Gender Board Quota Impact At The Firm-Level: Evidence from Italy

Erasmus University Rotterdam

Erasmus School of Economics

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Name: Anika Mishra
Student Number: 523318

Supervisor: Fabrizio Core

Second Assessor: Dr. Daniel Urban

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Abstract

Gender gaps have been fueled by social conventions and dominant gender stereotypes for a very long time. Over the past decades, awareness and encouragement towards gender diversity has been on a rise in Europe. Tremendous societal pressure encouraged the European Union to implement gender board quotas to increase the share of women in the upper management levels of listed firms. In this paper, I investigate the effect of gender board quota on firm performance from 2008 till 2021. I use the introduction of gender board quota law in Italy in 2011 as an exogeneous variation for my study. Thus, the study uses a different contextual setting as well as newer time frame to reassess the effects of the quota on firm performance, compared to existing studies on the Norwegian context. I use a Difference-in-Difference method where Italian listed firms represent the treatment and Spanish listed firms represent the control group. My results show that the introduction of quota leads to a rise in share of women on the board. Additionally, it causes a performance-enhancing effect in the short-term and performance-reducing effect in the long-term. Nevertheless, other unobserved factors may be included in the effect of the gender board quota that could add an element of ambiguity to the interpretations of this study.

Introduction

Many countries have succeeded in involving women in the labour market, however only a small percentage of women reach the highest levels of management and leadership. According to World Economic Forum (2015), only about 59% of the gender gap in economic possibilities has been addressed globally, whereas this economic gender-gap has only been reduced by around 5% in the last decade. Hence, there is clearly a need to facilitate initiatives and act towards gender equality. Moreover, not only gender equality, but women's engagement in economic opportunities as well as their active participation in the labour market are important development goals, according to the International Monetary Fund (IMF, 2014). As discussed later in this paper, various theories have stressed on the fact that women tend to inhibit talent, human capital and productivity similar to men, which gives even more reasons for women to contribute to the global economy. Furthermore, a greater involvement of women in the economy could have positive effects on cultural development (Fernandez, 2013).

Gender diversity in corporate board structure has been encouraged across the globe. In the US, 65% of the firms had at least one female member in the upper management, whereas only 25% of the US firms had more than one female executives. Similarly, in Europe, 62% of the firms had at least one female in the executive position in 2004, however, only 28% of the European firms had more than one female executives (Adams and Ferreira, 2009). Norway was the first country to introduce a gender board quota law in 2003, followed by Finland, Iceland, Spain, The Netherlands, Belgium, Italy and others. Similar quota mandates have been implemented in Australia, India, Quebec, California and in the Asia-Pacific region. Although the structure of the laws might differ across these countries, the common aim of the legislation is to encourage gender inclusion at an executive board level. Various existing academic studies have managed to assess the effects of board gender quota at the firm-level based on the Norwegian experience. As we know, Norway mandated 40% representation of each gender at the board-level for listed companies. This led to a dramatic structural change in the board dynamics of the Norwegian-listed firms. Existing research has shown that this quota has been effective towards increasing the share of women on boards, while being a significant source of cost to the firms in terms of performance measures.

Thus, this paper provides new evidence based on a different setting. The paper chooses Italian gender board quota law of 2011 to reassess the effects of the quota on firm performance. By choosing Italian gender law of 2011 as an exogeneous variation, the paper focuses on working with relatively recent dataset compared to the Norwegian studies of 2003. Moreover, unlike Norway, Italy is known to have a more gender conservative culture that has a poor ranking in majority of the gender statistics (Profeta et al., 2014). Additionally, the Italian quotas are known to be more temporal and gradual, compared to that of Norway. Hence, keeping the differences into consideration, the paper examines the following question:

How does a gender board quota have an influence on the performance of the firm?

In our study, we have attempted to consider both short-term as well long-term angles in performances measures. In other words, accounting-based performance measures are used to assess the short-term effects whereas market-based performance measures are used to assess the long-term effects. A difference-in-difference analysis applied to these performance measures to assess the gradual change in effects of quota over time.

This research is scientifically relevant since it chooses introduction of gender board quota in 2011 for Italian listed companies as an exogenous variation and further evaluate whether the results drawn from the Norwegian context could be generalized. In this way, the study uses a different contextual setting as well as newer time frame to reassess the effects of the quota on firm performance. Moreover, the research is socially relevant in the business context as well as for policymakers because of the implications that are derived from the research. By understanding the differences in the effect of a quota law, businesses could effectively evaluate whether to be in favor or against the statutory quota. Additionally, this may also encourage policymakers to rethink their policies and contribute to efficient decision-making.

The research consists of three sections. The first section focuses on understanding the relation between gender board quotas and firm performance by providing a theoretical and empirical overview. The second section focuses on the data and methodology where I explain the statistical methods used for the study. The third section focuses on explaining the results of the statistical analysis and discussing them further.

Theoretical Framework

Various academic studies have attempted to establish a direct theoretical link between female board representation and financial performance of the company. According to Kiel and Nicholson (2003), one fundamental proposition is that the composition of the board influences the extent to which the duties are carried out well, which helps to define firm performance. In other words, there may be a connection between board diversity, a subset of which includes gender and ethnic minority diversity, and firm performance.

