The gender equality paradox in Swedish listed firms

Are Swedish listed firms' financial performances affected by the ratio of women and men in leading positions?

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Abstract

This dissertation aims to investigate the Swedish private sector, with focus on the share of women in leading positions, and its effect on firms' financial stability in terms of stock return volatility. This thesis is based on AllBright's three lists from 2018 which rank Swedish listed firms after their level of gender equality within the companies' top management. With respect to the six-sigma theory, three new lists have been created which take into account which type of top management constellation the company has implemented for at least three years in a row. From the empirical results, one can conclude that the share of women on the board of directors (WBD), and the share of women employed (WE) have had a negative effect on stock return volatility during the time period 2008 – 2016 in companies that have implemented an equal gender distribution in their top management for at least three years in a row. The opposite could be confirmed for firms that have implemented an unequal gender distribution within their top management for at least three years in a row. Since AllBright was founded 2011, information about the firms' duration on each list was gathered between 2011 – 2018, where the most recent three-year list-placement was used. The panel data set included fixed effects of firm-level, industry, time, robust standard errors, and accounting measures as control variables. Information about these variables was mainly gathered from Retriever, Orbis, Yahoo Finance, and the companies' annual reports. The final sample consisted of 136 companies corresponding to 1224 observations.

Keywords

Financial performance – gender distribution – green/yellow/red list – six-sigma effect – Swedish listed firms – top management constellation.

Abbreviations

Earnings before tax and interests-margin = EBIT-margin

Initial public offering = IPO

Return on assets = ROA

Return on capital = ROC

Return on equity = ROE

Return on investment = ROI

The share of women employed = WE

The share of women on the board of directors = WBD

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Contribution
To my knowledge, this thesis is a first attempt to discuss the relation between firm risk taking and the gender composition in Swedish firms' top management. By modifying AllBright's three lists, I have been able to deepen AllBright's analysis and present the consequences of gender inequality in firms' top management. In doing so, I have confirmed that the WBD and WE in companies with gender equal top managements, have a negative effect on the risk metric stock return volatility, compared to companies with low gender equality within their top management. Since the investigated companies are listed on Stockholm Nasdaq and are among Sweden's largest firms, they can be assumed to have a load-bearing obligation to mitigate systemic risks. Hence, it is of highest interest, that these firms are financially stable for the Swedish economy as a whole.

Introduction
In the aftermath of 2017's #metoo-movement, female empowerment has been a frequently discussed topic in Sweden. However, while public authorities claim that Sweden is in the leading-edge regarding gender equality, the private sector has remained silent. According to AllBright's report *En spricka i glastaket* which was published in October 2018, only 23 percent of the executives within Sweden's largest, listed firms, are women. Furthermore, only 6 percent of CEO positions were occupied by women, and 8 percent filled the post as chairman in the board of directors. Why is that so? Are Swedish listed firms' financial performances affected by the ratio of women and men in leading positions?

Several studies argue that a riskier behavior is more common among men than women, which consequently would affect the financial performance of a company negatively. This approach towards risk has been investigated by Charness and Gneezy (2011). The authors created a data set, containing thousands of observations gathered from different studies with the same underlying investment form. Charness and Gneezy proposed the following difference in gender: when a man is offered to invest in a risky option, the man in general, chose to invest a higher amount of money, compared to the amount of money the general woman would invest in the same option.

Other factors than gender matter when it comes to risk. In behavioral economics, the upper echelon theory stipulates that managerial suitability also depends on components such as the

individual's cognitive capacity and socioeconomic background. These traits are especially important when it comes to group constellations, such as a board of directors. A report by Hunt, Prince, Dixon-Fyle and Yee (2018) found that firms in the bottom quartile for ethnic, cultural, and gender diversity were 29 percent less likely to achieve profitability above average. Furthermore, Murray, Manrai, and Manrai (2017) argue that the unification of low risk aversion in homogenous group constellations can result in devastating consequences due to bad decision-making, such as the financial crisis in 2008.

Another factor which may have contributed to the crisis in 2008 is the concept of moral hazard: when insurance contracting moderates insured behavior. If an individual or organization lacks consequences in the event of a bad investment, this could induce even more risky decision-making, since the cost of it will not be carried by the risk-taker itself. Hence, if a person exhibits an initially risky behavior and is put in this type of decision-making role, it could cause financial tensions for the company and the company's shareholders. In order to counteract the sanctions caused by risky decision-making, companies could utilize the theory of the six-sigma effect. In short, the six-sigma effect mean that a firm can improve its general performance if facts, data, statistical analysis, and tangible business results, are taken into consideration (Shafer, Moeller 2012, page. 521). However, in order to see results from a potential change within the company based on statistical analysis, the change needs to be implemented for at least 2,5 years in order to actually generate a different financial outcome as an influential body.

This dissertation aims to investigate the Swedish private sector, with focus on the share of women in leading positions, and its effect on firms' financial stability in terms of stock return volatility. Based on AllBright's three lists which rank Swedish, listed companies after their degree of gender equality within leading positions in a given year, I have created three new lists. The new lists integrate both the gender composition of the top management in a given year, and the duration of the composition, based on the six-sigma theory. Since AllBright was founded 2011, information about the firms' duration on each list was gathered between 2011 – 2018. As long as a company has operated on one of the lists for at least three years in a row between 2011 – 2018, earlier or later placements which did not fill the three-year criteria, are not needed to be considered. The new green list includes companies that have had between 40 and 60 percent of women in their top management for at least three years in a row. The new yellow list includes companies that have had at least one woman but not 40 percent within their top management, for at least three years in a row. Lastly, the new red list includes companies that have had top-management containing no

women, for at least three years in a row. Information about the firms has mainly been gathered from the databases Retriever, Orbis, and Yahoo Finance, as well as AllBright, and the companies' annual reports. The final sample consisted of 136 companies covering the time period 2008 – 2016.

From the results one could observe that WBD and WE in companies that have implemented the so-called top-quality management according to the six-sigma effect, i.e. have gender equality within leading positions, decrease their stock return volatility. The WBD and WE in companies on the new red list, which do not have gender equality within their top management, increase their stock return volatility.

Previous research

Gender and risk-taking

An acknowledged study regarding gender differences in risk-taking is Catherine C. Eckel's and Philip J. Grossman's *Men, women and risk aversion: experimental evidence* (2008). Eckel and Grossman aim to disambiguate the contention about whether one gender is more risk averse than the other, by analyzing earlier inquiries. The authors come to the conclusion that in general, women are more risk averse than men. However, this ascertainment only holds in abstract gamble experiments and not in experiments with a coherent environment (Eckel, Grossman 2008, page 1, 2).

The first part of Eckel and Grossman's review focuses on abstract gamble experiments. In these kinds of games, women appear to be more risk averse than men. In one of the studied experiments, 110 college students were asked if they were willing to take each of 18 different gambles, which varied in amount to be won, initial investment, gain or loss framing[1] and level of probability. The study found that women and men that were willing to accept gambles at a higher frequency, had spent larger amounts of money on gambling the previous year. Also, gain or loss framing affects men's choice significantly to gamble, in contrast to women's choice, which is not affected of gain or loss framing (Eckel, Grossman 2008, page. 3 – 6).

In another survey reviewed by Eckel and Grossman, the economists Hartog, Ferrer-i-Carbonell and Jonker (2002), estimate the risk aversion parameter of utility (which is regressed on several individual traits) by asking individuals for their willingness to pay for high-stakes lotteries. As a result, women's risk aversion parameter was 10 to 30 percent higher than men's (Eckel, Grossman 2008, page. 3). In a similar study made by Harbaugh, Krause and Vesterlund (2002), 234 individuals

[1] An individual may reject a bet when it is posed in terms of the risk surrounding possible gains but may accept the same bet when described in terms of the risk surrounding potential losses. I.e. individuals may act risk averse in terms of gains but risk seeking in terms of losses.

were presented to subjects where the participants could choose between a certain outcome or a lottery, with a total of 14 different choices. The risk aversion in this study was measured by using sets of three choices containing the same gamble, but with varying certainty options (less, equal, or more than the expected value of the gamble). In this game, no evidence of a gender difference in risk aversion was found (Eckel, Grossman 2008, page. 4 – 6).

In a study which interacts gender and risk-taking in decision-making, Gary Charness and Uri Gneezy congregate data from 15 sets of experiments with one underlying investment game, which makes it possible for the economists to test the robustness of the findings (Charness, Gneezy 2011, page. 50). Charness and Gneezy study differs from previous studies in this area, since the authors' aim is to untangle the results of data from former analyzes, without being biased. The economists emphasize the problems regarding studies involving risk-taking and gender, since researchers in this matter, often have a goal with their experiments (to either find a relationship or not). If the researchers' outcome does not coincide with their hypothesis, this might result in manipulated data or unpublished results. The data testing for risk aversion, content thousands of observations gathered by different researches but have the same underlying investment game. As Charness and Gneezy found out, in spite of large environmental differences among the sets of experiments, the economists can report a consistent gender difference: men are more risk-taking in that way that when offered to invest B of a received amount of money A in a risky option, men choose to invest a higher amount of B than women (Charness, Gneezy 2011, page. 51 – 57).

Moreover, Brad M. Barber and Terrance Odean discuss how traits of men and women affect their investments in the article *Boys will be boys: gender, overconfidence, and common stock investment* from 2001. According to stock investments made by 35 000 households between 1991 and 1997, overconfidence is more prominent among men than women in the finance area, causing men to trade 45 percent more than women. Hence, Barber and Odean explain that high levels of trading on financial markets are caused by overconfidence in an individual's own abilities, knowledge, and future prospect. This causes the financial performance among men to hurt more by excessive trading, compared to women's financial performance. Greater confidence leads to greater trading and as a result this lowers the trader's expected utility, compared to a rational investor, which increases his or hers expected utility when trading (Barber, Odean 2001, page. 261 – 266).

Current status of women in executive positions

The report *En spricka i glastaket (A crack in the glass ceiling)* was released in October 2018 by the Swedish foundation AllBright. AllBright aims to encourage businesses to recruit employees on

meritocratic grounds and advocate diversity. Each year, AllBright releases three lists containing Swedish companies listed on the stock exchange market. The companies are ranked based on their degree of gender equality among executive managers: the green list has between 40 to 60 percent of female executive managers, the yellow list has at least one woman among executive managers but not 40 percent, and the red list has no female executive manager. In 2018, a record of 23 percent for the share of female executives within Swedish listed companies was reached. Keep in mind that globally, Sweden is one of the top ten countries in gender development (AllBright 2018, page. 5 – 21).

AllBright's report describes the positive relationship between the rate of female board of directors and female executive directors. On average, firms with gender equal executive managements, have 37 percent females on their board of directors, which is three percentage points higher than the average percentage point on the stock market (AllBright 2018, page. 5 – 21). Nevertheless, 83 percent of the listed firms are dominated by men. Furthermore, AllBright's report points out that the number of employed females varies between industries. In companies with focus on clothing, properties and health, a higher percentage of recruited females can be observed, meanwhile industries targeted on energy, power supply and technology lack women in executive positions. Even though, the development regarding recruiting females for positions with executive power is going forward, still nine out of ten CEO positions are held by men (AllBright 2018, page. 5 – 21).

The foundation expects, that the predicted recession will lead to a decline in the number of gender equal firms. AllBright's report has shown, that newly-listed companies on the stock market tend to have a more equal gender distribution within, compared to older-listed companies. In 2018, 15 percent of the companies on the green list were recently introduced on the stock exchange market. Since a recession implies that fewer firms will reach the stock market, this will in turn cause a recession in gender equality among listed companies, unless the older firms start to introduce gender reforms within their corporation (AllBright 2018, page. 5 – 21).

As a share of the stock market, companies on the red list have decreased from 26 to 25 percent. However, the number of companies on the red list has increased, going from 77 firms to 81. One third of the firms on the red list is notably low developed at gender equality among executive managers. Additionally, 14 firms have left the yellow list and gone to the red list and 12 firms have neither a woman among their executive managers nor one on their board of directors. Withal, women continue to be underrepresented in IT, finance, CEOs, sales, the business area and as

operative chiefs among executive managers. Instead, positions in HR, communication, law and marketing, are dominated by women (AllBright 2018, page. 5 – 21).

The global management consulting firm McKinsey & Company has explored the economic impact of increased gender diversity at micro and macro levels over ten years (2007-2017), presented in their report *Women matter, time to accelerate: ten years of insights into gender diversity* (McKinsey & Company 2017, page. 8 – 78). The report begins with the macroeconomic effects caused by gender equality. If the gender gap were to be closed and all countries targeted to reach gender parity in the workforce, 12 trillion dollars could be added to annual global GDP growth in 2025, corresponding to eleven percent to global 2025 GDP according to McKinsey & Company (2017). However, in order to do so, women need to participate in the labor force in the same rate as men, both in numbers, in working hours and in higher-productivity sectors such as business services.

Moreover, McKinsey & Company's report points out that even though women make up over 50 percent of the world's higher-education graduates, only 25 percent of them occupy top management positions. Hence, at microeconomic level, companies fail to recruit on meritocratic fundaments. The "skills gap" amount to 38 to 40 million higher education graduates, corresponding 13 percent of the global demand for skills at that level. As a result, of the top 50 listed companies within the G20[2] countries in 2017, only 12 percent of executive committee members and 17 percent of corporate board members, were women (on average) (McKinsey & Company 2017, page. 25). McKinsey's report especially highlights the fact that Norway and Sweden are successful countries concerning gender parity but still have a long way to go in order to achieve gender equality in management positions.

McKinsey & Company continues to investigate male and female attitudes toward willingness to reach the top management positions: "79 percent of senior and mid-level women managers confirm this desire and 61 percent are even willing to sacrifice part of their personal lives if necessary. This is very much aligned with the answer of men (81 percent and 64 percent respectively)" (McKinsey & Company 2017, page. 31). However, when it comes to "confidence as a perception of one's chances of success in the current environment" women expressed their belief to succeed to be 15 percentage points lower compared to men's belief. The McKinsey report claims the corporate culture to be a dependable factor for this condition in women's mind-set. In addition,

[2] G20 contain 19 countries plus the European Union and produce 80 percent of the global economic output in terms of GDP, adjusted for purchasing power parity.

this fact causes a downward curve when it comes to hiring women, since McKinsey has shown that there is a correlation between women's employment rate and the representation of women in leadership positions. A similar effect is illustrated in a report by the World Bank, published in 2012. The report contends that women do not see themselves as competent enough to work in power-centralized positions. As a consequence, people develop what is called "adapted preferences" which rectifies individuals' needs and preferences after opportunity and stereotypes (World Bank 2012, page. 175).

From 2012, the Organization for Economic Cooperation and Development (OECD) released their report *Gender equality in education, employment and entrepreneurship: final report to MCM*. According to the report, the gender inequalities grow bigger the higher up one climbs career wise. Meanwhile women on average earn 16 percent less than men in OECD-countries, women that are highly-paid earn around 21 percent less than their male counterparts (OECD 2012, page. 5).

Lastly, McKinsey & Company's *Women matter* report (2017) states that most companies claim that they are highly committed to gender diversity issues and have compiled frameworks that serve the purpose to promote gender equality. However, in the majority of these companies, a visible change cannot be seen: "for example, in the United States in 2016, 78 percent of companies reported that commitment to gender diversity is a top priority for their CEO, up from 56 percent in 2012. But this commitment does not always translate into visible action: fewer than half of employees think their company is doing what it takes to improve gender diversity, and fewer than a third say senior leaders regularly communicate the importance of gender diversity and are held accountable for making progress" (McKinsey & Company 2017, page. 50).

