of men in the board of directors has increased from 87.2% to 92.1%. The average age of the board members will decrease from the age of 51.3 before the buyout to 46.6 after the buyout. So, the post-buyout board members are on average 4.7 years younger.

What is striking is the decrease in board experience; the average board experience pre-buyout is 10.6 years whereas the post-buyout shows an average of 7.2 years. This also holds for industry experience of the members, which shows a decline from 7.8 years to 3.8 years.

<Insert Table 1 and 2 Here>

5. Empirical Results

In this chapter the main findings of this research are presented. First, the change in the composition of the board of directors will be shown. Then, the correlation matrix and VIF values are discussed. The final part presents the performed OLS regression.

5.1 Discussion of the development of the diversity measures

To provide a clearer picture about the change in the board of directors, the development of the diversity measures will be shown. Table 3 shows the mean values of 'Age', 'Gender', 'Board Experience' and 'Industry Experience' in the situation where there is private equity involvement or not by comparing the means of the two groups.

These results show that there is only a small difference in the average age of the board of directors for firms with or without private equity involvement. There is a small decrease in the average age of the board of directors for firms with private equity involvement. The percentage change between pre- and post-buyout shows a slight difference. If there is private equity involvement the percentage change is -8.2% versus -8.9% if there is no private equity involvement in the company. This indicates that overall the firms do hire younger board members after a buyout but there is no remarkably difference between private equity involvement or not.

The results on the other independent variables show the same. The amount of women in the board of directors shows a decline for both pre- and post-buyout, private equity backed or not. This also applies to the other diversity measures 'Board Experience' and 'Industry Experience'. Although the differences are not statistically significant, overall the univariate analysis gives an indication that there is no remarkable difference between the means of the two groups (private equity involvement or not).

<Insert Table 3 Here>

5.2 Discussion of the correlation matrix and VIF values

In table 4, Pearson's correlation matrix is displayed. If two independent variables are highly correlated it implies that the corresponding coefficients become inadequate because of multicollinearity; the model will then be useless.

Evaluation of the correlation between the coefficients shows one high correlation between 'PE Dummy' and 'PE Percentage' (0.838) at a significance level of 1%. This makes sense because they are both independent variables that measure the private equity involvement and are regressed separately. Another correlation can be seen between 'Change average Board Experience' and 'Change in Age' (0.367) at a significance level of 1%. This can be explained by the fact that a senior board member is more likely to be more experienced, since it is significantly related to the number of years working.

In addition to the correlation matrix, the Variance Inflation Factors (VIF) is a well-known way to measure the degree of multicollinearity. Many practitioners have identified correlation between the variables using this method. Mason and Perreault (1991) show that several rules of thumb are used. Most commonly used is the rule of 10, which means that if the VIF values are below 10, there is no multicollinearity. All the variables can then be used in the OLS regression. Looking at table 5, the largest values are 3.63 and 3.53 for 'PE Dummy' and 'PE Percentage', which are both below 10. After evaluation of the correlation matrix and the VIF data it can be concluded that there is no multicollinearity since there are no high correlations; hence the regression model can be used.

<Insert Table 4 and 5 Here>

5.3 Discussion of the multivariate analysis

To answer the main research question of this research, namely what the effect is of private equity on board diversity, the effect on each diversity variable is used to test the hypotheses. The regressions tested are shown in chapter 4.2. Table 6 until 10 present the output of the OLS regressions. Columns 1, 3 and 5 include no fixed effects, whereas columns 2, 4 and 6 do include year and industry fixed effects (applies to all tables).

First the effect of private equity involvement on the age of the board of directors will be discussed. Table 6 shows the regression in which the age of the directors is used to measure board diversity.

<Insert Table 6 Here>

Column 1 and 2 show a negative relationship between the change in average age of the board and private equity involvement, -0.006 and -0.004. When adding the control variables a small reduction for the private equity involvement appears. Looking at the coefficient of 'PE Percentage' in column 5 and 6, both coefficients show a negative relationship as well. This is in line with hypothesis 1b and does support the idea that boards with private equity involvement are less diverse than the boards of the firms that are not backed by private equity. All these values are very small which indicates that the effect of private equity is almost zero. Hence, there is also no significant evidence for hypothesis 1b.

