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GENDER DIVERSITYAND STOCK RETURNS: EVIDENCE FROM THE S&P500

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Abstract

The following study examines the relationship between gender diversity in the board of directors and stock returns on companies in the S&P500 Index. For this purpose, a regression analysis analyzes which variables impact stock returns and learn if gender quotas affect stock returns. This study found that investing only in companies in the top percentile of women on board does not deliver superior returns. Furthermore, OLS and differences-in-differences regression show that gender diversity and gender quota do not influence stock returns.

Keywords (Gender Diversity, Gender Quotas, Stock returns, Financial Performance, Corporate Governance, Board of Directors)

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1. Introduction

1.1. Background

In 2003, Norway was the first country to mandate a quota of at least 40% of women on board (Solsvik and Fouche 2013). Recently, many laws have been enacted to increase gender equality on management boards. For example, in 2021, the German parliament passed a law that requires larger listed firms whose management boards have more than three members to include at least one woman (Hansen 2021). Furthermore, in 2018, the previous California Governor, Jerry Brown, signed Senate Bill 826, requiring listed firms in the state to have at least one, two, or three women on their board according to the company's size. In 2019, however, Meland v. Padilla (No. 20-15762, 9th US Circuit Court of Appeals) challenged this law claiming that the law requires or encourages shareholders to discriminate based on gender and against the Equal Protection Clause (Godoy 2021). Also, in 2022, the EU Parliament approved a new law requiring European public companies to have a minimum of 40% of non-executive directors or 33% of all director positions filled by females by July 2026 (European Parliament 2022).

Moreover, an increasing number of shareholders are pressuring companies to increase board diversity. An S&P Global (2020) study found that activist shareholders, institutional investors, employees, and customers are increasing their pressure on public companies to increase gender diversity. Also, Goldman Sachs' created a new policy to not do IPOs for companies with no female or diverse board members (Son 2020). Gender-themed funds are similarly in ascension, and asset managers such as UBS, Fidelity, and Nordea have launched this similar type of fund (Birindelli and Iannuzzi 2022). Another example is ESG loans tied to gender diversity on board which is increasing among companies. Loans containing gender diversity totaled more than $19 billion in 2021, representing a four-time increase compared to 2020, with an increase in regulatory requirements on disclosure of senior female representation (Poh 2021). In a recent report, Morgan Stanley Institute for Sustainable Investing survey, "63% of US investors and 67% of global asset owners identify gender diversity as an area of interest in allocating capital across their investment portfolios" (Thomas 2022). These results show that gender diversity has become a topic of increasing interest among investors.

It is, therefore, unsurprising that the impact of board gender diversity on firms' performance continues to be an area of considerable research. For example, Schneider (2017) found that board gender diversity positively correlates with Return on Assets (ROA) in Brazil. In addition, it finds that market reaction to female appointees is positive and significant and roughly 2% higher than male appointees (Adams, Gray, and Nowland 2011). Sandberg (2019) found that compared to companies with less gender diversity, companies with more gender-diverse boards are more profitable. These findings demonstrate the benefits that gender diversity quotas can bring to firms' stock performance.

On the other hand, many counterarguments exist for why imposing gender diversity quotas might not be in companies' best interests. Companies could have to recruit less experienced directors (Ahern and Dittmar 2012) to fulfill quotas, resulting in less performance and profitability and reducing firm value (Adams and Ferreira 2009; Matsa and Miller 2013; Ahern and Dittmar 2012; Fama 2021). Also, Fama (2021) found that restricting governance choices, such as laws on gender diversity, and forcing them on consumers could introduce inefficiencies that consumers would pay. Thus, this could lead investors to misunderstand valuations on gender-diverse boards.

1.2. Purpose of Thesis

The primary purpose of this thesis is to research the impact of gender diversity on portfolio construction and companies' stock returns. This paper studies the impact of gender diversity on market returns between states with and without gender quotas laws in the USA. It focuses on the United States of America because gender quotas are enacted in some states but not all. Also, the S&P500 contains the country's five hundred largest market capitalizations and companies domiciled in all states. Therefore, this paper examines how diverse boards are related to market returns, and if gender quota regulations impact the returns of companies in states with gender quotas compared to those without gender quotas. By investigating these aspects, this research aims to enhance the knowledge of the relationship between gender diversity, gender quotas, and companies' market performance.

1.3. Research Questions

The research focuses on the following two questions: Do companies with a higher percentage of women on board enjoy a better stock performance? And is this performance different in states requiring gender quotas vs states without quotas?

2. Literature Review

This chapter will discuss what gender diversity is, followed by a theoretical discussion of why gender diversity is relevant and existent empirical studies on gender diversity on boards of directors and findings on how it could impact firm performance.

2.1. Board Gender Diversity

Gender diversity on the board of directors is increasing due to both societal pressure and government law, such as gender quotas. The board of directors' primary function is to hire executives to run the firm's daily activities, advise management, and approve or adopt changes in corporate control (Matsa and Miller 2013). More so, board gender diversity is defined as the presence of females on the board of directors of a corporation (Carter, Simkins, and Simpson 2003). Thus, having more diversity on the board of directors could influence the corporation.

The upper echelon theory (Hambrick and Mason 1984) demonstrates why gender diversity is relevant. According to the upper echelon theory, top executives act according to their own experiences, personalities, values, and personalized factors (Hambrick 2018); thus, a company reflects its executives. This theory provides a theoretical framework for this research since it provides a theoretical foundation for linking diversity with company outcomes (Post and Byron 2015).

Furthermore, stock returns reflect investors' expectations regarding the company's future (Brinkhuis and Scholtens 2018). According to the efficient market theory, the stock price fully reflects all available information (Fama 1970; Malkiel and Fama 1970). Market efficiency theory is a core of finance theory (Malkiel and Fama 1970; Jensen 1978; Demsetz 1983; Fama 1991; Fama and French 1995). Following this theory, new and unexpected information could impact a company's value even though not all information is necessarily relevant. Therefore, firm stock returns would increase or decrease according to investors' belief that gender quotas would positively or negatively affect firm performance.

2.2. Gender Diversity on Board and Stock Performance

Numerous studies discuss gender diversity's effect on stock returns. So far, these studies provide mainly mixed evidence. Gul, Srinidhi, and Ng (2011) find that gender-diverse boards increase transparency and reflect firm-specific information, such as announcements, into their stock price. Also, it is more noticeable in companies with weak governance since relevant public information is directly incorporated into stock prices (Gul, Srinidhi, and Ng 2011). Furthermore, research done by Goldman Sachs Global Investment Research on the Stoxx Europe 600 index shows that stocks of companies in the top quartile (Q3) of their sectors based on the share of women on board or female managers outperformed, on average, by 2.5% a year compared to companies in the bottom quartile (Q1) (Bell 2020). More so, a study in the Asian context demonstrates that investors respond positively towards women as directors in firms in Singapore (Kang, Ding, and Charoenwong 2010).