However, there is no signal theory that directly establishes this link, rather it is a set of several theories from various fields that address this proposition (Terjesen et al., 2009). Thus, the theoretical framework of this study will take on an interdisciplinary approach followed by Carter et al. (2010) to draw important theories from economics, organizational theory and social psychology in order to provide the theoretical foundation for the testable hypotheses.

Resource Dependence Theory

Initially proposed by Pfeffer and Salancik (1978), the theory explains how organizations are heavily dependent on the resources from external environment, which may include financial capital, technology, human expertise, social network, raw materials, information and many more. Hillman et al. (2000) extend the resource dependence theory by incorporating the role of directors into the play. The study suggests that different types of directors will provide different valuable resources to the firm, which further implies that a more diverse board will be highly beneficial for the firm in terms of better performance. Additionally, diverse boards will provide a greater external talent pool, through which boards obtain various perspectives and unconventional approaches towards facilitating decision-making processes. Women may have a unique set of knowledge and skill set than men in some aspects, which can boost the problem-solving capacity of the firm. Hence, this theory suggests a positive link between gender diversity and firm performance in the firm.

Human Capital Theory

Becker (1964) defined human capital theory as an economic framework that views acquiring education, on-the job trainings and experience, and health improvements as mediums of investing human capital. According to his study, every individual possesses a stock of knowledge and skills that can be attributed towards one's productive capabilities. In simple words, investments in human capital would boost an individual's productivity as well as earning potential. Terjesen et al. (2009) incorporated the role of gender into the human capital theory. The authors suggest that differences in gender at board-level leads to directors having unique human capital. They further stress that women tend to have the same qualities for executive positions, but only less likely to have the same experience as a male executive. Hence, the human capital theory implies a positive link between board diversity and firm performance due to the unique capital an individual adds to the firm.

Agency Theory

The Agency theory is one of the foundation works by Jensen and Meckling (1976), which illustrates a framework for understanding the relationship between owners (principals) and managers (agents) in a firm. The theory addresses the agency problems that can arise when managers act on the behalf of shareholders, however, with varying goals and incentives which leads to conflicts of interest. Carter et al. (2003) emphasize on the board function of monitoring and controlling managers. A more diverse board increases board independence which is crucial towards solving the agency problem between executives and manager as it may be a better monitor of managers. In simple words, a diverse board will facilitate a more reliable and unbiased approach of monitoring. However, over monitoring is known to hamper the firm's operational flow which could decrease the shareholder value and have an adverse impact on the firm performance. Thus, it is difficult to establish a clear direct link between board diversity and firm performance through this theory.

Social Psychology Theory

Various academic literature emphasizes on how demographic minority directors have a favorable impact on the corporate sector by successfully influencing group decisions. However, studies such as Westphal and Milton (2000) have opposing views as they suggest that diverse board, with its demographic differences, reduces social cohesion between groups and decrease the likelihood of group decision-making. This is justified by the fact that demographic differences would lead to different opinions and perspectives which would make collective decision-making more time-consuming and inefficient. On the other hand, diverse groups can facilitate effective problem-solving through divergent approaches. Similarly, all the literature that support resource dependence theory promote diverse ideas amongst groups and perceive them as "valuable resources". Thus, this theory predicts a positive as well as negative link between board diversity and firm performance.

Empirical Evidence & Hypothesis Development

Gender Quota & Board Composition

The impact of gender board quotas on board diversity is a well-studied topic in the academic field. Various studies attempted to examine how the gender quotas changed the representation of women in corporate boards. For instance, Ahern and Dittmar (2012) suggest that introduction of gender board quotas in Norway leads to a higher percentage of women representation on corporate boards. Upon the implementation, Norway's board representation of women has increased from 9% to 40%. Hence, the first hypothesis of the research is as follows:

H1: The Italian board gender quota will increase the share of women in the board.

Board Diversity & Firm Outcomes

There are many prominent papers that have contributed to studying a relationship between gender quotas and firm performance. In theory, performance measures can be classified into two categories: on the one hand accounting-based measures, which reflect the accounting performance of a company by deriving insights from the company's financial statements. On the other hand, market-based measures reflect on the perceived value of a company by investors and provide insights on the growth prospects of the firm (Haslam et. al., 2010). Since the measures are fundamentally different in nature, the research will incorporate both the measures in the analysis. Return on Equity (ROE) and Return on Assets (ROA) are the accounting-based measures whereas Tobin's Q (to measure firm value) and Year-end closing price (to measure investors sentiment) are the marketing-based measures incorporated in this paper.

