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THE RELATIONSHIP BETWEEN EUROPEAN BANKS' PERFORMANCE AND FEMALE BOARD REPRESENTATION

Programme International Business Administration, specialization Finance

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ABSTRACT

Nevertheless that the gender-related issues have gained much attention recently, the banking industry has yet remained rather male-oriented. This graduation thesis investigates whether a relationship between banks' performance and female board representation exist. The research takes into account banks operating in Europe from the years 2004 to 2015. Altogether data from 282 banks are used. This research aims to seek if having female board representatives affects the performance of the bank. The performance measures used in this study are the Return on Assets (ROA) and the Return on Equity (ROE). The possible relationship is studied in two separate ways. Firstly, by conducting student's t-tests to seek the linkage between the female board representatives and ROA and ROE. Then, by conducting a regression in MS-Excel where the relationship between dependent and independent variables is studied.

The outcomes of the research are varying, and most of the research finds no relationship between female board representation and banks' performance. The regression part of this study indicates that there might be a linkage between how well the banks perform and the existence of female board representatives. However, in the student's t-tests for the ROA and ROE, no positive correlation is found.

Keywords: banks, board of directors, corporate governance, female board representation, gender diversity

INTRODUCTION

The gender equality matter has gained a growing amount of attention over the past ten years, especially amongst branches that are considered to be male-oriented. Besides the attempts to increase the number of female board representatives, females are still outnumbered by males in the boards of companies. The educational gap between males and females has disappeared, but a gap between the number of male and female board representatives still exists. Due to this gap potential female representatives are often ignored when recruiting new board members, and this might lead to the worse performance of the bank and a loss of talented board representatives. Profitability of banks is dependent on many factors including corporate governance mechanisms that have gained more attention after the financial crisis which began in 2007. It has been studied by Erkens et al. (2012) that one of the reasons for poor performance during the financial crisis was the size of the board. This suggests that one important factor influencing banks' performance is the structure and composition of their boards (de Haan, Vlahu 2015). Regardless of the fact that women should be equally able to enter the banking industry today, it is rather rare to see more women than men on the boards of the banks. Board gender diversification is a matter, which is considered to be important in different branches, but having the majority of women on boards in the banking industry is unusual. The banking industry is often excluded from the gender diversity studies because the complexity of banking business increases the asymmetry of information. As banks are the key element on payment and economic systems and possessing a high level of leverage, the performance, and board structure should be studied more (de Andres, Vallelado 2008). This complexity of the industry has led to the situation where there is proportionally only a small number of studies conducted about the relationship between the female representatives and performance of the banks. Nevertheless, there is anecdotal evidence attesting to the advantages of having women on boards (Jamali et al. 2007, 575).

It was stated in 1977 by Kanter that homogeneous top management teams cooperate more because social similarity breeds trust (1977). However, in the 21st century, it has been proved otherwise - a homogeneous group of directors does not necessarily accurately represent the society as a whole (Lückerath-Rovers 2011, 492). After few researches conducted in the banking

industry, it has been discovered that female representatives on boards might bring in new skills, abilities and fresh perspectives. There has also been an indication of a positive correlation between firm's value and the percentage of women on the board of directors (Jamali et al. 2007, 575). It has also been stated that females have higher expectations regarding their responsibilities as directors, which can lead the board to become more effective monitoring managers (Mateos de Capo et al. 2011, 146). However, in global comparison, the number of women working in the banking industry is smaller than the number of men. Moreover, even though Europe is considered vanguard when discussing equality issues yet it has not found a way to make banking industry more female-oriented.

This thesis will focus on examining how gender diversity of the boards affects the efficiency and performance of banks. In addition, this thesis will study if there is a linkage between the existence of female representatives in the board of directors and the performance of a bank. This thesis will also conduct a regression to seek if the presence of female representatives, the natural logarithm of total assets, or equity to total assets has an effect on the performance of the bank. The aim of this Bachelor's Thesis is to seek if having female representatives on the board of directors have any kind of effect, either positive or negative, on the performance of the banks.

The main research questions discussed in this thesis are:

1. Whether and to what extent does the performance of European banks differ?
2. Whether and to what extent is female board representation related to the performance of European banks?

To seek answers to these research questions, empirical analysis is conducted using yearly data for 282 European banks from the period 2004 to 2015. In order to find if female board representation has any effect on banks' performance, the data will be separated into two sets. The observations that confirm female representation in banks' board will be sorted into the first set and the observations which do not will be sorted into the second set. This thesis will use Return on Assets (ROA) and Return on Equity (ROE) as the performance measures of the banks. Finally, t-tests will be done to determine if the performance of those two sets of data are significantly different from each other. Data used in this thesis is downloaded from Thomson Reuters Eikon database. In addition, this thesis will use regression analysis to seek if there is a linkage between the dependent variable ROA and independent variables such as the presence of female representation, and bank's assets.

This thesis will be divided into three parts. The first part will focus on defining the banks' performance in Europe and will provide a detailed description of the current status of female board representatives. It will also take into consideration previous studies and findings conducted around the same topic. Also, the percentage of female representatives and size of the board will be taken into closer consideration by seeking the linkage between the percentage of female representatives and the size of the board and bank's performance using previous studies. The second part will describe the econometric modeling and methodology that are used to make an empirical study about the relationship between banks' performance and female board representation. In addition, an overview of used sampling principles and descriptive statistics of the sample will be provided. The third part will present the results of the empirical analysis. Finally, the results of this study will be analyzed, the main conclusions will be drawn, and suggestions for future research will be provided.

1. THEORETICAL FRAMEWORK

1.1. Gender diversity in top management

A banks' board plays a vital role in achieving effective governance (Pathan, Faff 2011). It could be argued that corporations, including banks, like other organizations, should reflect society as a whole and on that account, the number of female board representatives should be higher (Rose 2007). In terms of globalization, the diversification at workplaces is a matter which requires more recognition. In the past, the board representatives were the majority of males, and the management level was traditionally dominated by males. Over the past century, women have actively been taking the stand in becoming independent and succeeding career-wise. Since the 1980's, the companies have implemented strategies to increase the share of women as in board representatives and managers, and today the European workforce consists 50% of women (Huber 2012). In 2015 three countries with the most female board representatives in Europe were Norway (46.7%), France (34.0%) and Sweden (33.6%) (Catalyst 2015). The high results of Norway can be explained by the gender quota established in 2008 in which it was concluded that 40% of board members must be females or the firm faces dissolution (Adams, Ferreira 2008, 292). Nevertheless the compulsory quotas established to ensure female representation, many studies have also noted that the "glass ceiling" still exists regardless of the measures taken to equalize the opportunities for both sexes to succeed equally. Glass ceiling and stereotyping often interferes with the career progress of many middle- and higher-class female managers and board representatives (Berger et al. 2012). Besides the mandatory quotas, many European countries have made recommendations for the minimum level of female representation in the corporate boards. However, while the quotas and recommendations might bring in new female representatives, it may cause the boards to be overpopulated by unqualified representatives (Lending, Vähämaa 2016). Grosvold and Brammer (2011) write that "even if women attain the formal and professional prerequisites for board directorships, they face a number of organizational barriers en route to board directorships, including opaque recruitment processes, insufficient career development opportunities, and lower remuneration."