After discussing the role of private equity involvement on the age, the gender of the board of directors is studied. Table 7 shows the regression in which the percentage of women in the board of the directors is used to measure board diversity; in table 8 the percentage of men is used.

<Insert Table 7 and 8 Here>

Column 1 and 2 in table 7 display a positive effect of private equity involvement on the change in percentage of women in the board of directors. This change in percentage of women in the board will increase with 3.5%, adding the fixed effects it will increase with 3.8%. These findings are consistent with the expectations stated in hypothesis 2b. However, column 3 to 6 show a negative effect, striking is the change in the relationship when the control variables are added to the regression. Some of the control variables show statistically significant coefficients, but the coefficients of the variables 'PE Dummy' and 'PE percentage' do not. As expected, the relationship between the change in percentage of men and private equity involvement show the opposite (table 8). Based on column 3 to 6, it can conclude that the involvement of private equity in a firm will result in a small decrease of percentage change of women in a board and subsequently this will result in a more diverse board, which is not in line with the expectations. Adding the control variables to the regression results in more reliable outcomes, these results do not support hypothesis 2b.

Furthermore, the role of private equity involvement on the board experience will be discussed. All the columns of table 9 show a negative relationship between private equity involvement and the amount of board experience in the board. Looking at column 1 and 2 in table 9, it can be concluded that private equity involvement will result in a decrease in the change of board experience. Adding the control variables result in a decline in the change of board experience of 2.3% and 2.5%. Based on column 5 and 6 you should also conclude that the greater the amount of private equity in a firm, the less the change in the experiences of the board of directors would be. These findings are in line with the beliefs based on the "Old Boy's Network" since we expect a less diverse board, with more board experience for firms with more private equity involvement. Therefore, the findings are consistent with hypothesis 3b.

<Insert Table 9 Here>

Lastly, table 10 which is based on 191 observations on the role of private equity involvement on the industry experience. It can be stated that there will be more change in industry experience if there is private equity involvement. This is in line with the expectations, since we expect that private equity involvement will have a negative effect on the current industry experience. It is expected that private equity involvement result in a more diverse board, with experiences in other industries than the industry the board is operating in at the moment. Hence, these findings are consistent with hypothesis 4b. Remarkable in that regard is column 3, the negative coefficient of 'PE Dummy' indicates an opposite result. On the basis of this column, you could say that the involvement of private equity will result in a less change of industry experience. Column 3, shows results inconsistent with hypothesis 4b.

<Insert Table 10 Here>

None of the discussed coefficients is statistically significant. Including the 'Year' and 'Industry' fixed effects the R-square increases and most of the regressions show a negative adjusted R-square. In the end, based on the expectations of an "Old Boy's Network", this research found some support but mostly contrary effects of private equity on board diversity. However, all of the effects are extremely small and thus the share of private equity in a firm will have very little to no effect on board diversity. Besides that, the lack of statistically significant coefficients means this research cannot fully prove these findings.

6. Conclusion and Recommendations

This chapter contains the main findings of this research and draws some conclusions. Thereafter, the limitations and recommendations for future research are briefly described.

6.1 Conclusion

This study began with the observation of private equity involvement and their influence on the board of directors. In chapter 3, the expected relationships between private equity involvement and board diversity are drawn as expected. The main goal of this study was to investigate the effect of private equity involvement; therefore the main research question was formulated as follows:

To what extent does private equity involvement increase board diversity?

This effect is measured based on four characteristics of diversity and the different hypotheses will be discussed separately. Regarding hypothesis 1a the results do not support the theory, the average age of the board members will decrease. Next hypothesis 1b, the findings based on age do support the theory since there is less change in average age. However, all OLS coefficients show very small values, which indicated that the effect of private equity involvement on age diversity is almost zero.

Next, some of the findings are not consistent with hypotheses 2a and 2b, but not al the regressions based on gender diversity show the same results. The findings based on the univariate analysis show results consistent with hypothesis 2a, private equity involvement will result in more men in the board of directors. However, the OLS regression results in a negative effect. These results show that the involvement of private equity in a firm will result in a small decrease of percentage change of women in a board and subsequently this led to a more diverse board, which is in not line with the expectations and therefore there is no support for hypothesis 2b.