Studies such as Shrader et. al. (1997) conducted their research on a sample of US firms and found an insignificant relationship between the share of women on board and some chosen accounting-based performance measures. Similarly, Smith et. al. (2006) studied the relationship between board diversity and many accounting-based measures and found no significant relationship. Furthermore, the same relationship is investigated by Haslam et. al. (2010) on a sample of British firms, who find an insignificant relationship when using accounting-based measures as dependent variables whereas a negative, significant relationship with Tobin's Q as the dependent variable. Moreover, on the one hand, studies such as Campwell and Minguez-Vera (2007) find a significant, positive relationship between gender diversity and Tobin's Q when using a sample of Spanish firms. On the other hand, Adams and Ferreira (2009) find a significant, negative relationship when using an IV regression method on a sample of US firms.

Although all the stated papers investigate a relationship between gender diversity and firm performance, the studies fail to study the effect of quota on firm performance. However, Yang et al. (2019) use a difference-in-difference method to examine the effect of Norway's gender quota on firm performance in 2003. The authors consider the treatment group as firms that were subject to the introduction of the quota whereas the control group comprised other Nordic countries that were not subject to the quota. By comparing the two groups, Yang et al. (2019) was one of the first papers to illustrate a causal perspective in studying the effect of gender quota on firm performance. The study finds a positive significant effect on return on assets and

return on equity (accounting-based measures) and no significant effect on Tobin's Q and stock returns (market-based measures).

Our research aims to replicate the findings of this paper by following a similar methodology with a different exogenous variation and time frame, in order to test whether the results could be generalized. Hence, the following hypotheses can be drawn from the stated theoretical and empirical foundation:

H2a: The Italian board gender quota will have a positive significant effect on the firm's ROA.
H2b: The Italian board gender quota will have a positive significant effect on the firm's ROE.
H3a: The Italian board gender quota will have an insignificant effect on the firm's Tobin's Q.

Investors' sentiment drives stock prices which in turn has a crucial influence on the overall stock performance of a company (Fisher and Statman, 2000). The impact of board gender quotas on investors sentiment is not well-studied in the research field since the existing academic literature lacks concrete consensus on whether gender board quotas positively or negatively influence investors sentiment. However, studies such as Campbell and Minguez-Vera (2008) found that board diversity, led by gender quota mandates, is positively associated with higher stock returns. The authors suggest that the introduction of gender board quotas signals a commitment to diversity and inclusion, which would attract investors who value social responsibility. This could lead to higher demand for the company stocks, potentially driving up the stock price. Hence, the third hypothesis of the research is as follows:

H3b: The Italian board gender quota will have a positive significant effect on the firm's stock prices.

Data

This section explains the process of collecting data and creating databases for the analysis. It includes quantitative descriptive statistics and relevant graphs of the data used in the research. The Wharton Research Data Website (Wha, 1993) was manually used to gather information at board-level as well as firm level. The board-level data was collected from the BoardEx

database, which includes detailed information about the individuals' holding positions in the board of firms. The firm-level data was collected from Bureau van Dijk's AMADEUS database, which includes financial information about companies across the globe. Hence, the preliminary data collection resulted in two separate data sets: (1) Panel data on the Board over the years 2007-2021 and (2) Panel data on company's financial and stock performance over the years 2007-2021. Upon merging the two data sets on ISIN, the unique matched data was derived only from the year 2008 onwards. Hence, the final data set of the paper comprises of 2,786 observations for a time frame of 2008-2021.

In Table (1), I provide the descriptive statistics of my dataset and in Table (2) the correlation matrix of the chosen variables.

Table (1): Summary Statistics

Variables	**Number of Observations**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Sharewoman	2,786	0.267	0.137	0	0.714
Ln(Tobin's Q)	2,786	0.528	0.908	-3.276	4.775
ROA	2,786	4.197	5.192	-3.700	13.390
ROE	2,786	0.075	0.092	-0.084	0.225
Year-end Closing Price	2,786	55.016	940.195	0	28300
Treatment	2,786	0.545	0.498	0	1
Treatment Group	2,786	0.545	0.498	0	1
Number of Directors	2,786	9.843	2.902	3	18
Total Assets	2,786	6250	20400	10.4	285000
Sales	2,786	2150	7490	0	110000
Number of Employees	2,786	6323.203	20322.270	1	217908
Firm age	2,786	43.348	31.468	3	180

Note: This table contains the summary statistics of the board characteristics, firm performance measures, the firm characteristics, and the control variable. In total, I use 2,786 observations. The ROA and the ROE are reported in percentage points. Total Assets and Sales are reported in million dollars and Firm Age in years.

Table (2): Correlation Matrix

Variables	Sharewoman	Ln(Tobin's Q)	ROA	ROE	Year-end Closing Price	Number of Directors	Total Assets	Sales	Number of Employees	Firm age
Sharewoman	1									
Ln(Tobin's Q)	-0.008	1								
ROA	0.037	0.380	1							
ROE	0.057	0.394	0.830	1						
Year-end Closing Price	0.006	-0.044	-0.033	-0.037	1					
Number of Directors	0.076	-0.067	0.012	0.025	0.005	1				
Total Assets	0.101	-0.103	-0.061	0.012	-0.011	0.207	1			
Sales	0.038	-0.060	0.012	0.045	-0.009	0.200	0.760	1		
Number of Employees	0.038	-0.001	-0.015	0.093	-0.005	0.211	0.524	0.545	1	
Firm age	-0.055	-0.205	-0.023	-0.040	-0.005	0.208	0.104	0.105	0.103	1

Note: This table contains the correlation matrix between the board characteristics, firm performance measures, the firm characteristics, and the control variable.