Traditionally the diversification of boards has created two contradictory views, one in favor of diversification and the other against it. The theory introduced by Kanter in the 1970's claimed that homogeneous boards would perform more efficiently because of the similar structure of the board (Kanter 1977). This homogeneity is thought to make decision processes more efficient because of the social similarity. Kanter also states that when the uncertainty of a company is high, it tends to rely more on homogeneous boards. In this case, homogeneous boards are more valued at times of uncertainty because they are thought to provide more stability compared to gender-diverse boards. Berger et al. (2012) have also found that if individuals come from very different backgrounds, this might harm their cooperation and restrict their ability to decide appropriately. However, on the contrary, Brunzell and Liljeblom (2013) discovered that high-risk firms tend to hire more female board representatives. Most research has argued that women are discriminated against the appointment processes for board positions, or that women may lack the necessary competencies, networks or desire to pursue board appointments. Also, women are less likely to be nominated for compensation, executive, and finance committees and more likely to public affairs committees (Brunzell, Liljeblom 2013). Although the importance of female board members has been acknowledged, there has also been a discussion about the willingness of females to be appointed for the board positions, as females have made only modest gains to reach out for them (Mateos de Capo 2011). Furthermore, the lack of role models for females is perceived as a serious disadvantage by women who want to climb up the career ladder (Huber 2012).

However, a more recent view prioritizes the importance of having women in top management. Also, this has been associated with higher level of performance. A number of previous studies (Campbell, Mínquez-Vera 2007; Adams, Ferreira 2004; Carter et al. 2003) concluded that gender diverse boards have a better understanding of markets because the diversity of boards generate a greater variety of opinions. Diversification of boards allows better geographic understanding of customers and suppliers which leads to a greater share of the markets. It also leads to more efficient ways to solve problems; decisions made in heterogeneous groups tend to yield various ways to solve the problem. This heterogeneousness leads to more innovative and creative ways to develop the company further (Carter et al. 2003). Innovativeness is a factor which is seen positive both for the development in the future and for the competitiveness of a company. Having women on board in an organization signals supporting the equal rights and helps the process of women's professional advancement. In addition, it creates a better public image through role models (Jamali et al. 2007). Lending and Vähämaa (2016) have also stated that

women are more diligent in participating in the board meetings and that the more gender-diverse the board is, the fewer attendance problems the male executives have.

The banking industry has traditionally been a branch of male managers, and still, the majority of board representatives and top managers consist of males. The minimal participation of females in boardrooms as brought out by Jamali et al. (2007) can be explained by many factors. For example, the small number of available vacancies, the reluctance of organizations to appoint women and minorities, the preference of male CEO's to appoint other male CEO's as board members, difficulties in finding qualified and interested women, the fear that the board diversity will complicate the decision-making process, and the fact that there is no penalty for not having women on boards. Lately, some companies have felt societal pressure to add female representatives to their boards, and this societal pressure has led to nominating females to top-management positions without considering their abilities to succeed in that position (Lending, Vähämaa 2016). This male administration is a relic from the past because decades ago it was common for females to stay home rather than pursue a successful career. Nevertheless, now it has been found that female board members come from a variety of different backgrounds such as marketing, technology, human resources, and finance which brings more variety and experience to the boardroom (Jamali et al. 2007). These factors bring in the innovation and creativity as well as different angles to the decision-making processes.

1.2. The size of the board

Conyon and Peck (1998) suggest that the purpose of having a board in a company is to replace the management in times of poor financial performance, or more generally to hire, fire and compensate the Chief Executive Officer. They also suggest that the importance of board size should be emphasized. It has been found that there is an upper limit for the size of the board of directors, as coordination, communication, and decision-making problems are known to impede company performance when the number of directors increases (Tanna et al. 2011, 443). This indicates that, at least to some extent, board size can be associated with affecting the level of company's performance. However, the efficiency of the board of the bank is dependent on many factors such as gender and ethnical diversity, the origin country of the bank, the activity of the board and the size of its board. One factor in determining the size of the board is also the ownership structure of the bank (Krivogorsky 2006). It has been found out that an inverse

relationship between banks' performance and its board size exists (Conyon, Peck 1998; Pathan, Faff 2011). However, these studies also emphasize that the relationship between banks' performance and the size of the board depends on the economic environment of the company

De Andres and Vallelado (2008) state that boards which are larger and balanced between insiders and outsiders and male and female representatives create more value in the banks. One of the advantages of larger boards is that they have a greater amount of collective information available. However, most of the public debate of the board structure has centered on pressure for smaller boards. It has been found that boards that consist of seven to nine people are the most efficient (Guest 2009). It is generally thought that companies with a smaller board of directors are more effective and profitable since they can monitor the company better (Staikouras et al. 2007). They have also detected that the effectiveness of the board decreases as the size of the board increases. Lower communication and coordination costs and lack of "free-riders" in the board are benefits of a small board of directors (Pathan, Faff 2011). It has been argued that although larger board size initially facilitates key board functions, there comes a point when larger boards suffer from coordination and communication problems and hence board effectiveness and the performance of the firm declines. Also, the representatives in large boards might have issues with expressing their opinions, as well as challenges with getting through agenda in limited time frame (Pathan, Faff 2011). It has been stated as well that oversized boards represent bad governance (Conyon, Peck 1998).

By the study conducted by Belkhir (2009), it was found out that banks can adjust the size of the board based on their past performance. He also made a discovery that often the size of the bank and the size of its board have a positive correlation, when the size of the bank increases, also the number of board of directors tend to increase. This finding implicates that the size of the board is not always optimal when it comes to the efficiency of the board. Guest (2009) concluded that the performance of the bank and its board size differ considerably in different countries depending on how much the performance is stressed in that country. Also, often a correlation exists between the size of the board and the number of female board of directors which implicates that adding more female board representatives creates communication and coordination problems (Guest 2009). On the other hand, the study on European Women on Boards (2016) made about the gender diversity on European boards stated that on average the firms in Europe have the same percentage of female representatives regardless of the size of the board.