This research find results inconsistent with hypothesis 3a, more private equity involvement in a firm results in a lower mean value for board experience. Though, the findings on board experience are consistent with the expected effect (hypothesis 3b). All OLS results show a negative relationship between private equity involvement and the change in the amount of board experience in the board of directors. Therefore, one can conclude that private equity involvement will result in a less diverse board.

Regarding hypotheses 4a and 4b the results are in line with the expectations, since we expect that private equity involvement will have a negative effect on industry experience. Hence, it can be stated that there will be less industry experience (in the current industry) if there is private equity involvement.

Concluding, to what extent does private equity involvement increase board diversity? As a result of the literature review, it was expected that private equity involvement resulted in an older board with more male board members. Furthermore, private equity involvement was expected to result in a board with more board experience. Based on these three characteristics, the private equity involvement would result in a less diverse board of directors. Based on the fourth diversity characteristic (industry experience), it is assumed that private equity involvement will have an opposite effect on board diversity. The board is expected to consist of directors with more experience in various industries and this will result in a more diverse board of directors.

None of the discussed coefficients is statistically significant. Hence, this research cannot fully prove the effect of private equity involvement on board diversity. However, all of the effects are extremely small and the right conclusion following the results of this research would be that the share of private equity in a firm will have very little to no effect on board diversity.

6.2 Limitations and Future research

There are some shortcomings regarding this study. For example this study is based on 222 pre-buyout and 221 post-buyout companies, all based in the U.K.. The results are therefore limited to the U.K. and cannot be applied to other countries. Future research is needed to examine whether private equity involvement in a (different) country will result in an effect on board diversity. Secondly, this research cannot fully prove the effect of private equity involvement on the board diversity, since the results unfortunately are not statistically significant. Next to that, only four different board characteristics are used in this study.

However Erhardt et al. (2003) show that there are more characteristics that can influence the board diversity. Additional research could be done including more diversity characteristics, for example by adding the degree of education or nationality of the board of directors would result in a deeper understanding about diversity. All of the effects are extremely small and most of the regressions show a negative adjusted R-square. Additional research needs to be done, to gain better insight into the effects of private equity involvement on board diversity.

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Appendix

Table 1. Variable Definitions

This table reports description of the variables used in this study.

	Description
Dependent variables	
Age Pre (Post)	Average of the Total Age of the Board
%Change in Age	(Age Post – Age Pre) / Age Pre
Women Pre (Post)	Share of Women in the Board Pre (Post) Buyout
%Change in Women	(Women Post – Women Pre) / Women Pre
Men Pre (Post)	Share of Men in the Board Pre (Post) Buyout
%Change in Men	(Men Post – Men Pre) / Men Pre
Board Exp. Pre (Post)	Average of the Total Board experience Pre (Post) Buyout
%Change in Board Exp.	(Board Exp. Post – Board Exp. Pre) / Board Exp. Pre
Industry Exp. Pre (Pre)	Average of the Total Industry Experience in the current industry Pre (Post) Buyout
%Change in Industry Exp.	(Industry Exp. Post – Industry Exp. Pre) / Industry Exp. Pre
Independent variables	
PE Dummy	Dummy variable that takes value '1' when private equity is involved, while '0' in other cases
PE Percentage	Percentage of private equity involvement in the buyout
Control variables	
Company Age	Natural logarithm of Company Age Company Age = (Deal year – Incorporation year)
Company Size	Natural logarithm of the Total Assets
Board Size	Natural logarithm of the Board size

Table 2. Descriptive Statistics

This table reports the descriptive statistics for the variables being used in this study. This table reports the mean, median, standard deviation, minimum, maximum and number of observations of the described variables.