Gender and firm performance

In the paper *CEO gender and firm performance* (2013) Khan and Vieto examined if the firm performance differs depending on the gender of the CEO and if it affects the firm risk level. Khan and Vieito found a negative and statistically significant relationship between the firm risk level and female CEOs, indicating that firms run by female CEOs are less risky (Khan, Vieito 2013, page. 64). The study was based on data with 11315 observation for the year period 1992 – 2004, gathered from the Standard and Poor's ExecuComp database. Furthermore, Khan and Vieito found that when the firm stock ownership of companies with female CEO grows, the firm's risk level also rises. This can be linked to the previously mentioned problem of moral hazard: CEOs become riskier due to personal interests, that is, their individual wealth gains to firm performance (Khan, Vieito 2013, page. 62).

The report *Gender diversity in senior positions and firm performance: evidence from Europe* (2016) links financial performance of two million firms in Europe to gender diversity in senior corporate positions. The report distributed by the International Monetary Fund (IMF) (2016), discusses the contemporary gender distribution within top largest companies in Europe. Even though gender diversity appears to improve financial performance, bringing heterogeneity in values, mindsets, and beliefs, only 14 percent of senior executive positions are occupied by women (IMF 2016, page. 4 – 16). Contrary to other studies, the report by the IMF covers a large sample of non-financial businesses, both listed and non-listed, across 34 European countries.

The IMF data shows that firms with a larger share of women in senior positions have significantly higher ROAs, in fact, by replacing a man by a woman on the corporate board or in senior management, the ROA tend to increase with 8 – 13 basis points (IMF 2016, page. 6). This effect is markedly stronger in sectors that recruit more females in the labor force. Furthermore, it can be seen that in firms with "unusually" high female intensity[3] (having one additional woman in senior management or on the board, while keeping everything else equal) is associated with circa 20 basis points higher ROAs (IMF 2016, page. 6). In the opposite scenario, a positive change in profitability could not be endorsed. Typical male-dominated areas, such as high-technology sectors, benefited the most in terms of firm performance by one more woman on the board or in the senior management. These areas are often linked to creativity and critical thinking, a factor that thrive in the presence of diversity. Hence, the report *Gender diversity in senior positions and firm performance: evidence from Europe* proved that if these kinds of sectors would add another woman in previously mentioned positions, they would gain around 30 basis points in ROAs (IMF 2016, page. 6). Therefore, the financial improvements are particularly noticeable in certain sectors.

Another revision of gender diversity within firms was made by Niclas L. Erhardt, James D. Werbel and Charles B. Shrader titled *Board of director diversity and firm financial performance* (2003) Based on 127 large U.S companies between 1993-1998 Erhardt, Werbel and Shrader assume that organizations with higher intensities of board of director diversity, expressed in terms of gender and ethnic representation, will exhibit higher levels of performance, measured in ROA and ROI (Erhardt, Shrader, Werbel 2003, page. 102 – 108). The result of the study shows that organizational

[3] The female intensity in certain industries are described on page 28 in the IMF report. The following industries have an unusually high female intensity: *Activities of households as employers; undifferentiated goods- and services producing activities of households for own use (92%), Arts, entertainment, and recreation (70%), Education (70%).*

performance, that is ROA and ROI, is positively associated with board of director diversity. From previous studies at that time, this research differed since it analyzed the impact of variety on several levels within the workforce. Hence, the authors conclude that diversity is highly effective in order to improve organizational performance on all firm levels (Erhardt, Shrader, Werbel 2003, page. 108).

In order to measure organizational health and firm performance based on employees' characteristics, McKinsey & Company has developed an organizational health index (OHI). The index investigates nine traits: direction, accountability, coordination and control, leadership, external orientation, innovation, capability, motivation and environment and values. It is shown that the healthiest companies based on these traits are more than twice as likely to outdo their compeers (McKinsey & Company 2011, page. 2 – 5). In the earlier mentioned report *Women matter, time to accelerate: ten years of insights into gender diversity*, McKinsey & Company could confirm that female leader tends to possess the OHI-attributes in a greater magnitude than men, resulting in better performing companies (McKinsey & Company 2017, page 14).

In another revision called *Delivering through diversity* (2018) by McKinsey & Company the business case for inclusion and diversity is discussed. Based on data from over 1000 companies covering 12 countries, two main measurements have been used: average EBIT-margin in order to measure financial performance-profitability and economic profit margin with the purpose to measure value creation (McKinsey & Company 2018, page. 1). The authors of the report; Hunt, Prince, Dixon-Fyle and Yee; inter alia found that firms with more diverse leadership teams financially outperform firms with homogenous teams. The highest-performing companies regarding both diversity and profitability had more women in line roles than in staff roles on their executive teams. Firms in the bottom quartile for ethnic, cultural and gender diversity were 29 percent less likely to achieve profitability above average (McKinsey & Company 2018, page. 1, 11, 14). In summation, companies with greater levels of diversity in leadership are more likely to outperform peer industry groups in lucrativeness and value creation.

In order to keep this trend, one may consider the study *CEO succession, gender and risk taking* which claims that the likelihood that a woman will be chosen as CEO increase if the current CEO is a female (Elsaid, Ursel 2011, page. 504 – 508). Based on data from 679 CEO successions in North American firms, Elsaid and Ursel found that a CEO is more likely to be a woman if there is a

higher share of females on the board of directors which in turn results in a decrease in several measures of firm risk taking.

Theory

Risk

The concept of speculation can be described as "the assumption of considerable investment risk to obtain commensurate gain", where it becomes clear that risk affects an individual's decision to invest or not (Bodie, Kane Marcus 2014, page. 169). The idea of an individual being rational claims that a person will not invest, unless the potential gains make up for the risk involved. However, the potential gains are highly subjective and differ between people. An individual's stance to risk depends on several things, such as information, knowledge, and psychological traits (Breakwell 2014, page. 52 – 84). In order to clarify this, economists have summarized an individual's characteristics and simplified the person's risk preferences by categorizing the individual as one of the following types of person: risk-averse (marginal utility is concave-down increasing with wealth), risk-neutral (marginal utility is equal to wealth), or risk-taking (marginal utility is concave-up increasing with wealth) (Breakwell 2014, page. 85 – 121. Frey, Hertwig, Mata, Richter, Schupp 2018, page. 159 – 164). The mathematics behind the aspects of risk, was presented by Daniel Bernoulli in his work *Exposition of a new theory on the measurement of risk* (1738). Bernoulli claims, that in order to determine the value of an item, one should not consider the item's price, but rather the utility it yields. He argues as follows "The price of the item is dependent only on the thing itself and is equal for everybody; the utility, however, is dependent on the particular circumstances of the person making the estimate." (Bernoulli 1954, page. 24).

Economic theories of teams

In behavioral and financial economics, the upper echelon theory explains how managerial background characteristics inter alia affect performance level and organizational outcomes (Wei Kiong Ting, Binti Azzizan, Long Kweh 2015, page. 687 – 689). In another article, Sabina Nielsen argues that the principle of the upper echelon's theory is that top managers' traits affect their decisions which in turn affect the firm's performance (Nielsen 2010, page. 303 – 308). Furthermore, a manager's decision-making can be limited by his or her field of vision, selective perceptions and interpretation, due to the manager's restricted cognitive capability and values (Hambrick, Mason 1984, page. 195 – 197).

Hambrick and Mason highlight this weakness in upper level group compositions by analyzing the socioeconomic background of top managers in U.S., 1975. It is found that executives of major firms in U.S. were more or less exclusively male, white, republican, protestant, had attended

prestigious universities and shared the same background as their predecessors (Hambrick, Mason 1984, page. 201 – 202).

Another consequence of homogenous groups is explained by Irving L. Janis presented his work *Victims of groupthink* in 1972. Janis defines groupthink as an "excessive form of concurrence-seeking among members of high prestige, tightly knit policy-making groups" (Hart 1991, page. 247). With "excessive form of concurrence-seeking", Janis refers to a group-member who value his or her role and the group as a whole, higher than anything. As a consequence, the member seeks unanimity solutions in order to avoid confrontation. This is done by not doing anything that might disturb the cohesiveness of the group. Ad hoc, it appears to be a relationship between people's agreement and the willingness to stay in a group. According to Janis, the consequences of group-thinking rarely end in a successful outcome, but rather in self-censorship, overestimation of the group, closed-mindedness and pressures toward uniformity (Hart 1991, page. 252 – 266). However, Janis has been criticized by inter alia Longley and Pruitt (1980) who claims that avoiding the influx of outside opinions and self-censorship can in some contexts be necessary in a decision-making process (Hart 1991, page. 269. Longley and Pruitt 1980, page. 1, 74-93). In accordance with this, group characteristics have been further studied by Goll, Sambharya, and Tucci (Goll, Sambharya, Tucci 2001, page. 114 – 118). The authors suggest that a homogeneity in tenure and education level influence communication, decision-making and integration positively, meanwhile heterogeneity with respect to age and background induces creativity and diversity in viewpoints.

The six-sigma effect

The six-sigma effect was established in the 1980s at Motorola Inc. and refers to the quality management adoption in order to achieve proper implementation and maximizing business results (Ertürk, Tuerdi, Wujiabudula 2016, page. 445). Main components of the six-sigma doctrine include the use of performance metrics, reducing inherent variation in the processes, the generation of tangible business results, and the use of facts, data and statistical analysis (Shafer, Moeller 2012, page. 521). Furthermore, the six-sigma theory suggests that in order to observe a change in a firm's financial performance after implementing a certain top management constellation, the constellation needs to be durable for at least 2,5 years in a row (Shafer, Moeller 2012, page. 522). Hence, the six-sigma effect is of particular interest considering the firms on AllBright's lists. For example, a company on AllBright's green list for 2018, would not have an observable change in its financial performance if it has not been on the green list since the beginning of 2016. If the company instead has been on the red list the years 2015, 2016, and 2017, the firm will perform according to the red list's policies. In summation, according to the six-sigma theory, the effects from a specific top

management constellation can only be observed if the constellation has been implemented for at least 2,5 years.

Critical mass threshold

As earlier mentioned, AllBright's yellow list include companies which have at least one woman among executive managers, but below 40 percent. According to the article *Board gender diversity in the STEM&F sectors: the critical mass required to drive firm performance* (2018), Carolyn Wiley and Mireia Monollor-Tormos analyzes the relationship between firm performance and board gender diversity (Wiley and Monollor-Tormos 2018, page. 294). According to the authors, a U-shaped link was shown between the two issues, which could be explained by the critical mass threshold theory. The critical mass threshold theory states that a particular number of personnel, in this case women, are needed on leading positions in order to affect policy and actually change the company's performance as an influential body. Hence, if a firm want to change its financial performance based on the critical mass theory, it needs to reach the threshold for the effective number of women in leading positions. Otherwise, no results will appear. As Wiley and Monollor-Tormos put it "…gender barriers are not broken down, and the benefits of gender diversity do not appear".

Moral Hazard

Asymmetric information can be described as a problem that may cause the efficiency of a market to malfunction due to lack of information about one side of the market's actions (Varian 2010, page. 724-726). One of these states is called moral hazard, i.e. when insurance contracting moderates insured behavior (Connelly, Rowell 2012, page. 1072).

Murray, Manrai and Manrai (2017), argues that in the context of the financial crisis in 2008 several moral hazard events occurred, such as the fact that a financial institution knows it is protected by a lender of last resort, which can generate a riskier behavior among financial institutions. Another aspect of moral hazard at both individual and organizational level, is the lack of consequences that the management faces in the event of a bad investment, which instead results in a burden afflicted on their shareholders (Murray, Manrai, Manrai 2017, page. 171, 184 – 186). Hence, an individual in a decision-making position at a financial institution or company, may be more risk-taking since the costs its decision may induce, will not be carried by the risk-taker.

Furthermore, Bei Ye discusses in why irrationality on corporate investment decision may occur. A common denominator among corporate managers is overconfidence, a trait which tend to cause managers to underestimate the probability of failure and overestimate the probability of success

(Ye 2011, page. 1). Ergo, Ye finds that the overconfidence level is positively related to the firm's investment and cash-flow sensitivity, and negatively related to stock incentives.

Measuring firm performance

There are numerousness ways to measure firm performance, however some ratios might be more important than others. In a company, there are mainly two aspects one needs to consider regarding financial management: how to use the firm's capital and how to get the capital (Bodie, Kane, Marcus 2014, p. 640). In order to answer these questions, one needs to analyze following factors: if assets are used efficiently (study turnover ratios), the profitability of sales (study profit margins), if the leverage is excessive (study debt and coverage ratios) and lastly if there is sufficient liquidity (study current, quick cash ratios and net working capital).

The size of the firm plays an important role when it comes to measuring profitability: the larger company, the larger earned profits. Hence, most performance measures concenter around earning per dollar employed, where three measurements have been especially prosperous: ROA, ROC, and ROE (Bodie, Kane, Marcus 2014, p. 641 – 644).

ROA describes the income earned per dollar deployed in the firm and is defined as:

$$ROA = \frac{EBIT^{4}}{Total\ assets}$$

ROC describes the income earned per dollar of long-term capital invested in the firm and is defined as:

$$ROC = \frac{EBIT}{Long - term\ capital}$$

ROE describes the profitability of equity investments. It is defined as:

$$ROE = \frac{Net\ income}{Shareholders' equity}$$

A firm's financial leverage increases the risk of the equity-holder returns (p. 644). Hence, it is crucial to explain the relationship between ROE, ROA and leverage:

$$ROE = (1 - tax\ rate)\left[ROA + (ROA - interest\ rate)\frac{debt}{equity}\right]$$

[4] EBIT = earnings before interest and taxes.

The expression implies that if ROA > borrowing rate, the firm will earn more than it pays out, whereas the surplus earnings are available to equity-holders which increases ROE. If ROA < interest rate paid on debt, ROE will decrease. The amount of debt makes a firm's ROE more sensitive to business cycles, hence financial leverage increases the risk of firm's equity and therefore raise the expected ROE. Ad hoc, leverage can be seen as a measure of the safety of a company's debt (Bodie, Kane, Marcus 2014, page. 643 – 644).

Another metric in order to measure financial performance and profitability is the EBIT-margin. EBIT-margin shows how much profit a firm has made after paying for costs of production (Bodie, Kane and Marcus 2014, page. 470, 472, 636). The EBIT-margin is defined as follows:

$$EBITmargin = \frac{EBIT}{Revenue}$$

Data

Sample description

This dissertation aims to investigate the Swedish private sector, with focus on the share of women in leading positions, and its effect on firms' financial stability in terms of stock return volatility. This study is based on the firms on AllBright's three lists which covers 318 of Sweden's largest companies. The data-set embody both cross-sectional data and time series, forming a panel data over the time-period 2008 – 2016. The panel data is balanced, which means that the number of time series observations are equivalent to the cross-sectional units[5] (Brooks 2008, page 487).