On the other hand, research by Solal and Snellman (2019) concludes that companies that appoint women to the board of directors are penalized by investors and witness a decline in market value for two years. The study also finds that investors interpret companies that appoint female board members as less committed to maximizing shareholder return (Solal and Snellman 2019). Moreover, a meta-analysis by Post and Byron (2015) shows that the relationship between female board representation and market performance is not statistically significant and is almost zero. However, it turns into a positive relationship in countries with greater gender equality and a negative relationship in countries with less gender equality (Post and Byron 2015). Schmid and Urban (2016) study with a sample of 53 countries finds that markets react more negatively to a female board member's retirement than a male board member. However, the impact varies depending on countries and gender inequalities (Schmid and Urban 2016).

Furthermore, Loy and Rupertus (2022) study indicates that women on board do not improve or reduce firms' long-term stock performance, and imposing gender diversity quotas does not reduce shareholder value (Farrell and Hersch 2005). A study of firms on the Fortune 500 and Service 500 lists in 1990 finds insignificant abnormal returns on the announcement of a woman to the board of directors (Farrell and Hersch 2005). In Norway, Ahern and Dittmar (2012) research shows that stock market returns are negatively impacted after the announcement of mandatory gender quotas.

3. Hypothesis

Studies find mixed evidence on gender diversity on board and stock returns. The theoretical framework of the upper echelon theory (Hambrick and Mason 1984) implies that diversity in companies influences companies' outcomes. Therefore, diverse companies would outperform heterogeneous companies. The efficient market theory (Fama 1970; Malkiel and Fama 1970) suggests that new and unexpected information would impact firm value. Hence, the announcement of gender diversity quotas would affect public firm stock returns.

This study hypothesizes that an increase in gender diversity on the board of directors of a public firm leads to an increase in a firm's stock returns. Therefore, firms headquartered in states with gender diversity quotas outperform companies from other states.

3. Methodology

This chapter will discuss the methodology used in this study, followed by the definition of the variables, information about the data selection and construction, portfolio construction, and chosen portfolio measurements.

3.1. Data

This section will discuss the data included in this study's database, the variables, and the data sources.

The United States of America, and its most well-known index, the S&P500, is the index chosen for this research. The United States of America was selected because gender quotas exist in California and Washington. However, quotas are not mandatory at the federal level or in other states. More so, The S&P500 index is chosen because it contains the 500 largest companies, also known as blue chips, in the USA across all sectors. The index is the most used benchmark for the US stock market and investors' portfolios as it reflects the state of the US economy (Beers 2022).

This paper includes data from multiple sources, and the years analyzed are from 2013 until 2021. Both accounting and market data are included because accounting data incorporates information from the reporting period, and market data is a forward-looking measure that accounts for investors' perspectives (Brinkhuis and Scholtens 2018). Moreover, this study started in 2013 because there is a lack of information about the percentage and number of women on the board of directors of companies in the S&P500 before this date. Also, this study excludes financial firms because this type of firm traditionally has high leverage; however, high leverage is more likely to indicate distress for non-financial firms (Fama and French 1992).

Table 1 Variables

Fama French Model (Monthly)

Variable name	**Abbreviation**	**Definition**	**Prior Studies**	**Source**
Dependent variables				
Returns	*R*	Portfolio returns minus the monthly risk-free rate	Fama and French 1993, Fama and French 2015	CRSP
Independent variables				
Small-minus-Big	*SMB*	Size premium	Fama and French 1993, Fama and French 2015	Kenneth R. French
High-minus-Low	*HML*	Value premium	Fama and French 1993, Fama and French 2015	Kenneth R. French
Robust-minus-Weak	*RMW*	Profitability factor	Fama and French 1993, Fama and French 2016	Kenneth R. French
Conservative-minus-Aggressive	*CMA*	Investment factor	Fama and French 1993, Fama and French 2017	Kenneth R. French

OLS, DiD (Yearly)

Variable name	**Abbreviation**	**Definition**	**Prior Studies**	**Source**
Dependent variables				
Returns	*rtn*	Log yearly stock returns		CRSP
Independent variables				
Gender Diversity	*genderdiv*	Percentage of Woman on Board	Ahern and Dittmar 2012, Yang et al. 2019, Dobbin and Jung, Noland, Moran, Notschwar 2016, Yang et al. 2019, Loy and Rupertus 2022	Refinitiv Eikon

Average Board Tenure	*avgboardtenure*	Average number of years since board members have been appointed	Ahern and Dittmar 2012, Matsa and Miller 2013, Jones 2022, Yang et al. 2019	Refinitiv Eikon
Non-Executive Directors	*NED*	Percentage of non-executive directors on the board	Ahern and Dittmar 2012, Eckbo et al. 2018	Refinitiv Eikon
Board Size	*logboardsize*	Number of members on the board of directors	Ahern and Dittmar 2012, Matsa and Miller 2013, Jones 2022	Refinitiv Eikon
Return on Equity	*ROE*		Yang et al. 2019, Jones 2022	Refinitiv Eikon
Board Affiliation	*boardaffili*	Number of directors that currently hold other board seats	Matsa and Miller 2013	Refinitiv Eikon
Beta	*beta*	Stock beta	Dobbin and Jung, Manconi, Rizzo, Spalt 2017, Velte, Ahlklo and Lind, Yang et al. 201	Refinitiv Eikon
Leverage	*leverage*	Total long-term debt divided by total assets	Ahern and Dittmar 2012, Fischer and Sawczyn 2013, Velte	Compustat
Return on Assets	*roa*	Net income divided by total assets	Yang et al. 2019, Jones 2022	Compustat
	logTA	Log of total assets	Ahern and Dittmar 2012, Velte	Refinitiv Eikon
Market Capitalization	*logmktcap*	Common shares outstanding multiplied by price close calendar	Velte, Ahlklo and Lind; Noland, Moran and Notschwar 2016	Compustat
Book-to-Market	*btm*	Total common equity divided by market capitalization	Yang et al. 2019	Compustat
Dividends Dummy	*divDummy*	Dummy equal to 1 if firm pays dividends		Refinitiv Eikon
CEO Board Member	*ceoboardmember*	Dummy equal to 1 for if firm CEO is also board member	Ahern and Dittmar 2012	Refinitiv Eikon
Gender Quota	*genderQ*	Dummy equal to 1 for states with gender quotas	Noland, Moran, Notschwar 2016	

Control Variables

Year	fyear	Fiscal year	Ahern and Dittmar 2012	Compustat
Firm Industry	indus	SIC code	Matsa and Miller 2013, Eckbo, Nygaard and Thorburn 2018	Compustat

3.2. State of Domicile and Gender Diversity Quotas

This section discusses the history of gender diversity quota law in the USA, the states which enacted this quota, and the quota definition in each state.

In 2018, California was the first state to apply this type of quota. So far, only Washington State has enacted quotas that mirrored California statute. All apply to public domestic and foreign companies whose principal executive offices SEC filings (Form 10-K) are in the state. However, penalties, deadlines, and the number of female directors vary between states.

3.3. Portfolio Construction

This section discusses the portfolio construction of the portfolios used for the Fama French Three Factor Model and Fama French Five Factor Model and their weights.

Following Manconi, Rizzo, and Spalt (2015), this study builds two diverse portfolios: an equal-weighted portfolio and a gender-diversity-weighted portfolio. The percentage of women on the board of directors was chosen to assign weights for each company in the portfolio because it measures the number of women proportional to the board size. The percentage was preferred over the number of women because choosing the number could be misleading since board size varies among companies. The percentage of women on board is updated once a year. In the equal-weighted portfolio, each company represents an equal percentage of the portfolio's returns.

