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The effect of female representation in top management on firm performance

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Abstract

This paper examines the effect of female representation in top management on firm performance in the United States. I use data on the S&P 500 companies over the sample period from 2013 to 2018. I use the ExecuComp database to get data about the five highest placed managers within the company and the CompuStat database for the financials of the firms. I use ordinary least squares regressions to determine the relationship between female representation and firm performance. To solve the endogeneity problem, I use the fixed effects method with lagged manager variables and ordinary least squares regressions with two period lagged firm performance and manager variables. I find that female Chief Financial Officers have a positive effect on firm performance, but female top managers in general have no statistically significant effect on firm performance. Female Chief Executive Officers even have a negative effect on firm performance.

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1. Introduction

The number of women in corporate life is increasing, yet they still remain in the minority. There are still not many on the boards and in top management. In 2006, only around 30% of the corporations in the United States (US) had one woman or more in top management and little has changed since then according to Standard & Poor's (S&P) (2010). In S&P 500 companies in 2019, only 11% of the top managers was female and only 5% of the Chief Executive Officers (CEO) (Catalyst, 2019).

Gender diversity has advantages. It can make the company more competitive and more valuable. That is why some countries have decided to set legislative quota targets for women on corporate boards of companies, such as in Europe (European Commission, 2019). This way, they hope to create more equality and reap the benefits of more female representation.

This is why more and more research is being conducted into the effect of female representation on the performance of the company. Government policy increasingly focuses on more women in corporate life, but we still know little about whether it actually leads to better performance. The results of the existing literature are ambiguous. Gyapong, Monem and Hu (2016) find a positive relationship between board membership and firm value in South Africa, but Farrell and Hersch (2005) find no direct relation in the US. Adams and Ferreira (2009) even find a negative one in the US.

There are reasons that female representation improves firm performance, such as that women are less overconfident and more risk averse (Sunden and Surette, 1998) and have a better understanding of the customers (Carter, Simkins and Simpson, 2003). But there are also reasons that female representation leads to poorer firm performance, such as that it can lead to worse communication and delays the decision-making process because of the many opinions (Bennouri, Chtioui, Nagati and Nekhili, 2018).

My research question is therefore: *“What is the effect of female representation in top management on firm performance?”* Female representation is defined as female top managers, female CEOs and female Chief Financial Officers (CFO). Firm performance is defined as firm value (Tobin's Q and return on equity (ROE)) and financial performance (return on assets (ROA) and return on sales (ROS)).

My research is scientifically relevant, because it contributes to the existing literature and also provides additions. Examples of this are that I use more measures for both firm value and financial performance in the regressions and also investigate the effect of female CEOs and CFOs on firm performance. In addition, I look at what role innovation plays in the relationship between firm value and female representation in top management and also pay attention to the endogeneity problem to see if the results are robust. There is not much research yet on the effect of women in top management on firm performance. Most studies

focus on female board membership. Besides, the results from past articles are rather mixed, as previously described. This may be because the relationship between female representation and firm performance changes over time or varies by country or because other measures for female representation and firm performance are used. It could also be because the endogeneity problem is addressed differently or even not at all. I will solve this problem in several ways, as discussed below. In addition, I add innovation intensity to the regression, as described above, in order to perhaps get a clearer answer to the question what the effect of female representation is on firm performance. I focus on the US, where not much research has been done in this area in the past seven years.

It is also socially relevant, because after more research the government can say with certainty whether more women in top management should be encouraged and then she has a good reason to set legislative quota targets to create more equal opportunities for women, leading to better decision making. In addition, companies will also know for sure whether more women in top management lead to better performance or whether, for example, there must be more than two to pay off. Nevertheless, the government will likely have to encourage companies to hire women, because there are still prejudices and companies are much more cautious when hiring women, because shareholders often react negatively. So more women in top management could lead to more economic prosperity for society and more gender equality in business life, if it appears that there is a positive link between female representation and firm performance.

To answer my research question, I use data on the S&P 500 companies over the sample period from 2013 to 2018 to answer my research question. I use the ExecuComp database to get data about the five highest placed managers within the company and the CompuStat database to get data about the financials of the firms.

I use the ordinary least squares (OLS) regression method to determine the relationship between female representation and firm performance. In addition, it also examines the effect of innovation. To be sure, I use robust standard errors to control for heteroskedasticity. To solve the endogeneity problem (which will be discussed later), I use the fixed effects method with a lag of female representation and lags of the control variables instead of the contemporary ones. In addition, I use the OLS regression method with two lags of firm performance and two lags of the control variables instead of the contemporary ones.

The results show that female top managers have no statistically significant effect on both Tobin's Q and ROE. Maybe men and women have an equally good leadership style, even though it differs. However, there is a statistically significant negative relationship between Tobin's Q and female CEO if innovation intensity is included in the regression, so a female CEO worsens firm value. Maybe female CEOs are more risk averse, so they do not accept the somewhat riskier projects, which are very profitable. Female CFOs have a statistically

significant positive effect on Tobin's Q if innovation intensity is included in the regression, so a female CFO improves firm value. Maybe female CFOs make better long-term financial decisions than men.

The results also show that there is no statistically significant relationship between female top managers and financial performance. Maybe the advantage of higher quality debates on difficult issues is offset by the disadvantage of delay in the decision-making process. Female CEOs have no statistically significant effect on both ROA and ROS. Perhaps male and female CEOs have an equally good understanding of their customers. There is no relationship between female CFO and ROA, but there is a statistically significant positive relationship between female CFO and ROS, so a female CFO improves a company's financial performance. Perhaps female CFOs are better at monitoring employees and other top managers, allowing them to detect problems more quickly.

The structure of my paper is as follows. In section 2, I discuss the existing literature and develop my hypotheses. In section 3, the data, sample selection and methodology are discussed. In section 4, the results are presented. Finally, in section 5 the discussion and conclusion follow.

2. Theoretical framework

2.1 Firm value

A lot of research has been done into the effect of female representation on firm value, but the results are inconclusive. Some studies find a positive relationship between female representation and firm value. For instance, Gyapong et al. (2016) find a positive relationship between board gender and firm value in South Africa. They also find that if there are three or more female board members, firm value is even higher. Other studies find no relationship or even a negative one, such as Adams et al. (2009) in the US. Farrell et al. (2005) find no direct relation between female board membership and firm value in the US. These differences may be due to the fact that they investigate different countries, so there will be other companies in the sample, and different time frames. Gyapong et al. (2016) investigate the period from 2008 to 2013, Adams et al. (2009) from 1996 to 2003 and Farrell et al. (2005) from 1990 to 2000. The articles are also about slightly different subjects. The article of Gyapong et al. (2016) is mainly about the effect of the number of female board members on firm value. The article of Adams et al. (2009) is about the relationship between female board membership and governance and the effect of this on performance. The article of Farrell et al. (2005) is about the reaction of the shareholders to adding a woman to the board of directors. As a result, other variables are used for firm value, female representation and control variables. All three articles

address the endogeneity problem. Gyapong et al. (2016) use the Heckman two-stage model and Two-Stage Least Squares (2SLS). Adams et al. (2009) use the fixed effects method and an instrumental variable approach. Farrell et al. (2005) use lagged variables and the fixed effects method. So the differences in results cannot be due to this.