Board Data for Difference-in-Difference Analysis

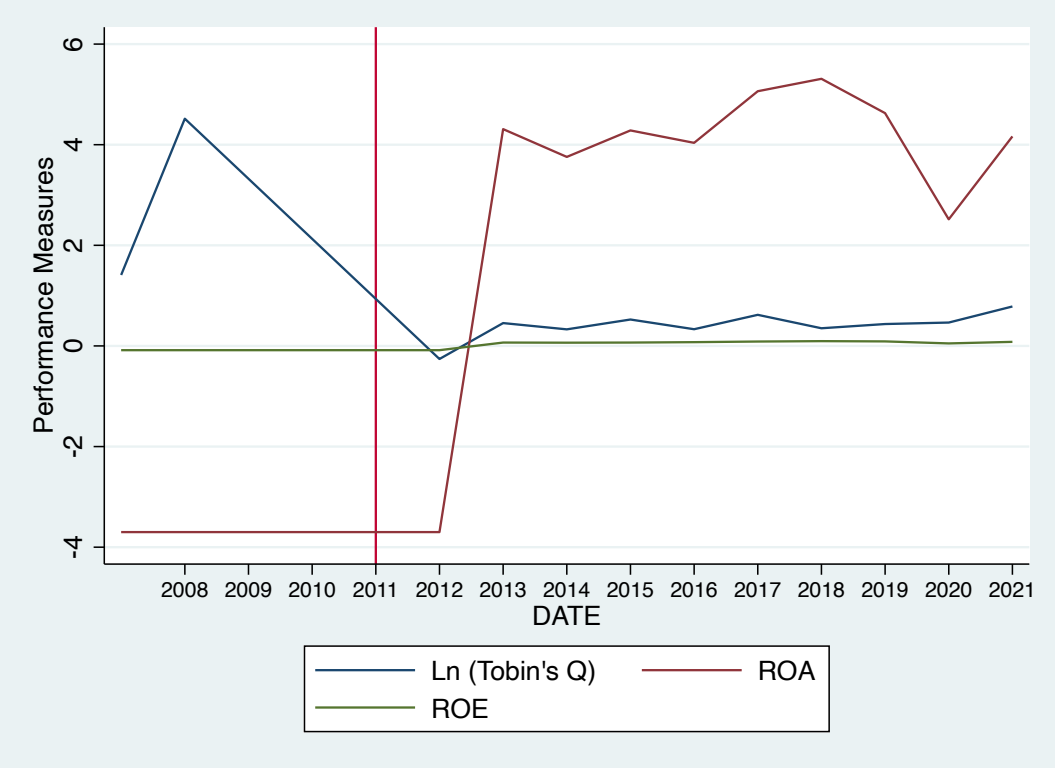
To investigate the change in the share of women in the board, I use the *Gender Ratio* variable from the BoardEx Database. *Gender Ratio* measures the ratio of men to women in the board. Following along the same lines as the study by Adams and Ferreira (2009), this study follows an approach where the ratio takes the value of 1 if the board is completely male and a value of 0 if the board is fully female. In this analysis, the smallest Gender Ratio is 0.286, which belongs to the company Carel Industries S.P.A., that is in the treatment group. Figure (A) shows the trend of the share of women over the years. Both the treatment and control group show an increasing trend in share of woman. However, the treatment group has, on average, a higher share of women than the control group (See Appendix; Figure A)

Firm Data for Difference-in-Difference Analysis

As accounting-based measures, I use *Return on Assets (ROA*) and *Return on Equity (ROE)*. Both the ratios are winsorized at the 99th percentile in this study. The denominator of Return on Assets represents the book value of Total assets whereas the denominator of Return on Equity represents the book value of Total stockholder's equity. Even though both the profitability ratios measure the returns generated from a firm's investments, they differ from each other based on their reference bases. In theory, the higher the value of these ratios, the better the company is utilizing its capital to generate profits (Furhmann, 2022). However, a lower ROA and ROA may not be seen as negative always since various businesses may prioritize long-term growth over profitability which may lead to lower values in the short-term. As market-based measures, I use *Tobin's Q* and *Year-end closing price.* Tobin's Q is calculated by dividing the market value of a company by its assets' replacement cost (Furhmann, 2022). A ratio larger than 1 indicates that the firms add potential value through efficient use of its assets. Year-end closing price reflects the market valuation of a company's stock at the end of a specific period. A high year-end closing price is associated with positive investor sentiment and future growth potential, as it affects the stock price.