Based on AllBright's listed companies, three new lists are created which take into account for how long each company has practiced a certain type of top-management constellation. The *new* green list contains companies which have had a gender equal top management for at least three years in a row. The *new* yellow list contains companies which have had at least one woman but not 40 percent in their top management for at least three years in a row. Lastly, the *new* red list includes firms that have not had any women in their top management for at least three years in a row. Information about these listed companies' sizes and financial performances, has been gathered from the AllBright-reports, the databases Retriever and Orbis, which provides key financial figures about Swedish firms, and Yahoo Finance. Information regarding the firms' share of employed women and share of women on the board of directors, have been manually collected from each

[5] Hence, a technique called listwise deletion, which eliminates units with missing observations, has been applied.

and every companies' annual reports for the given time period, due to lack of aggregated data in this issue. The final sample of the balanced panel data is reduced to the number of firms that delivered complete information, resulting in 136 companies, corresponding to 1224 observations, covering the time period 2008 – 2016.

Potential biases

During the investigated time period 2008 – 2016, some companies split or merged which could have affected the quality of the panel data. In order to keep consistency in the individual units, the information regarding gender has been especially scrutinized.

All of the studied companies are quite large and have a high number of employees in not only Sweden, but also in affiliates located abroad. All of the companies have a mother company located in Sweden, which in most cases only consists of the board of directors and the CEO. However, over time, the companies have expanded and outsourced employees, stores, and parts of their production, resulting in subsidiaries both abroad and at home. In some cases, these subsidiaries also have CEOs and board of directors. Since this thesis is limited to focus on the women in *Sweden*, the share of women on the board of directors has been based on the board of directors in the *mother company*. The share of women employed has been calculated from the number of employees presented in the subsidiary that covers the operations in Sweden.

Due to the fact that AllBright first started to publish their annual lists in 2011, I have only been able to gather information about the firms' duration on the lists since then. However, as long as a company operate on a certain list for at least three years in a row after 2011, it does not matter if the same firm operated on another list for three years in a row before 2011. The most up to date three-year list-placement, is the one that is actual. Since the original grouping of the companies are based on AllBright's report from 2018, I have examined the firms' ranking between 2011 to 2018, and from there, modified the lists from 2018.

Lastly, the concept of survivorship bias must be considered. Survivorship bias occurs when the studied sample only consists of units that survived a certain process and does not include the units who did not make it through the process. This can lead to a one-sided outcome which might be more optimistic than the actual result. In this study, only companies that have not gone bankrupt in 2018 are examined. Since the study is based on the lists from AllBright provided in 2018, only the companies on those lists, that specific year, are studied. This implies, that companies that were, for example, on the green list year 2016 but went bankrupt in 2017, are neither included or

investigated in this sample. This could cause skewed financial results when measuring the companies' financial performances. This survivorship bias has not been remarked in the sample, however I am aware of this problematic regarding my data.

Variable measurement

With the intention to encapsulate a company's variation in financial performance, the yearly stock return volatility will operate as dependent variable. The daily stock return was gathered from *Yahoo Finance*. Thereafter each companies' yearly standard deviation for the time period 2008 – 2016 has been calculated as below, in order to obtain stock return volatility.

$$\frac{Close\ price_{day} - Close\ price_{day-1}}{Close\ price_{day-1}} = daily\ stock\ return$$

$$Standard\ deviation(daily\ stock\ return\ during\ year\ x) = stock\ return\ volatility\ for\ year\ x$$

A low stock return volatility indicates that the company follows a stable development over time, meanwhile a higher deviation indicates that the financial performance is more unpredictable and disseminated. It follows that a company with a more fluctuating evolvement in this measurement is riskier and equity holders have less reliable estimates of future earnings for the company (Che 2018, page. 140, 149, 151 – 157).

Since this research aims to investigate whether or not the gender composition of a firm has any impact on the company's financial performance, the share of employed women and the share of women on the board, operate as variables of interest. The quota of employed women has been calculated as follows:

$$\frac{Number\ of\ employed\ women\ in\ Sweden}{Total\ amount\ of\ employees\ in\ Sweden}$$

The share of women on the board of directors has been calculated as follows:

$$\frac{Number\ of\ women\ on\ the\ board\ of\ directors}{Total\ number\ on\ boards\ of\ directors}$$

It is expected that the variables of interest will generate a negative effect on the stock return volatility in companies that have implemented an equal top management constellation for at least three years in a row. Two specifications will be performed: one for the share of women on the

board of directors, and on for the share of women employed. If both measures would be regressed at year *t*, one cannot disentangle which one of the measurements that came first, since the variables are assumed to have affected the previous year's shares of women. Hence, the time value for these variables are lagged as (t-1).

In order to reduce the risk of spurious regressions, a number of control variables that are believed to affect the dependent variable, are added (Hultman, Österberg 2018, page. 22). Earlier studies suggest that *firm size* has a positive impact on firm performance (Elsaid, Ursel 2011, page. 503). Therefore, capitalization size on the stock exchange market is added, in order to control for size-related heteroscedasticity. The companies are coded after their appearance in the small, middle, or large cap, where companies in the small cap obtain the value 1, middle cap obtain the value 2, and companies in the large cap obtain value 3.

Another factor that will operate as a control variable is the *industry* in which the firm engage in. According to a study made by Du Rietz and Henrekson (2000), it is utterly important to control for firms' sectors, otherwise companies with women on the board might seem to under-perform (Smith, Smith, Verner 2006, page. 571). In this study, the companies have been categorized according to the *Standard for Swedish Branch Industry Classification*, SNI (Standard för svenska näringsgrensindelning) which is used by the Swedish statistical central bureau (SCB 2007, page. 9). Therefore, every company will be assigned a dummy variable for the industry it operates in (Johansen - Nyberg 2014, page. 19).

The company's leverage can be used as a proxy for a firm's riskiness (Elsaid, Ursel 2011, page. 503). As mentioned earlier, leverage can be explained as an investment tactic of using loaned money in order to increase the potential return on equity. This entails that a company that is highly leveraged has more debt than equity. If debt then is an effective factor to control for the agency conflict within the firm, it causes leverage to have a positive impact on the firm's financial performance, or increase the cost of bankruptcy (Lango, Tillenius 2018, page. 23). Hence, the degree of leverage will operate as a control variable in order to observe its effect on firm performance.

The degree of *ROE* can act as an alternative for controlling the firm's riskiness. The measure ROE can be seen as how effectively the company's assets are used in order to create profits. The return

on equity incorporate both operative and financial risk and is a generally known measure to use when it comes to estimating financial performance (Johansen - Nyberg 2014, page. 3).

Lastly, the *EBIT-margin* will operate as a control variable. The EBIT-margin tells how much of the turnover that is left to cover taxes, rates, and profits, after that the company's costs has been paid for. The EBIT-margin can be interpreted as an indicator of how well the company is doing, the higher EBIT-margin, the better (Bodie, Kane and Marcus 2014, page. 636, 640).

Hypothesis

This dissertation aims to investigate the Swedish private sector, with focus on the share of women in leading positions, and its effect on firms' financial stability in terms of stock return volatility. The following hypothesis have been formulated:

H1: The new green list shows that WBD and WE have a negative effect on the stock return volatility since the top management constellation is gender equal and has been implemented for at least three years in a row.

H2: The new yellow list show that WBD and WE have a positive effect on the stock return volatility since the number of women do not reach the critical mass threshold even if the top management constellation includes at least one woman, but not 40 percent.

H3: The new red list show that WBD and WE have a positive effect on the stock return volatility since the top management constellation does not include any women.

Methodology

Econometric approach

When analyzing panel data, two panel estimator approaches can be used: either the random effect model or the fixed effect model. In the fixed effect model, the intercept in the regression is allowed to variate cross-sectionally but not over time, meanwhile the slope estimates are fixed both cross-sectionally and over time (Brooks 2008, page. 490). On the contrary, the random effect model assumes that the intercepts for each cross-sectional unit arise from a common intercept.

In this study, individual specific effects which encapsulate all variables that affect our dependent variable cross-sectional but do not vary over time, are expected. An individual specific effect can for example be the branches that the firms operates in (Brooks 2008, page. 491). The following equations illustrates the setup behind a fixed effect model.

The original equation:

$$y_{it} = \alpha + \beta x_{it} + u_{it}$$

Where y_{it} is the dependent variable, α is the intercept term, β is the vector of parameters to be estimated on the explanatory variables, x_{it} is a vector of observations on the explanatory variables and lastly u_{it} is our disturbance term. In order to express the fixed effect model, we can rewrite the disturbance term as below:

$$u_{it} = \mu_i + v_{it}$$

Where μ_i is the firm-level specific effect, and v_{it} is the remained disturbance, which capture everything that is left unexplained about the original regression in (Brooks 2008, page. 491). This results in that we can rewrite our original equation as follows:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + v_{it}$$

In order to ensure that the fixed effect model is the correct methodology, the Hausman test which detects endogenous regressors in a regression model will be performed (Sheytanova 2014, page. 1 – 45). The null under the Hausman test is that the preferred model is the random effect. If the null is rejected, the fixed effect model is the correct one to use.

Since industries have different level of risks, industry fixed effects are assumed (Johansen - Nyberg 2014, page. 19). Therefore, 32 industry dummy variables categorized after the SNI, will be added to the regression. Subsequently, the companies' firm sizes are also presumed to affect the dependent variable. Hence, dummy variables for the firm's size (small cap, mid cap, large cap), will be added to the regression.

Furthermore, time-fixed effects, such as tax rate changes and law regulations concerning firms, needs to be considered. Due to the financial crisis in 2008 – 2009, this study will include a time-fixed effect model. This type of model assumes that the average value of the dependent variable changes over time, however not cross-sectional (Brooks 2008, page. 493). The time-fixed effect model can be written as below.

$$y_{it} = \alpha + \beta x_{it} + \lambda_t + v_{it}$$

Where λ_t is a time-varying intercept that captures all of the variables that affect the dependent variable and that vary over time but are constant cross-sectionally (Brooks 2008, page. 493). Hence, dummy variables will be added for each year (1,2,3…9) in order to capture time variation.

Since the data is assumed to generate individual specific effects and time-fixed effects, the panel data must be balanced and stationary. In order to test for stationarity, a Dickey-Fuller test will be performed (Upton and Cook 2014). Another assumption concerning fixed effect models is that the error terms must be homoscedastic. Ad hoc, Breusch-Pagan's test for heteroscedasticity has been applied (Black, Hashimzade and Myles 2017). Finally, the data must be robust, i.e. have a low degree of multicollinearity between independent variables and be normally distributed. Therefore, a variance inflation factor test (VIF-test) and a histogram will be carried out (Ding 2019, page. 1 – 5). Lastly, boxplots and histograms has been added in order to discover potential outliers.

The Breusch-Pagan test indicated that heteroscedasticity was present. Hence, robust standard errors were added to the regression. The boxplots showed that the data included outliers. In order to make the data set more robust, these outliers have been erased.

Empirical strategy

Step by step

First, I classify AllBright's listed companies from 2018 into three new categories: new green list if the top management been gender equal for at least three years in a row, new yellow list if the top management have had at least one woman but below 40 percent in the top management for at least three years in a row, and new red list if the top management have not had any woman for at least three years in a row. This is done by studying which AllBright-list each company was on between the years 2011 – 2018 (see potential biases, page. 18).

Second, I estimate the following regressions for each new list:

$$\ln(StockReturnVolatility)_{i,t} = \alpha + \beta_1 WomBoard_{i,t-1} + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(Leverage)_{i,t} + \beta_5 \ln(ROE)_{i,t} + \beta_6 \ln(EBITmargin)_{i,t} + \lambda_{7,t} + u_{i,t}$$

$$\ln(StockReturnVolatility)_{i,t} = \alpha + \beta_1 WomEmpl_{i,t-1} + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(Leverage)_{i,t} + \beta_5 \ln(ROE)_{i,t} + \beta_6 \ln(EBITmargin)_{i,t} + \lambda_{7,t} + u_{i,t}$$

Since WBD and WE are assumed to correlate, one regression for each variable of importance is performed.

Third, I change the dependent variable and test for the gender effect on ROE, leverage, and EBIT-margin. When analyzing financial risk, two measurements are often used: one that analyzes the risk related to the market, and one that analyzes the accounting risk. The present value of future cash flows, and growth opportunities are reflected in the market risk (in this case the stock return volatility), meanwhile historical costs of past investments are reflected in the accounting value of a firm (Bodie, Kane and Marcus 2014, page. 142). Hence, the following regressions are applied:

$$\ln(ROE)_{i,t} = \alpha + \beta_1 WomEmpl/WomBoard_{i,t-1} + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(Leverage)_{i,t} + \beta_5 \ln(StockReturnVolatility)_{i,t} + \beta_6 \ln(EBITmargin)_{i,t} + \lambda_{7,t} + u_{i,t}$$

$$\ln(Leverage)_{i,t} = \alpha + \beta_1 WomEmpl/WomBoard_{i,t-1} + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(StockReturnVolatility)_{i,t} + \beta_5 \ln(ROE)_{i,t} + \beta_6 \ln(EBITmargin)_{i,t} + \lambda_{7,t} + u_{i,t}$$

$$\ln(EBITmargin)_{i,t} = \alpha + \beta_1 WomEmpl/WomBoard_{i,t-1} + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(Leverage)_{i,t} + \beta_5 \ln(ROE)_{i,t} + \beta_6 \ln(StockReturnVolatility)_{i,t} + \lambda_{7,t} + u_{i,t}$$

In order to observe the effect that each list have on the dependent variable, I add a dummy variable for the new green/yellow/red list. If a company belongs to the new green/yellow/red list, it will obtain the value 1 and remaining companies will obtain the value 0. The dummy-constants are assumed to illustrate how the regression will kink depending on how the lists' risk affect the companies' financial performance. Following regression is applied:

$$Y_{i,t} = \alpha + \beta_1 newGreen/Yellow/RedList_i + + \beta_2 Capsize + \beta_3 industry_{dummy} + \beta_4 \ln(Leverage)_{i,t} + \beta_5 \ln(ROE)_{i,t} + \beta_6 \ln(EBITmargin)_{i,t} + \lambda_{7,t} + u_{i,t}$$

i = 1…136 and t = 2008… 2016

(Applies to all of the mentioned regressions)

Results

Descriptive analysis

Table 1 shows the descriptive statistics for variables. The average share of women on the board of directors was approximately 22 percent, and the average percentage of women employed within the company was circa 30 percent.

```
. summarize lnStockReturnVolatility WomBoard  WomEmployed lnEBITmargin  lnROE
> lnLeverage

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
lnStockRet~y |      1,163    -3.69011    .6673975  -4.754759   6.418519
    WomBoard |      1,164    .2214947    .1380338          0         .6
 WomEmployed |      1,164    .3030204    .1515506          0    .698356
lnEBITmargin |        956   -2.310976    1.128734  -6.907755   2.383796
       lnROE |        946   -1.911439    .8652979  -6.907755   2.788524
-------------+---------------------------------------------------------
  lnLeverage |      1,150   -4.643082    .9491846   -9.21034  -.4574428
```

Table 1.

The number of cap sizes were three (small, middle, large), the number of industries was 32, and the time-period was between 2008 – 2016 (see appendix, page. 34). The descriptive statistics show that most companies are in the large cap (see appendix, page. 34). One could also observe that the industry "Building activity" had the highest share of women on the board of directors, and the industry "Freight traffic" has the lowest share of women on the board of directors. In each of these industries, only one company operate. The industry with the highest share of women employed was "Retail". The industry with the lowest share of women employed was "Sawn goods & building material, wholesale trade". In the last-mentioned industry, only one company operate (see appendix, page. 35 and 37).

In order to obtain a more robust result, outliers were eliminated from the variables of interest. For WBD, the upper limit is restricted to 60 percent and the lower limit to 0 percent. For WE the upper limit is restricted to circa 70 percent and the lower limit to 0 percent (see appendix, page 36 and 38).