There are still reasons why there may be a positive relationship. Sunden et al. (1998) find that women are less over-confident and more risk averse than men. This allows them to make more thoughtful and prudent decisions, which often leads to higher long-term firm value (Carter et al., 2003). Carter et al. (2003) also find that women are more inquisitive, which means that they do more research and pay more attention to what is happening in the company. This can improve corporate governance and earnings quality (Adams et al., 2009).

Levi, Li and Zhang (2014) find in their research that women accept fewer mergers and acquisitions and when they accept one, they make a better deal, which increases the shareholder value, which indirectly leads to a higher long-term firm value. Women are also more likely to have an advanced degree and international work experience.

There can be argued that women have unique resources that profit the firm and enhance efficiency (Gyapong et al., 2016). Women's specific human capital provides the firm with a variety of experiences and competences. They have a completely different leadership style, which also contributes to diversity in decision making. Farrell et al. (2005) argue that women bring a new perspective to the company, which leads to a broader view and can enhance the understanding of the environment in which the company operates. Gyapong et al. (2016) argue that men and women differ in the way they make decisions. They collect information, process it and come to a conclusion in a different way. Women are more independent, which can strengthen decision making (Carter et al., 2003).

Carter et al. (2003) argue that more gender diversity leads to more effective problem-solving, because more different opinions will emerge and this leads to discussions. They will think more thoroughly about the different alternatives and the consequences in order to arrive at the best choice. They also think that gender diversity can improve global relations between international firms.

Rosener (1995) and Carter et al. (2003) think that women induce more creativity and new ideas, which leads to more innovation. This is good for the company in the long-term, because innovation is a crucial factor for competitiveness. Rosener (1995) also shows that women give more compliments and support employees, which also leads to more creativity and innovation. Chen, Leung and Evans (2018) find a positive relation between female board membership and innovation in the US, which improves firm value. They show that companies with female board members invest more in innovation and accomplish more innovative success. This would suggest that firm value is even higher if a company operates in an industry where creativity and innovation are very important.

The articles discussed above are about female board membership. That is why I think this effect is even stronger for female representation in top management. Female top managers determine the course of the company and can determine that the company must commit itself to more innovation. Women are known for investing more in innovation and making better decisions, so this combination of traits can lead to a more successful business. It can make the company more competitive and improve firm value.

So hypothesis 1 is: *“Female representation in top management has a positive direct effect on firm value if the innovation intensity of the company is high.”*

2.2 Financial performance

The top management makes the daily decisions for the company and has a major influence on the short-term financial performance. The influence of women on performance may be due to more information and a better understanding of the customers in the market and potential suppliers (women know better how other women think and what they want) (Carter et al., 2003). Gender differences in managerial behaviour are also important, for example women are much more interactive and collaborative than men, which increases information sharing.

The results of Liu, Wei and Xie (2014) show that firms in China with female board membership have better financial performance than firms without. The financial performance of the company is even better if there are three or more women on the board. They also argue that female middle managers will be more motivated if women are in top management, because they feel more that they are not overlooked and that it is possible to achieve a high position within the company someday. Female leaders are better at reaching women in the workforce and in society, which also helps them attract more qualified and motivated employees.

Research shows that women are known for motivating employees to get the best out of themselves, which can lead to higher profits (Liu et al., 2014). In addition, gender-related norms for managerial behaviour make that employees are more open to tasks previously labelled as stereotypical for men or women.

Liu et al. (2014) argue that gender diversity leads to higher quality debates on difficult issues, because many experienced people can combine their knowledge. Women are also known to be more involved in the daily affairs of the company. They are more active in monitoring employees and other top managers than men allowing potential problems to be detected early.

Strøm, D’Espallier and Mersland (2014) find a positive relationship between female CEOs in microfinance institutions and financial performance. They also find this relationship for female chairman of the board. They argue that the financial performance of the company

increases even more when a female leader has characteristics that match the strategy of the company. Bertrand and Schoar (2003) find that female directors and managers have a beneficial management style, which among other things means that they are more concerned with establishing and maintaining a relationship with a supplier or a customer.

Bennouri et al. (2018) state that there is a positive relation between the number of female directors and financial performance in France. Women are known for looking further ahead, making decisions that have short-term consequences more attuned to the long-term strategy. This leads to higher profits. Because women are more risk averse (Sunden et al., 1998), they also think more about the various investment opportunities and weigh all alternatives. In this way they arrive at the best and most profitable choice, both in the short and long term.

Most articles discussed above are about female board membership. That is why I expect the relationship between female representation in top management and financial performance to be even stronger, because executives are more often recruited from within the company than board members. As a result, they know the company better. Female middle managers will become more motivated, because they see that they can get a better job through hard work. This further improves the financial performance.

So hypothesis 2 is: *“Female representation in top management has a positive significant effect on financial performance.”*

3. Data and methodology

3.1 Data and sample selection

I want to investigate US firms over the sample period 2013 to 2018. The sample will be based on the S&P 500 firms, because these companies are prominent in the world and cover nearly 80% of the available market capitalization in the US (S&P Dow Jones Indices LLC, 2020). The sample period is chosen based on the most recently available data. Therefore, 2019 is not covered and six years of data provides enough information to draw conclusions from the results. The list contains companies that were in the index at the beginning of June 2020 and can be found in table A1 in the appendix.

I use the ExecuComp database to get data about the five highest placed managers within the company, like the CEO and CFO. From this database I get characteristics such as the gender and age of the managers and the percentage of the shares of the company they own. The CompuStat database is used to get data about the financials of the firms. From this database I get information such as net income (loss), research and development (R&D) expenses and long-term debt.