Figure (1) showcases a graphical representation of the variation in chosen performance measures over a specified time period. Return on Assets (ROA) measure seems to be more volatile over the years. As seen from the figure, tobin's q experienced a sharp drop in 2008 and then recovered in the following years, which could be justified due to the Global Financial Crisis that led to dampening firm value. On the other hand, ROA was steady until the year 2012 when it had a steep growth over the time span of one year. This could possibly be justified through the quota legislation implemented in 2011 which will be evaluated later in this study. Lastly, ROE seem to be consistent over the time span which indicates that return on equity stands to stay unaffected over the years. Furthermore, year-end closing price has been declining for Italian listed firms since 2008. The stock prices did attempt to recover during the period 2013-2014, however, they have been reported to be persistently low since the year 2017 (Figure F, Appendix).

Figure (1): Descriptive Figure of Firm Performance Measures in Italy



Note: This figure illustrates the trend of the firm performance measures in Italy. The blue line indicates the trend for the natural logarithm of Tobin's Q, the red line for the ROA and the green line for the ROE. In 2011, Italy implemented a gender quota to increase the share of women on boards. This is illustrated with the red vertical line in the figure.

Control Variables

According to studies such as Ahern and Dittmar (2012) and Yang et al. (2019), board characteristics tend to be a common and crucial control variable. Following along the same lines, this paper considers board size as one of the control variables, where the size is measured in terms of the number of directors on the board. In addition to the board size, the study also incorporates firm fixed effects, industry fixed effects and year fixed effects in order to account for the time-invariant differences. The paper distinguishes between the effect if each firm by using data on Total Assets, the Sales, Total number of Employees, and Firm age. Further, the study incorporates industry fixed effects by retrieving 3-digits SIC codes, where the primary classifications are further divided into 10 broad categories, which can be seen in Table (A) in the Appendix.

Methodology

Difference-in-Difference (DiD)

For my analysis, I apply the Difference-in-Difference (DiD) method to the study. Using DiD, I look at how the introduction of a statutory quota on Italian firms in 2011 affects the board composition of Italian publicly listed companies. This approach is conducted by looking at the change in board characteristics such as gender ratio and number of directors. Additionally, the study also uses DiD method to analyze the effects of Italian gender board quota on the performance of the Italian publicly listed companies. This analysis is done by looking at the change in both accounting-based as well as market-based performance measures. Accounting-based performance measures tend to incline more on the financial side of the company and reflect on the short-term variation in firm performance. On the other hand, market-based performance measures tend to reflect more on the long-term variation in firm performance through market-driven changes. More specifically, the study includes Tobin's Q to estimate firm value, return on assets and Return on Equity to estimate firm's profitability while year-end closing price to assess firm's level of risk-taking and investor's profile.

A difference-in-difference approach is suitable for this study since it considers the initial differences between the treatment and control group, as well as the time-varying unobserved factors that have a fair influence on both the groups. Thus, by taking these initial differences into account, the method attempts to remove potential selection bias from the study. Ideal research setting of the DiD experiment comprises of only one group of randomly selected firms that are subject to the reform in a particular year (treatment group) and a group of other firms that are not subject to the reform in a particular year (control group). The outcomes of the treatment and control group are compared with each other before and after the reform. In Italy, the privately listed companies could have been the potential control group for the study as the statutory quota law applies to only publicly listed firms. However, it is difficult to collect a vast panel data set on private companies without a hands-on approach. Hence, the research takes a "near-neighboring" approach and chooses a control group that is similar to the treatment group, however the policy intervention does not apply to it. For instance, papers such as Card's and Krueger's (1994) studied the minimum wage legislation intervention for New Jersey (treatment group) while using a neighboring state of Pennsylvania as the control group.

Similarly, Yang et al. (2019) studied the impact of gender board quota on Norwegian firms in 2003 and used few other Scandinavian countries as the control group. Basing on their approach, my analysis will use Spain as the counterfactual. The Italian government passed a law in 2011 which requires at least one-third of board members of listed and state-owned companies to be women. In contrast to that, Spain passed a law in 2008 that requires only publicly traded companies to comprise 40% of their board as women. The country decided to rely on voluntary suggestions back in 2008 while the first assessment of this policy was in 2015. Thus, these quota laws were not in the news in 2011, which makes Spanish public listed companies an effective counterfactual group. Additionally, Spain is a Southern-European country that is similar to Italy in terms of cultural features as well as gender statistics (Ferrari et al., 2016).

The DiD regression capturing the effect of the policy is as follows:

$$Y_{jit} = \beta * Treatment + \rho * TGroup + \lambda_t * Year_t + \theta_{jit} * NDirectors \quad (1)$$

Where Y_{jit} denotes the value for the share of woman measure of firm j in sector i at time t, driven by the treatment effect $\beta * Treatment$. The treatment effect is constructed through the interaction between belonging to the treatment group, i.e. when TGroup takes on value 1, and when Year takes on a value greater than 2011. Board size, measured as $\theta_{jit} * Ndirectors$ in the regression, is taken as a control variable.

$$Y_{jit} = \beta * Treatment + \rho * TGroup + \lambda_t * Year_t + \theta_{jit} * NDirectors + \alpha_j + \gamma_i + \varepsilon_{ijt} \quad (2)$$

Where Y_{jit} denotes the value for the firm performance measure (roa, roe, tobin's q and year-end closing price) of firm j in sector i at time t, driven by the treatment effect $\beta * Treatment$. The treatment effect is constructed through the interaction between belonging to the treatment group, i.e. when TGroup takes on value 1, and when Year takes on a value greater than 2011. Besides controlling for the size of the board $\theta_{jit} * NDirectors$, I hold year fixed effects $Year_t$, firm fixed effects α_j and industry fixed effects γ_i constant.