1.3. Previous research on the topic

The relationship between the female board representation and company performance has been studied previously resulting both positive correlation and no correlation. It is a growing area of research because regardless of the measures taken to increase female share in the boards, the share of women is considerably low in the European countries (Lückerath-Rovers 2011). Different researches made on the female board representation claim that having women on the board increases the shareholder value (Campbell, Mínquez-Vera 2007). Furthermore, increasing shareholder value implies often better public image and reputation for the company (Carter et al. 2003). The gender diversified top management and board also gives a positive signal to the employees of the company. It has been studied that the overall image of a company is viewed positively by the possible customers. Also, more gender-diverse boards are positively related to corporate social responsibility (Lending, Vähämaa 2016). From this, it follows that gender diversification has a positive effect on business performance. The more gender diversified board, the better it can respond to the changes in the diversified market (Lückerath-Rovers 2011). It has been remarked that female representatives can ask more freely questions and provide more strategic inputs which can generate more creative outputs. Compared to traditional management styles, females also are depicted to have a more hands-on management style, and creativeness and innovativeness is emphasized and valued which leads to greater variety in solutions (Brunzell, Liljeblom 2013). It has been discovered by Pathan and Faff (2011) that large firms tend to hire more female managers, especially companies that operate in service-oriented, labor intensive or women's product industries.

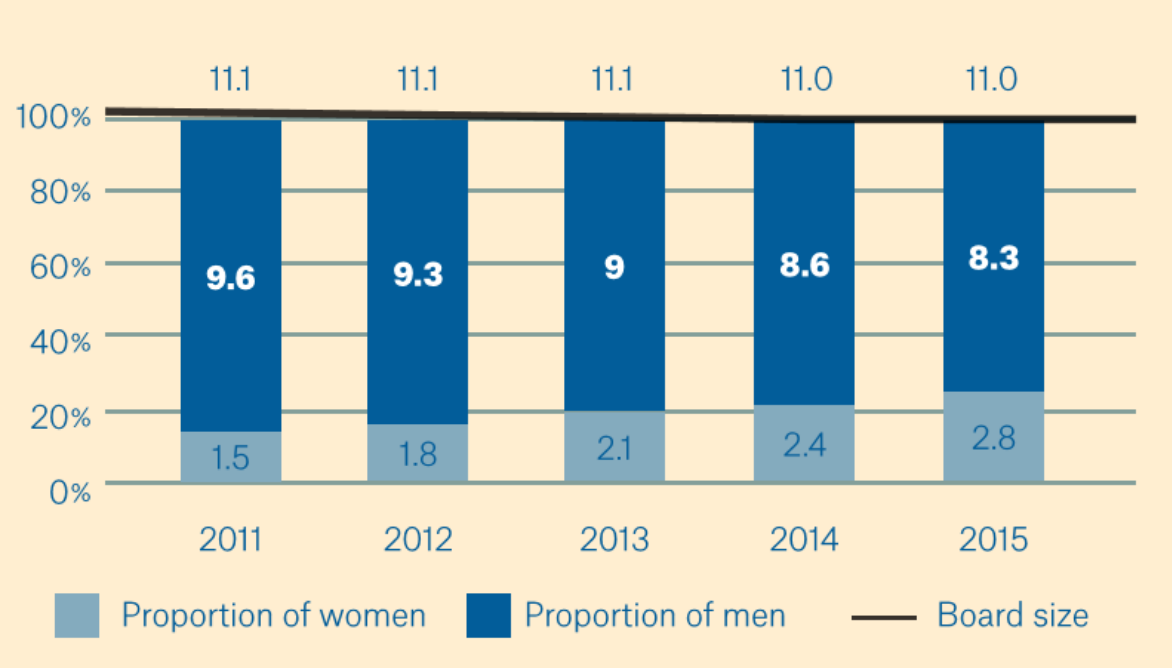

Figure 1. Average number of male and female representatives on European Boards.
Source: European Women on Boards (2016)

The previous studies have noted that the number of women in the board representatives is increasing. Figure 1 above sums up the results of a study conducted by A European Women on Boards Study (2016). It found out that the average number of female representatives on European boards has been steadily increasing from 1.5 out of 11.1 in 2011 to 2.8 out of 11.0 in 2015. On average the increase in percentages has been 11.9%. The same study also concluded that the tenure spent on the board of the firm is on average 3.7 years in female board representatives and 6.4 years in male board representatives. It has been found that often the pressure coming from both outside and inside the company has resulted in adding more board seats to women in order to achieve the desired gender mix (Farrell, Hersch 2004). Also, many proposals from government explicitly stress the importance of the gender diversity in the boardroom (Adams, Ferreira 2008). Moreover, studies show that seats held by female board representatives are often passed forward also to females (Dutta, Bose 2007).

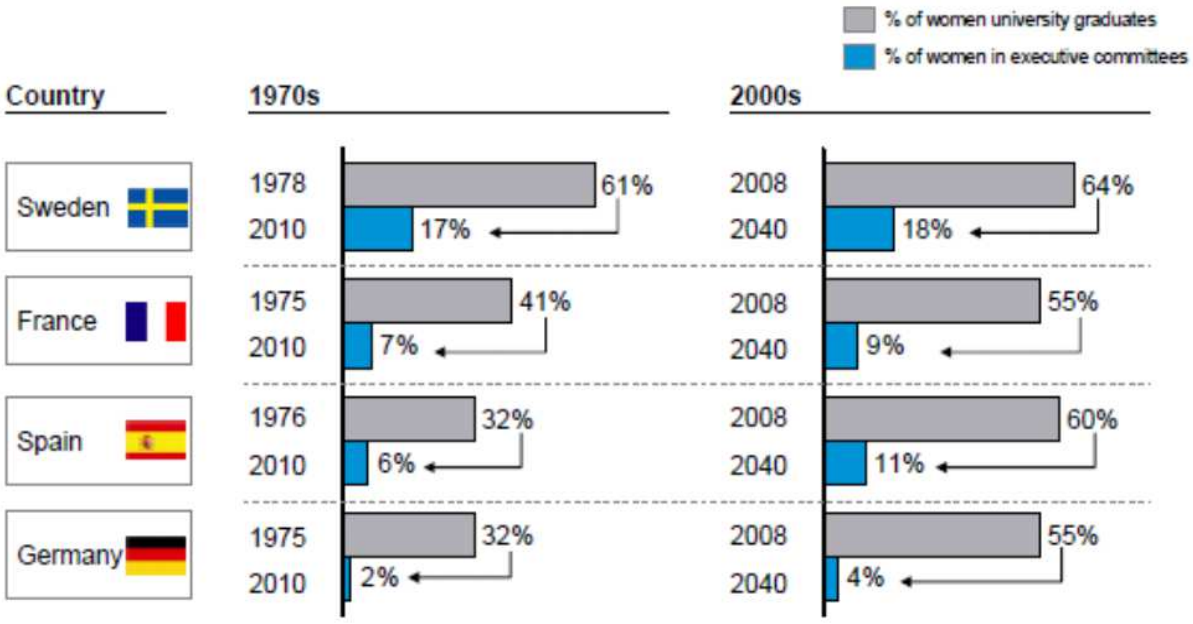

Figure 2. Female university graduates vs. women in executive positions
Source: Huber (2012)