Equal Weighted Portfolio weights (EW_P)

$$EW_P = \frac{1}{total\ nº\ of\ stocks} \tag{1}$$

In the gender-diversity-weighted portfolio, weights are allocated according to the percentage of women on the board of directors. Companies with a higher percentage of women on board receive a higher weight in the portfolio. In contrast, firms with fewer women on board receive less weight in the portfolio.

Gender Diverse Portfolios weights (GDW_{LP})

$$GDW_{LP} = \frac{\%\ of\ \text{women}\ on\ board_{stock\ i}}{\sum \%\ of\ \text{women}\ on\ board} \tag{2}$$

3.4. Empirical Analysis

This chapter will discuss the regression models chosen to evaluate the portfolio performance and to compare the returns of companies located in states with and without gender diversity quotas.

3.4.1. Fama and French Factor Models

This study uses the Fama French Three Factor Model (Fama and French 1993) and Fama French Five Factor model (Fama and French 2015) to analyze the excess portfolio returns. Fama French Three Factor Model captures the excess returns, size, and value of the average stock returns. Moreover, the Five Factor Model extends the Three Factor model and includes profitability and investment patterns in the analysis.

Both factor models have their advantages and disadvantages. The Fama French Five Factor Model performs better than the Three Factor Model for average stock returns for size, value, profitability, and investment factors. However, the Five Factor Model fails to record small stocks with low average returns with high investment rates regardless of low profitability, making it unnecessary to report average return for the value factor (Fama and French 2015). Therefore, this study incorporates both regressions to find excess returns and the influence of each factor included in the model.

$$R_{it} = \alpha_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + e_{it} \quad (3)$$

$$R_{it} = \alpha_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_{it} \quad (4)$$

R_{it} is the monthly portfolio's total return at time *t*. $R_{Mt} - R_{Ft}$ monthly return on the market portfolio minus the risk-free rate return. SMB_t, small minus big, is the size premium; HML_t, high minus low, is the value premium; RMW_t, robust minus weak, is the profitability factor; and CMA_t, conservative minus aggressive, is the investment factor.

3.3.3. OLS Regression Analysis

This study runs an OLS analysis for firms in states with and without board gender quotas. It analyzes the effect of an increase in gender diversity in stock returns using yearly information for firm-level accounting and market-based measures. Returns and firm variables are winsorized at the 5th and 95th percentiles to limit the influence of outliers on regression coefficients.

A Hausman test was done to find whether random effects or fixed effects model was more suitable for this analysis and to control if any unobservable heterogeneity was correlated with independent variables. The null hypothesis is that random effects are preferred, and unique errors are not correlated with the regressors; the alternative hypothesis is that fixed effects are preferred over random effects, and unique errors are correlated with regressors. The test included all variables rtn, genderdiv, avgboardtenure, NED, logboardsize, ROE, boardaffili, beta, leverage, roa, logTA, logmktcap, and btm. The test runs with these variables to check if any bias might impact the outcome variables' predictors. Test results showed no difference in results using random or fixed effects; therefore, it is assumed that the variation is random and uncorrelated. Thus, this study adopts an OLS analysis with random effects because it is more efficient and can include time-invariant variables such as gender.

Moreover, variance inflation factor (VIF) analysis was used to check the degrees of multicollinearity and suitability of variables for the model. This test included the same variables used in the Hausman test. The results from the first VIF test displayed that logTA has a high variance; thus, it was removed from the model. Furthermore, ROE shows a high variance in the second test. This variable is also removed from the regression. In the third VIF test, all values were lower than the maximum threshold of ten following Wooldridge (2018).

After validating the variables and the model, this study runs an OLS regression of stock returns on gender diversity, average board tenure, non-executive directors, log of board size, board affiliation, beta, leverage, return on assets, log of market capitalization, book-to-market, CEO as a board member, and dividend dummy variable. The regression is conducted with industry-year effects to exclude time-invariant differences (Ahern and Dittmar 2012; Matsa and Miller 2013).

$$R_{it} = \beta_0 + \beta_1 genderdiv_{it} + \beta_2 avgboardtenure_{it} + \beta_3 NED_{it} + \beta_4 logboardsize_{it}$$
$$+ \beta_5 boardaffili_{it} + \beta_6 beta_{it} + \beta_7 leverage_{it} + \beta_8 roa_{it} + \beta_9 logmktcap_{it}$$
$$+ \beta_{10} btm_{it} + \beta_{11} ceoboardmember_{it} + \beta_{12} divDummy_{it} + \sum nt$$
$$= 1\beta_{13} YD_{it} + \beta_{14} IND_{it} + e_{ijt} \quad (5)$$

where $genderdiv_{it}$ is the percentage of women on the board of directors, $avgboardtenure_{it}$ is the average board tenure, NED_{it} is the percentage of non-executive directors on the board, $logboardsize_{it}$ is the log of board size of the number of members on the board of directors, $beta_{it}$ is the company's beta, $leverage_{it}$ is the firm leverage as the total long-term debt/total assets, roa_{it} is the return on assets as net income/total assets, $logmktcap_{it}$ is the log of market cap as common shares outstanding * price close calendar, btm_{it} is the book-to-market as total common equity/market capitalization, $ceoboardmember_{it}$ is a dummy variable equal to 1 if CEO is a board member, $divDummy_{it}$ is a dummy variable equal to 1 if firm pays dividends, YD_{it} is the time fixed effect, IND_{it} is the industry fixed effect.

3.3.4 Difference-in-Differences Analysis

This study conducts difference-in-differences to estimate the effect of board gender quotas on stock returns for firms headquartered in states with board gender quotas against companies headquartered in states without the quota. Also, this paper runs two Differences-in-Differences regressions to evaluate the impact of only the gender quotas on the companies' stock returns. Firstly, it runs a difference in differences using an OLS regression with control variables. Secondly, it runs difference-in-differences regression and a difference-in-differences with wild-clustered bootstrap as robustness tests. These regressions analyze returns for companies and see if there is a difference and whether the difference is significant. This approach is a type of quasi-experimental method, which is more appropriate for establishing causality (Angrist and Pischke 2008; Antonakis et al. 2010). Also, difference-in-differences is suited when an exogenous shock, such as gender quotas laws, affects a treatment group but not a comparable control group (Angrist and Krueger 1999; Angrist and Pischke 2008; de Cabo et al. 2019). Most studies use the Norwegian setting to find the effect of women on the board of directors on a firm's performance (Ahern and Dittmar 2012; Matsa and Miller 2013; Eckbo, Nygaard, and Thorburn 2016). This study uses the USA setting. USA states fit this description because states are in the same country and have a similar culture, but all states do not adopt the same laws; in this case, not all states have board gender quotas. The gender quota dummy is measured as a variable equal to 1 for observations after implementing the board gender quota in 2018 for CA and 2020 for WA and zero otherwise.