With the intention to create accounting measures that follow a normal distribution, the variables stock return volatility, leverage, ROE, and EBIT-margin are logged. This generate better estimates of each variables' distribution, since they initially consist of very small numbers (see appendix, page. 36 and 38).

Regression analysis

When the regression which measures the gender effect on stock return volatility is fitted for the new green list, both WBD and WE have a negative effect on stock return volatility. Both variables have negative coefficients at a one- and two-star significance level (see appendix, page. 43). Hence, the result of the output indicates that one should reject the null that WBD and WE do not affect a company's stock return volatility. The result coincides with the first hypothesis which suggest that WBD and WE have a negative effect on the stock return volatility if the top management have been gender equal according to AllBright's definition, for at least three years in a row.

Summary: WBD and WE have a negative effect on stock return volatility at a company with a gender equal top management. Ad hoc, the gender equal top management induce a negative effect on stock return volatility.

When the regression which measures the gender effect on stock return volatility is applied for the new yellow list, Both WBD and WE obtain a negative coefficient, but not on any significant level. Hence, the null cannot be rejected, the WBD and WE do not have a confirmative effect on stock return volatility (see appendix, page. 44).

Summary: WBD and WE at a company with a top management with at least one woman but below 40 percent, do not have a significant effect on the stock return volatility. The result does not coincide with the second hypothesis.

When the regression which measures the gender effect on stock return volatility is conformed for the new red list, WBD and WE have a significant positive effect on stock return volatility. WBD get a positive coefficient at a two-star level, and WE get a positive coefficient at a three-star level. The result therefore coincides with the third hypothesis (see appendix, page. 45).

Summary: WBD and WE at a company without any woman in the top management, have a significant positive effect on stock return volatility. The certain constellation of top management induces a positive effect on stock return volatility.

When the regression which measures the gender effect on ROE, leverage, and EBIT-margin for the new green list is applied, both WBD and WE generate a positive effect on ROE on a three-star significance level. When the accounting metric leverage operate as dependent variable, WE have a significant negative effect on leverage at a three-star level, while WBD do not have any significant effect on leverage. When EBIT-margin work as dependent variable, both WBD and WE obtain a negative coefficient at a three-star level (see appendix, page. 46).

Summary, accounting measures as dependent variable, new green list: WBD have a significant positive effect on the ROE, and a negative effect on the EBIT-margin. Regarding leverage, the WBD do not have a significant effect on the metric. WE has a significant positive effect on ROE, and a significant negative effect on both leverage and the EBIT-margin.

When the regression which measures the gender effect on ROE, leverage, and EBIT-margin for the new yellow list is fitted, WE have a negative effect on ROE at a three-star significant level. The WBD have no significant effect on ROE. When the accounting metric leverage operate as dependent variable, WE have a significant positive effect on leverage at a two-star level. The WBD do not have any significant effect on leverage. When EBIT-margin work as dependent variable, the WBD receive a positive coefficient at a one-star level significance, and WE have a positive coefficient at a three-star level significance (see appendix, page. 47).

Summary, accounting measures as dependent variable, new yellow list: WE have a significant negative effect on the ROE, and a positive effect on leverage, and the EBIT-margin. The WBD do not have a significant effect on either ROE or leverage. The WBD have a positive significant effect on the EBIT-margin.

When the regression which measures the gender effect on ROE, leverage, and EBIT-margin for the new red list is conformed, neither WBD or WE have a significant effect on ROE. In both cases, the coefficient shows a negative sign. When the accounting metric leverage operate as dependent variable, neither WBD or WE have a significant effect on the variable. When EBIT-margin work as dependent variable, neither WBD or WE have a significant effect on the metric (see appendix, page. 48).

Summary, accounting measures as dependent variable, new red list: when ROE, leverage, and EBIT-margin operate as dependent variable, neither WBD or WE affect the metrics on a significant level.

When the regression which measures the new lists' effect on stock return volatility for the whole sample is applied, the new green list has a positive, significant effect on the stock return volatility on a three-star level. When the new yellow list operates as independent variable, one can notify that the variable has a significant, negative effect on the stock return volatility on a three-star level. Lastly, the new red list operates as independent variable and show to have a significant, positive effect on stock return volatility on a three-star level. One can observe that the new green list has a

greater, positive effect on the stock return volatility for the entire sample, than the new red list (see appendix, page. 49 – 50).

Summary: both the new green and new red list obtain a positive coefficient when the lists' effect on stock return volatility is analyzed. In addition, the new green list seems to have a greater, positive effect on stock return volatility, than the new red list. The new yellow list has a negative effect on stock return volatility.

Discussion

The purpose of this study is to investigate whether or not the gender distribution within a firm's top management affects the company's financial riskiness in terms of stock return volatility. In order to determine the firms' gender composition, AllBright's yearly lists – which distribute Swedish, listed firms based on their level of gender equality within the top management – are modified. Three new lists are created, which sorts firms based on their dominant level of gender distribution in accordance with the six-sigma theory. Thereafter, it was analyzed if the share of women on the board, and the share of women employed, affects the stock return volatility differently, depending on the gender distribution within top management.

From the results, one can observe that WBD and WE affect the stock return volatility negatively in companies which have a gender equal top management. On the contrary, WBD and WE in companies with no woman within their top management, have a positive effect on the stock return volatility. Thus, it presumes that companies operate differently in terms of riskiness due to their top management. Risk averse top managements are more common amongst gender equal top managements, and therefore present themselves as less financially risky. Meanwhile, firms with no women in their top management, present themselves as more financially risky.

When the regression which measures the lists' effect on stock return volatility is fitted, one can see that the modified green list obtains a positive, significant, coefficient for the whole sample's stock return volatility. This result is no surprise, since the companies on AllBright's yearly green list, are in general much younger than the companies on the yellow, and red list. As mentioned earlier, of the companies on AllBright's green list from 2018, around 15 percent were recently introduced on the Stockholm Nasdaq. When a firm for the first time offers shares to the public, it is called initial public offering (IPO) (Bodie, Kane and Marcus 2014, page. 60 – 61). According to Houston, Jame, and Karceski (2006), these new stocks are generally recognized to be underpriced, partly in order to increase the stock's demand, partly due to the company's uncertainty regarding its future profits. Eventually however, the market will steer the stock's price to its rightful value. Henceforth, the

initial volatility in newly-listed companies' stocks can be extreme during their first period on the stock exchange market (Paul B. McGuiness 2016, page. 804).

The aforementioned fact also explains the engendered results from the modified yellow, and red list. When the regression which measures the lists' effect on stock return volatility is fitted for the new yellow list, a negative and significant coefficient for the whole sample's stock return volatility, can be observed. Since the companies on the modified yellow list have had more time, compared to the new green list, to establish and brand themselves as listed corporates, it was not a remarkable outcome that they generate a more stable effect on the overall stock return volatility. Thus, the output that the new red list causes, is also coherent with the other lists' results. The corporations on the modified red list, generates a smaller positive coefficient on the stock return volatility than the companies on the new green list, due to their time on the stock exchange market.

When the accounting measures took turn to operate as the dependent variable, WBD and WE for companies on the new green list show to have a positive effect on the ROE, and a negative effect on leverage. Even though ROE is affected negatively when the leverage increases, the companies on the new green list manage to affect these two variables separately towards financially stable demeanors. Furthermore, the EBIT-margin is negatively affected by WBD and WE for companies on the new green list. Since ROE is the ratio of EBIT-margin divided by the shareholders' equity[6], it implies that the quantity of equity is small, which makes sense, considering the companies on the new green list's time on the stock exchange market.

This interpretation of the new green list's results is intelligible with the new yellow list's results. For the companies on the modified yellow list, WE has a significant negative effect on ROE, and a significant positive effect on leverage and the EBIT-margin. An increased leverage generates a reduced ROE, therefore WE's negative effect on ROE is not unexpected. Furthermore, since the companies on the yellow list probably include more shareholders due to their time as listed companies, the ROE-quota is smaller, and therefore ROE is affected negatively.

[6] Shareholder equity is calculated by adding equity at the beginning of the period to equity at the end of the period and dividing by two.

Conclusion

This thesis proposes that a gender equal management has a negative effect on stock return volatility, and therefore present itself as less financially volatile. It has also been suggested that a management without any women, have a positive effect on stock return volatility, and therefore present itself as more financially volatile. Hence, the results of this dissertation are coherent with the upper echelon theory, and the critical mass theory. Furthermore, this thesis support theories about women being less risk-taking than men which is consistent with previous research.

The analyzed companies are among Sweden's largest firms and listed on Stockholm Nasdaq. Earlier research tells us that due to these companies' size, they have a direct effect on the Swedish economy's stability. Hence, it is of highest importance that these firms have low volatility in order to mitigate the systemic risk. Therefore, this thesis hopefully contributes to help large firms on the new red list to reduce their volatility and employ more women within their top management.

References

AllBright (2018). *En spricka i glastaket*. Retrieved: https://static1.squarespace.com/static/5501a836e4b0472e6124f984/t/5bc4147be5e5f08331be3cf9/1539576971496/Allbrightrapporten+2018.pdf. Gathered: 2018-09-10.

Barber and Odean (2001). *Boys will be boys: gender, overconfidence, and common stock investment*. Retrieved: http://eds.b.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=7&sid=e11e34e2-c9b8-40fd-94f2-0a1ebcd3601f%40pdc-v-sessmgr01. Gathered: 2019-01-12.

Bell – Jones (2014). *Explaining fixed effects: random effects modeling of time-series cross-sectional and panel data*. Retrieved: https://www.cambridge.org/core/journals/political-science-research-and-methods/article/explaining-fixed-effects-random-effects-modeling-of-timeseries-crosssectional-and-panel-data/0334A27557D15848549120FE8ECD8D63. Gathered: 2019-02-02.

Bernoulli (1954). *Exposition of a new theory on the measurement of risk*. Retrieved: https://www.jstor.org/stable/1909829. Gathered: 2019-01-17.

Black, Hashimzade, and Myles (2017). *A dictionary of economics*. Retrieved: http://www.oxfordreference.com.ludwig.lub.lu.se/view/10.1093/acref/9780198759430.001.0001/acref-9780198759430-e-3486?. Gathered: 2019-02-03.

Bodie, Kane and Marcus (2014). *Investments*. Retrieved: https://www.academia.edu/23642542/Investments_10E_by_Bodie_Kane_Marcus. Gathered: 2019-01-06.

Breakwell (2014). *The psychology of risk*. Retrieved: https://www-cambridge-org.ludwig.lub.lu.se/core/services/aop-cambridge-core/content/view/E200B75CBB7AE072BFA8E29EA6421B07/9781139061933c3_p52-84_CBO.pdf/individual_and_group_differences_in_risk_perception.pdf. Gathered: 2019-02-27.

Brooks, C. (2008). *Introductory econometrics for finance*. Retrieved: http://ebookcentral.proquest.com. Gathered: 2019-02-15.

Charness and Gneezy (2011). *Strong evidence for gender differences in risk taking.* Retrieved: https://ac-els-cdn-com.ludwig.lub.lu.se/S0167268111001521/1-s2.0-S0167268111001521-main.pdf?_tid=8249d8f1-cdbc-44b4-8395-af239b0eb5a2&acdnat=1551284694_46c5a9bd18361a4411cbb30fc7104f9d. Gathered: 2019-01-14.

Che (2018). *Investor types and stock return volatility.* Retrieved: http://resolver.ebscohost.com.ludwig.lub.lu.se/openurl?sid=EBSCO:edselp&genre=article&issn=09275398&isbn=&volume=47&issue=&date=20180601&spage=139&pages=139-161&title=Journal%20of%20Empirical%20Finance&atitle=Investor%20types%20and%20stock%20return%20volatility&btitle=Journal%20of%20Empirical%20Finance&jtitle=Journal%20of%20Empirical%20Finance&series=&aulast=Che%2C%20Limei&id=DOI:10.1016/j.jempfin.2018.03.005. Gathered: 2019-03-20.

Connelly and Rowell (2012). *A history of the term "moral hazard"*. Retrieved: http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=83585463&S=R&D=bth&EbscoContent=dGJyMNHX8kSeprA4y9fwOLCmr1Gep65Ssau4TLWWxWXS&ContentCustomer=dGJyMPGpt0mwqrBRuePfgeyx43zx. Gathered: 2019-01-23

Cook – Upton (2014). *A dictionary of statistics*. Retrieved: http://www.oxfordreference.com.ludwig.lub.lu.se/view/10.1093/acref/9780199679188.001.0001/acref-9780199679188?btog=chap&hide=true&jumpTo=Pagan&page=79&pageSize=20&skipEditions=true&sort=titlesort&source=%2F10.1093%2Facref%2F9780199679188.001.0001%2Facref-9780199679188. Gathered: 2019-02-02.

Desvaux, Devillard, Labaye, Sancier-Sultan, Kossoff and Zelicourt (2017). *Women matter, time to accelerate: ten years of insights into gender diversity*. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Women%20matter/Women%20Matter%20Ten%20years%20of%20insights%20on%20the%20importance%20of%20gender%20diversity/Women-Matter-Time-to-accelerate-Ten-years-of-insights-into-gender-diversity.ashx. Gathered: 2018-11-01.

Ding (2019). *Two paradoxical results in linear models: the variance inflation factor and the analysis of covariance*. Retrieved: https://arxiv.org/pdf/1903.03883.pdf. Gathered: 2019-02-27.

Eckel and Grossman (2008). *Men, women and risk aversion: experimental evidence*. Retrieved: https://www.sciencedirect.com/science/article/pii/S1574072207001138. Gathered: 2019-01-17.

Elsaid, Ursel (2011). *CEO succession, gender and risk taking*. Retrieved from: https://www.emeraldinsight.com/doi/abs/10.1108/17542411111175478. Gathered: 2018-12-18.

Erhardt, Shrader and Werbel (2003). *Board of director diversity and firm financial performance*. Retrieved: http://eds.b.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=9&sid=b98278ea-557a-42a9-b5ff-ab45ee2ac6b8%40sessionmgr101. Gathered: 2019-01-20.

Ertürk, Tuerdi, and Wujiabudula (2016). *The effects of six sigma approach on business performance: a study of white goods (home appliances) sector in Turkey.* Retrieved: http://resolver.ebscohost.com.ludwig.lub.lu.se/openurl?sid=EBSCO:edselp&genre=article&issn=18770428&isbn=&volume=229&issue=&date=20160819&spage=444&pages=444-452&title=Procedia%20-%20Social%20and%20Behavioral%20Sciences&atitle=The%20Effects%20of%20Six%20Sigma%20Approach%20on%20Business%20Performance%3A%20A%20Study%20of%20White%20Goods%20%28Home%20Appliances%29%20Sector%20in%20Turkey&btitle=Procedia%20-%20Social%20and%20Behavioral%20Sciences&jtitle=Procedia%20-%20Social%20and%20Behavioral%20Sciences&series=&aulast=Ertürk%2C%20Muzaffer&id=DOI:10.1016/j.sbspro.2016.07.154. Gathered: 2019-03-25.

Frey, Hertwig, Mata, Richter and Schupp (2018). *Risk preference: a view from psychology*. Retrieved: http://eds.b.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=3&sid=32c3c97e-4cfe-4908-bf50-f29d5173c4bd%40pdc-v-sessmgr02. Gathered: 2019-01-16.