The increasing number of seats held by female representatives can be partially explained by the number of the university graduates. The number of females graduated from university is increasing and is high in Europe when considering the overall situation globally. Figure 2 above states that despite the high level of the university graduates in these European countries (Sweden, France, Spain and Germany) the number of women in executive positions follows far behind. But regardless of a large number of women that have a university-level education, the situation on the job market is not affected towards the way of having more female representatives. The reason behind the gap between male and female representatives is considered to be somewhere else than in education. Grosvold and Brammer (2011) suggested that one of the motives behind the gap between male and female representatives is the country's institutional environment because it shapes how common the prevalence of female representatives is. They found out that the Scandinavian and Eastern-European countries were more prone to be having female board representatives than Latin-European which was explained by the traditional role of females in the society. It has been assumed that one of the reasons for creating the gap between male and female representatives is the recruitment and promotional systems of companies. These systems should be revaluated and refined because they often seem female unfriendly and discriminating for women (Huber 2012). The systems should be changed because both men and women should

have equal chances of being hired for all the jobs. If there is discrimination between sexes, it will not be possible.

Despite the numerous positive results, there are studies that have found no significant relationship between the performance of a company and female board representation (Berger et al. 2012). The biggest issue when discussing about the diversified board representation is that by adding female seats to the board, the decision-making will eventually become a harder process. This is because of the larger amount of opinions provided. Also, often the diversification makes reaching unanimous decision slower (Adams, Mehran 2005). However, the majority of empirical studies conducted around the topic have found a positive dependency on the diversification and the female board representatives. This is a matter which needs to be studied further and has to be developed forward so that the equality will eventually be reached (Carter et al. 2003; Adams, Ferreira 2004; Campbell, Mínquez-Vera 2007; Huber 2012).

2. SAMPLE AND METHODOLOGY

2.1. Sample

The data used in this thesis is taken from the Thomson Reuters Eikon database. More specifically, performance measures and information about the banks' age and board composition such as female representation percentage and number of board representatives were gathered. The database covers banks from all around the globe, but the sample in this study was narrowed down, and only the banks operating in Europe were taken into analysis. The sample consists of 282 different European listed banks, and yearly data is gathered for the period 2004-2015. The total number of observations is 3384 of which 576 (17%) represent the ones with at least one female in banks' board of directors, the rest 2808 (83%) are the observations that show only male members in banks' board of directors. This thesis focuses on two profitability indicators of a bank: the Return on Assets (ROA) and the Return on Equity (ROE). The data was sorted out into two parts from which the profitability was measured and compared. The first part of data consisted of the banks that had only males on their board of directors and the second part consisted of the banks that had at least one female on their board of directors. In addition, the number of board representatives and the percentage of female representatives of the board of directors was used to make a regression analysis in Excel. Also, the natural logarithm of total assets and equity of total assets were used in the regression to see if the performance of a bank was dependent on these variables.

The previous studies have stated that the countries with the largest share of female representatives are Norway, France, and Sweden (Catalyst 2015). However, those results are from all the industries which have been studied in Europe. Figure 3 below shows the division of female board representatives by countries during the years 2004 to 2015 based on the sample used in this study. In can be seen that the countries which have the most female representatives on their board are Italy, Spain, and the United Kingdom. However, in this case, countries such as Sweden and France have rather a large share of female board members in the banking industry, but Norway lies in the latter part of the table.

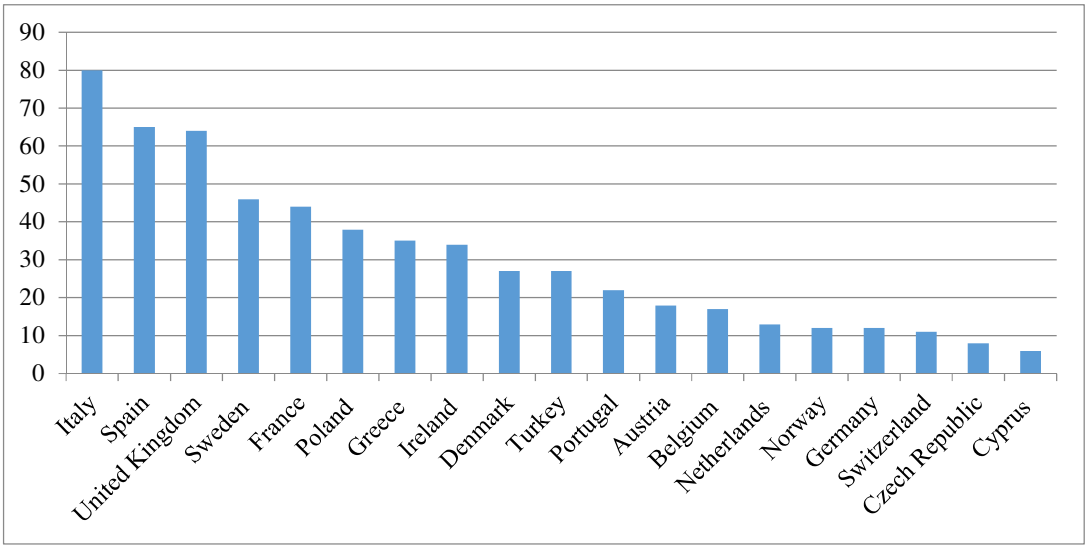

Figure 3. The number of observations with female board representatives in Europe by countries, during the years 2004-2015
Source: Author's calculations (2018)

The Table 1 below shows the number of female board representatives in Europe during the years 2004 to 2015. It can be seen that the amount of female representatives from the year 2004 to 2015 has been steadily increasing from year to year. The amount of female board representatives has more than tripled in 11 years. As the percentage, in 2004 there were 6.7% banks with female board representatives out of the total of 282. In 2015 the percentage was 25.2%. Many European countries have set the mandatory quota for female board representatives to 40%. However, there are still many countries that are not using the quota, which brings down the average number of the whole Europe.

Table 1. The number of banks with females on board and with no females on board.