Another required adjustment of this estimation when applying it to gender diversity is the inclusion of industry-year fixed effects (Ahern and Dittmar 2012; Matsa and Miller 2013; Eckbo, Nygaard, and Thorburn 2016). The empirical strategy is to analyze how gender quotas affect stock returns in the USA using a difference-in-differences analysis.

$$R_{it} = \beta_0 + \beta_1 TREAT_{it} \times POST_{it} + \beta_2 genderdiv_{it} + \beta_3 avgboardtenure_{it} + \beta_3 NED_{it} + \beta_5 logboardsize_{it} + \beta_6 boardaffili_{it} + \beta_7 beta_{it} + \beta_8 leverage_{it} + \beta_9 roa_{it} + \beta_{10} logmktcap_{it} + \beta_{11} btm_{it} + \beta_{12} ceoboardmember_{it} + \beta_{13} divDummy_{it} + \sum nt = 1\beta_{14} YD_{it} + \beta_{15} IND_{it} + e_{ijt} \quad (6)$$

Where R_{it} denotes the stock returns for company *i* in period *t*, $genderdiv_{it}$ is the percentage of women on the board of directors, $TREAT_{it}$ is a dummy variable equal to 1 if the company is located in a state with gender quotas and 0 otherwise, $POST_{it}$ is the time dummy variable equal to 1 after the treatment occurred and 0 before the treatment, $TREAT_{it} \times POST_{it}$ is the interaction term, $avgboardtenure_{it}$ is the average board tenure, NED_{it} is the percentage of non-executive directors on the board, $logboardsize_{it}$ is the log of board size of the number of members on the board of directors, $beta_{it}$ is the company's beta, $leverage_{it}$ is the firm leverage as the total long-term debt/total assets, roa_{it} is the return on assets as net income/total assets, $logmktcap_{it}$ is the log of market cap of common shares outstanding * price close calendar, btm_{it} is the book-to-market as total common equity/market capitalization, $ceoboardmember_{it}$ is a dummy variable equal to 1 if CEO is a board member, $divDummy_{it}$ is a dummy variable equal to 1 if firm pays dividends, YD_{it} is the time fixed effect, IND_{it} is the industry fixed effect.

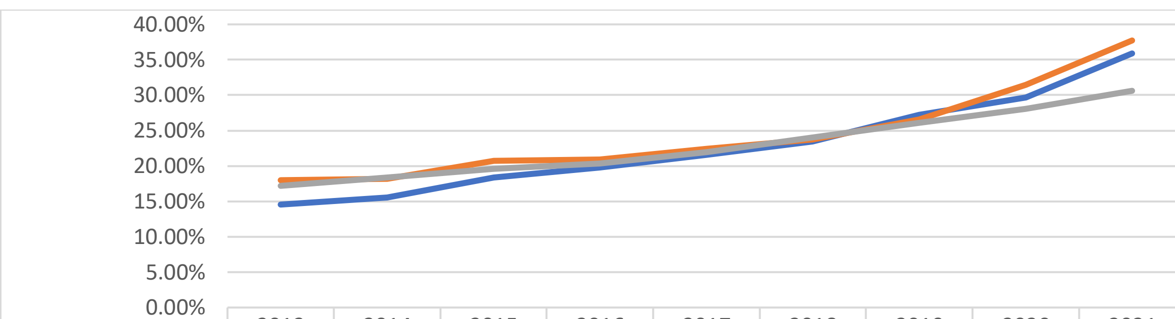
As a robustness test, this study runs a difference-in-differences with wild-cluster bootstrap (Cameron, Gelbach, and Miller 2008) since the number of states that implemented a board gender quota is small. More so, the study adopts a simple difference-in-differences regression because Matsa and Miller (2013) find negligible differences between difference-in-differences and triple-differences results. Also, this study considers how gender quotas affect the difference in performance between the treatment group and control group to limit endogeneity.

4. Empirical Results

This chapter will present and discuss descriptive statistics, correlation matrices, and empirical results.

4.1. Descriptive Statistics & Correlation Matrix

Figure 1 below illustrates the mean percentage of women on board per year in states with and without gender diversity quotas. Gender diversity vastly increased in companies on the S&P500 over the past years. However, it is observable that companies in California had less percentage of women on board than in other states before the implementation of the quotas.



	2013	2014	2015	2016	2017	2018	2019	2020	2021
California	14.54%	15.56%	18.34%	19.74%	21.53%	23.46%	27.18%	29.68%	35.89%
Washington	17.99%	18.19%	20.76%	20.91%	22.42%	23.71%	26.57%	31.42%	37.73%
Other States	17.19%	18.38%	19.60%	20.37%	21.92%	24.06%	26.07%	28.04%	30.62%

Figure 1 Mean percentage of women on board in companies in the S&P500 in states with and without gender quotas

In California and Washington, the percentage of women on board of directors steeply increased after the gender quota law. In 2019, California's percentage was higher than in other states. Furthermore, companies in Washington had a percentage of women on board above other states most of the years. Still, it is observable that the most significant increase in the percentage of women on the board of directors after the gender quotas law was enacted in 2020. As a result, nowadays, both states with gender quotas have a higher percentage of females on the board of directors when compared to all other states.

Table 2 Summary statistics Fama French 3 and 5 Factor Model

Variable	N	Mean	SD	Min	p25	p50	p75	Max	Kurtosis	Skewness
R_ew	107	1.00	4.37	-18.89	-0.75	0.89	3.71	15.36	7.32	-0.62
R_gdwt	107	1.29	5.60	-22.29	-1.16	1.15	4.58	18.08	5.76	-0.58
mkt_rf	107	1.28	4.03	-13.38	-0.10	1.54	3.40	13.65	5.04	-0.41
smb	107	-0.06	2.75	-8.36	-1.95	0.16	1.69	7.04	3.26	0.17
hml	107	-0.32	3.15	-13.92	-2.02	-0.44	1.14	8.20	6.03	-0.19
rmw	107	0.28	1.92	-3.88	-0.93	0.16	0.98	7.38	4.85	0.88
cma	107	-0.14	1.68	-3.22	-1.43	-0.26	0.92	4.78	3.20	0.64
rf	107	0.05	0.07	0.00	0.00	0.01	0.11	0.21	2.60	1.07

The summary statistics for the Fama French 3 Model and Fama French 5 Model are presented in table 2. The mean returns of the equal-weighted portfolio were 1.00% per month, with a maximum of 15.36% and a minimum of -18.89%. Moreover, the mean returns of the gender-weighted portfolio are 1.29% per month, and the maximum is 18.08%, while the minimum is -22.29%. Regarding standard deviations, it is observable that the gender-weighted portfolio bears more volatility, 5.60, than the equal-weighted portfolio, 4.37. The Sharpe ratio of the equal-weighted and gender-weighted portfolios are 0.228 and 0.230, respectively. As a result, both portfolios delivered a low Sharpe ratio and were inefficient in terms of risk and return since the risk is greater than the portfolio's excess return. The gender-weighted portfolio delivered a slightly better Sharpe ratio than the gender-weighted portfolio because its returns are higher than the increase in volatility.