Robustness Checks

The difference-in-difference method relaxes many assumptions. For instance, the assumption of "with-without" by considering the initial difference between treatment and control group. Additionally, it also relaxes the assumption of "before-after" by considering the differences that occur over time which are not associated with the policy intervention. However, the method only considers one assumption that expects the initial differences between the treatment and control group to be same over time. This assumption is known as the Parallel Trends Assumption (PTA). In simple words, the PTA holds when the outcomes of treatment and control group is the same in the absence of treatment (Rambachan and Roth, 2020). To test the PTA for each dependent variable, I compare the trend of the treatment group and control group from the year 2008 till 2011 (See Appendix). The trend for treatment and control group does not run parallel for share of women, return on assets, return on equity, tobin's q and year-end closing price. Thus, our chosen variables do not satisfy the parallel trends assumption.

Since PTA fails to hold, the research attempts to conduct various robustness checks. These robustness checks will evaluate whether the result of the regression is reliable and resilient to the variations in assumptions of the model. In the first robustness check, I take Spanish firms as the treatment group and Italian firms as control group. Since the law for the gender board quota passed for Spanish firms in 2008, there is a possibility that the two groups are different before 2008. In that case, I additionally create a new treatment effect belonging to the treatment group (Spanish firms) and the year being larger than 2008, then the treatment effect should be insignificant for the two groups to be similar. This method helps to define the treatment and control groups better by closely associating to the implementation of the leads approach.

The second robustness check is included to evaluate whether Italy and Spain are more similar than any other European countries that could be included as a counterfactual. This is done by choosing a control group that is subject to no gender quota reforms and tends to be less similar to Italy, considering Swish publicly listed companies as a control group and running the analysis. This study chooses Switzerland as a counterfactual here since the Swiss federal council implemented a gender quota of 30% for the board of directors from January 2021 (Law Library of Congress, 2020). Since, our dataset is only up to the end of 2021, it is reasonable to assume that the effect of Swiss quota on the chosen dependent variables will not be significant enough.

Results

In this section, I will present the results of the DiD analyses conduced for the research in three sections. First section illustrates the effect of quotas on board composition, specifically, the share of woman in the board. Second section illustrates the effect of quotas on firm performance, that is measured by ROE, ROA, Tobin's Q and Year-end closing price of firms. Last section illustrates a robustness analysis.

Board Composition

Upon following the empirical approach of Matsa and Miller (2013), the study investigates whether a gender board quota significantly increases the share of women on boards. Table (3) reports the results of the regression of the board composition on the treatment variable using the years after 2011 as post-treatment periods (Yang at al., 2019). Column [1] presents the regression specifications that includes both year fixed effects as well as industry fixed effects. In column 2, the regressions include only industry fixed effects. On the other hand, column [3] and [4] present regression specifications that does not include any industry fixed effects. The results in all the columns indicate a positive and significant coefficient for the treatment variable for the years after 2011. This implies that the quota increases the share of women on the board significantly after 2011. Interestingly, the coefficients of the treatment x Post (2011) variables in columns 3-4 tend to have a relatively less significant coefficients ($p < 0.05$) compared to the first two columns ($p < 0.01$). This suggests that unobserved industry-specific factors tend to have more influence on the share of women variable compared to year-specific characteristics. Overall, the results show that the Italian companies did comply with the new legislation and the quota stands to be effective towards its purpose of uplifting female representation in corporate board levels. Therefore, Hypotheses [1] of this is study is accepted.

Table (3): Effect of Quotas on the Board Composition

	Share of Women			
	[1]	[2]	[3]	[4]
Treatment x Post (2011)	0.365***	0.285***	0.348**	0.298**
	(0.007)	(0.002)	(0.034)	(0.024)
Treatment Group (Italy)	-0.259***	-0.185***	-0.237*	-0.193**
	(0.002)	(0.004)	(0.065)	(0.049)
Board Size	0.007*	0.007	0.006	0.004
	(0.078)	(0.199)	(0.313)	(0.377)
R-squared	0.443	0.331	0.271	0.163
Number of Observations	2,786	2,786	2,786	2,786
Year FE	Yes	No	Yes	No
Firm & Industry FE	Yes	Yes	No	No

Note: This table illustrates the regression of the board composition on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Model [1] includes both Industry fixed-effects and Year fixed-effects; Model [2] includes only Industry fixed-effects; Model [3] includes only Time fixed-effects; Model [4] does not include any fixed effects in the regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Firm Performance

In this section, the study follows the approach by Yang et al. (2019) to evaluate the effect of gender board quotas on firm outcomes. As stated before, I use Return on Assets (ROA) and Return on Equity (ROE) as accounting-based measures, whereas Tobin's Q and Year-end closing price as market-based measures in the study.