Year	Banks with females on board	Banks with no females on board	Total
2004	19	263	282
2005	24	258	282
2006	28	254	282
2007	35	247	282
2008	42	240	282
2009	44	238	282
2010	55	227	282
2011	60	222	282
2012	64	218	282
2013	68	214	282
2014	66	216	282
2015	71	211	282

Source: Author's calculations (2018)

2.2. Methodology

The overall performance of banks was measured by both, the ROA and ROE of the banks. In order to get a more detailed description of the banks' performance, the yearly results of banks were compared in addition to the whole period of 2004-2015. The mean ROA and ROE were used when looking at the overall performance of banks. This study used Data Analysis tool pack in MS Excel for data processing.

ROE and ROA measure the performance of a company, so they were selected to find out if there was a correlation between the banks' performance and the gender diversity of board representatives. In this study Return on Assets is measured as the net income before taxes to total assets. The ROA describes the banks' profitability compared to its total assets. The Return on Equity is measured by the net income before taxes to total equity.

Student's t-test was used in this study to compare the average performance of the banks that had at least one female on their board to the ones that had no female representatives. Firstly F-test was used to determine if the t-test for two-sample assuming equal variances or the t-test for two-sample assuming unequal variances should be used. The relevant null hypothesis (H0) was set up, saying that the sample variances are equal. Accordingly, the alternative hypothesis (H1) says that the sample variances are unequal. When the F statistic's value exceeded the F critical value

in selected significance level, then the null hypothesis is rejected and t-test assuming unequal variances should be used in further analysis. Alternatively, the null hypothesis is confirmed, and the sample variances are assumed to be equal.

F-test comparing the variances of two samples was run for the whole period of 2004-2015 and also yearly. In this study, after conducting the F-test, the value of F statistics exceeded the F critical value. Thus, it was conducted that the t-test for two-sample assuming unequal variances should be used in further data analysis. The t-test for two-sample assuming unequal variances is calculated as shown in the formula below.

$$t = \frac{(\overline{x} - \overline{y}) - (\mu_x - \mu_y)}{\sqrt{\frac{s^2x}{n_x} + \frac{s^2y}{n_y}}}$$

where

$\overline{x}$ – the sample mean of x
$\overline{y}$ – the sample mean of y
s_x – the standard deviation of the sample x
s_y – the standard deviation of the sample y
n_x – the sample size of x
n_y – the sample size of y

The relevant null hypothesis (H0) set for t-test says that the means of two samples are equal. And the alternative hypothesis (H1) says that the means of two samples are unequal. The null hypothesis is confirmed if the absolute value for t-statistic is smaller than the relevant critical value. Otherwise, the null hypothesis will be rejected, and the means of two samples are unequal. The t-test was used to measure the possible difference in performance between the banks with only men in their board and the banks which had at least one woman on their board of directors. This statistical significance was measured separately for the ROA and ROE. The significance level (or alpha) used in this study was set to be 0.05 or 5%. Thus, the result is statistically significant if $p \leq 0.05$.

In addition, the regression analysis was executed in MS Excel to see if the change in independent variables yielded a change in the dependent variable. Firstly, the banks which did not have any data for female board representation, the number of board of directors and banks' age were left

out in order to get accurate results. The regression was run for separately for all the years from 2004 to 2015 by using the real values. In regression, the dependent variable in this study was set out to be ROA, and the independent variables were the percentage of female board representation, the number of board representatives, banks' age, the natural logarithm of total assets, and the equity to total assets. The significance level in the regression was set to be 0.05 or 5%, and the result was statistically significant if $p \leq 0.05$. The results which were above the significance level of 0.05 were considered to be null, so in this case, they were rejected. The formula below shows the general model of the regression that includes all the variables.

$$ROA_{it} = \alpha_i + \beta_1 s00037_{it} + \beta_2 s00035_{it} + \beta_3 age_{it} + \beta_4 ln\_ta_{it} + \beta_5 e\_ta_{it} + \varepsilon_{it}$$

where

ROA_{it} – return on assets of bank i in the year t
α_i – constant
$s00037_{it}$ – the percentage of female board representatives of bank i in the year t
$s00035_{it}$ – board size of bank i in the year t
age_{it} – age of bank i in the year t
ln_ta_{it} – natural logarithm of total assets of bank i in the year t
e_ta_{it} – equity to total assets of bank i in the year t
ε_{it} – regression residual

3. EMPIRICAL RESULTS AND DISCUSSION

In this section, the empirical results gathered from the study are analyzed and looked deeper into. The ROA, ROE and t-test two-sample assuming unequal variances are analyzed separately in order to see if there is difference in performance of banks with at least one female in their board versus banks which have only males in their board of directors. Also, the results of the regression are analyzed and discussed.

3.1. Profitability of the banks

The Return on Assets was measured separately from the Return on Equity. The banks with only male representatives on their board were compared to the banks with at least one female. The mean was calculated from the t-test and used in Figure 4 below. From the Figure 4 it can be seen that for many years, the banks which had only males on the board of directors were performing better. However, the number of banks which had at least one female on their board of directors varied increasingly from 19 to 71 from 2004 to 2015. There was relatively high variation in the average ROA of the banks with only male board representatives. The results varied from the highest point of 1.78% in 2006 to the lowest point of -1.02% in 2015. The banks with at least one female board representative did not undergo as much as fluctuation as the banks with only male representatives. The average yearly ROA varied with those banks from 1.47% in 2007 to -0.47% in 2011. However, both, banks with only male representatives and banks with at least one female representative, experienced a decrease in ROA from 2008 to 2011 which can be explained by the financial crisis which began in 2007.

Figure 4. Average yearly Return on Assets, 2004-2015
Source: Author's calculations (2018)

When discussing the yearly ROE, it can be said that banks which have at least one female on their board of directors are performing better. When looking at Figure 5 below it can be seen that at the beginning of the period banks with females were doing better. However, as previous studies have stated, there has been a little evidence on how and if there is a positive correlation between the female representatives and banks' performance (Adams, Ferreira 2004).