Table 3 Summary statistics OLS and DiD

Variable	N	Mean	SD	Min	p25	p50	p75	Max	Kurtosis	Skewness
genderdiv	4829	22.027	9.113	0.000	15.380	22.220	27.270	50.000	2.729	0.129
genderQ	6138	0.054	0.227	0.000	0.000	0.000	0.000	1.000	16.435	3.929
avgboardtenure	4801	9.011	3.016	3.640	6.830	8.730	10.810	16.580	2.623	0.444
NED	4829	85.818	6.462	70.000	81.820	87.500	91.670	93.330	2.549	-0.784
boardaffili	4828	1.011	0.444	0.220	0.690	1.000	1.300	2.000	2.429	0.313

ceoboardmember1	4796	0.984	0.126	0.000	1.000	1.000	1.000	1.000	60.302	-7.701
logboardsize	4829	10.828	1.874	7.000	9.000	11.000	12.000	15.000	2.330	0.106
rtn	5207	0.008	0.471	-2.482	-0.127	0.088	0.250	1.650	11.591	-2.000
beta	5968	1.042	0.472	0.000	0.718	1.027	1.359	2.212	2.557	0.127
ROE	5309	17.700	18.948	-48.130	7.710	14.440	25.310	93.270	5.406	0.740
leverage	5391	0.270	0.164	0.000	0.145	0.263	0.382	0.634	2.271	0.244
roa	5400	0.058	0.058	-0.119	0.019	0.050	0.093	0.215	3.194	0.252
at	5401	38234	54515	1749	6867	15999	41124	259840	7.926	2.326
mktcap	5357	34154	43324	2345	9034	17263	37788	251335	9.315	2.448
btm	5357	0.377	0.297	-0.003	0.155	0.300	0.521	1.359	3.720	1.093
divDummy	6138	0.675	0.469	0.000	0.000	1.000	1.000	1.000	1.556	-0.746

The summary statistics for OLS and Difference-in-Differences regressions are presented above in table 3. The mean gender diversity on the board of directors was 22.15%, with a minimum of 0% and a maximum of 66.67%. Furthermore, the average tenure is 9.07 years, and tenures vary between 0.00 and 29.44 years. The mean return is -0.005, with a minimum return of -4.87% and a maximum return of 6.9%. The mean non-executive directors on the boards are 85.81%. The mean average board tenure is 9 years, with a minimum of 3 years and a maximum of 16 years. The mean beta is 1.06, showing that the portfolio beta follows the market's beta. The dividend dummy shows that 67.5% of companies in the portfolio pay dividends.

Table 4 Correlation Matrix Fama French 3 and 5 Factor Model

	R_ew	***R_gdwt***	***mkt_rf***	***smb***	***hml***	***rmw***	***cma***	***rf***
R_ew	1							
R_gdwt	0.9932	1						
mkt_rf	0.9498	0.947	1					
smb	0.3815	0.3723	0.3441	1				
hml	0.3023	0.2952	0.1469	0.3599	1			
rmw	0.1408	0.133	0.0782	-0.3947	0.1452	1		
cma	-0.05	-0.0436	-0.1607	0.0798	0.5211	0.1784	1	
rf	-0.1568	-0.1452	-0.1574	-0.1593	-0.1801	-0.0797	-0.0371	1

Table 4 shows the Pearson correlation matrix for Fama French 3 and 5 Factor Models. A R_ew and R_gw, equal-weighted and the gender diversity weighted mean returns, are correlated because portfolios are composed by the same companies even though different weights are attributed to portfolio returns. Besides these two variables, all other variables present a low correlation.

Table 5 in the appendix presents the Pearson correlation matrix between variables, and the p-values of these correlations are located below the correlation value. It is observable that the dependent variable, stock returns (rtn), is positive and significantly correlated with gender diversity, gender quotas, ROE, ROA, and market capitalization. Returns are negatively and significantly correlated with CEO as a board member, book-to-market, and dividends. At the same time, there is a positive and significant association between gender diversity and gender quotas, non-executive directors, board affiliation, board size, ROE, leverage, total assets, market capitalization, and dividends. Gender diversity is negatively and significantly associated with average board tenure and beta. Furthermore, gender quotas are negatively and significantly associated with non-executive directors, board size, beta, leverage, book-to-market, and dividend. It is also positively and significantly correlated with gender diversity, returns, ROE, ROA, and market capitalization.

4.2. Regression Results

4.2.1. Fama French Three-Factor and Five-Factor Model Regression

Table 6 Fama French 3 Factor Model

Variables	**R_ew**	**R_gdwt**
mkt_rf	1.002***	1.284***
	(0.000)	(0.000)
smb	0.006	-0.008
	(0.892)	(0.905)
hml	0.229***	0.286***
	(0.000)	(0.000)
Constant	-0.207*	-0.257
	(0.091)	(0.119)
Observations	107	107
R-squared	0.929	0.922
r2	0.929	0.922
r2_a	0.927	0.919

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 shows the Fama French 3 Factors Models regressions. The equal-weighted portfolio is negative and significant (p = 0.091), at a 10% significance level, related to returns with an alpha of -0.207% monthly and t-statistic of -1.71. Hence, the equal-weighted portfolio delivered a negative mean excess return from 2013 to 2021. The gender diversity weighted portfolio is negative and insignificant (p = 0.119) at any significance level, related to returns with an alpha of -0.257% monthly and a t-statistic of -1.57. Furthermore, we can observe that both portfolios have risk exposure to the HML factor. In conclusion, these portfolios have risk exposure to value stocks, and the gender diversity portfolio underperforms the equal-weighted portfolio throughout the same period. However, returns from gender diversity-weighted portfolios are not significant.

Table 7 Fama French 5 Factor Model

Variables	R_ew	R_gdwt
mkt_rf	0.988***	1.277***
	(0.000)	(0.000)
smb	0.068	0.052
	(0.219)	(0.484)
hml	0.193***	0.232***
	(0.000)	(0.000)
rmw	0.147**	0.140
	(0.041)	(0.152)
cma	0.023	0.085
	(0.781)	(0.454)
Constant	-0.234*	-0.288*
	(0.055)	(0.082)
Observations	107	107
R-squared	0.932	0.924
r2	0.932	0.924
r2_a	0.929	0.920

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 shows the Fama French 5 Factor Model Regression for equal-weighted (R_ew) and gender diversity-weighted (R_gdw) portfolio returns. The equal-weighted portfolio is negative and significant (p = 0.055), at a 10% significance level, related to returns with an alpha of -0.234% monthly and t-statistic of -1.94. Thus, the equal-weighted portfolio delivered a negative mean excess return from 2013 to 2021. The gender diversity weighted portfolio is negative and significant (p = 0.082), at a 10% significance level, related to returns with an alpha of -0.288% monthly and a t-statistic of -1.76. Moreover, these portfolios have a risk exposure to the HML factor. The equal-weighted portfolio also has risk exposure to the RMW factor. As a result, both portfolios have risk exposure to value stocks, and the equal-weighted portfolio also has risk exposure to high-quality stocks (with robust profitability). The gender diversity portfolio again delivers more negative mean excess return than the equal-weighted portfolio throughout the same period. In conclusion, the t-test shows that we reject the null hypothesis.