Goll, Sambharya and Tucci (2001). *Top management team composition, corporate ideology, and firm performance.* Retrieved: http://resolver.ebscohost.com.ludwig.lub.lu.se/openurl?sid=EBSCO%3abth&genre=article&issn=09388249&isbn=&volume=41&issue=2&date=20010601&spage=109&pages=109-129&title=Management+International+Review+(MIR)&atitle=Top+Management+Team+Composition%2c+Corporate+Ideology%2c+and+Firm+Performance.&btitle=Management+International+Review+(MIR)&jtitle=Management+International+Review+(MIR)&series=&aulast=Goll%2c+Irene&id=DOI%3a&site=ftf-live. Gathered: 2019-01-17.

Hambrick and Mason (1984). *Upper echelons: the organization as a reflection of its top managers*. Retrieved: http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=4277628&S=R&D=bth&EbscoContent=dGJyMNXb4kSeqLU4xNvgOLCmr1GeprJSsqm4TK6WxWXS&ContentCustomer=dGJyMPGpt0mwqrBRuePfgeyx43zx. Gathered: 2019-01-23.

Hart (1991). *Irving L. Janis' Victims of groupthink*. Retrieved: https://www.jstor.org/stable/3791464?seq=1#page_scan_tab_contents. Gathered: 2019-01-17.

Houston, James, and Karceski (2006). *What a difference a month makes: stock analyst valuations following initial public offerings*. Retrieved: http://eds.b.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=8&sid=ceb7631a-8d0b-4c14-b330-85e21767ca28%40sessionmgr4010. Gathered: 2019-03-25.

Hultman – Österberg (2018). *Does foreign aid equal welfare?* Retrieved from: http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=8947596&fileOId=8947601. Gathered: 2018-09-20.

IMF (2016). *Gender diversity in senior positions and firm performance: evidence from Europe.* Retrieved: https://www-elibrary-imf-org.ludwig.lub.lu.se/doc/IMF001/23266-9781513553283/23266-9781513553283/Other_formats/Source_PDF/23266-9781475522570.pdf. Gathered: 2019-01-07.

Johansen – Nyberg (2014). *Gender effect on corporate risk taking*. Retrieved: http://arc.hhs.se/download.aspx?mediumid=2358. Gathered: 2019-01-22.

Khan and Vieito (2013). *CEO gender and firm performance.* Retrieved: https://ac-els-cdn-com.ludwig.lub.lu.se/S014861951300012X/1-s2.0-S014861951300012X-main.pdf?_tid=94cef087-7448-455b-96b4-a4b208613cfd&acdnat=1551299767_90ce87fca4e92e9e773f92187b5c3a74. Gathered: 2019-01-23.

Kiong Ting, Binti Azzizan, Long Kweh (2015). *Upper echelon theory revisited: the relationship between CEO personal characteristics and financial leverage decision.* Retrieved: https://www.sciencedirect.com/science/article/pii/S1877042815037556. Gathered: 2019-01-16.

Lango, Tillenius (2018). *Gender composition on the board of directors and firm performance.* Retrieved: https://lup.lub.lu.se/student-papers/search/publication/8949549. Gathered: 2019-01-11.

Longley, J., and Pruitt, D.G (1980). *Groupthink: a critique of Janis theory.* Retrieved: http://resolver.ebscohost.com.ludwig.lub.lu.se/openurl?sid=EBSCO%3aedsskl&genre=book&issn=&isbn=9780761940449&volume=4&issue=&date=20030101&spage=&pages=&title=Social+Psychology&atitle=Social+Psychology&btitle=&jtitle=&series=&aulast=Michael+A.+Hogg&id=DOI%3a10.4135%2f9781446263471&site=ftf-live . Gathered: 2019-01-08.

McGuinness (2016). *An empirical assessment of initial return volatility in newly listed stocks*. Retrieved: http://eds.b.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=5&sid=ceb7631a-8d0b-4c14-b330-85e21767ca28%40sessionmgr4010. Gathered: 2019-03-20.

McKinsey & Company (2011). *Organizational Health Index*. Retrieved: https://www.mckinsey.com/industries/public-sector/our-insights/organizational-health-index. Gathered: 2019-01-07.

McKinsey & Company (2017). *Women matter, time to accelerate: ten years of insights into gender diversity.* Retrieved: https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Women%20matter/Women%20Matter%20Ten%20years%20of%20insights%20on%20the%20importance%20of%20gender%20diversity/Women-Matter-Time-to-accelerate-Ten-years-of-insights-into-gender-diversity.ashx. Gathered: 2018-09-10.

McKinsey & Company (2018). *Delivering through diversity*. Retrieved: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Delivering%20through%20diversity/Delivering-through-diversity_full-report.ashx. Gathered: 2019-01-08.

Moeller – Shafer (2012). *The effects of six sigma on corporate performance: an empirical investigation.* Retrieved: https://www.sciencedirect.com/science/article/abs/pii/S027269631200068X. Gathered: 2019-03-22.

Murray, Manrai and Manrai (2017). *The financial services industry and society: the role of incentives/punishments, moral hazard, and conflicts of interests in the 2008 financial crisis.* Retrieved: https://www.emeraldinsight.com/doi/pdfplus/10.1108/JEFAS-02-2017-0027. Gathered: 2019-01-08.

Nielsen (2010). *Top management team diversity: a review of theories and methodologies*. Retrieved: http://eds.a.ebscohost.com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=3&sid=f3e80126-7489-494e-b313-2d36a9f7699d%40sdc-v-sessmgr04. Gathered: 2019-01-20.

OECD (2012). *Gender equality in education, employment and entrepreneurship: final report to the MCM 2012.* Retrieved: https://files.eric.ed.gov/fulltext/ED533102.pdf. Gathered: 2018-10-22.

ORBIS: https://orbis-bvdinfo-com.ludwig.lub.lu.se/Home.serv?product=orbisneo&loginfromcontext=ipaddress.

RETRIEVER: http://web.retriever-info.com.ludwig.lub.lu.se/services/businessinfo.html.

SCB, MIS 2007:2. *SNI 2007 Standard för svensk näringsgrensindelning 2007*. Retrieved: https://www.scb.se/contentassets/d43b798da37140999abf883e206d0545/mis-2007-2.pdf. Gathered: 2019-02-26.

Sheytanova (2014). *The accuracy of the Hausman Test in panel data: a Monte Carlo study.* Retrieved: http://oru.diva-portal.org/smash/get/diva2:805823/FULLTEXT01.pdf. Gathered: 2019-02-20.

Smith, Smith and Verner (2006). *Do women in top management affect firm performance? A panel study of 2500 Danish firms"*. Retrieved from: https://www.emeraldinsight.com/doi/abs/10.1108/17410400610702160. Gathered: 2019-01-04.

University of the West of England (2019). *Data Analysis: Pearson's Correlation Coefficient*. Retrieved from http://learntech.uwe.ac.uk/da/default.aspx?pageid=1442. Gathered: 2019-02-26.

Varian (2010). *Intermediate microeconomics*. Retrieved: http://fac.ksu.edu.sa/sites/default/files/microeco-_varian_0.pdf. Gathered: 2019-01-07.

Wiley – Monollor-Tormos (2018). *Board gender diversity in the STEM&F sectors: the critical mass required to drive firm performance*. Retrieved: https://journals-sagepub-com.ludwig.lub.lu.se/doi/10.1177/1548051817750535 . Gathered: 2018-12-01.

World Bank (2012). *World development report 2012: gender equality and development*. Retrieved: http://documents.worldbank.org/curated/en/492221468136792185/pdf/646650WDR0201200Box364543B00PUBLIC0.pdf. Gathered: 2018-11-02.

YAHOO FINANCE: https://finance.yahoo.com.

Ye (2011). *A model of managerial overconfidence, moral hazard and corporate investments.* Retrieved: https://ieeexplore-ieee-org.ludwig.lub.lu.se/stamp/stamp.jsp?tp=&arnumber=5998458. Gathered: 2019-01-16.

Appendix

Descriptive data

Balanced data confirmation

```
xtset Companynum Year
    panel variable:  Companynum (strongly balanced)
     time variable:  Year, 2008 to 2016
             delta:  1 unit
```

The picture above confirms that the panel data is balanced and covers the time period 2008 – 2016.

Firm allocation: industry and size (whole sample)

Industry	Large cap	Mid cap	Small cap	Total
Biotechnical research & development	0	0	2	2
Building activity	1	0	0	1
Businesses operated at headquarters	27	24	16	67
Computers, programs & equipment, wholesale trade	1	0	0	1
Consulting activity	0	1	3	4
Consulting activity in IT	0	0	2	2
Electronic components & circuit boards	1	1	0	2
Electronics manufacturing	0	0	1	1
Employment services & recruitment	0	0	1	1
Financial services	4	0	0	4
Financial support services	1	0	0	1
Freight traffic	0	0	1	1
Furniture manufacturing	0	0	1	1
Holding business	2	1	2	5
Household appliance & electronics, wholesale trade	0	0	2	2
Household supply, wholesale trade	0	1	0	1
Ironmongery & HVAC supply	0	1	0	1
IT	1	2	4	7
Machine manufacturing	1	2	0	3
Means of transportation industry	1	0	1	2
Media & advertising	0	0	1	1
Metal industry	1	0	1	2
Professional, scientific & technical activities	0	0	1	1
Real estate activities	6	5	0	11
Retail	0	0	2	2
Sawn goods & building material, wholesale trade	0	0	1	1
Scientific & technical research & development	0	2	1	3
Social science & humanistic research & development	0	1	0	1
Sports facilities	0	1	0	1
Technical consulting activity	0	0	2	2
Telecommunication	0	1	0	1
Vehicle manufacturing	1	0	0	1
Total	**48**	**43**	**45**	**136**

The table show how the 32 industries are allocated in each cap. One can notify that most firms operate in the industry "businesses operated at headquarters". The second most common industry to operate in is "real estate activity". The third most common industry that firms operate in is "IT".

Mean of women on the board in each industry (whole sample)

Industry	Women on the board of directors
Biotechnical research & development	29,3%
Building activity	43,3%
Businesses operated at headquarters	22,9%
Computers, programs & equipment, wholesale trade	16,4%
Consulting activity	12,7%
Consulting activity in IT	30,6%
Electronic components & circuit boards	19,8%
Electronics manufacturing	13,3%
Employment services & recruitment	40,0%
Financial services	23,4%
Financial support services	25,5%
Freight traffic	3,4%
Furniture manufacturing	28,2%
Holding business	18,9%
Household appliance & electronics, wholesale trade	18,5%
Household supply, wholesale trade	37,6%
Ironmongery & HVAC supply	21,7%
IT	15,8%
Machine manufacturing	22,8%
Means of transportation industry	18,9%
Media & advertising	34,2%
Metal industry	19,9%
Professional, scientific & technical activities	16,9%
Real estate activities	29,5%
Retail	31,9%
Sawn goods & building material, wholesale trade	6,6%
Scientific & technical research & development	29,4%
Social science & humanistic research & development	34,3%
Sports facilities	22,9%
Technical consulting activity	18,5%
Telecommunication	14,4%
Vehicle manufacturing	15,3%
Total	**22,9%**

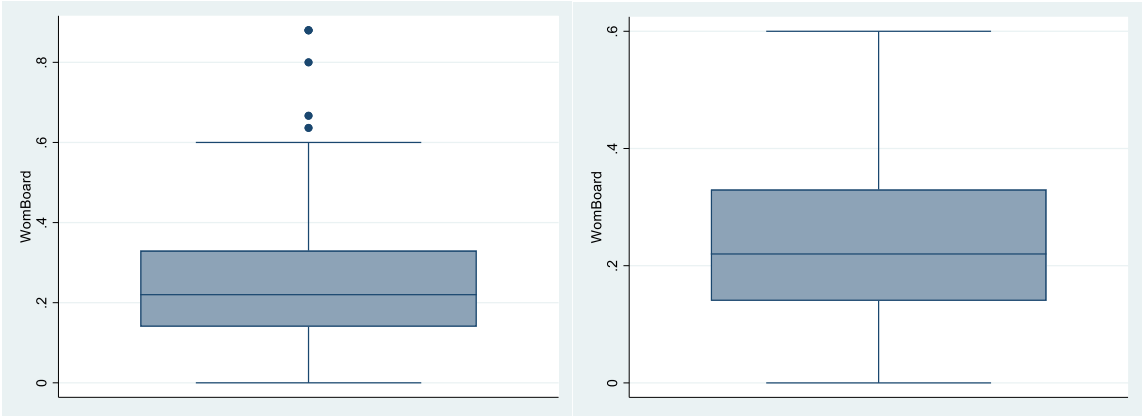
The table above show how many women there are on the board of directors in average for each industry. The total average for women on the board of directors is approximately 23 %. One can observe that the industry "Building activity" has the highest share of women on the board of directors. The industry "Freight traffic" has the lowest share of women on the board of directors. Though, in each of these industries, only one company operates.

Mean of women on the board in each cap (whole sample)

Cap	Mean, women on the board
Large cap	26,5%
Mid cap	22,0%
Small cap	19,9%
Total	**22,9%**

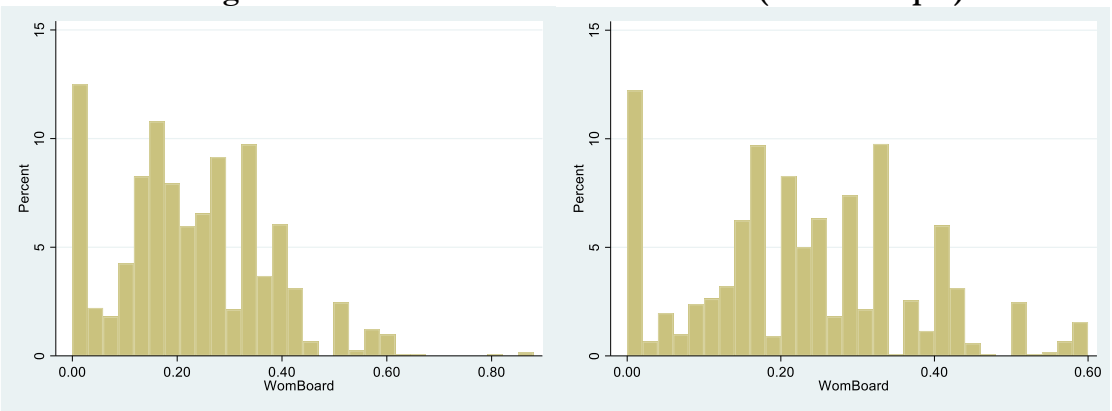
The table show the mean share of women on the board, distributed in each cap. We can see that the result is accurate since it coincides with the total mean of women on the board in the previous table. It is not a surprise that there are most women in the large cap, since most companies (48) are allocated in the large cap.

Boxplot: women on the board in each company (whole sample)



The boxplot illustrates the distribution of women on the board in each company. The upper limit is restricted to 60% and the lower limit is 0%. Most common is to have around 23% women on the board of directors. The dots in the boxplot represents outliers, i.e. unusually high shares of women on the board of directors. In order to make the data robust, the outliers were eliminated.

Histogram: women on the board of directors (whole sample)



The distribution of women on the board of directors can also be illustrated in the histogram above. Here it is more obvious that zero percent woman on the board of directors is most common among the companies. The histogram to the right is after outliers have been eliminated.