Table (4) and (5) reports the results of the regression of the accounting-based measures on the treatment variables. Column [1] presents the regression specifications that includes both year fixed effects as well as industry fixed effects. In column 2, the regressions include only industry fixed effects. Column [3] incorporates only year fixed effects whereas column [4] present regression specifications that does not include any fixed effects.

According to the results reported in Table (2) and (3), the DiD estimator is significantly positive for return on assets (ROA) and return on equity (ROE). Interestingly, the coefficients of the treatment x Post (2011) variables in columns 4 of Table (4) tend to have a relatively high significant coefficients ($p < 0.01$) compared to the rest of the columns ($p < 0.05$). This may suggest that the fixed effects tend to capture some of the variability that is associated to the independent variable of interest in the model. On the other hand, the coefficients of the treatment x Post (2011) variables in columns 1 of Table (5) tend to have a relatively high significant coefficients ($p < 0.01$) compared to the rest of the columns ($p < 0.05$). This implies that unobserved year-specific as well as industry-specific characteristics together have a substantial influence on the ROE variable. Moreover, these results are not in line with the findings from Yang et al. (2019) as they derive a significantly negative estimator for accounting-based measures. Thus, Hypotheses [2a] and [2b] is accepted.

Table (4): Effect of Quotas on Return on Assets (ROA)

	ROA			
	[1]	[2]	[3]	[4]
Treatment x Post (2011)	6.754**	6.620**	7.790**	7.806***
	(0.012)	(0.024)	(0.021)	(0.005)
Treatment Group (Italy)	-7.363**	-7.368***	-7.911**	-8.064**
	(0.014)	(0.006)	(0.034)	(0.018)
Board Size	0.157	0.166	-0.026	0.044
	(0.388)	(0.384)	(0.992)	(0.373)
R-squared	0.313	0.290	0.033	0.010
Number of Observations	2,786	2,786	2,786	2,786
Year FE	Yes	No	Yes	No
Firm & Industry FE	Yes	Yes	No	No

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Model [1] includes both Industry fixed-effects and Year fixed-effects; Model [2] includes only Industry fixed-effects; Model [3] includes only Time fixed-effects; Model [4] does not include any fixed effects in the regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Table (5): Effect of Quotas on Return on Equity (ROE)

	ROE			
	[1]	[2]	[3]	[4]
Treatment x Post (2011)	0.127***	0.122**	0.162**	0.159**
	(0.002)	(0.020)	(0.023)	(0.011)
Treatment Group (Italy)	-0.137**	-0.134***	-0.160**	-28.608***
	(0.020)	(0.001)	(0.035)	(0.022)
Board Size	0.002	0.002	0.000	0.006
	(0.332)	(0.336)	(0.448)	(0.184)
R-squared	0.709	0.221	0.041	0.016
Number of Observations	2,786	2,786	2,786	2,786
Year FE	Yes	No	Yes	No
Firm & Industry FE	Yes	Yes	No	No

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Model [1] includes both Industry fixed-effects and Year fixed-effects; Model [2] includes only Industry fixed-effects; Model [3] includes only Time fixed-effects; Model [4] does not include any fixed effects in the regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Table (6) and (7) reports the results of the regression of the market-based measures on the treatment variables. Column [1] presents results that include year fixed effects and industry fixed effects. In column 2, the regression specifications only include industry fixed effects. Column [3] incorporates only year fixed effects whereas column [4] present regression results that does not include any fixed effects.

According to the results reported in Table (6), the DiD estimator is significantly negative for Tobin's q in columns 1, 2 and 4. However, the treatment variable for Tobin's Q has a negative and insignificant estimator in column 3, similar to the findings of Yang et al. (2019). This implies that excluding industry fixed effects does lead to a significantly different outcome for Tobin's Q. Interestingly, as seen in column 4, inclusion of no fixed effects tends to yield a significant DiD estimator for Tobin's q. Overall, hypothesis [3a] is rejected and could only be accepted if industry fixed effects are excluded from the regression model.

Furthermore, in Table (7), the results present a negatively significant DiD estimator for all the columns. As seen in the table, exclusion of fixed effects has no impact on the DiD estimators. These results are in line with the findings of Ahern and Dittmar (2012) who found that gender quotas have a negative impact on stock prices of a firm. However, as per our theoretical implications, gender board quota should boost stock prices since it facilitates positive investment sentiments about the firm. Hence, hypothesis [3b] is rejected.