4.2.2. OLS Regression

Table 8 shows the results for the two OLS regressions. Table 8 (1) shows returns for companies in states with gender quotas. The result is negative and not significant (p = 0.940), at any significance level, for gender diversity related to returns with a beta of -0.000 and t-statistic of -0.07. In this

Table 8 OLS Regressions

	genderQ = 1	genderQ = 0

Variables	F.rtn	F.rtn
genderdiv	-0.000	0.001
	(0.941)	(0.290)
avgboardtenure	0.015**	0.001
	(0.039)	(0.551)
NED	0.002	0.001*
	(0.602)	(0.054)
logboardsize	-0.031	-0.044**
	(0.819)	(0.048)
boardaffili	-0.021	-0.014
	(0.732)	(0.120)
beta	0.114	-0.008
	(0.148)	(0.506)
leverage	0.445**	0.057*
	(0.025)	(0.092)
roa	0.465	-0.156*
	(0.216)	(0.069)
logmktcap	-0.017	-0.015***
	(0.451)	(0.004)
btm	0.045	0.010
	(0.696)	(0.598)
ceoboardmember1	-0.036	0.011
	(0.743)	(0.737)
divDummy	-0.123**	-0.001
	(0.049)	(0.908)
fyear effect	Yes	Yes
industry effect	Yes	Yes
Constant	0.021	0.189
	(0.963)	(0.148)
Observations	235	4,230
Number of id	0.342	0.326
r2	0.342	0.326
r2_a	0.120	0.287

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

regression, stock returns were significantly predicted by average board tenure (β = 0.015, p = 0.038), leverage (β = 0.445, p = 0.023), and dividends (β = -0.123, p = 0.047). Table 8 (2) shows the difference in returns for companies in states without gender quotas. The impact of gender diversity in stock returns is positive and insignificant (p = 0.290), at any significance level, with a beta of 0.001 and a t-statistics of 0.290. The variables that show to influence returns on states without gender quotas are non-executive directors (β = 0.001, p = 0.054), board size (β = -0.044, p = 0.048), leverage (β = 0.057, p = 0.092), return on assets (β = -0.156, p = 0.069), and market capitalization (β = -0.015, p = 0.004).

Regarding the research questions, it demonstrates that companies located in states with gender quotas do not have an increase in returns due to the increase in gender diversity in companies since the relationship is not significant.

4.2.3. Difference-in-Differences Regressions

Table 9 shows the results for the Difference-in- Differences regression with control variables. The gender diversity is positive and not significant (p = 0.254) at any significance level, related to stock returns with a coefficient of 0.001 and a t-statistics of 1.14. The average treatment effect of the

Table 9 Difference-in-Differences Regression

Variables	rtn
1.treat	0.029**
	(0.038)
1.post	0.099***
	(0.000)
0b.treat#0b.post	0.000
	(.)
0b.treat#1o.post	0.000
	(.)
1o.treat#0b.post	0.000
	(.)
1.treat#1.post	0.018
	(0.331)
genderdiv	0.001
	(0.254)
avgboardtenure	0.001
	(0.404)
NED	0.001**
	(0.049)
logboardsize	-0.037*
	(0.085)
boardaffili	-0.012
	(0.181)
beta	-0.003
	(0.834)
leverage	0.081**
	(0.016)
roa	-0.101
	(0.222)
logmktcap	-0.015***
	(0.004)
btm	0.011
	(0.576)
ceoboardmember1	0.005
	(0.868)
divDummy	-0.006
	(0.611)
fyear effect	Yes
industry effect	Yes
Constant	0.162
	(0.211)
Observations	4,465
R-squared	0.324
r2	0.324
r2_a	0.287

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

gender quota on stock returns is 0.018 and a t-statistics of 0.97. This difference is positive and not significant (p = 0.331).

The variables that influence stock returns are non-executive directors (β = 0.001, p = 0.049), board size (β = -0.037, p = 0.085), leverage (β = 0.081, p = 0.016), market capitalization (β = -0.015, p = 0.004). Thus, the increase in gender diversity and the implementation of the gender quota did not have a significant effect in stock returns.

Table 10 Difference-in-Differences

Variables	ATET	Controls
r1vs0.genderQ	0.007	
	(0.730)	
Constant		0.100***
		(0.000)
Observations	4,706	4,706
r2	.	.
r2_a	.	.

Robust pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11 DiD with wild-cluster bootstrap

Variables	ATET	Controls
r1vs0.genderQ	0.007	
	(0.700)	
Constant		
Observations	4,706	
r2	.	
r2_a	.	

Robust pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10 illustrates the results for the Difference-in-Differences. There is a difference in stock returns before and after the implementation of board gender quotas. This difference is positive and insignificant (p = 0.730) at any significance level. The average treatment effect on stock returns is 0.007, and a t-statistics of 0.38. As a result, it shows that the effect of gender quotas did not significantly impact the stock returns of companies located in states with gender quotas. Table 11 shows the difference-in-differences regression with wild-cluster bootstrap inference. The difference is again positive and insignificant (p = 0.700) at any significance level, and the average treatment effect on returns was 0.007 and a t-statistics of 0.35. The treatment effect is slightly less insignificant (p = 0.700) with the wild-cluster bootstrap method. Thus, confirming the robustness of previous results. Regarding the research questions, it shows that gender diversity quotas do not significantly affect the stock returns of companies in states with gender quotas.

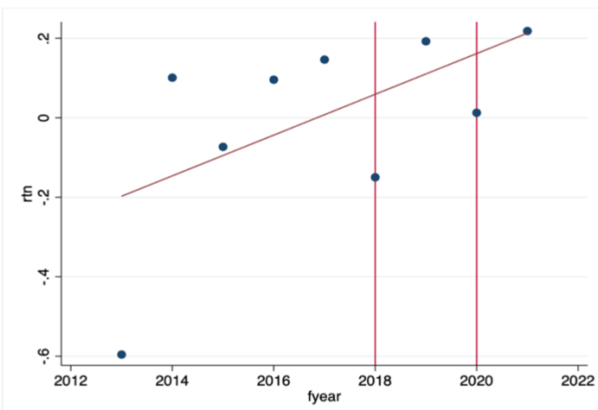


Figure 2 Returns per year in states without gender quotas

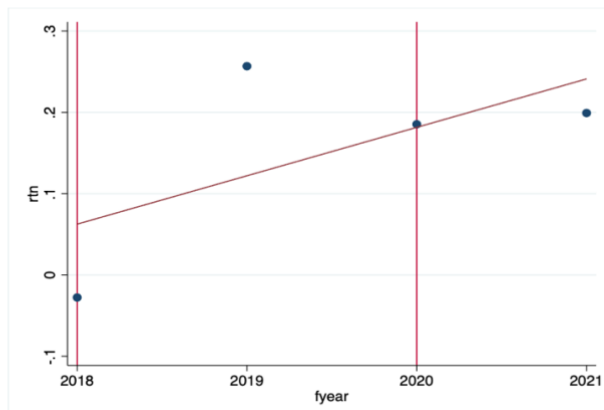


Figure 3 Returns per year in states with gender quotas

Figures 2 and 3 show annual returns for companies in states with gender quotas and states without gender quotas. On figure 2 and 3, the returns were down when the gender quota was enacted in California in 2018. Returns in both states also increased in 2019. The most significant difference is in 2020. However, the difference in returns in the states with and without gender quotas in 2020 could had been affected by the COVID-19 pandemic. If the gender quota had a positive impact, companies located in states with gender quotas would have had higher returns in the years the quotas were implemented than companies in states without quotas. Thus, it shows that returns in companies in states with and without gender quotas are uniform and that there is no impact of the gender diversity quota on the stock returns of companies in the S&P500.