3.2 Methodology

The two hypotheses will be tested using regressions. The regression that will be performed for hypothesis 1 is:

$$\text{Firm value} = \beta_0 + \beta_1 \text{ Female representation in top management} + \beta_2 \text{ Innovation intensity} + \beta_3 \text{ Female representation in top management} \times \text{Innovation intensity} + \text{Control variables} + \mu$$

Tobin's Q is used for long-term *firm value*, which is suggested by the literature (for example Bennouri et al. (2018)) and is seen as a market-based measure of performance. It is defined as the sum of the book value of debt (as stated on the balance sheet) and the market value of equity (share price multiplied by the total number of outstanding shares at the end of the fiscal year) divided by the book value of total assets. One should note that in neoclassical investment models Tobin's Q is used as a measure of investment opportunities, but in this context it is used for firm value. As a check, *firm value* will also be defined as ROE, which is defined as net income divided by average shareholders' equity.

For *female representation in top management* a dummy variable is used, which is 1 if the top manager is a woman and 0 otherwise. In addition, it is also defined as female CEO and female CFO (the dummy variable is 1 if the top manager is female and CEO or CFO, respectively and 0 otherwise). For *innovation intensity* I use the ratio of R&D expenses to assets from the current year.

The regression that will be performed for hypothesis 2 is:

$$\text{Financial performance} = \beta_0 + \beta_1 \text{ Female representation in top management} + \text{Control variables} + \mu$$

Short-term *financial performance* is defined as ROA (net income divided by total assets) and ROS (operating profit divided by net sales). *Female representation in top management* is defined as described above.

The control variables are included in the regressions to control for differences in characteristics between the companies and the ones that will be used in the regressions are: *firm size* which is defined as the total assets of the firm in millions of US dollars and number of employees in thousands. *Leverage* is defined as the book value of total liabilities divided by total assets. *Capital expenditures* is defined as the capital expenditures of the company in a given year in millions of US dollars. *Revenue* is defined as the revenue that a company has achieved in a given year in millions of US dollars. *CEO duality* indicates that the top manager is also a member of the board of directors and for this variable a dummy variable is used, which is 1 if the top manager is also a director and 0 otherwise. *Manager age* is defined as the age of the manager in years in a given year. *Salary* is defined as the salary that the manager earns per year in thousands of US dollars. *Percentage of total shares owned* is defined as the

percentage of shares that the manager owns of the total number of shares of the company where the manager works in percent. There will also be *year* and *industry* dummies in the regression, which are 1 if it is that particular year or industry, respectively, and 0 otherwise. *Innovation intensity* will also be added as a control variable to the regression of hypothesis 2.

Table 1 shows summary statistics of the variables used in the regressions. It contains the number of observations, the mean, the standard deviation, the minimum and the maximum.

Table 1 Summary statistics of the variables used in the regressions

Variable	Observations	Mean	Std. Dev.	Min	Max
Tobin's Q	14,828	1.763	1.717	0.035	20.093
ROE	14,630	0.273	3.350	-40.835	143.588
ROA	14,630	0.066	0.076	-1.227	0.533
ROS	14,630	0.178	0.176	-4.060	0.682
Female top managers	16,446	0.103	0.304	0	1
Female CEO	16,446	0.009	0.093	0	1
Female CFO	16,446	0.012	0.109	0	1
Innovation intensity	8,751	0.041	0.060	0	0.576
Total assets	16,044	64407.810	210205.900	205.407	2622532
Number of employees	15,961	52.635	126.823	0.068	2300
Leverage	16,016	0.640	0.219	0.032	2.919
Capital expenditures	14,614	1383.063	3023.280	0	37985
Revenue	16,041	21467.590	40288.220	107.601	511729
CEO duality	16,424	0.283	0.450	0	1
Manager age	16,368	54.486	6.750	29	77
Salary	16,424	711.324	467.578	0	16000
Percentage of total shares owned	15,445	0.326	2.038	0	52.908

It can be seen that the ranges with possible values are very large, such as with total assets and revenue. The number of observations also varies greatly, because not everything

is known for every company. It is also noticeable that the minima of ROE, ROA and ROS are negative. This is because net income and operating profit are negative for some companies. It can also be deduced from the table that on average over the past six years 10.3% of the top managers, 0.9% of the CEOs and 1.2% of the CFOs were women. As expected, the table shows that there are mainly large companies in the sample and relatively few small ones, because the averages of for example total assets and capital expenditures are quite high. The top managers are also relatively a little older (54 years on average) and earn a relatively high salary (711 thousand US dollars per year on average). 28.3% of the top managers is also on the board of directors and on average they own 0.326% of the shares of the company where they work, which is not very much.

Table 2 shows the correlations between the main variables used in the regressions. Most correlations are not very strong. The correlation between Tobin's Q and ROA is quite strong (0.321), but that is not surprising, since they both relate to the company's performance. The correlation between innovation intensity and Tobin's Q is also quite strong (0.526), which may be because they are both influenced by the degree of research and development of the firm. The correlations between the different measures of female representation in top management and firm value and financial performance are not that strong. The strongest is between female CEO and ROS, which is 0.042.

Table 2 Correlation matrix of the main variables used in the regressions

	Tobin's Q	ROE	ROA	ROS	Female top managers	Female CEO	Female CFO	Innovation intensity	Capital expenditures	Revenue	CEO duality	Percentage of total shares owned
Tobin's Q	1.000											
ROE	0.007	1.000										
ROA	0.321	0.064	1.000									
ROS	0.153	0.023	0.531	1.000								
Female top managers	-0.005	-0.004	0.017	-0.025	1.000							
Female CEO	-0.001	0.001	0.007	-0.029	0.299	1.000						
Female CFO	0.020	-0.010	0.027	0.042	0.334	0.054	1.000					
Innovation intensity	0.526	-0.022	-0.054	-0.003	-0.038	0.004	0.011	1.000				
Capital expenditures	-0.139	-0.004	-0.034	-0.080	0.010	0.026	0.020	-0.057	1.000			
Revenue	0.179	0.009	-0.044	-0.192	0.020	0.017	0.020	-0.129	0.676	1.000		
CEO duality	-0.002	0.001	0.004	-0.018	-0.087	0.157	-0.055	-0.026	0.013	-0.011	1.000	
Percentage of total shares owned	0.046	-0.004	0.008	0.030	-0.035	0.015	-0.012	0.032	0.001	-0.018	0.188	1.000

Table 3 shows the development of the percentage of top managers, CEOs and CFOs who are women from 2013 to 2018. It is noticeable that all three increase steadily. The percentage of female top managers increases from 8.6% to 12%, which is considerable. The percentage of female CEOs increases from 0.7% to 1%, which is not much. The percentage of female CFOs increases from 0.7% to 2%. This increase is greater than that of female CEOs, which is quite striking. So there are more female CFOs than CEOs in 2018, while it was the same in 2013. These statistics also show that there are far more male top managers than female.