	Mean	Median	Std. Deviation	Min	Max	Observations
Dependent variables						
Age Pre	51.329	51.8	5.962	37	72.333	221
Age Post	46.619	46	5.292	34.5	72.333	221
%Change in Age	-0.086	-0.085	0.097	-0.359	0.226	221
Women Pre	0.128	0	0.194	0	1	221
Women Post	0.079	0	0.149	0	0.667	219
%Change in Women	-0.223	0	0.487	-1	2	221
Men Pre	0.872	1	0.194	0	1	221
Men Post	0.921	1	0.149	0.333	1	219
%Change in Men	0.105	0	0.349	-0.5	2	217
Board Exp. Pre	10.597	10.8	3.157	0	24.333	203
Board Exp. Post	7.180	7	3.569	0	18	212
%Change in Board Exp.	-0.274	-0.315	0.357	-0.955	1.133	200
Industry Exp. Pre	7.824	7.944	3.954	0	16.542	203
Industry Exp. Post	3.771	3.5	3.063	0	15.417	212
%Change in Industry Exp.	-0.379	-0.5	0.726	-1	5.893	191
Independent variables						
PE Dummy	0.518	1	0.501	0	1	220
PE Percentage	0.268	0.109	0.306	0	1	221
Control variables						
Company Age	2.710	2.708	0.816	0.693	4.663	221
Company Size	9.413	9.345	1.042	5.739	12.480	221
Board Size	0.357	0	0.917	-0.909	4	220

Table 3. Univariate analysis

This table reports the results from the differences in mean tests of descriptive statistics for the variables being used in this study. This table reports the mean, mean difference, standard error, number of observations and p-value of the described variables. . *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

	Mean if PE dummy= 0	Mean if PE dummy = 1	Mean difference	Standard Error	Observations	P-value
Dependent variables						
Age Pre	51.709	50.867	0.843	0.399	220	0.292
Age Post	47.282	45.946	1.336	0.356	220	0.061***
%Change in Age	-0.082	-0.089	0.007	0.006	220	0.634
Women Pre	0.129	0.122	0.007	0.013	220	0.789
Women Post	0.075	0.081	-0.006	0.009	218	0.762
%Change in Women	-0.242	-0.208	-0.034	0.033	220	0.600
Men Pre	0.871	0.878	-0.007	0.129	220	0.789
Men Post	0.925	0.919	0.006	0.009	218	0.762
% Change in Men	0.114	0.097	0.017	0.024	216	0.722
Board Exp. Pre	10.642	10.532	0.110	0.222	202	0.805
Board Exp. Post	7.448	6.945	0.503	0.246	211	0.308
% Change in Board Exp.	-0.263	-0.282	0.019	0.025	199	0.703
Industry Exp. Pre	8.259	7.489	0.770	0.276	202	0.164
Industry Exp. Post	4.399	3.228	1.171	0.212	211	0.005**
% Change in Industry Exp.	-0.380	-0.378	-0.002	0.053	191	0.988
Independent variables						
PE Dummy	0	1	-1	0.034	220	-
PE Percentage	0.003	0.516	-0.513	0.021	220	0.000*
Control variables						
Company Age	2.885	2.537	0.348	0.055	220	0.001*
Company Size	8.999	9.796	0.797	0.070	220	0.000*
Board Size	0.215	0.489	-0.274	0.062	220	0.027

Table 4. Correlation matrix

This table represents the correlations between each variable.
*** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

	Age Pre	Change Age	Women Pre	Change Women	Board Exp. Pre	Change Board Exp.	Industry Exp. Pre	Chang Ind. Exp.	PE Dummy	PE Percentage	Comp Age	Comp Size	Board Size
Age Pre	**1.000**												
Change Age	-0.516*	**1.000**											
Women Pre	0.018	-0.047	**1.000**										
Change Women	-0.047	0.124***	-0.474*	**1.000**									
Board Exp. Pre	0.327*	-0.211*	-0.055	-0.047	**1.000**								
Change Board Exp.	-0.006	0.367*	-0.054	0.075	-0.335*	**1.000**							
Industry Exp. Pre	0.103	-0.045	0.111	-0.074	0.523*	-0.328*	**1.000**						
Change Ind. Exp.	-0.032	0.119	-0.112	0.152**	-0.175**	0.358*	-0.400*	**1.000**					
PE Dummy	-0.072	-0.032	-0.018	0.036	-0.017	-0.027	-0.098	0.001	**1.000**				
PE Percentage	-0.057	-0.076	0.060	-0.012	0.002	-0.030	-0.101	0.025	0.838*	**1.000**			
Company Age	0.182*	0.003	0.218*	-0.150**	0.088	0.126***	0.172**	0.078	-0.215*	-0.180*	**1.000**		
Company Size	0.112***	-0.040	-0.103	0.040	-0.023	0.148**	-0.130***	0.096	0.382*	0.354*	-0.031	**1.000**	
Board Size.	-0.102	-0.019	-0.053	0.230*	0.111	-0.223*	0.175***	-0.067	0.150**	0.132***	-0.178*	-0.011	**1.000**