The trend in returns between the two states is the same; therefore, investors might not expect that gender quotas would positively or negatively affect a firm performance. This results contrast with studies that find that gender diversity on board have a positive (Kang, Ding, and Charownwong 2010, Bell 2020) and negative (Ahern and Dittman 2012, Solal and Snallman 2019) effect on returns. However, it is in line with studies which show that gender diversity on board of directors does not impact market performance (Post and Byron 2015, Loy and Rupertus 2022, Farrel and Hersch 2005). In addition, impact of gender diversity and quotas could vary depending on geography as stated by Post and Byron (2025) and Schmid and Urban (2016). Thus, this not significant result for the impact of gender quotas might only be applicable for companies in the S&P500.

5. Conclusion

On May 13, 2022, the Gender Diversity law was ruled unconstitutional at trial because academic research was inconclusive, and the state did not show evidence that higher gender diversity improved financial performance (Temple-West 2022). This study found that gender diversity quotas have increased the percentage of women on board in companies located in states with quotas. Also, this research concludes that investing only in the companies in the top quintile regarding gender diversity does not deliver higher mean portfolio returns. More so, increasing gender diversity in companies in the S&P500 does not affect stock returns significantly. Lastly, companies in states with gender quotas did not have higher returns than those without gender quotas. This result is in line with previous research by Post and Byron (2015), Loy and Rupertus (2022), and Farrell and Hersch (2005).

6. Limitations

This research has limitations. Firstly, the sample is composed only of companies in the S&P500 Index. For this reason, this study excludes other companies listed in the US stock market. Secondly, statistically, the best scenario would be to have an even split between the treatment and control groups. However, in this study, the treatment group is much smaller than the control group. Thirdly, gender quotas are evaluated over a short period. Gender quotas began in California in 2018 and in Washington in 2020. As a result, this research analyzed the effect of gender quotas during three years in California and one year in Washington. Lastly, the COVID-19 pandemic could have affected results since the stock market was highly affected by the pandemic in 2020.

7. Future Research

Regarding future research, it is proposed to address the limitations of this research, such as sample size and periods. Also, apply this type of research in a new location to explore the effects gender diversity quotas might have on different countries. More so, future research can address unanswered aspects of this research, such as if an increase in gender diversity affects stock returns differently for each sector.

Reference

Adams, Renée B., and Daniel Ferreira. 2009. "Women in the Boardroom and Their Impact on Governance and Performance." *Journal of Financial Economics* 94 (2): 291–309. https://doi.org/10.1016/j.jfineco.2008.10.007.

Adams, Renee B., Stephen Gray, and John Nowland. 2011. "Does Gender Matter in the Boardroom? Evidence from the Market Reaction to Mandatory New Director Announcements." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1953152.

Ahern, Kenneth R., and Amy K. Dittmar. 2012. "The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation." *Quarterly Journal of Economics* 127 (1): 137–97. https://doi.org/10.1093/qje/qjr049.

Angrist, Joshua D., and Alan B. Krueger. 1999. "Empirical Strategies in Labor Economics." In , 1277–1366. https://doi.org/10.1016/S1573-4463(99)03004-7.

Angrist, Joshua D, and Jorn-Steffen Pischke. 2008. "Mostly Harmless Econometrics An Empiricist's Companion."

Antonakis, John, Samuel Bendahan, Philippe Jacquart, and Rafael Lalive. 2010. “On Making Causal Claims: A Review and Recommendations.” *The Leadership Quarterly* 21 (6): 1086–1120. https://doi.org/10.1016/j.leaqua.2010.10.010.

Beers, Brian. 2022. “Why Do Investors Use the S&P 500 As a Benchmark?” Investopedia. September 11, 2022.

Bell, Sharon. 2020. “The Stock Market Boost from Having More Women in Management.” *Financial Times*, November 2, 2020.

Birindelli, Giuliana, and Antonia Patrizia Iannuzzi. 2022. “Women in the Asset Management Sector.” In *Palgrave Macmillan Studies in Banking and Financial Institutions*, 205–37. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-93471-2_7.

Brinkhuis, Eline, and Bert Scholtens. 2018. “Investor Response to Appointment of Female CEOs and CFOs.” *The Leadership Quarterly* 29 (3): 423–41. https://doi.org/10.1016/j.leaqua.2017.08.002.

Cabo, Ruth de, Siri Terjesen, Lorenzo Escot, and Ricardo Gimeno. 2019. “Do ‘Soft Law’ Board Gender Quotas Work? Evidence from a Natural Experiment.” *European Management Journal* 37 (5): 611–24. https://doi.org/10.1016/j.emj.2019.01.004.

Cameron, A. Colin, Jonah B. Gelbach, and Douglas L. Miller. 2008. “Bootstrap-Based Improvements for Inference with Clustered Errors.” *Review of Economics and Statistics* 90 (3): 414–27. https://doi.org/10.1162/rest.90.3.414.

Carter, David A., Betty J. Simkins, and W. Gary Simpson. 2003. “Corporate Governance, Board Diversity, and Firm Value.” *The Financial Review* 38 (1): 33–53. https://doi.org/10.1111/1540-6288.00034.

Demsetz, Harold. 1983. “The Structure of Ownership and the Theory of the Firm.” *The Journal of Law and Economics* 26 (2): 375–90. https://doi.org/10.1086/467041.

Eckbo, B Espen, Knut Nygaard, and Karin S Thorburn. 2016. “Does Gender-Balancing the Board Reduce Firm Value?” 11176. 11176.

European Parliament. 2022. “ Parliament Approves Landmark Rules to Boost Gender Equality on Corporate Boards.” *European Parliament*, November 22, 2022.

Fama, Eugene F. 1970. “Efficient Capital Markets: A Review of Theory and Empirical Work.” *The Journal of Finance* 25 (2): 383. https://doi.org/10.2307/2325486.

———. 1991. “Efficient Capital Markets: II.” *The Journal of Finance* 46 (5): 1575–1617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x.

———. 2021. “Contract Costs, Stakeholder Capitalism, and ESG.” *European Financial Management* 27 (2): 189–95. https://doi.org/10.1111/eufm.12297.

Fama, Eugene F., and Kenneth R. French. 1992. “The Cross-Section of Expected Stock Returns.” *The Journal of Finance* 47 (2): 427. https://doi.org/10.2307/2329112.

———. 1993. “Common Risk Factors in the Returns on Stocks and Bonds.” *Journal of Financial Economics* 33 (1): 3–56. https://doi.org/10.1016/0304-405X(93)90023-5.

———. 1995. “Size and Book-to-Market Factors in Earnings and Returns.” *The Journal of Finance* 50 (1): 131–55. https://doi.org/10.1111/j.1540-6261.1995.tb05169.x.

———. 2015. “A Five-Factor Asset Pricing Model.” *Journal of Financial Economics* 116 (1): 1–22. https://doi.org/10.1016/j.jfineco.2014.10.010.

Farrell, Kathleen A., and Philip L. Hersch. 2005. “Additions to Corporate Boards: The Effect of Gender.” *Journal of Corporate Finance* 11 (1–2): 85–106. https://doi.org/10.1016/j.jcorpfin.2003.12.001.