Table 3 The percentage of top managers, CEOs and CFOs who are women from 2013 to 2018

Year	Female top managers	Female CEOs	Female CFOs
2013	0.086	0.007	0.007
2014	0.091	0.008	0.007
2015	0.103	0.008	0.010
2016	0.106	0.009	0.013
2017	0.112	0.009	0.016
2018	0.120	0.010	0.020

I use panel data to control for observable and unobservable factors that influence both female representation and firm performance. First I will use OLS to establish the relationship between female representation and firm performance. The regressions that will be performed are stated above.

To be sure, heteroskedasticity is controlled by robust standard errors. When the regressions were performed without robust standard errors, the standard errors were lower, which affected the level of significance (it was higher, which reduces the reliability). For this reason, I chose to use robust standard errors.

There is also a high probability that an endogeneity problem will arise. For example, there is probably simultaneous equation bias, which means that female representation not only influences firm performance, but that firm performance also influences female representation. There is some evidence that better performing firms are more likely to promote women to top management and that women prefer to work for companies that perform well when they have the choice (Adams et al., 2009). There are several solutions to this problem.

First, I will use fixed effects with lagged manager variables. This means that the fixed effects model is used and that the lag of female representation in top management and the lags of the control variables (except the year and industry dummies) have been used in the regressions instead of the contemporary ones. Another reason for applying this method is that it is possible that female top managers influence firm performance only after a while.

Second, I will use OLS regressions with two period lagged firm performance and manager variables. This means that OLS is used with two lags of firm performance and two lags of the control variables (except for the different dummy variables) instead of the contemporary ones. The reason for this is that past firm performance and manager characteristics often play a role in appointing a top manager in the present.

4. Results

4.1 Firm value

First hypothesis 1 is tested, which states that female representation in top management has a positive direct effect on firm value if the innovation intensity of the company is high. The regressions presented in table 4 contain a constant, but because all variables are never 0 at the same time, it cannot be interpreted. Therefore it is not mentioned in the table.

Table 4 Regressions of firm value on female representation in top management

Variable	Tobin's Q				ROE			
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female top managers (a)	0.044 (0.039)	0.044 (0.069)			-0.055 (0.083)	-0.090 (0.132)		
Female CEO (b)			-0.011 (0.105)	0.460*** (0.144)			-0.025 (0.090)	0.082 (0.136)
Female CFO (c)			0.174 (0.122)	-0.199 (0.215)			-0.356 (0.224)	-0.946 (0.594)
Innovation intensity (d)		14.079*** (0.780)		14.249*** (0.768)		0.225 (0.233)		0.198 (0.234)
Interaction term between (a) and (d)		0.323 (2.176)				-0.246 (1.111)		
Interaction term between (b) and (d)				-10.512*** (2.286)				-0.696 (1.556)
Interaction term between (c) and (d)				11.435** (5.318)				8.335* (4.638)
Ln(assets)	-1.290*** (0.029)	-1.117*** (0.035)	-1.291*** (0.029)	-1.118*** (0.035)	-0.195*** (0.056)	-0.140 (0.092)	-0.193*** (0.056)	-0.132 (0.090)
Number of employees	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	-0.001* (0.000)	0.000 (0.000)	-0.001* (0.000)
Leverage	-0.820*** (0.113)	-0.436*** (0.116)	-0.815*** (0.113)	-0.398*** (0.115)	0.501** (0.229)	0.231 (0.299)	0.494** (0.229)	0.228 (0.300)
Ln(capital expenditures)	0.360*** (0.018)	0.387*** (0.023)	0.361*** (0.018)	0.386*** (0.023)	0.035 (0.031)	0.006 (0.050)	0.034 (0.031)	0.002 (0.050)
Ln(revenue)	0.333*** (0.022)	0.216*** (0.031)	0.333*** (0.022)	0.217*** (0.031)	0.180*** (0.031)	0.218*** (0.046)	0.180*** (0.031)	0.215*** (0.045)
CEO duality	-0.038 (0.031)	-0.087** (0.038)	-0.037 (0.031)	-0.079** (0.038)	-0.073 (0.088)	-0.030 (0.139)	-0.075 (0.090)	-0.036 (0.143)
Manager age	-0.001 (0.002)	0.001 (0.003)	-0.001 (0.002)	0.000 (0.003)	0.006 (0.005)	0.008 (0.009)	0.005 (0.005)	0.008 (0.009)
Salary	0.001** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001* (0.000)	0.000 (0.000)	0.001* (0.000)	0.000 (0.000)
Percentage of total shares owned	0.011** (0.006)	0.011* (0.006)	0.011** (0.006)	0.012** (0.006)	-0.001 (0.007)	-0.008 (0.006)	-0.001 (0.007)	-0.008 (0.006)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,813	7,813	12,813	7,813	13,136	7,875	13,136	7,875
R ²	0.427	0.519	0.427	0.523	0.026	0.029	0.026	0.029

The robust standard errors are shown in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels, respectively.

The regression results in table 4 show that neither female top manager nor female CEO and CFO are statistically significant if innovation intensity is not included in the regression. This applies to Tobin's Q (regression 1 and 3) as well as ROE (regression 5 and 7). Regression 2 shows that female top managers and the interaction term between innovation intensity and female top managers are also not statistically significant if innovation intensity is added to the regression, so female top managers do not improve or deteriorate Tobin's Q (firm value). However, it appears that innovation intensity improves Tobin's Q (it is significant at the 1% level). If innovation intensity increases by one unit, Tobin's Q increases by 14.079 units.

Regression 4 shows that female CEO is statistically significant at the 1% level if innovation intensity is included in the regression, but female CFO is still not. So if the CEO is female, Tobin's Q increases by 0.460 units. Innovation intensity is again statistically significant and improves Tobin's Q and in addition, the interaction terms are also significant. The interaction term between innovation intensity and female CEO is statistically significant at the 1% level and means that if the CEO is a woman and innovation intensity increases by one unit, Tobin's Q decreases by 10.512 units, so it worsens firm value. The interaction term between innovation intensity and female CFO is statistically significant at the 5% level and means that if the CFO is a woman and innovation intensity increases by one unit, Tobin's Q increases by 11.435 units, so it improves firm value.

Regression 6 shows that female top managers, innovation intensity and the interaction term between innovation intensity and female top managers are not statistically significant if innovation intensity is added to the regression, so female top managers and innovation intensity do not improve or deteriorate ROE (firm value).