Table 5. VIF data

This table shows the Variance Inflation Factor (VIF) for each variable.

Variable	VIF
Change in Age	1.21
Change in Women	1.86
Change in Men	1.77
Change in Board Exp.	1.45
Change in Ind. Exp.	1.17
PE Dummy	3.63
PE Percentage	3.53
Company Age	1.14
Company Size	1.19
Board Size.	1.16
Mean VIF	**1.81**

Table 6. The output of the regression analysis – Change in average Age of the Board of Directors

This table presents the output of 3 ordinary least squares regressions (OLS). The dependent variable in all regressions is Change in average Age of Board of Directors. Robust Standard Errors are bracketed. Industry dummy variables are constructed for each industry, defined by the 2-digit NACE code. Columns 1, 3 and 5 include an OLS regression with no fixed effects. Columns 2, 4 and 6 include year and industry fixed effects. *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

Change in average Age of Board	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PE Dummy	-0.006	-0.004	-0.003	-0.004		
	[0.013]	[0.016]	[0.014]	[0.011]		
Board Size			-0.002	0.00002	-0.001	0.0003
			[0.011]	[0.012]	[0.011]	[0.011]
Company Age			0.0001	0.0000006	-0.001	-0.001
			[0.008]	[0.011]	[0.008]	[0.10]
Company Size			-0.003	0.0003	-0.001	-0.001
			[0.007}	[0.001]	[0.007]	[0.010]
PE Percentage					-0.024	-0.016
					[0.023]	[0.030]
_Cons	-0.082*	-0.043	-0.054	-0.041	-0.065	-0.044
	[0.009]	[0.056]	[0.066]	[0.995]	[0.065]	[0.098]
Observations	220	220	220	220	220	220
R^2	0.001	0.129	0.002	0.129	0.007	0.130
adjusted R^2	-0.004	-0.048	-0.016	-0.066	-0.012	-0.064

Table 7. The output of the regression analysis – Change in percentage of women in the Board

This table presents the output of 3 ordinary least squares regressions (OLS). The dependent variable in all regressions is Change in percentage of women in the Board. Robust Standard Errors are bracketed. Industry dummy variables are constructed for each industry, defined by the 2-digit NACE code. Columns 1, 3 and 5 include an OLS regression with no fixed effects. Columns 2, 4 and 6 include year and industry fixed effects. *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

Change in percentage of women in Board	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PE Dummy	0.035	0.038	-0.043	-0.041		
	[0.067]	[0.080]	[0.071]	[0.082]		
Board Size			0.114*	0.091*	0.116*	0.091*
			[0.026]	[0.032]	[0.027]	[0.032]
Company Age			-0.074***	-0.052	-0.077***	-0.053
			[0.043]	[0.048]	[0.042]	[0.048]
Company SIze			0.026	0.053	0.032	0.053
			[0.033]	[0.039]	[0.032]	[0.038]
PE Percentage					-0.136	-0.077
					[0.107]	[0.130]
_Cons	-0.242*	-0.407***	-0.284	-0.739***	-0.323	-0.731***
	[0.053]	[0.219]	[0.343]	[0.434]	[0.341]	[0.432]
Observations	220	220	220	220	220	220
R^2	0.001	0.210	0.069	0.252	0.074	0.252
adjusted R^2	-0.003	0.049	0.052	0.084	0.056	0.085

Table 8. The output of the regression analysis – Change in percentage of men in the Board

This table presents the output of 3 ordinary least squares regressions (OLS). The dependent variable in all regressions is Change in percentage of men in the Board. Robust Standard Errors are bracketed. Industry dummy variables are constructed for each industry, defined by the 2-digit NACE code. Columns 1, 3 and 5 include an OLS regression with no fixed effects. Columns 2, 4 and 6 include year and industry fixed effects. *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