Godoy, Jody. 2021. "9th Circuit Revives Challenge to California Women on Boards Law." *Reuters*, June 21, 2021.
Gul, Ferdinand A., Bin Srinidhi, and Anthony C. Ng. 2011. "Does Board Gender Diversity Improve the Informativeness of Stock Prices?" *Journal of Accounting and Economics* 51 (3): 314–38. https://doi.org/10.1016/j.jacceco.2011.01.005.
Hambrick, Donald C. 2018. "Upper Echelons Theory." In *The Palgrave Encyclopedia of Strategic Management*, 1782–85. London: Palgrave Macmillan UK. https://doi.org/10.1057/978-1-137-00772-8_785.
Hambrick, Donald C., and Phyllis A. Mason. 1984. "Upper Echelons: The Organization as a Reflection of Its Top Managers." *Academy of Management Review* 9 (2): 193–206. https://doi.org/10.5465/amr.1984.4277628.
Hansen, Holgar. 2021. "German Parliament to Clear Way for Women Quota on Some Company Boards." *Reuters*, May 28, 2021. https://www.reuters.com/business/sustainable-business/german-parliament-clear-way-women-quota-some-company-boards-2021-05-28/.
Jensen, Michael C. 1978. "Some Anomalous Evidence Regarding Market Efficiency." *Journal of Financial Economics* 6 (2–3): 95–101. https://doi.org/10.1016/0304-405X(78)90025-9.
Kang, Eugene, David K. Ding, and Charlie Charoenwong. 2010. "Investor Reaction to Women Directors." *Journal of Business Research* 63 (8): 888–94. https://doi.org/10.1016/j.jbusres.2009.06.008.
Loy, Thomas R., and Hendrik Rupertus. 2022. "How Does the Stock Market Value Female Directors? International Evidence." *Business & Society* 61 (1): 117–54. https://doi.org/10.1177/0007650320949839.
Malkiel, Burton G., and Eugene F. Fama. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance* 25 (2): 383–417. https://doi.org/10.1111/j.1540-6261.1970.tb00518.x.
Manconi, Alberto, Antonino Emanuele Rizzo, and Oliver G. Spalt. 2015. "Diversity Investing." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2706550.
Matsa, David A, and Amalia R Miller. 2013. "A Female Style in Corporate Leadership? Evidence from Quotas." *American Economic Journal: Applied Economics* 5 (3): 136–69. https://doi.org/10.1257/app.5.3.136.
Poh, Jacqueline. 2021. "Women in Boardroom Count Toward Companies' Borrowing Costs." *Bloomberg*, September 3, 2021.
Post, Corinne, and Kris Byron. 2015. "Women on Boards and Firm Financial Performance: A Meta-Analysis." *Academy of Management Journal* 58 (5): 1546–71. https://doi.org/10.5465/amj.2013.0319.
Sandberg, Daniel J. 2019. "When Women Lead, Firms Win."
Schmid, Thomas, and Daniel Urban. 2016. "Women on Corporate Boards: Good or Bad?"
Schneider, Fernando Zanotti. 2017. "How Does Diversity of the Board Members Affect Firm Performance? The Case of Brazil." Lisbon: Nova SBE.
Solal, Isabelle, and Kaisa Snellman. 2019. " Why Investors React Negatively to Companies That Put Women on Their Boards."
Solsvik, Terje, and Gwladys Fouche. 2013. "Norway's Gender Quota Law Has Made Boards More Professional: State Fund Boss." *Reuters*, September 30, 2013.
Son, Hugh. 2020. "Goldman Won't Take Companies Public without 'at Least One Diverse Board Candidate,' CEO Says." *CNBC*, January 21, 2020.
S&P Global. 2020. "How Gender Fits into ESG?" February 24, 2020.

Temple-West, Patrick. 2022. "California's Gender Diversity Board Mandate Struck down in Court." *Financial Times*, May 16, 2022.
Thomas, Emily. 2022. "Why Gender Diversity May Lead to Better Returns for Investors."
Wooldridge, Jeffrey M. 2018. *Introductory Econometrics: A Modern Approach*. 7th Edition. Cengage Learning.

Appendix

Pearson Correlation Matrix OLS and Difference-in-Differences

Table 5 Pearson Correlation Matrix OLS and DiD

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) *genderdiv*															
_															
(2) *genderQ*	**0.139**														
_	0.00														
(3) *avgboardtenure*	**-0.156**	**0.010**													
_	0.000	0.499													
(4) *NED*	**0.199**	**-0.078**	**-0.204**												
_	0.000	0.000	0.000												
(5) *boardaffili*	**0.167**	**-0.004**	**-0.265**	**0.166**											
_	0.000	0.773	0.000	0.000											
(6) *ceoboardmember*	**0.025**	**-0.024**	**-0.052**	**-0.014**	**0.034**										
_	0.100	0.116	0.001	0.345	0.024										
(7) *logboardsize*	**0.134**	**-0.076**	**-0.085**	**0.302**	**0.131**	**0.053**									
_	0.000	0.000	0.000	0.000	0.000	0.000									
(8) *rtn*	**0.085**	**0.077**	**0.001**	**-0.020**	**0.006**	**-0.025**	**-0.002**								
_	0.000	0.000	0.949	0.199	0.711	0.094	0.893								
(9) *beta*	**-0.064**	**-0.036**	**-0.103**	**0.010**	**-0.012**	**0.038**	**-0.042**	**-0.110**							
_	0.000	0.017	0.000	0.491	0.432	0.013	0.006	0.000							
(10) *ROE*	**0.091**	**0.068**	**0.055**	**0.024**	**0.022**	**-0.056**	**0.017**	**0.096**	**-0.170**						
_	0.000	0.000	0.000	0.107	0.139	0.000	0.263	0.000	0.000						
(11) *leverage*	**0.036**	**-0.043**	**-0.104**	**0.068**	**0.075**	**-0.007**	**-0.017**	**0.004**	**-0.091**	**0.073**					
_	0.019	0.004	0.000	0.000	0.000	0.623	0.252	0.803	0.000	0.000					
(12) *roa*	**-0.016**	**0.121**	**0.151**	**-0.115**	**-0.043**	**-0.062**	**-0.110**	**0.093**	**-0.202**	**0.779**	**-0.160**				
_	0.279	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000				
(13) *logTA*	**0.203**	**-0.016**	**-0.119**	**0.265**	**0.164**	**0.034**	**0.482**	**0.006**	**0.009**	**-0.113**	**-0.080**	**-0.295**			
_	0.000	0.294	0.000	0.000	0.000	0.027	0.000	0.678	0.532	0.000	0.000	0.000			
(14) *logmktcap*	**0.176**	**0.142**	**-0.036**	**0.150**	**0.167**	**0.013**	**0.339**	**0.182**	**-0.212**	**0.247**	**-0.068**	**0.218**	**0.662**		
_	0.000	0.000	0.018	0.000	0.000	0.377	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
(15) *btm*	**-0.010**	**-0.129**	**-0.085**	**0.069**	**0.039**	**0.002**	**0.146**	**-0.218**	**0.255**	**-0.502**	**-0.198**	**-0.510**	**0.375**	**-0.257**	
_	0.528	0.000	0.000	0.000	0.010	0.873	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
(16) *divDummy*	**0.120**	**-0.125**	**0.038**	**0.177**	**0.093**	**0.069**	**0.241**	**-0.054**	**-0.080**	**0.072**	**0.042**	**-0.018**	**0.301**	**0.174**	**0.121**
_	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.236	0.000	0.000	0.000