Regression 8 shows that female CEO and female CFO are not statistically significant if innovation intensity is included in the regression, so female CEO and CFO do not improve or deteriorate firm value. Innovation intensity and the interaction term between innovation intensity and female CEO are also not statistically significant and do not affect firm value. The interaction term between innovation intensity and female CFO is statistically significant at the 10% level and means that if the CFO is a woman and innovation intensity increases by one unit, Tobin's Q increases by 8.335 units, so it improves ROE (firm value). This effect is not as strong as with Tobin's Q.

It can be concluded that innovation intensity plays an important role in firm value, as also appears from the existing literature, for example Chen et al. (2018). More innovation ensures that the company continues to improve its products and services and remains competitive. Innovation intensity improves Tobin's Q, but this relationship does not exist with ROE. This may be due to the fact that ROE is not a good measure of firm value, because relatively few variables are significant in the regressions with ROE, as also shown later in section 4.3.

If innovation intensity is included in the regression, then there is a statistically significant negative relationship between female CEO and Tobin's Q. This is not what I expected based on the literature, but Adams et al. (2009) also found a negative relationship. Perhaps female CEOs are a bit more risk averse than men, so they do not accept the somewhat riskier projects, which are very profitable, or they invest less in long-term innovation.

The relationship between female CFO and Tobin's Q is positive. This is consistent with the literature and what I expected. Perhaps female CFOs make better long-term financial decisions than men and are less overconfident.

There is no statistically significant relationship between female top managers and Tobin's Q or ROE. It may not matter whether a top manager is a man or a woman and that they have an equally good leadership style, even though it differs. There is also no statistically significant relationship between female CEO and ROE, but there is a positive relationship between female CFO and ROE. Perhaps male and female CEOs have the same insights, but female CFOs have a better understanding of the vast amount of information they need to process than men.

So the results are mixed, but if female representation in top management is defined as female CFO and firm value as Tobin's Q or ROE and innovation intensity is included in the regressions, then hypothesis 1 is true. Otherwise it is wrong.

4.2 Financial performance

Secondly, hypothesis 2 is tested, which states that female representation in top management has a positive significant effect on financial performance. These regressions also contain a constant, but this is again not shown in the table for the reason mentioned above.

Table 5 Regressions of financial performance on female representation in top management

Variable	ROA		ROS	
	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
Female top managers	-0.002 (0.002)		-0.004 (0.004)	
Female CEO		-0.006 (0.007)		-0.009 (0.008)
Female CFO		0.018*** (0.007)		0.049*** (0.012)
Ln(assets)	-0.058*** (0.002)	-0.058*** (0.002)	0.034*** (0.003)	0.034*** (0.003)
Number of employees	0.000 (0.000)	0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Leverage	-0.050*** (0.006)	-0.050*** (0.006)	-0.004 (0.009)	-0.003 (0.009)
Ln(capital expenditures)	0.013*** (0.001)	0.014*** (0.001)	0.008*** (0.002)	0.009*** (0.002)
Ln(revenue)	0.039*** (0.002)	0.039*** (0.002)	-0.047*** (0.004)	-0.047*** (0.004)
CEO duality	-0.008*** (0.002)	-0.007*** (0.002)	-0.010*** (0.003)	-0.008*** (0.003)
Manager age	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.001** (0.000)
Salary	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Percentage of total shares owned	0.000 (0.000)	0.000 (0.000)	0.002*** (0.001)	0.002*** (0.001)
Innovation intensity	-0.196*** (0.026)	-0.196*** (0.026)	-0.370*** (0.055)	-0.370*** (0.055)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	7,875	7,875	7,875	7,875
R ²	0.218	0.219	0.251	0.253

The robust standard errors are shown in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels, respectively.

The regression results in table 5 show that there is no statistically significant relationship between female top managers and ROA (regression 1). Regression 3 shows that there is also no statistically significant relation between female top managers and ROS, so female top managers neither improve nor deteriorate ROA and ROS (financial performance).

Regression 2 shows that there is no statistically significant relation between female CEO and ROA, but there is between female CFO and ROA. If the CFO is female, ROA

increases by 0.018 units, so it improves financial performance.

Regression 4 shows that there is again no statistically significant relationship between female CEO and ROS, but there is between female CFO and ROS. If the CFO is female, ROS increases by 0.049 units, so it improves financial performance. This effect is stronger than with ROA.

It can be concluded that there is no statistically significant relationship between female top managers and financial performance. This is not expected, because the literature suggests a positive relationship, such as Liu et al. (2014). Perhaps the advantage of higher quality debates on difficult issues is offset by the disadvantage of delay in the decision-making process.

There is also no statistically significant relationship between female CEO and financial performance. This is striking, because Strøm et al. (2014) find a positive relationship between female CEO and financial performance. Perhaps male and female CEOs have an equally good understanding of their customers.

However, there is a positive relationship between female CFO and financial performance (both with ROA and ROS). So a female CFO improves a company's financial performance. This is consistent with the literature. Perhaps female CFOs are better at monitoring employees and other top managers, allowing them to detect budget deficits and inefficiencies more quickly.

So the results are mixed, but if female representation in top management is defined as female CFO, then hypothesis 2 is true. Otherwise it is wrong.

4.3 Robustness of the results

As discussed earlier, there is an endogeneity problem between female representation in top management and firm performance. The solutions discussed in methodology will be performed below to see if the results are still statistically significant after controlling for the endogeneity problem. Only the regressions where there was a statistically significant effect will be performed again below to see if the results are robust.

Table 6 shows how the results of the relationship between female representation in top management and firm value change after controlling for the endogeneity problem.

Table 6 Regressions of firm value on female representation in top management controlling for the endogeneity problem

Variable	Tobin's Q		ROE	
	Fixed effects with lagged manager variables	OLS with two period lagged firm value and manager variables	Fixed effects with lagged manager variables	OLS with two period lagged firm value and manager variables
	(1)	(2)	(3)	(4)
One period lag of firm value		0.767*** (0.056)		-0.086 (0.119)
Two period lag of firm value		0.040 (0.053)		0.027 (0.034)
Female CEO (a)	0.632* (0.336)	0.133 (0.121)	0.202 (0.139)	0.172 (0.204)
Female CFO (b)	0.069 (0.324)	-0.259 (0.407)	-1.376 (0.998)	-0.871 (0.759)
Innovation intensity (c)	16.232*** (1.142)	2.352*** (0.651)	-0.056 (0.335)	0.076 (0.423)
Interaction term between (a) and (c)	-13.153*** (2.492)	-0.939 (1.702)	-1.180 (1.376)	0.992 (2.100)
Interaction term between (b) and (c)	8.632*** (3.143)	7.643 (11.130)	12.985 (8.796)	10.144 (8.389)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	5,490	3,658	5,515	3,679
R ²		0.798		0.052

The robust standard errors are shown in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels, respectively.