Mean of employed women in each industry (whole sample)

Industry	Employed women
Biotechnical research & development	40,4%
Building activity	16,6%
Businesses operated at headquarters	32,1%
Computers, programs & equipment, wholesale trade	27,3%
Consulting activity	36,9%
Consulting activity in IT	14,6%
Electronic components & circuit boards	11,8%
Electronics manufacturing	12,8%
Employment services & recruitment	69,5%
Financial services	36,5%
Financial support services	39,7%
Freight traffic	22,1%
Furniture manufacturing	25,8%
Holding business	28,7%
Household appliance & electronics, wholesale trade	29,3%
Household supply, wholesale trade	49,5%
Ironmongery & HVAC supply	23,7%
IT	32,8%
Machine manufacturing	25,1%
Means of transportation industry	20,4%
Media & advertising	53,2%
Metal industry	22,3%
Professional, scientific & technical activities	58,0%
Real estate activities	35,6%
Retail	79,0%
Sawn goods & building material, wholesale trade	7,5%
Scientific & technical research & development	40,4%
Social science & humanistic research & development	61,1%
Sports facilities	39,6%
Technical consulting activity	19,0%
Telecommunication	21,1%
Vehicle manufacturing	20,4%
Total	**32,6%**

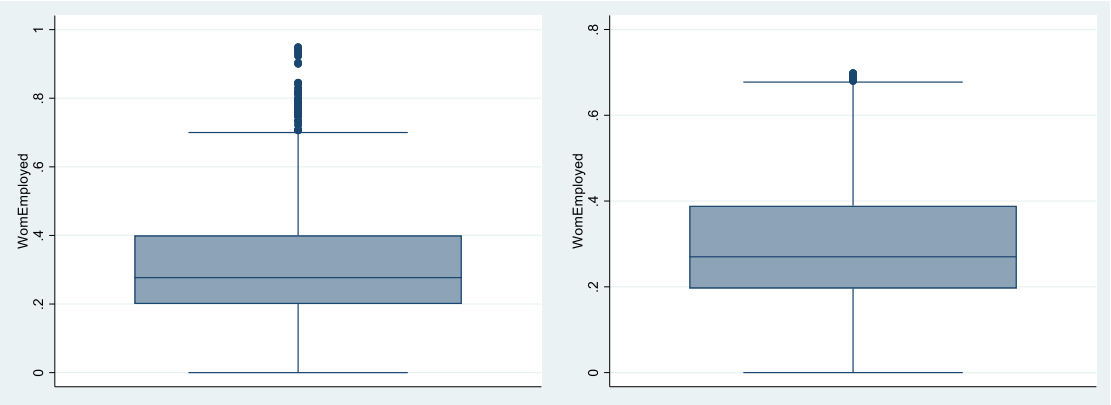
The table show the mean distribution of women employed in each industry. The industry with the highest share of women employed is "Retail". The industry with the lowest share of women employed is "Sawn goods & building material, wholesale trade".

Mean of employed women in each cap (whole sample)

Cap	Mean, employed women
Large cap	33,5%
Mid cap	32,2%
Small cap	31,9%
Total	**32,6%**

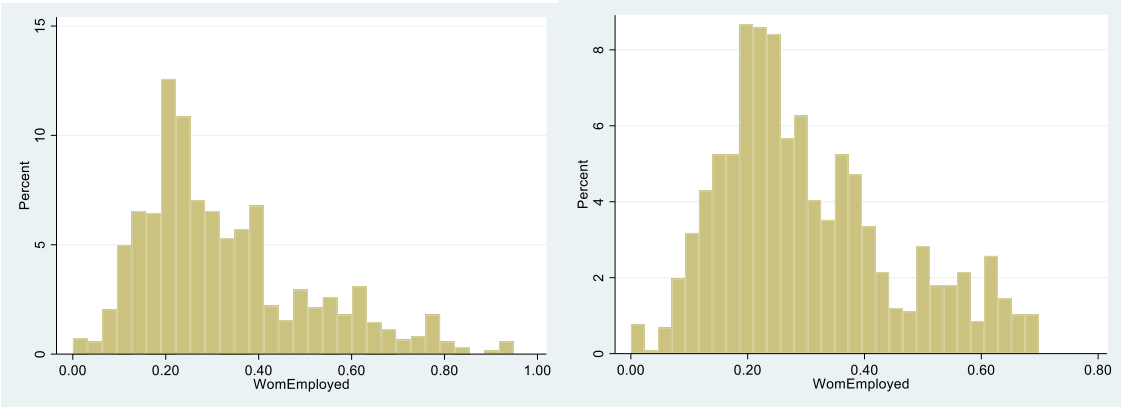
The table show the mean share of women employed, distributed in each cap. We can see that the result is accurate since it coincides with the total mean of women employed in the previous table. One can also notify a more equal distribution of employed women in each cap. This is probably due to that the female-dominated industry "Retail" operates in the small cap.

Boxplot: employed women in each company (whole sample)



The boxplot illustrates the distribution of employed women in each company. The upper limit is restricted to circa 70% and the lower limit is 0%. Most common is to have around 30% employed women. The dots in the boxplot represents outliers, i.e. unusually high shares of women employed. The boxplot to the right show when the lower and upper limit is restricted to 0% and 70%.

Histogram: employed women (whole sample)



In order to get a more specific overview of the women employed in each company the allocation can be illustrated in a histogram. In the histogram the outliers are illustrated in the tails of the distribution. One can observe that it is most common to have around 22 percent female employees. The histogram to the right represents the variable when outliers have been eliminated.

Summary of variables: before and after creation of risk measures

```
. summarize StockReturnVolatility WomBoard WomEmployed EBITmargin ROE Leverage

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
StockRetur~y |      1,164    .8541551    20.61079         0   613.0948
    WomBoard |      1,164    .2214947    .1380338         0         .6
 WomEmployed |      1,164    .3030204    .1515506         0    .698356
  EBITmargin |      1,164   -.3190813    9.175108      -284     10.846
         ROE |      1,164    .0243142    2.160152    -69.43     16.257
-------------+---------------------------------------------------------
    Leverage |      1,164    .0138704    .0237136     -.2524      .6329
```

The table illustrate the summarized descriptive statistics for the variables before logging the risk measures (return on equity, leverage, EBIT-margin, and stock return volatility).

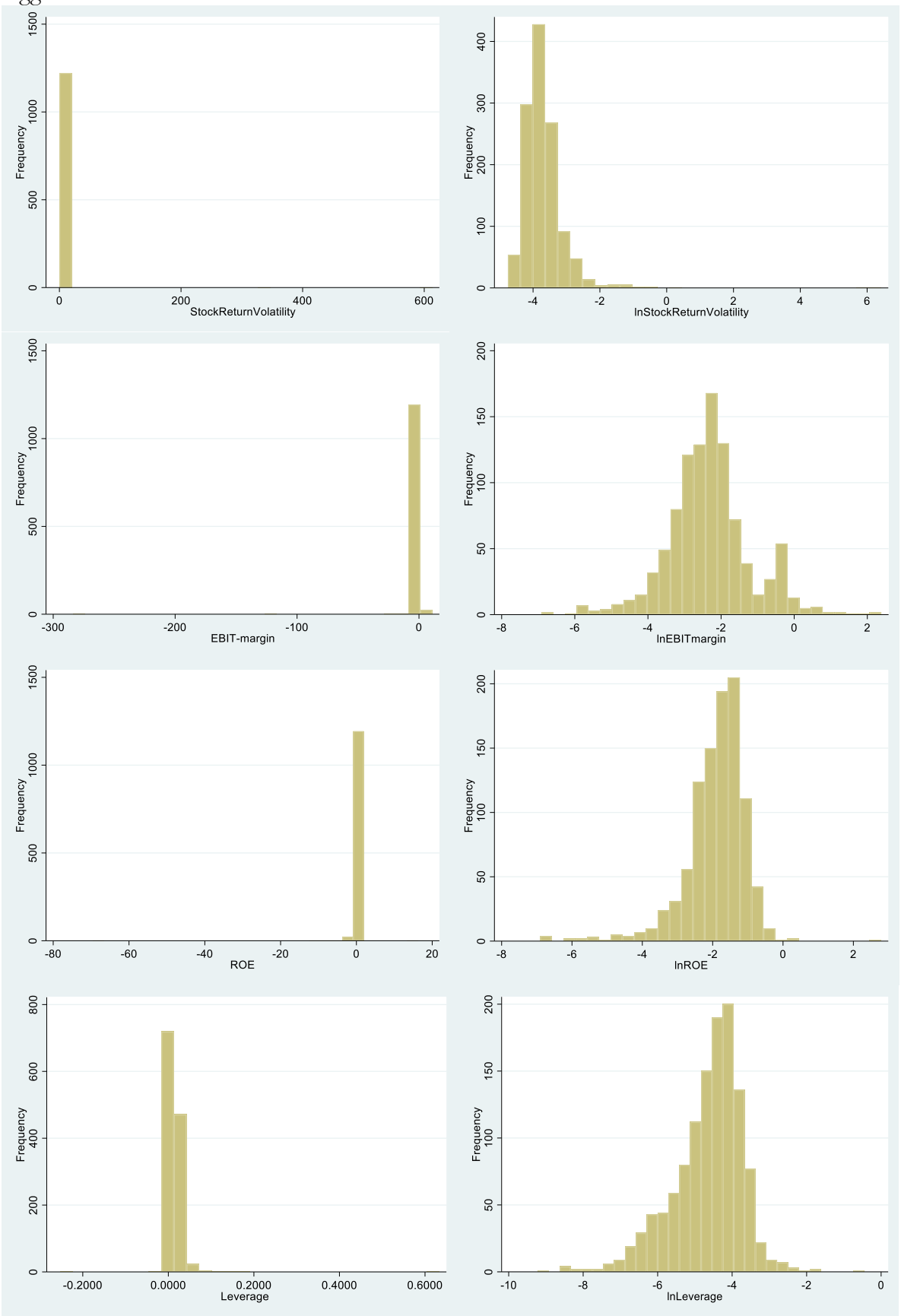
```
. summarize lnStockReturnVolatility WomBoard  WomEmployed lnEBITmargin  lnROE
> lnLeverage

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
lnStockRet~y |      1,163    -3.69011    .6673975  -4.754759   6.418519
    WomBoard |      1,164    .2214947    .1380338          0         .6
 WomEmployed |      1,164    .3030204    .1515506          0    .698356
lnEBITmargin |        956   -2.310976    1.128734  -6.907755   2.383796
       lnROE |        946   -1.911439    .8652979  -6.907755   2.788524
-------------+---------------------------------------------------------
  lnLeverage |      1,150   -4.643082    .9491846   -9.21034  -.4574428
```

The table illustrate the summarized descriptive statistics for the variables after logging the risk measures. Since one cannot log negative values, these were deleted from the sample automatically when logged.

Histograms of risk measures

The following histograms show how the risk measures follows a more normal distribution when logged.



Additional tests

Hausman's test

```
. hausman fe re

                ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
    WomBoard |   -.6504535    -.5210401       -.1294134        .0607278
 WomEmployed |   -.4161395    -.2121563       -.2039832        .1939633
lnEBITmargin |   -.0293098    -.0617656        .0324558        .0314868
  lnLeverage |   -.0484355    -.0536447        .0052093        .0268614
       lnROE |    .0127085     .0118782        .0008303        .0230105
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       15.95
                Prob>chi2 =      0.0070
```

From the table one can conclude that it is accurate to apply fixed effects to this study, since prob > chi2 = 0.0044 (Bell, Jones 2014, page. 1 – 17).

Test for time fixed effects

```
.  testparm i.Year

 ( 1)  2009.Year = 0
 ( 2)  2010.Year = 0
 ( 3)  2011.Year = 0
 ( 4)  2012.Year = 0
 ( 5)  2013.Year = 0
 ( 6)  2014.Year = 0
 ( 7)  2015.Year = 0
 ( 8)  2016.Year = 0

       F(  8,   786) =   45.13
            Prob > F =    0.0000
```

The table show that prob > F = 0.0000, which means that one must reject the null hypothesis that the coefficients for all years are equal to zero. Time-fixed effects must be added to the regressions.

Fisher's unit root test based on Augmented Dickey Fuller-test

```
Fisher-type unit-root test for WomEmployed
Based on augmented Dickey-Fuller tests
-------------------------------------------
Ho: All panels contain unit roots           Number of panels       =    132
Ha: At least one panel is stationary        Avg. number of periods =   8.82

AR parameter: Panel-specific                Asymptotics: T -> Infinity
Panel means:  Included
Time trend:   Not included                  Cross-sectional means removed
Drift term:   Included                      ADF regressions: 1 lag
------------------------------------------------------------------------------
                                  Statistic      p-value
------------------------------------------------------------------------------
 Inverse chi-squared(256)  P       599.9336       0.0000
 Inverse normal            Z       -12.7037       0.0000
 Inverse logit t(644)      L*      -12.8934       0.0000
 Modified inv. chi-squared Pm       15.1999       0.0000
------------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

When the Dickey-Fuller test is executed, I found that the panel data is stationary. Above is an example when the test is performed for the independent variable *WomBoard*. For all variables, the null hypothesis was rejected. Hence, one can confirm that the data does not have any unit roots and is stationary.

Breusch Pagan's test

```
. regress lnStockReturnVolatility WomBoard WomEmployed lnEBITmargin lnLeverage
>  lnROE

      Source |       SS           df       MS      Number of obs   =       929
-------------+----------------------------------   F(5, 923)       =     12.11
       Model |  10.8928576         5  2.17857152   Prob > F        =    0.0000
    Residual |  166.107402       923  .179964682   R-squared       =    0.0615
-------------+----------------------------------   Adj R-squared   =    0.0565
       Total |  177.000259       928  .190733038   Root MSE        =    .42422

------------------------------------------------------------------------------
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    WomBoard |  -.3058556   .1096775    -2.79   0.005    -.5211019   -.0906094
 WomEmployed |  -.0861854   .0990475    -0.87   0.384    -.2805698    .1081991
lnEBITmargin |  -.0816785   .0146349    -5.58   0.000    -.1104001   -.0529569
  lnLeverage |  -.0510474   .0165386    -3.09   0.002     -.083505   -.0185899
       lnROE |  -.0045405   .0185347    -0.24   0.807    -.0409155    .0318345
       _cons |  -4.141333   .0971832   -42.61   0.000    -4.332059   -3.950608
------------------------------------------------------------------------------

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of lnStockReturnVolatility

         chi2(1)      =     7.71
         Prob > chi2  =   0.0055

.
```

The table confirms that the variance is heteroscedastic, since prob > chi2 = 0.000. Hence, robust standard errors were used in the regressions.

Variance inflation factor

```
. regress lnStockReturnVolatility WomBoard WomEmployed lnEBITmargin lnLeverage
>  lnROE

      Source |       SS           df       MS      Number of obs   =       929
-------------+----------------------------------   F(5, 923)       =     12.11
       Model |  10.8928576         5  2.17857152   Prob > F        =    0.0000
    Residual |  166.107402       923  .179964682   R-squared       =    0.0615
-------------+----------------------------------   Adj R-squared   =    0.0565
       Total |  177.000259       928  .190733038   Root MSE        =    .42422

------------------------------------------------------------------------------
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    WomBoard |  -.3058556   .1096775    -2.79   0.005    -.5211019   -.0906094
 WomEmployed |  -.0861854   .0990475    -0.87   0.384    -.2805698    .1081991
lnEBITmargin |  -.0816785   .0146349    -5.58   0.000    -.1104001   -.0529569
  lnLeverage |  -.0510474   .0165386    -3.09   0.002     -.083505   -.0185899
       lnROE |  -.0045405   .0185347    -0.24   0.807    -.0409155    .0318345
       _cons |  -4.141333   .0971832   -42.61   0.000    -4.332059   -3.950608
------------------------------------------------------------------------------