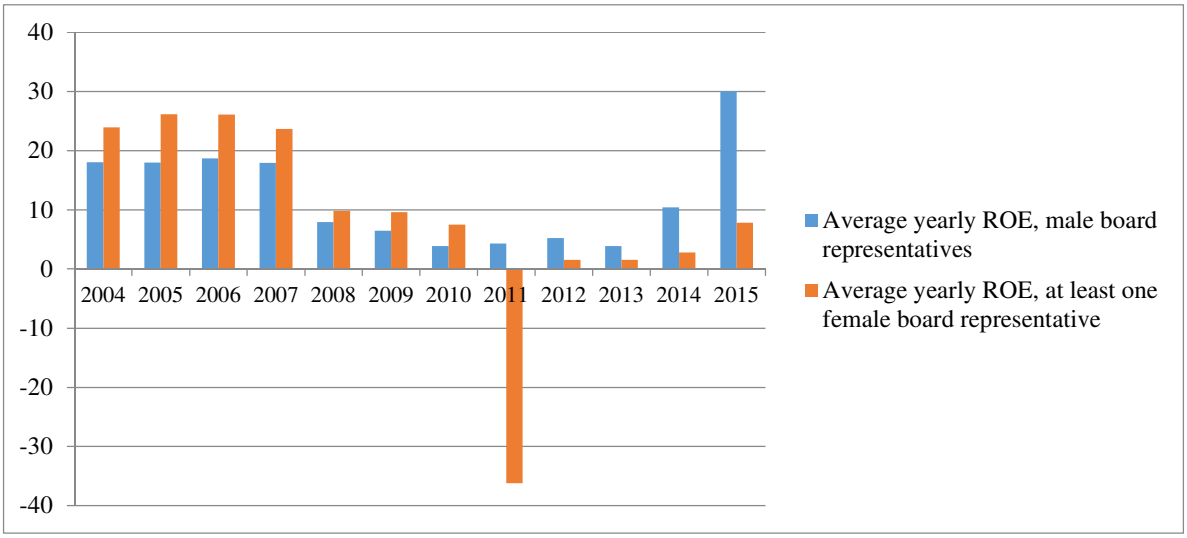

Figure 5. Average yearly Return on Equity, 2004-2015
Source: Author's calculations (2018)

The fluctuation in the results of average ROE is rather big which makes the results hard to interpret and compare. When comparing the average yearly ROE with at least one female board representative, the highest ROE of 26.14% was in 2005 and the lowest ROE of -36.22% in 2011, the difference shown on the graph is large, and it is hard to draw conclusions which might have led to that result. Also, the results of male board representatives vary from 30.08% in 2015 to 3.88% in 2013. There might be several reasons for the variation of the ROE such as the economic situation, the size of the board, the composition of the board and changes in the ownership of the bank (de Haan, Vlahu 2015). It also was noted that when the number of females on boards increases, the risk-taking in the companies increases (Berger et al. 2012).

3.2. Banks' performance and female board representation

The t-test two-sample assuming unequal variances was used because the f-test two-sample for variances showed that there is an unequal variance so that the statistical F value exceeded the critical F value. The alpha was set to be $p \leq 0.05$ so all the results from the t-test which were less than 0.05 were considered to be statistically significant. If the result was statistically significant, there was a possibility that on average the banks with female board representatives were doing better.

In Table 2 below the average yearly mean values for ROA are listed. Those mean values are from the t-test two-sample assuming unequal variances. From the table, it can be seen that the p values for the Return on Assets were statistically significant during the years 2004, 2005, 2006, 2007 and 2012. Also, the overall average from all the measured years was statistically significant. This indicates that there might be a relationship between the female board representatives and the banks' performance. In these years there was a possibility that the female board members would have had a positive effect on the performance of those banks.

Table 2. The yearly mean ROA, for male and female representatives and the significance of the f-test and t-test.

Year	Mean ROA (%)		Significance of F-test	Significance of t-test
	only male	at least one female		
2004	1.51	0.99	***	***
2005	1.65	1.13	***	***
2006	1.78	1.14	***	***
2007	1.71	1.15	***	***
2008	0.84	0.73	***	-
2009	0.51	0.76	***	-
2010	0.40	0.71	***	-
2011	0.25	-0.47	-	-
2012	0.74	0.00	***	**
2013	0.74	0.34	***	-
2014	0.08	0.38	***	-
2015	-1.02	0.57	***	-
2004-2015	0.78	0.49	***	**

Source: Author's calculations (2018)
Notes: ***p<0.01 **p<0.05 *p<0.1 and – if the result was not statistically significant

In Table 3 below the Return on Equity is taken into consideration. The years 2004, 2005, 2006 and 2007 were considered to be statistically significant because their p-value was lower than 0.05. In all of these years, the ROE with banks that had a female on their board of directors were higher than the ROE of banks which had only male representatives. So, during these years there was a positive relationship between the performance of the banks and their female board of directors. However, the linkage between statistical significance and ROE is not direct because in some years (2008-2015) the ROE of banks with at least one female was higher than the ROE of banks with only men. However, during these years the p-value for ROE was higher than the alpha of 0.05. This finding strengthens the assumption that the two factors mentioned above are not related.

Table 3. The yearly mean ROE, for male and female representatives and the significance of the f-test and t-test.

Year	Mean ROE (%)		Significance of F-test	Significance of t-test
	only male	at least one female		
2004	18.05	21.97	***	**
2005	18.02	26.14	***	***
2006	18.75	26.12	***	***
2007	17.95	23.67	***	***
2008	7.93	9.82	**	-
2009	6.47	9.62	***	-
2010	3.89	7.49	***	-
2011	4.30	-36.22	*	-
2012	1.56	5.25	***	-
2013	3.88	1.53	**	-
2014	10.43	2.80	***	-
2015	30.08	7.84	***	-
2004-2015	4.69	12.17	***	-

Source: Author's calculations (2018)
Notes: ***p<0.01 **p<0.05 *p<0.1 and – if the result was not statistically significant

3.3. Regression

The regression was conducted to see if a change in any of the chosen independent variables, the percentage of female board representation (s00037), the number of board members (s00035), the age of the bank, the natural logarithm of total assets (ln_ta) and the equity to total assets (e_ta), had an effect to dependent variable which was set out to be ROA. The significance level (or alpha) in the regression was set out to be $p \leq 0.05$, so the p-values from the independent variables which were less than 0.05 were considered to be statistically significant. In this case, they might have either positive or negative linkage to the ROA. If the linkage was found, it meant that the independent variable had a positive or negative correlation with the dependent variable, so it changed in the same direction as the dependent variable. The significance F was also considered important in the research because it explained if the results of this research were reliable. The significance level used in significance F was also set to $p \leq 0.05$. This meant that the results of the regression were reliable if they were less than 0.05 or 5%. Since the regression included multiple independent variables, the Adjusted R^2 was used instead of R^2. The Adjusted R^2 explained how many points fell to the regression line of the model or how big percentage fit the model.

First, the regression models were run in two different ways to see which model should be used in this research. The regression was run separately for both models for all the years from 2004 to 2015 to see in which model the adjusted R^2 was higher. It was seen from the results that the model which had three dependent variables had higher Adjusted R^2 during most of the years, so the model with three variables was used instead of the model with five variables. This proved that the fewer variables the model had, the more accurate the results from the model were.