Regressions 3 and 4 show that there is no longer a statistically significant relationship between ROE and both female CEO and female CFO if innovation intensity is included in the regressions. However, it appears that innovation intensity continues to play an important role in Tobin's Q (it is statistically significant at the 1% level in regressions 1 and 2).

Regression 2 shows that there is no longer a statistically significant relation between Tobin's Q and both female CEO and CFO. However, regression 1 shows that there is still a negative relationship between Tobin's Q and female CEO if innovation intensity is included in the regression. This effect is even stronger than in table 4 (-13.153 instead of -10.512), so a female CEO worsens firm value. Regression 1 also shows that there is still a positive relation between Tobin's Q and female CFO. This effect is slightly less strong (8.632 instead of 11.435), but it is statistically significant at the 1% level instead of the 5% level as in table 4, so a female CFO improves Tobin's Q.

Table 7 shows how the results of the relationship between female representation in top management and financial performance change after controlling for the endogeneity problem.

Table 7 Regressions of financial performance on female representation in top management controlling for the endogeneity problem

Variable	ROA		ROS	
	Fixed effects with lagged manager variables	OLS with two period lagged financial performance and manager variables	Fixed effects with lagged manager variables	OLS with two period lagged financial performance and manager variables
	(1)	(2)	(3)	(4)
One period lag of financial performance		0.484*** (0.033)		0.852*** (0.073)
Two period lag of financial performance		0.247*** (0.030)		-0.032 (0.064)
Female CEO	-0.010 (0.017)	0.000 (0.007)	-0.024 (0.021)	-0.001 (0.005)
Female CFO	0.019 (0.013)	0.007 (0.007)	0.043* (0.024)	0.014** (0.007)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	5,536	3,686	5,536	3,686
R ²		0.522		0.876

The robust standard errors are shown in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels, respectively.

There is still no statistically significant relationship between female CEO and both ROA and ROS (regression 1 to 4), as in table 5. The relationship between female CFO and ROA has disappeared after controlling for the endogeneity problem (regression 1 and 2). The positive relationship between female CFO and ROS is still there, but it is somewhat less strong, both in terms of the coefficient size (0.043 and 0.014 instead of 0.049) and the level of significance (significant at the 5% and 10% level instead of the 1% level). But a female CFO still improves ROS.

5. Discussion and conclusion

The following research question is discussed in this paper: *“What is the effect of female representation in top management on firm performance?”*

This question was examined on the basis of hypotheses. Hypothesis 1 was: *“Female representation in top management has a positive direct effect on firm value if the innovation intensity of the company is high.”* The results show that innovation intensity plays a very important role in firm value and improves Tobin’s Q. There is no statistically significant relationship between female top managers and both Tobin’s Q and ROE. After controlling for the endogeneity problem, there is a statistically significant negative relationship between Tobin’s Q and female CEO if innovation intensity is included in the regression, so a female CEO worsens firm value. After controlling for the endogeneity problem, there is a statistically significant positive relationship between Tobin’s Q and female CFO if innovation intensity is included in the regression, so a female CFO improves firm value. So hypothesis 1 is partly true.

Hypothesis 2 was: *“Female representation in top management has a positive significant effect on financial performance.”* The results show that there is no statistically significant relationship between female top managers and financial performance. There is also no statistically significant relationship between female CEO and both ROA and ROS. The relationship between female CFO and ROA has disappeared after controlling for the endogeneity problem. However, the statistically significant positive relationship between female CFO and ROS is still there, so a female CFO improves a company's financial performance. So hypothesis 2 is also partly true.

So the final answer to the research question is that female CFOs have a positive effect on firm performance, but female top managers in general have no statistically significant effect on firm performance. Female CEOs even have a negative effect on firm performance.

There are also a few shortcomings in my research. For example, more or different companies in the sample could have led to different results. Also, a longer sample period or a different time frame could have led to different relationships between the variables, because different economic events happen in each period, which are unconsciously reflected in the results. In addition, another (perhaps better) solution to the endogeneity problem would have been 2SLS, but it is very difficult to find a good instrument for female representation that is not influenced by firm performance. Perhaps all results would not have been statistically significant if this method had been used. In addition, only less than half of the companies reported R&D expenses, so innovation intensity had fewer observations than the other variables. As a result, the influence of innovation and female representation on firm performance can be determined less well and with less certainty.

Further research could focus on the nature of the relationship between firm performance and both female CEO and CFO and the reasons behind these relationships. In addition, the effect of governance on the relationship between female representation and firm performance could be researched. The effect of the degree of sustainability of a firm on the relationship between female representation and firm performance is also interesting for further research, because more and more investors call on companies to operate in a more sustainable manner and companies are responding to this.

Based on my results, the implications for practice are that the government should encourage companies to hire a female CFO, but discourage hiring a female CEO.

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7. Appendix

Table A1 The list of companies included in the sample

Company name				
Live Nation Entertainment, Inc.	Agilent Technologies, Inc.	American Airlines Group, Inc.	Advance Auto Parts, Inc.	Apple, Inc.
NortonLifeLock, Inc.	W.R. Berkley Corp.	Jacobs Engineering Group, Inc.	Old Dominion Freight Line, Inc.	STERIS Plc (Ireland)
Zebra Technologies Corp.	Baker Hughes Co.	Paycom Software, Inc.	Healthpeak Properties, Inc.	ViacomCBS, Inc.
ServiceNow, Inc.	Truist Financial Corp.	Trane Technologies Plc	Howmet Aerospace, Inc.	Carrier Global Corp.
Otis Worldwide Corp.	Raytheon Technologies Corp.	AbbVie, Inc.	AmerisourceBergen Corp.	ABIOMED, Inc.