. vif

    Variable |       VIF       1/VIF
-------------+----------------------
lnEBITmargin |      1.25    0.800831
       lnROE |      1.17    0.851377
  lnLeverage |      1.10    0.911683
 WomEmployed |      1.09    0.914531
    WomBoard |      1.07    0.932800
-------------+----------------------
    Mean VIF |      1.14
```

The table show that the data has a low degree of collinearity. If a variable's VIF-value is greater than 10, the data is recommended to be furthered investigated. The tolerance, 1/VIF, should not be lower than 0,1 if the data is supposed to have a low degree of collinearity (Ding 2019, page 1 – 5).

Regressions

New green list: WBD's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomBoard lnROE lnLeverage lnEBITmargin Capcod
> e i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =         92
Absorbed variable: Industry                     No. of categories =          6
                                                F(  13,     73)   =       7.60
                                                Prob > F          =     0.0000
                                                R-squared         =     0.6577
                                                Adj R-squared     =     0.5733
                                                Root MSE          =     0.3205

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 lagWomBoard |   -.9368309   .3988792    -2.35   0.022    -1.731796   -.1418658
       lnROE |    .2218463   .0724795     3.06   0.003     .0773949    .3662977
  lnLeverage |    .1959509   .0879295     2.23   0.029     .0207076    .3711942
lnEBITmargin |   -.2836433   .0854479    -3.32   0.001    -.4539408   -.1133458
     Capcode |    .0215477   .1070799     0.20   0.841    -.1918621    .2349576
             |
        Year |
        2009 |   -.0209872   .2502929    -0.08   0.933    -.5198202    .4778459
        2010 |   -.5048064   .2139353    -2.36   0.021    -.9311789   -.0784339
        2011 |   -.3210623   .2289179    -1.40   0.165    -.7772951    .1351704
        2012 |   -.6449253   .2022079    -3.19   0.002    -1.047925   -.2419255
        2013 |   -.8733482   .2019156    -4.33   0.000    -1.275765    -.470931
        2014 |   -.7794264    .202368    -3.85   0.000    -1.182745   -.3761075
        2015 |    -.572391   .2009832    -2.85   0.006      -.97295    -.171832
        2016 |   -.5410895   .2218487    -2.44   0.017    -.9832334   -.0989456
             |
       _cons |    -2.21711    .468561    -4.73   0.000    -3.150951    -1.28327
------------------------------------------------------------------------------
```

Variable	active
lagWomBoard	-.93683085**
lnROE	.22184631***
lnLeverage	.19595091**
lnEBITmargin	-.28364329***
Capcode	.02154772
Year	
2009	-.02098719
2010	-.50480638**
2011	-.32106235
2012	-.64492534***
2013	-.87334823***
2014	-.77942637***
2015	-.57239099***
2016	-.5410895**
_cons	-2.2171104***

legend: * p<.1; ** p<.05; *** p<.01

New green list: WE's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomEmployed lnROE lnLeverage lnEBITmargin Cap
> code i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =         92
Absorbed variable: Industry                     No. of categories =          6
                                                F(  13,     73)   =       6.97
                                                Prob > F          =     0.0000
                                                R-squared         =     0.6308
                                                Adj R-squared     =     0.5398
                                                Root MSE          =     0.3328

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lagWomEmpl~d |   -.4092413   .2127564    -1.92   0.058    -.8332642    .0147817
       lnROE |    .2121272   .0737333     2.88   0.005     .0651769    .3590774
  lnLeverage |    .1173128    .085791     1.37   0.176    -.0536684    .2882941
lnEBITmargin |   -.3181371   .0890635    -3.57   0.001    -.4956404   -.1406339
     Capcode |   -.0822248   .0871925    -0.94   0.349    -.2559993    .0915497
             |
        Year |
        2009 |    .0075975   .2716714     0.03   0.978    -.5338429    .5490379
        2010 |   -.4966826   .2307435    -2.15   0.035    -.9565537   -.0368116
        2011 |    -.306204   .2418297    -1.27   0.209    -.7881698    .1757618
        2012 |   -.6601131   .2308165    -2.86   0.006     -1.12013   -.2000965
        2013 |   -.8638769   .2302644    -3.75   0.000    -1.322793   -.4049606
        2014 |     -.77094    .227632    -3.39   0.001     -1.22461   -.3172701
        2015 |   -.5834558   .2323855    -2.51   0.014    -1.046599   -.1203121
        2016 |   -.5773923   .2560631    -2.25   0.027    -1.087725   -.0670593
             |
       _cons |   -2.544947   .5192272    -4.90   0.000    -3.579765   -1.510129
------------------------------------------------------------------------------
```

Variable	active
lagWomEmpl~d	-.40924127*
lnROE	.21212718***
lnLeverage	.11731284
lnEBITmargin	-.31813711***
Capcode	-.0822248
Year	
2009	.00759748
2010	-.49668264**
2011	-.30620399
2012	-.66011309***
2013	-.86387686***
2014	-.77094002***
2015	-.58345578**
2016	-.57739228**
_cons	-2.5449471***

legend: * p<.1; ** p<.05; *** p<.01

New yellow list: WBD's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomBoard lnROE lnLeverage lnEBITmargin Capcod
> e i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =        609
Absorbed variable: Industry                     No. of categories =         25
                                                F(  13,     571)  =      19.18
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4780
                                                Adj R-squared     =     0.4441
                                                Root MSE          =     0.3007

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 lagWomBoard |  -.1950339    .130289    -1.50   0.135    -.450938    .0608702
       lnROE |  -.0261125   .0220835    -1.18   0.238   -.0694874    .0172623
  lnLeverage |   .0124875   .0192309     0.65   0.516   -.0252844    .0502595
lnEBITmargin |   -.027411    .020521    -1.34   0.182   -.0677168    .0128948
     Capcode |  -.1056571   .0185563    -5.69   0.000   -.1421041   -.0692101
             |
        Year |
        2009 |  -.1954258    .067199    -2.91   0.004   -.3274131   -.0634384
        2010 |   -.472347   .0630021    -7.50   0.000   -.5960912   -.3486028
        2011 |  -.3506166   .0598852    -5.85   0.000   -.4682387   -.2329944
        2012 |  -.5533019   .0592693    -9.34   0.000   -.6697143   -.4368895
        2013 |  -.6769979   .0722641    -9.37   0.000   -.8189337    -.535062
        2014 |  -.6879392   .0568972   -12.09   0.000   -.7996926   -.5761859
        2015 |  -.5423402   .0594812    -9.12   0.000   -.6591688   -.4255115
        2016 |  -.5487996   .0577671    -9.50   0.000   -.6622615   -.4353377
             |
       _cons |  -3.159118   .1374274   -22.99   0.000   -3.429043   -2.889193
------------------------------------------------------------------------------
```

Variable	active
lagWomBoard	-.19503388
lnROE	-.02611251
lnLeverage	.01248754
lnEBITmargin	-.02741101
Capcode	-.10565713***
Year	
2009	-.19542578***
2010	-.472347***
2011	-.35061656***
2012	-.55330187***
2013	-.67699788***
2014	-.68793924***
2015	-.54234017***
2016	-.5487996***
_cons	-3.1591185***

legend: * p<.1; ** p<.05; *** p<.01

New yellow list: WE's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomEmployed lnROE lnLeverage lnEBITmargin Cap
> code i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =        609
Absorbed variable: Industry                     No. of categories =         25
                                                F(  13,     571)  =      19.50
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4760
                                                Adj R-squared     =     0.4421
                                                Root MSE          =     0.3013

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lagWomEmpl~d |  -.0825845   .0999757    -0.83   0.409   -.2789495    .1137805
       lnROE |  -.0280824   .0225912    -1.24   0.214   -.0724545    .0162896
  lnLeverage |   .0131121   .0196663     0.67   0.505   -.0255151    .0517393
lnEBITmargin |  -.0254074   .0216533    -1.17   0.241   -.0679373    .0171225
     Capcode |  -.1055504   .0187587    -5.63   0.000   -.1423949   -.0687059
             |
        Year |
        2009 |  -.1770086   .0697948    -2.54   0.011   -.3140945   -.0399226
        2010 |   -.452111   .0666186    -6.79   0.000   -.5829584   -.3212636
        2011 |  -.3359666    .060039    -5.60   0.000   -.4538908   -.2180424
        2012 |  -.5378713   .0599837    -8.97   0.000   -.6556869   -.4200557
        2013 |  -.6636356   .0716477    -9.26   0.000   -.8043609   -.5229104
        2014 |  -.6767461   .0580458   -11.66   0.000   -.7907554   -.5627368
        2015 |   -.532858   .0595979    -8.94   0.000   -.6499159   -.4158001
        2016 |  -.5451851   .0586539    -9.29   0.000   -.6603888   -.4299814
             |
       _cons |  -3.190086   .1447361   -22.04   0.000   -3.474366   -2.905806
------------------------------------------------------------------------------
```

Variable	active
lagWomEmpl~d	-.08258448
lnROE	-.02808243
lnLeverage	.01311213
lnEBITmargin	-.02540739
Capcode	-.10555039***
Year	
2009	-.17700856**
2010	-.45211099***
2011	-.33596662***
2012	-.53787128***
2013	-.66363561***
2014	-.6767461***
2015	-.53285797***
2016	-.54518512***
_cons	-3.1900858***

legend: * p<.1; ** p<.05; *** p<.01

New red list: WBD's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomBoard lnROE lnLeverage lnEBITmargin Capcod
> e i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =        200
Absorbed variable: Industry                     No. of categories =         13
                                                F(  13,    174)   =       5.78
                                                Prob > F          =     0.0000
                                                R-squared         =     0.3988
                                                Adj R-squared     =     0.3125
                                                Root MSE          =     0.4092

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 lagWomBoard |   .5167748   .2294719     2.25   0.026     .0638681    .9696814
       lnROE |   .0071751    .042611     0.17   0.866    -.0769259    .0912762
  lnLeverage |   .1649457   .0638958     2.58   0.011     .0388351    .2910564
lnEBITmargin |   .0174757   .0355913     0.49   0.624    -.0527704    .0877219
     Capcode |  -.1054253   .0538845    -1.96   0.052    -.2117766     .000926
             |
        Year |
        2009 |  -.0956421   .1409937    -0.68   0.498    -.3739203     .182636
        2010 |  -.2740131   .1472229    -1.86   0.064    -.5645856    .0165595
        2011 |  -.0523724   .1421039    -0.37   0.713    -.3328416    .2280968
        2012 |  -.2097758   .1449096    -1.45   0.150    -.4957826    .0762309
        2013 |  -.3280323    .144907    -2.26   0.025     -.614034   -.0420305
        2014 |  -.4879914   .1077713    -4.53   0.000    -.7006987   -.2752842
        2015 |  -.4064232   .0981014    -4.14   0.000    -.6000451   -.2128012
        2016 |  -.5708008   .1018258    -5.61   0.000    -.7717735   -.3698282
             |
       _cons |  -2.451609   .2738774    -8.95   0.000    -2.992158   -1.911059
------------------------------------------------------------------------------
```

Variable	active
lagWomBoard	.51677477**
lnROE	.00717513
lnLeverage	.16494572**
lnEBITmargin	.01747574
Capcode	-.10542531*
Year	
2009	-.09564215
2010	-.27401306*
2011	-.0523724
2012	-.20977581
2013	-.32803226**
2014	-.48799144***
2015	-.40642317***
2016	-.57080083***
_cons	-2.4516085***

legend: * p<.1; ** p<.05; *** p<.01

New red list: WE's effect on stock return volatility

```
. areg lnStockReturnVolatility lagWomEmployed lnROE lnLeverage lnEBITmargin Cap
> code i.Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =        200
Absorbed variable: Industry                     No. of categories =         13
                                                F(  13,    174)   =       5.24
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4109
                                                Adj R-squared     =     0.3262
                                                Root MSE          =     0.4051

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lagWomEmpl~d |   .7095196   .2068698     3.43   0.001     .3012225    1.117817
       lnROE |   .0131724   .0431764     0.31   0.761    -.0720445    .0983893
  lnLeverage |   .1792737   .0632042     2.84   0.005     .0545281    .3040192
lnEBITmargin |  -.0056615    .036912    -0.15   0.878    -.0785145    .0671915
     Capcode |  -.0503672   .0562617    -0.90   0.372    -.1614104     .060676
             |
        Year |
        2009 |  -.1527991   .1369829    -1.12   0.266    -.4231611    .1175628
        2010 |  -.2903131   .1552198    -1.87   0.063    -.5966691    .0160429
        2011 |  -.0717789   .1451713    -0.49   0.622    -.3583024    .2147445
        2012 |  -.2515296   .1492808    -1.68   0.094    -.5461638    .0431047
        2013 |  -.3666997   .1527577    -2.40   0.017    -.6681962   -.0652032
        2014 |  -.5460526   .1153859    -4.73   0.000    -.7737887   -.3183165
        2015 |  -.4591679   .1063022    -4.32   0.000    -.6689756   -.2493602
        2016 |  -.5770731   .1142266    -5.05   0.000    -.8025211   -.3516252
             |
       _cons |  -2.609601   .2743563    -9.51   0.000    -3.151095   -2.068106
------------------------------------------------------------------------------
```

Variable	active
lagWomEmpl~d	.70951964***
lnROE	.01317241
lnLeverage	.17927367***
lnEBITmargin	-.0056615
Capcode	-.05036721
Year	
2009	-.15279913
2010	-.29031311*
2011	-.07177894
2012	-.25152956*
2013	-.36669972**
2014	-.5460526***
2015	-.4591679***
2016	-.57707315***
_cons	-2.6096008***

legend: * p<.1; ** p<.05; *** p<.01

New green list: gender effect on ROE, leverage, and EBIT-margin

ROE

Variable	active
lagWomBoard	1.3873332***
lnLeverage	.00602499
lnEBITmargin	.85478005***
lnStockRet~y	.63067114***
Capcode	.19844738*
Year	
2009	-.46701329
2010	.26727698
2011	.03511288
2012	.31337038
2013	.53668739*
2014	.27522962
2015	.26030303
2016	.25740631
_cons	.96413218