Change in percentage of men in Board	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PE Dummy	-0.017	-0.033	0.044	0.036		
	[0.048]	[0.052]	[0.049]	[0.055]		
Board Size			-0.035***	-0.023	-0.036***	-0.023
			[0.020]	[0.028]	[0.199]	[0.027]
Company Age			0.088**	0.100**	0.089**	0.100**
			[0.036]	[0.039]	[0.037]	[0.040]
Company Size			-0.029	-0.051***	-0.032	-0.050***
			[0.020]	[0.026]	[0.020]	[0.026]
PE Percentage					0.108	0.067
					[0.080]	[0.091]
_Cons	0.114*	-0.024	0.128	0.107	0.148	0.099
	[0.036]	[0.107]	[0.209]	[0.251]	[0.206]	[0.251]
Observations	216	216	216	216	216	216
R^2	0.0006	0.188	0.058	0.248	0.062	0.248
adjusted R^2	-0.004	0.019	0.040	0.076	0.044	0.076

Table 9. The output of the regression analysis – Change in average Board Experience of the board members.

This table presents the output of 3 ordinary least squares regressions (OLS). The dependent variable in all regressions is Change in average Board Experience of the board members. Robust Standard Errors are bracketed. Industry dummy variables are constructed for each industry, defined by the 2-digit NACE code. Columns 1, 3 and 5 include an OLS regression with no fixed effects. Columns 2, 4 and 6 include year and industry fixed effects. *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

Change in Board Experience	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PE Dummy	-0.019	-0.014	-0.023	-0.025		
	[0.051]	[0.060]	[0.054]	[0.060]		
Board Size			-0.078**	-0.088**	-0.078**	-0.088**
			[0.035]	[0.036]	[0.035]	[0.036]
Company Age			0.041	0.029	0.040	0.028
			[0.033]	[0.045]	[0.034]	[0.046]
Company Size			0.057**	0.061***	0.058**	0.062**
			[0.025]	[0.032]	[0.023]	[0.030]
PE Percentage					-0.055	-0.058
					[0.079]	[0.102]
_Cons	-0.263*	-0.098	-0.875*	-0.640	-0.884*	-0.640
	[0.036]	[0.230]	[0.275]	[0.445]	[0.264]	[0.441]
Observations	199	199	199	199	199	199
R^2	0.001	0.150	0.082	0.219	0.083	0.220
adjusted R^2	-0.004	-0.046	0.063	0.022	0.064	0.023

Table 10. The output of the regression analysis – Change in average Industry Experience of the board members.

This table presents the output of 3 ordinary least squares regressions (OLS). The dependent variable in all regressions is Change in average Industry Experience of the board members. Robust Standard Errors are bracketed. Industry dummy variables are constructed for each industry, defined by the 2-digit NACE code. Columns 1, 3 and 5 include an OLS regression with no fixed effects. Columns 2, 4 and 6 include year and industry fixed effects. *** , ** and * indicate significance at the 10%, 5% and 1 % level, respectively.

Change in Industry Experience	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PE Dummy	0.002	0.069	-0.020	0.016		
	[0.103]	[0.120]	[0.111]	[0.130]		
Board Size			-0.042	-0.052	-0.043	-0.054
			[0.066]	[0.067]	[0.066]	[0.067]
Company Age			0.063	0.126***	0.066	0.133***
			[0.071]	[0.068]	[0.069]	[0.069]
Company Size			0.073	0.130***	0.068	0.114
			[0.052]	[0.068]	[0.055]	[0.072]
PE Percentage					0.027	0.208
					[0.208]	[0.294]
_Cons	-0.380*	-0.644*	-1.210**	-1.988*	-1.182**	-1.920*
	[0.050]	[0.145]	[0.575]	[0.619]	[0.592]	[0.622]
Observations	191	191	191	191	191	191
R^2	0.000001	0.156	0.019	0.193	0.019	0.198
adjusted R^2	-0.005	-0.048	-0.002	-0.022	-0.002	-0.016