Abbott Laboratories	Accenture Plc	Adobe, Inc.	Analog Devices, Inc.	Archer-Daniels-Midland Co.
Automatic Data Processing, Inc.	Alliance Data Systems Corp.	Autodesk, Inc.	Ameren Corp.	Electric Power Co., Inc.
The AES Corp.	Aflac, Inc.	Allergan Plc	American International Group, Inc.	Apartment Investment & Management Co.
Assurant, Inc.	Arthur J. Gallagher & Co.	Akamai Technologies, Inc.	Albemarle Corp.	Align Technology, Inc.
Amphenol Corp.	Aptiv Plc	Alexandria Real Estate Equities, Inc.	Atmos Energy Corp.	Activision Blizzard, Inc.
Allegion Plc	Arista Networks, Inc.	Advanced Micro Devices, Inc.	Alaska Air Group, Inc.	AvalonBay Communities, Inc.
Alexion Pharmaceuticals, Inc.	ANSYS, Inc.	AMETEK, Inc.	The Allstate Corp.	Broadcom, Inc.
Applied Materials, Inc.	Anthem, Inc.	Amgen, Inc.	Franklin Resources, Inc.	Avery Dennison Corp.
Amcor Plc	Aon Plc	Ameriprise Financial, Inc.	Brown-Forman Corp.	American Water Works Co., Inc.
The Boeing Co.	A. O. Smith Corp.	American Tower Corp.	Biogen, Inc.	American Express Co.
Bank of America Corp.	Apache Corp.	Amazon.com, Inc.	The Bank of New York Mellon Corp.	AutoZone, Inc.
Baxter International, Inc.	Air Products & Chemicals, Inc.	Boston Properties, Inc.	Booking Holdings, Inc.	Citigroup, Inc.
Best Buy Co., Inc.	Ball Corp.	Berkshire Hathaway, Inc.	Conagra Brands, Inc.	Chubb Ltd.
Becton, Dickinson & Co.	Bristol-Myers Squibb Co.	Boston Scientific Corp.	Cardinal Health, Inc.	Cboe Global Markets, Inc.
BlackRock, Inc.	Broadridge Financial Solutions, Inc.	BorgWarner, Inc.	Caterpillar, Inc.	CBRE Group, Inc.
Crown Castle International Corp.	CDW Corp.	CF Industries Holdings, Inc.	C.H. Robinson Worldwide, Inc.	Cigna Corp.
Carnival Corp.	Celanese Corp.	Citizens Financial Group, Inc. (Rhode Island)	Charter Communications, Inc.	Cincinnati Financial Corp.
Cadence Design Systems, Inc.	Cerner Corp.	Church & Dwight Co., Inc.	CME Group, Inc.	Colgate-Palmolive Co.
The Clorox Co.	Comerica, Inc.	Comcast Corp.	Chipotle Mexican Grill, Inc.	Cummins, Inc.
CMS Energy Corp.	The Cooper Cos., Inc.	salesforce.com, inc.	Corteva, Inc.	The Walt Disney Co.
Centene Corp.	ConocoPhillips	Cisco Systems, Inc.	Citrix Systems, Inc.	Discovery, Inc.

CenterPoint Energy, Inc.	Costco Wholesale Corp.	CSX Corp.	CVS Health Corp.	Discovery, Inc.
Capital One Financial Corp.	Coty, Inc.	Cintas Corp.	Chevron Corp.	DISH Network Corp.
Cabot Oil & Gas Corp.	Campbell Soup Co.	CenturyLink, Inc.	Concho Resources, Inc.	Digital Realty Trust, Inc.
Dominion Energy, Inc.	Capri Holdings Ltd.	Cognizant Technology Solutions Corp.	Quest Diagnostics, Inc.	Dollar Tree, Inc.
Delta Air Lines, Inc.	Copart, Inc.	Discover Financial Services	D.R. Horton, Inc.	Dover Corp.
DuPont de Nemours, Inc.	Deere & Co.	Dollar General Corp.	Danaher Corp.	Dow, Inc.
Duke Realty Corp.	DaVita, Inc.	eBay, Inc.	The Estée Lauder Companies, Inc.	Energy, Inc.
Darden Restaurants, Inc.	Devon Energy Corp.	Ecolab, Inc.	Eastman Chemical Co.	Edwards Lifesciences Corp.
DTE Energy Co.	DXC Technology Co.	Consolidated Edison, Inc.	Emerson Electric Co.	Exelon Corp.
Duke Energy Corp.	Electronic Arts, Inc.	Equifax, Inc.	EOG Resources, Inc.	Expeditors International of Washington, Inc.
Equity Residential	Essex Property Trust, Inc.	Edison International	Equinix, Inc.	Expedia Group, Inc.
Eversource Energy	E*TRADE Financial Corp.	Eaton Corp. Plc	Entergy Corp.	Extra Space Storage, Inc.
Ford Motor Co.	FedEx Corp.	FleetCor Technologies, Inc.	Fortinet, Inc.	Corning, Inc.
Diamondback Energy, Inc.	FirstEnergy Corp.	FMC Corp.	Fortive Corp.	General Motors Co.
Fastenal Co.	F5 Networks, Inc.	Fox Corp.	General Dynamics Corp.	Alphabet, Inc.
Facebook, Inc.	Fidelity National Information Services, Inc.	First Republic Bank (San Francisco, California)	General Electric Co.	Genuine Parts Co.
Fortune Brands Home & Security, Inc.	Fifth Third Bancorp	Federal Realty Investment Trust	Gilead Sciences, Inc.	Global Payments, Inc.
Freeport-McMoRan, Inc.	FLIR Systems, Inc.	TechnipFMC Plc	General Mills, Inc.	Gap, Inc.
Fiserv, Inc.	Flowserve Corp.	W.W. Grainger, Inc.	Globe Life, Inc.	Hasbro, Inc.
Garmin Ltd.	The Goldman Sachs Group, Inc.	The Hartford Financial Services Group, Inc.	Halliburton Co.	Helmerich & Payne, Inc.
Huntington Bancshares, Inc.	The Home Depot, Inc.	Huntington Ingalls Industries, Inc.	Harley-Davidson, Inc.	Hewlett-Packard Enterprise Co.