Appendix 1 concludes the results from regression done separately for every year during the whole period of 2004-2015. During the period of 2004-2015, the number of banks that reported the necessary data for the regression grew from 16 banks in 2004 to 57 banks in 2015. The regressions show that the significance F, which measured the reliability of the results, was below 0.05 during all the years except 2015, which means that the results of this study are reliable. The results of the regression indicated that the independent variables s00037 and ln_ta were statistically significant only during one year, which was 2011. This meant that these two variables might have had an effect to the dependent variable on that year, so a correlation between the presence of females as board representatives and the natural logarithm of assets compared to ROA might exist. The third independent variable, e_ta, had results that were $p \leq 0.05$ during all the other years, except 2015, so a correlation between equity to total assets existed during 11 years out of 12. This addressed that the independent variable e_ta had a linkage to the ROA.

Furthermore, besides calculating regression by using real values, the regression for 2015 was also calculated by using the averages of the natural logarithm of total assets and equity to total assets for the whole period of 2004 to 2015. For the percentage of female board representation, the number of board representatives and for the age of the bank, the original values from 2015 were used. In 2015, 282 banks reported their results in the data and out of the 282, 57 banks reported the number of their board representatives and the percentage of females out of it. These 57 banks were used in the regression. The model with three independent variables was used because it had lower adjusted R^2 than the model with five independent variables. When looking at table 4 below, which uses the average values of ln_ta and e_ta in 2015, it was found that two of the variables, s00037 and e_ta, were statistically significant. So, if using the averages instead of real values for ln_ta and e_ta, the independent variable e_ta was statistically significant during all the years. It can be seen from the regression output below that the effect of female board representation (variable s00037) on banks' performance is minor. Even though that the

coefficient was positive, increasing the percentage of female board representation by 1% would lead only to 0.025% increase in ROA. Also, the table 4 states that when using the averages, the significance F was $9.29*10^{-8}$ which is below 0.05, so the results from this year are reliable, whereas when using the real values for 2015, the results were not considered to be reliable because the significance F was 0.292. This seems to indicate that, female board representation affects the performance of European banks only to quite small extent.

Table 4. Regression for 2015. Dependent variable ROA. Independent variables: percentage of female board representatives, the natural logarithm of total assets and equity to total assets

Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.025	0.009	2.616	0.012
ln_ta	-0.059	0.042	-1.418	0.162
e_ta	0.232	0.033	6.934	$5.77*10^{-9}$
R^2				0.486
Adjusted R^2				0.457
F statistic				16.686
Significance F				$9.29*10^{-8}$
Number of observations				57

Source: Author's calculations (2018)
Notes: s00037 – percentage of female board representatives, ln_ta – the natural logarithm of total assets, e_ta – equity to total assets

The year 2011 deviated more from the results of other years. As previously stated in Figure 4, the average yearly ROA was -0.47% in banks that had at least one female board representative. The year 2011 was the only year during the whole period where the average ROA with at least one female board representative was negative. However, the results from the regression in 2011, presented in table 5 below, state that all of the three independent variables were statistically significant. 2011 was also the only year with real values during which the s00037 and ln_ta were statistically significant. During 2011 these three variables had a linkage to the ROA. Because the yearly average ROA in banks that had at least one female board representative in 2011 was negative, this denotes that the independent variables might have affected to ROA moving towards negative direction. However, the actual effect is still quite small, as increasing the percentage of female board representation by 1% would lead only to 0.067% increase in ROA. Also, the adjusted R^2 was higher in regression results of 2011, 62.4%, if compared to the results

in 2015 when it was 45.7%. This indicated that more of the points of the regression fell to the regression line.

Table 5. Regression for 2011. Dependent variable ROA. Independent variables: percentage of female board representatives, the natural logarithm of total assets and equity to total assets

Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.067	0.032	2.099	0.041
ln_ta	0.675	0.236	2.842	0.007
e_ta	0.799	0.089	8.990	$1.31*10^{-11}$
R^2				0.647
Adjusted R^2				0.624
F statistic				27.515
Significance F				$2.92*10^{-10}$
Number of observations				49

Source: Author's calculations (2018)
Notes: s00037 – percentage of female board representatives, ln_ta – the natural logarithm of total assets, e_ta – equity to total assets

3.4. Discussion

The results listed above covering the studies of ROA, ROE and t-test two-sample assuming unequal variances show that banks' female board representation and the performance measures are not exclusively related. This can be deducted because the statistical significance is not changing always in the same direction as the ROA and ROE are. This can be seen for example in the year 2007 for ROA when the statistical significance is less than the alpha, but the ROA itself is higher amongst the banks which have only men on their board. However, during these years that were used for this research, there was the financial crisis in 2007-2008 which led to depression. This is one of the reasons why ROA and ROE started to fall in 2008. After the financial crisis, ROA and ROE have started to increase again but are not yet as stable as they were before the crisis.

The regression that was made did indicate that excluding variables s00035 and banks' age yielded more accurate results. The independent variables went through fluctuation in different years and only independent variable that was every year statistically significant was e_ta. This was the case only when used the average values of ln_ta and e_ta instead of real values in 2015, if real values were used, then e_ta was not statistically significant. This means that e_ta might

had a positive correlation with the dependent variable ROA, as expected. Regarding other two independent variables, s00037 and ln_ta the results were only statistically significant during 2011, so no stable correlation was found. The presence of female board representatives seemingly had an effect on the ROA, and during the year 2011, it was the strongest. This indicates that female board representation might affect the performance of European banks only to quite small extent. Nevertheless, that the results of average yearly ROA with banks that had at least one female representative were negative. By means of regression, during all the other years, a weak linkage between the performance of the bank and female board representatives existed. The number of how many banks reported their data that was suitable for the regression, was increasing during the whole period which was studied. This might indicate that more and more banks are aware that this issue should be addressed more and are ready to publish their information to the public and are open to change. The banks should make this information available to everyone so that it would be easier for people to understand that inequality still exists. By being open about the issues, it is easier to work towards correcting them.

During the period of 2004-2015 on average, only 17% of banks had at least one female in their board of directors. This issue should be addressed more in the future so equal rights in working life can be achieved. There should be more innovative ways to recruit women and encourage them more to reach out for the top management positions. Already existing mandatory quotas are a working way to increase the number of female representatives on the board of the banks. Even though the performance of a bank is not related or determined by how many female representatives it has, it is still important to acknowledge that the number of women should be increased.