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	.83821502***
lnLeverage	.18331438
lnEBITmargin	.94142538***
lnStockRet~y	.56437914**
Capcode	.34074542***
Year	
2009	-.4952142
2010	.24383536
2011	.00714167
2012	.29794413
2013	.47868998*
2014	.22939507
2015	.25850109
2016	.275622
_cons	1.4488461

legend: * p<.1; ** p<.05; *** p<.01

Leverage

Variable	active
lagWomBoard	.27937657
lnROE	.00364782
lnEBITmargin	-.12266308
lnStockRet~y	.33726811**
Capcode	-.27588018***
Year	
2009	.02005374
2010	.25512201
2011	.23261986
2012	.4806937*
2013	.50720741*
2014	.45811464*
2015	.41349958*
2016	.31092202
_cons	-3.3370895***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	-.73437968***
lnROE	.09659656
lnEBITmargin	-.29453955**
lnStockRet~y	.16446947
Capcode	-.19909968***
Year	
2009	-.04539213
2010	.08866032
2011	.11080562
2012	.31895588
2013	.2876829
2014	.23725772
2015	.22357353
2016	.19660838
_cons	-3.7024628***

legend: * p<.1; ** p<.05; *** p<.01

EBIT-margin

Variable	active
lagWomBoard	-1.1835479***
lnROE	.62856427***
lnLeverage	-.14898136
lnStockRet~y	-.59295067***
Capcode	.05806731
Year	
2009	.30481245
2010	-.18403408
2011	-.10229868
2012	-.38231165*
2013	-.62616971***
2014	-.42901984*
2015	-.30468473
2016	-.27654429
_cons	-2.9738411***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	-1.1041237***
lnROE	.567271***
lnLeverage	-.33680862***
lnStockRet~y	-.51002757***
Capcode	-.0391712
Year	
2009	.2341696
2010	-.21105253
2011	-.11692157
2012	-.36224828*
2013	-.56020228***
2014	-.41315151*
2015	-.33074154*
2016	-.28641307
_cons	-3.2944484***

legend: * p<.1; ** p<.05; *** p<.01

New yellow list: gender effect on ROE, leverage, and EBIT-margin

ROE

Variable	active
lagWomBoard	-.24615119
lnLeverage	.42390602***
lnEBITmargin	.69322765***
lnStockRet~y	-.09597467
Capcode	-.10948397***
Year	
2009	-.12715734
2010	-.12522394
2011	-.0826413
2012	-.11859829
2013	-.21418723
2014	-.19126943
2015	-.10803485
2016	-.13087819
_cons	1.7528052***

legend: * p<.1; ** p<.05; *** p<.01

Leverage

Variable	active
lagWomBoard	.18508767
lnROE	.41449753***
lnEBITmargin	-.54668385***
lnStockRet~y	.04487841
Capcode	.16626137***
Year	
2009	-.04759509
2010	.00578288
2011	-.06083501
2012	-.03413764
2013	.02283296
2014	.014901
2015	-.0477237
2016	.09884454
_cons	-5.3512613***

legend: * p<.1; ** p<.05; *** p<.01

EBIT-margin

Variable	active
lagWomBoard	.40964808*
lnROE	.58133409***
lnLeverage	-.46884986***
lnStockRet~y	-.08448565
Capcode	.21358722***
Year	
2009	-.06098262
2010	.00850221
2011	-.03823338
2012	-.11183751
2013	-.08047344
2014	.0002599
2015	-.06593033
2016	.02570352
_cons	-4.2621437***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	-.916282***
lnLeverage	.42720906***
lnEBITmargin	.7235128***
lnStockRet~y	-.09899677
Capcode	-.07306992*
Year	
2009	-.16088133
2010	-.14919928
2011	-.11476069
2012	-.13738755
2013	-.22766491*
2014	-.21232566
2015	-.12423975
2016	-.15361925
_cons	1.9812336***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	.48447683**
lnROE	.42968579***
lnEBITmargin	-.57006548***
lnStockRet~y	.04649111
Capcode	.14835164***
Year	
2009	-.03431384
2010	.01269787
2011	-.04799345
2012	-.02804722
2013	.02803171
2014	.02423832
2015	-.04099516
2016	.10977593
_cons	-5.4393927***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	1.1379689***
lnROE	.58722632***
lnLeverage	-.46001658***
lnStockRet~y	-.07269518
Capcode	.16006798***
Year	
2009	-.02038228
2010	.03117818
2011	-.0014949
2012	-.08519661
2013	-.05725958
2014	.02707891
2015	-.04298487
2016	.05416633
_cons	-4.3133205***

legend: * p<.1; ** p<.05; *** p<.01

New red list: gender effect on ROE, leverage, and EBIT-margin

ROE

Variable	active
lagWomBoard	-.42859103
lnLeverage	.27272903***
lnEBITmargin	.62301539***
lnStockRet~y	.01498849
Capcode	-.03767715
Year	
2009	-.11833949
2010	-.07369554
2011	.01606554
2012	-.17757398
2013	-.25081813
2014	-.06382677
2015	.11810635
2016	.07478728
_cons	1.0594414

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	-.53763681
lnLeverage	.25794513***
lnEBITmargin	.63836905***
lnStockRet~y	.02797162
Capcode	-.07873607
Year	
2009	-.07028761
2010	-.05676263
2011	.032112
2012	-.14059787
2013	-.21567236
2014	-.01229682
2015	.16374447
2016	.08440833
_cons	1.1995307

legend: * p<.1; ** p<.05; *** p<.01

Leverage

Variable	active
lagWomBoard	.17208821
lnROE	.239348**
lnEBITmargin	-.23801912*
lnStockRet~y	.30239027***
Capcode	-.20827716*
Year	
2009	-.32063459
2010	-.25090011
2011	-.24093583
2012	-.12708084
2013	-.01700199
2014	.04084458
2015	-.07361189
2016	-.02860222
_cons	-3.3820694***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	-.38474202
lnROE	.22597244**
lnEBITmargin	-.22907494*
lnStockRet~y	.3335008***
Capcode	-.22467361*
Year	
2009	-.31611047
2010	-.23918269
2011	-.23477318
2012	-.1167131
2013	.00849868
2014	.07853649
2015	-.03973931
2016	.01730368
_cons	-3.1191236***

legend: * p<.1; ** p<.05; *** p<.01

EBIT-margin

Variable	active
lagWomBoard	-.21952023
lnROE	.58656341***
lnLeverage	-.25534631***
lnStockRet~y	.03437004
Capcode	.54921649***
Year	
2009	-.0593424
2010	-.01748293
2011	.0092656
2012	-.03231152
2013	.16375417
2014	.19189962
2015	.14861175
2016	.25302377
_cons	-3.3331888***

legend: * p<.1; ** p<.05; *** p<.01

Variable	active
lagWomEmpl~d	.54524687
lnROE	.59664055***
lnLeverage	-.24439391***
lnStockRet~y	-.01123633
Capcode	.56865731***
Year	
2009	-.06423558
2010	-.03199837
2011	.00197497
2012	-.04651348
2013	.12598758
2014	.13610241
2015	.09957104
2016	.1874554
_cons	-3.6347092***

legend: * p<.1; ** p<.05; *** p<.01

Whole sample: new green list's effect on stock return volatility

```
. areg lnStockReturnVolatility GreenTMdum lnROE lnLeverage lnEBITmargin Capcode
>  i.Year, absorb(Industry) robust

Linear regression, absorbing indicators          Number of obs     =        929
Absorbed variable: Industry                      No. of categories =         32
                                                 F(  13,    884)   =      24.10
                                                 Prob > F          =     0.0000
                                                 R-squared         =     0.3724
                                                 Adj R-squared     =     0.3411
                                                 Root MSE          =     0.3545

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  GreenTMdum |   .1670416   .0634815     2.63   0.009     .0424495    .2916337
       lnROE |  -.0022208   .0217716    -0.10   0.919    -.0449508    .0405093
  lnLeverage |   .0229697   .0201798     1.14   0.255    -.0166361    .0625756
lnEBITmargin |   -.037874    .024218    -1.56   0.118    -.0854055    .0096576
     Capcode |  -.1240346   .0173209    -7.16   0.000    -.1580295   -.0900397
             |
        Year |
        2009 |  -.1737228   .0596079    -2.91   0.004    -.2907123   -.0567332
        2010 |  -.4359748    .057305    -7.61   0.000    -.5484444   -.3235051
        2011 |  -.2834269   .0566465    -5.00   0.000    -.3946042   -.1722496
        2012 |  -.4993654   .0558736    -8.94   0.000    -.6090258   -.3897049
        2013 |  -.6146656   .0623963    -9.85   0.000    -.7371278   -.4922034
        2014 |  -.6228337   .0495392   -12.57   0.000    -.7200618   -.5256055
        2015 |  -.5005712   .0504863    -9.91   0.000    -.5996581   -.4014843
        2016 |  -.5463247    .049022   -11.14   0.000    -.6425379   -.4501115
             |
       _cons |  -3.115841   .135921   -22.92   0.000    -3.382607   -2.849076
------------------------------------------------------------------------------
```

Variable	active
GreenTMdum	.16704158***
lnROE	-.00222077
lnLeverage	.02296975
lnEBITmargin	-.03787396
Capcode	-.12403461***
Year	
2009	-.17372275***
2010	-.43597475***
2011	-.2834269***
2012	-.49936537***
2013	-.61466558***
2014	-.62283367***
2015	-.50057121***
2016	-.54632467***
_cons	-3.1158411***

legend: * p<.1; ** p<.05; *** p<.01

Whole sample: new yellow list's effect on stock return volatility

```
. areg lnStockReturnVolatility YellowTMdum lnROE lnLeverage lnEBITmargin Capcod
> e i.Year, absorb(Industry) robust

Linear regression, absorbing indicators          Number of obs     =        929
Absorbed variable: Industry                      No. of categories =         32
                                                 F(  13,    884)   =      27.63
                                                 Prob > F          =     0.0000
                                                 R-squared         =     0.3938
                                                 Adj R-squared     =     0.3636
                                                 Root MSE          =     0.3484

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 YellowTMdum |  -.1796761   .0328986    -5.46   0.000    -.2442447   -.1151076
       lnROE |        .003   .0212178     0.14   0.888    -.0386431    .044643
  lnLeverage |   .0301944   .0188349     1.60   0.109    -.0067719    .0671608
lnEBITmargin |  -.0495306   .0231541    -2.14   0.033     -.094974   -.0040871
     Capcode |  -.1021362   .0176832    -5.78   0.000    -.1368421   -.0674303
             |
        Year |
        2009 |  -.1810047   .0594065    -3.05   0.002     -.297599   -.0644105
        2010 |   -.440651   .0564396    -7.81   0.000    -.5514222   -.3298797
        2011 |  -.2869241   .0560471    -5.12   0.000     -.396925   -.1769233
        2012 |   -.503379   .0550444    -9.14   0.000    -.6114121    -.395346
        2013 |  -.6219065   .0616629   -10.09   0.000    -.7429292   -.5008838
        2014 |  -.6278708   .0489886   -12.82   0.000    -.7240184   -.5317232
        2015 |  -.5056582   .0501419   -10.08   0.000    -.6040692   -.4072472
        2016 |  -.5567031   .0490206   -11.36   0.000    -.6529135   -.4604926
             |
       _cons |  -3.010157    .123517   -24.37   0.000    -3.252578   -2.767737
------------------------------------------------------------------------------
```

Variable	active
YellowTMdum	-.17967614***
lnROE	.00299997
lnLeverage	.03019444
lnEBITmargin	-.04953057**
Capcode	-.10213622***
Year	
2009	-.18100475***
2010	-.44065097***
2011	-.28692415***
2012	-.50337905***
2013	-.62190651***
2014	-.62787077***
2015	-.50565823***
2016	-.55670305***
_cons	-3.0101574***

legend: * p<.1; ** p<.05; *** p<.01

Whole sample: new red list's effect on stock return volatility

```
. areg lnStockReturnVolatility RedTMdum lnROE lnLeverage lnEBITmargin Capcode i
> .Year, absorb(Industry) robust

Linear regression, absorbing indicators         Number of obs     =        929
Absorbed variable: Industry                     No. of categories =         32
                                                F(  13,    884)   =      24.93
                                                Prob > F          =     0.0000
                                                R-squared         =     0.3725
                                                Adj R-squared     =     0.3412
                                                Root MSE          =     0.3545

------------------------------------------------------------------------------
             |               Robust
lnStockRet~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    RedTMdum |   .1010985   .0383612     2.64   0.009     .0258089    .1763881
       lnROE |  -.0062206   .0210035    -0.30   0.767    -.0474431    .0350019
  lnLeverage |     .03404   .0193306     1.76   0.079    -.0038992    .0719792
lnEBITmargin |  -.0366319   .0226845    -1.61   0.107    -.0811537    .0078898
     Capcode |  -.1216925   .0175618    -6.93   0.000    -.1561602   -.0872249
             |
        Year |
        2009 |   -.179953   .060924    -2.95   0.003    -.2995255   -.0603805
        2010 |  -.4416343   .0577814    -7.64   0.000    -.5550391   -.3282295
        2011 |  -.2906638   .0573523    -5.07   0.000    -.4032264   -.1781012
        2012 |  -.5066722   .0560972    -9.03   0.000    -.6167714    -.396573
        2013 |  -.6241608   .0625571    -9.98   0.000    -.7469387    -.501383
        2014 |  -.6292169   .0505306   -12.45   0.000    -.7283909   -.5300429
        2015 |  -.5060528   .0516738    -9.79   0.000    -.6074705   -.4046351
        2016 |  -.5576378    .050025   -11.15   0.000    -.6558194   -.4594562
             |
       _cons |  -3.077199   .1280533   -24.03   0.000    -3.328523   -2.825875
------------------------------------------------------------------------------
```

Variable	active
RedTMdum	.1010985***
lnROE	-.00622061
lnLeverage	.03403999*
lnEBITmargin	-.03663193
Capcode	-.12169255***
Year	
2009	-.179953***
2010	-.44163434***
2011	-.29066377***
2012	-.50667219***
2013	-.62416083***
2014	-.62921689***
2015	-.50605283***
2016	-.55763782***
_cons	-3.0771992***

legend: * p<.1; ** p<.05; *** p<.01

The modified lists

AQ Group	Beijer Electronics Group	Duni	Peab	Husqvarna	Sandvik	Volvo	Latour
Arjo	JM	Electra Gruppen	Poolia	Ica Gruppen	Sas	Addnode Group	Lindab International
Atrium Ljungberg	Wallenstam	Ericsson	Prevas	Indutrade	Securitas	Beijer Alma	Lundbergföretagen
Björn Borg	AAK AB	Essity	Pricer	Intrum	Semcon	Beijer Ref	Midsona
Concordia Maritime	Acando	Anoto Group	Proact IT Group	Kabe	Skanska	Bergs Timber	New Wave
Corem Property Group	Assa Abloy	BioInvent International	Probi	Kinnevik	Skistar	BTS Group	Nibe Industrier
Elos Medtech	Atlas Copco	Consilium	Profilgruppen	Klövern	Softronic	Bure Equity	Nolato
Feelgood Svenska	Axfood	Empir Group	Radisson Hospitality	Knowit	Stockwik Förvaltning	Catella	NOTE
Hennes & Mauritz	Axis	Enea	Fabege	Malmbergs Elektriska	Studsvik	Elanders	Novotek
Investor	Bilia	Eniro	Fagerhult	Medivir	Svedbergs	FastPartner	OEM International
Midway	Biotage	HMS Networks	Getinge	Modern Times Group	Swedish Match	Fingerprint Cards	Ortivus
Sweco	Boliden	Multiq International	Heba	Mycronic	Swedol	Formpipe Software	Precise Biometrics
Trention	Castellum	NCC	Hexagon	ÅF	Telia Company	Image Systems	Raysearch Laboratories
Venue Retail Group	Catena	Nederman Holding	Hexpol	Ratos	Trelleborg	Invisio Communications	Sintercast
Viking Supply Ships	Cellavision	Net Insight	Hiq International	Rejlers	VBG Group	Invisio Communications	Strax
Wihlborgs Fastigheter	CTT Systems	Nobia	Holmen	RNB Retail and Brands	Vitec Software Group	ITAB Shop Concept	TradeDoubler
Xano Industri	Diös Fastigheter	Opus Group	Hufvudstaden	Saab	Vitrolife	Lammhults Design Group	Victoria Park

The green colored companies construct the new green list.
The yellow colored companies construct the new yellow list.
The red colored companies construct the new red list.