Hanesbrands, Inc.	Hess Corp.	Hilton Worldwide Holdings, Inc.	Hologic, Inc.	HP, Inc.
HCA Healthcare, Inc.	HollyFrontier Corp.	Humana, Inc.	Honeywell International, Inc.	H&R Block, Inc.
Hormel Foods Corp.	Host Hotels & Resorts, Inc.	International Business Machines Corp.	Intercontinental Exchange, Inc.	IDEX Corp.
Henry Schein, Inc.	The Hershey Co.	Ingersoll Rand, Inc.	IDEXX Laboratories, Inc.	Juniper Networks, Inc.
International Flavors & Fragrances, Inc.	Intuit, Inc.	Iron Mountain, Inc.	Invesco Ltd.	JPMorgan Chase & Co.
Illumina, Inc.	International Paper Co.	Intuitive Surgical, Inc.	J.B. Hunt Transport Services, Inc.	Nordstrom, Inc.
Incyte Corp.	Interpublic Group of Cos., Inc.	Gartner, Inc.	Johnson Controls International Plc	Kellogg Co.
IHS Markit Ltd.	IPG Photonics Corp.	Illinois Tool Works, Inc.	Jack Henry & Associates, Inc.	KeyCorp
Intel Corp.	IQVIA Holdings, Inc.	KLA Corp.	Johnson & Johnson	Keysight Technologies, Inc.
The Kraft Heinz Co.	Kimco Realty Corp.	Lennar Corp.	Kimberly-Clark Corp.	LyondellBasell Industries NV
Kinder Morgan, Inc.	Kansas City Southern	Laboratory Corp. of America Holdings	Alliant Energy Corp.	Mastercard, Inc.
CarMax, Inc.	Loews Corp.	LKQ Corp.	Lowe's Cos., Inc.	Mid-America Apartment Communities, Inc.
The Coca-Cola Co.	L Brands, Inc.	Eli Lilly & Co.	Lam Research Corp.	Marriott International, Inc.
The Kroger Co.	Leidos Holdings, Inc.	Lockheed Martin Corp.	Southwest Airlines Co.	Masco Corp.
Kohl's Corp.	Leggett & Platt, Inc.	Lincoln National Corp.	Las Vegas Sands Corp.	McDonald's Corp.
L3Harris Technologies, Inc.	Linde Plc	Marsh & McLennan Cos., Inc.	Lamb Weston Holdings, Inc.	M&T Bank Corp.
Microchip Technology, Inc.	MGM Resorts International	3M Co.	The Mosaic Co.	Mettler-Toledo International, Inc.
McKesson Corp.	Mohawk Industries, Inc.	Monster Beverage Corp.	Marathon Petroleum Corp.	Micron Technology, Inc.
Moody's Corp.	McCormick & Co., Inc.	Altria Group, Inc.	Merck & Co., Inc.	Maxim Integrated Products, Inc.
Mondelez International, Inc.	MarketAxess Holdings, Inc.	NetApp, Inc.	Marathon Oil Corp.	Mylan NV
Medtronic Plc	Martin Marietta Materials, Inc.	Northern Trust Corp.	Morgan Stanley	Noble Energy, Inc.

MetLife, Inc.	Northrop Grumman Corp.	Nucor Corp.	MSCI, Inc.	Norwegian Cruise Line Holdings Ltd.
Newmont Corp.	National Oilwell Varco, Inc.	NVIDIA Corp.	Microsoft Corp.	Nasdaq, Inc.
Netflix, Inc.	NRG Energy, Inc.	NVR, Inc.	Motorola Solutions, Inc.	NextEra Energy, Inc.
NiSource, Inc.	Norfolk Southern Corp.	Newell Brands, Inc.	PepsiCo, Inc.	PulteGroup, Inc.
NIKE, Inc.	Omnicom Group, Inc.	News Corp.	Pfizer Inc.	Packaging Corporation of America
Nielsen Holdings Plc	Oracle Corp.	People's United Financial, Inc.	Principal Financial Group, Inc.	PerkinElmer, Inc. (United States)
News Corp.	O'Reilly Automotive, Inc.	PACCAR, Inc.	Procter & Gamble Co.	Prologis, Inc.
Realty Income Corp.	Occidental Petroleum Corp.	Public Service Enterprise Group, Inc.	Progressive Corp.	Philip Morris International, Inc.
ONEOK, Inc.	Paychex, Inc.	QUALCOMM, Inc.	Parker-Hannifin Corp.	The Charles Schwab Corp.
The PNC Financial Services Group, Inc.	Public Storage	Qorvo, Inc.	Rockwell Automation, Inc.	Sealed Air Corp.
Pentair Plc	Phillips 66	Royal Caribbean Cruises Ltd.	Rollins, Inc.	The Sherwin- Williams Co.
Pinnacle West Capital Corp.	PVH Corp.	Everest Re Group Ltd.	Roper Technologies, Inc.	SVB Financial Group
PPG Industries, Inc.	Quanta Services, Inc.	Regency Centers Corp.	Ross Stores, Inc.	The J. M. Smucker Co.
PPL Corp.	Pioneer Natural Resources Co.	Regeneron Pharmaceuticals, Inc.	Republic Services, Inc.	Schlumberger NV
Perrigo Co. Plc	PayPal Holdings, Inc.	Regions Financial Corp.	SBA Communications Corp.	SL Green Realty Corp.
Prudential Financial, Inc.	Sempra Energy	Robert Half International, Inc.	Starbucks Corp.	TE Connectivity Ltd.
Snap-On, Inc.	State Street Corp.	Raymond James Financial, Inc.	Synchrony Financial	Teleflex, Inc.
Synopsys, Inc.	Seagate Technology Plc	Ralph Lauren Corp.	Stryker Corp.	Target Corp.
The Southern Co.	Constellation Brands, Inc.	ResMed, Inc.	Sysco Corp.	Tiffany & Co.
Simon Property Group, Inc.	Stanley Black & Decker, Inc.	TransDigm Group, Inc.	AT&T, Inc.	The TJX Cos., Inc.

S&P Global, Inc.	Skyworks Solutions, Inc.	Textron, Inc.	Molson Coors Beverage Co.	United Rentals, Inc.
Thermo Fisher Scientific, Inc.	Tractor Supply Co.	Under Armour, Inc.	UDR, Inc.	U.S. Bancorp
T-Mobile US, Inc.	Tyson Foods, Inc.	Under Armour, Inc.	Universal Health Services, Inc.	Visa, Inc.
Tapestry, Inc.	Take-Two Interactive Software, Inc.	United Airlines Holdings, Inc.	Ulta Beauty, Inc.	Varian Medical Systems, Inc.
T. Rowe Price Group, Inc.	Twitter, Inc.	Verizon Communications, Inc.	UnitedHealth Group, Inc.	VF Corp.
The Travelers Cos., Inc.	Texas Instruments Incorporated	Westinghouse Air Brake Technologies Corp.	Unum Group	Valero Energy Corp.
Vulcan Materials Co.	VeriSign, Inc.	Waters Corp.	Union Pacific Corp.	WEC Energy Group, Inc.
Vornado Realty Trust	Vertex Pharmaceuticals, Inc.	Walgreens Boots Alliance, Inc.	United Parcel Service, Inc.	Welltower, Inc.
Verisk Analytics, Inc.	Ventas, Inc.	WestRock Co.	Western Digital Corp.	Exxon Mobil Corp.
Wells Fargo & Co.	Willis Towers Watson Plc	The Western Union Co.	Wynn Resorts Ltd.	Dentsply Sirona, Inc.
Whirlpool Corp.	The Williams Cos., Inc.	Weyerhaeuser Co.	Xcel Energy, Inc.	Xerox Holdings Corp.
Waste Management, Inc.	Walmart, Inc.	Zimmer Biomet Holdings, Inc.	Xilinx, Inc.	Zoetis, Inc.
Xylem, Inc.	Yum! Brands, Inc.	Zions Bancorporation NA		

Source: Sure Dividend (2020).