CONCLUSION

In this research, the relationship between European banks' performance and female board representation was studied. The data used in this study was from years 2004-2015 from all the European countries. As previous studies have stated, there can be a weak positive linkage between banks' performance and female board representation. However, this relationship is weak since it was only found in few independent years which were not subsequent nor related by means of performance measures ROA or ROE. Despite the weak positive linkage, most of the data was treated as a null hypothesis which means that there was no significant positive linkage between the female board representatives and the performance of the bank.

While most of the studies conducted around the topic are encouraging towards more diversified board composition, still in most of the cases there is no any direct linkage that increasing the number of women would take the performance of a firm to a better direction. However, this was not the case every time, and most of the results concluded that even though the p-value addressed statistical significance, the ROA and ROE were better with the banks that had only men in their boards. It was found that there is no relationship between the performance of the bank and female board representation when using the ROA and ROE and the statistical significance.

The regression results proved that this research was reliable nevertheless the results from the regression varied. From the regression in 2015, when using the averages, it was seen that when the results in independent variables s00037 and e_ta were statistically significant, the ROA with banks that had at least one female board representative was growing. This denotes that the percentage of female board representatives and the equity to total assets might have a positive effect on to the ROA during some independent years. However, the regression results for 2011 stated that all the independent variables were statistically significant, but the average yearly ROA with banks that had at least one female board representative was at its lowest point. This, in turn, indicated that the independent variables might have had a negative effect on the ROA. The results from this research were varied, so the conclusion about the results is complicated to draw. One of the three variables, e_ta, was statistically significant during all the years, which indicates

that having a female representative on board of the bank effects the performance. This linkage indicates that e_ta had a positive correlation with the ROA, which means that when e_ta increases, so might the ROA and vice-versa. The other two independent variables were only significant during one or two years, so no stable relationship between them and the dependent variable was found. Nevertheless, that the percentage of female board representatives or ln_ta and the ROA had a linkage during few independent years. In this case, the linkage was weak, so it was not sufficient enough to determine whether it was a regular or accidental occurrence. When looking at the results from the student's t-tests, no direct linkage was found between the female board representation and ROA or ROE.

In this thesis, the overall linkage between female board representatives and performance is not found from the performance measures when using the student's t-tests. However there are still other studies which have found a positive relationship between the banks' performance and the number of female representatives, so it is possible to find the linkage by using some other measures than ROA and ROE. In this study, a positive correlation was found in regression between the dependent variable ROA and independent variable e_ta. So by using the regression, it is possible to find a linkage between the performance of the bank and female board representation. The studies which have resulted in positive linkage between performance and the number of female representatives should be taken into closer consideration. It has been studied that having more gender diversified board will bring in new skills and perspectives to the management board of the firm and can result in a positive way.

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APPENDICES

Appendix 1.

Regression for 2004-2015. Dependent variable ROA. Independent variables: percentage of female board representatives, the natural logarithm of total assets and equity to total assets

Year: 2004 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	$-9.60*10^{-4}$	0.006	-0.165	0.872
ln_ta	-0.038	0.053	-0.719	0.486
e_ta	0.171	0.062	2.755	0.017
R^2				0.561
Adjusted R^2				0.451
F statistic				5.106
Significance F				0.017
Number of observations				16
Year: 2005 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.002	0.003	0.631	0.537
ln_ta	-0.042	0.048	-0.882	0.391
e_ta	0.171	0.047	3.620	$2.30*10^{-3}$
R^2				0.636
Adjusted R^2				0.568
F statistic				9.320
Significance F				$8.45*10^{-4}$
Number of observations				20
Year: 2006 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	-0.004	0.006	-0.737	0.470
ln_ta	-0.079	0.069	-1.148	0.266
e_ta	0.214	0.058	3.688	0.002
R^2				0.590
Adjusted R^2				0.522
F statistic				8.632
Significance F				$9.17*10^{-4}$
Number of observations				22
Year: 2007 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	$2.20*10^{-4}$	0.006	-0.034	0.972
ln_ta	-0.030	0.056	-0.532	0.600
e_ta	0.197	0.048	4.090	$4.49*10^{-4}$
R^2				0.578
Adjusted R^2				0.523

F statistic				10.511
Significance F				$1.51*10^{-4}$
Number of observations				27
Year: 2008 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.006	0.007	0.786	0.437
ln_ta	-0.024	0.081	-0.290	0.773
e_ta	0.315	0.043	7.318	$2.12*10^{-8}$
R^2				0.775
Adjusted R^2				0.754
F statistic				37.877
Significance F				$8.55*10^{-11}$
Number of observations				37
Year: 2009 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	-0.005	0.010	-0.476	0.637
ln_ta	0.035	0.095	0.368	0.715
e_ta	0.307	0.049	6.312	$2.12*10^{-7}$
R^2				0.626
Adjusted R^2				0.596
F statistic				21.202
Significance F				$3.08*10^{-8}$
Number of observations				42
Year: 2010 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.005	0.017	0.308	0.760
ln_ta	0.201	0.140	1.438	0.157
e_ta	0.371	0.065	5.690	$8.99*10^{-7}$
R^2				0.489
Adjusted R^2				0.455
F statistic				14.359
Significance F				$1.07*10^{-6}$
Number of observations				49
Year: 2011 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.067	0.032	2.099	0.041
ln_ta	0.675	0.236	2.842	0.007
e_ta	0.799	0.089	8.990	$1.31*10^{-11}$
R^2				0.647
Adjusted R^2				0.624
F statistic				27.515
Significance F				$2.92*10^{-10}$
Number of observations				49
Year: 2012 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.008	0.013	0.639	0.526
ln_ta	0.179	0.110	1.634	0.109
e_ta	0.304	0.034	9.027	$1.16*10^{-11}$
R^2				0.669
Adjusted R^2				0.647
F statistic				30.308
Significance F				$7.10*10^{-11}$
Number of observations				49

Year: 2013 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.013	0.010	1.331	0.189
ln_ta	0.118	0.113	1.040	0.304
e_ta	0.308	0.054	5.704	$8.02*10^{-7}$
R^2				0.481
Adjusted R^2				0.447
F statistic				14.187
Significance F				$1.12*10^{-6}$
Number of observations				50
Year: 2014 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.028	0.018	1.609	0.114
ln_ta	0.083	0.175	0.475	0.637
e_ta	0.227	0.086	2.621	0.012
R^2				0.161
Adjusted R^2				0.108
F statistic				3.063
Significance F				0.037
Number of observations				52
Year: 2015 Variable	Coefficient	Standard Error	t Stat	P-value
s00037	0.036	0.018	1.927	0.059
ln_ta	-0.158	0.174	-0.907	0.368
e_ta	0.029	0.081	0.359	0.721
R^2				0.067
Adjusted R^2				0.015
F statistic				1.275
Significance F				0.292
Number of observations				57