Table (6): Effect of Quotas on Tobin's q

	Tobin's q			
	[1]	[2]	[3]	[4]
Treatment x Post (2011)	-1.464*** (0.004)	-3.135** (0.029)	-0.690 (0.160)	-2.354** (0.017)
Treatment Group (Italy)	1.059*** (0.008)	2.727** (0.031)	0.586 (0.218)	2.243** (0.026)
Board Size	0.011 (0.505)	0.011 (0.508)	-0.006 (0.653)	-0.006 (0.695)
R-squared	0.423	0.412	0.044	0.063
Number of Observations	2,786	2,786	2,786	2,786
Year FE	Yes	No	Yes	No
Firm & Industry FE	Yes	Yes	No	No

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Model [1] includes both Industry fixed-effects and Year fixed-effects; Model [2] includes only Industry fixed-effects; Model [3] includes only Time fixed-effects; Model [4] does not include any fixed effects in the regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Table (7): Effect of Quotas on Year-end closing price

	Year-end Closing Price			
	[1]	[2]	[3]	[4]
Treatment x Post (2011)	-1996.929** (0.013)	-1298.344*** (0.006)	-1955.395*** (0.010)	-1276.566*** (0.002)
Treatment Group (Italy)	2132.662** (0.011)	1448.828*** (0.005)	2017.489 (0.008)	1349.941*** (0.003)
Board Size	0.162 (0.966)	0.203 (0.896)	1.783* (0.065)	3.544 (0.270)
R-squared	0.019	0.011	0.011	0.003
Number of Observations	2,786	2,786	2,786	2,786
Year FE	Yes	No	Yes	No
Firm & Industry FE	Yes	Yes	No	No

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Model [1] includes both Industry fixed-effects and Year fixed-effects; Model [2] includes only Industry fixed-effects; Model [3] includes only Time fixed-effects; Model [4] does not include any fixed effects in the regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Robustness Analysis

In this section, I present the results of two robustness checks. First, I take Spanish firms as the treatment group and Italian firms as control group where I additionally create a new treatment effect belonging to the treatment group (Spanish firms) and the year being larger than 2008. Table B (See appendix) reports the results, which indicates an insignificant DiD estimator for ROA and ROE but a significant estimator for Tobin's Q and Year-end Closing Price. Similar to the results of the previous model, the board size tends to have a insignificant coefficient for all dependent variables (ROA, ROE, Ln (Tobin's Q) and Year-end Closing Price). In contrast to earlier regression results, Tobin's Q has a positive and significant estimator, which suggests that there is an additional effect of the board quota being captured between the years 2008-2011 for the Spanish firms. This implies that the results are partially robust.

Second, I take Italians firms as the treatment group and Swiss firms as control group where the treatment effect is belonging to the treatment group (Italian firms) and the year being larger than 2011. Since the gender board quota law was implemented in the beginning of 2021, the chosen time frame of our dataset allows to consider Switzerland as a quota-free country. Table C (see appendix) reports the results that also incorporates industry and time fixed effects into the regression model. DiD estimators of all the dependent variables have similar signs compared to the regression results where Spain was taken as a counterfactual. However, the DiD estimators for ROA, ROE and Tobin's q seems relatively less significant. This highlights the crucial role gender board quota plays in influencing firm performance in addition to the contracting results that support the validity of the initial findings. On the other hand, Table D (see appendix) reports the results that does not incorporate industry and time fixed effects into the regression model. In this case, DiD estimators of ROA, ROE and tobin's q are highly statistically significant ($p < 0.01$). Thus, exclusion of fixed effects from the regression model adds consistency to the results across both control groups (Spain and Switzerland), indicating that the results are robust and not subject to a particular context. Further, the consistency in findings strengthens the suggestion that gender board quota does have an impact on firm performance.

Discussion

The study has analyzed the effect of gender board quotas on Italian listed companies in accordance with two specific dimensions: board composition and firm performance. Our study finds that gender board quotas does lead to larger share of women on the board, which positively reflects on the effectivity of the legislation. In simple words, the quota legislation did facilitate women engagement at the board-level. Based on this finding, the study attempted to assess the impact of larger share of women at the board-level on firm performance. Our results suggest that more diverse board had a positive impact on accounting-based measures of firm performance. More specifically, higher share of women at board-level led to positive return on assets and equity over time. According to Loyd et al. (2013), female directors possess certain values that facilitate deliberation in their decision-making as they tend to elicit multiple perspectives. These under-taken decisions may enhance the firm's ability to yield profits from its assets and equity. On the other hand, our results suggest that a more diverse board leads to negative firm performance in terms of marketing-based measures. More specifically, gender diversity at board-level have led to a decline in firm value over the years. Additionally, the results also suggest that women engagement is linked to a lower stock price outcomes for the firms. A possible explanation could be that posing a constraint on the choice of directors may lead to a board composition that does not maximize shareholder value (Ahern and Dittmar, 2012).

Academic papers such as Ahern and Dittmar (2012) have studied the impact of gender board quota on board composition and firm valuation, however for a Norwegian setting. As we know, Norway was the first European country to pass a gender board quota legislation in 2003 which led to an immediate jump up to 40% in female representation (Bianco et al., 2015). The authors focused on board characteristics such as share of women in board, level of education, etc. and firm valuation measures like tobin's q and stock price reaction upon announcement. According to the results of the paper, the gender board quota led to a negative impact on the firm's tobin's q as well as stock price reaction to the announcement which was more severe for the firms with no existing female directors compared the ones with at least one female director at the executive level. Our paper attempted to study the impact of the gender quota on similar performance measures however, upon subject to a different exogenous variation. We focused on the status quo reform passed in 2011 in Italy which requires at least one-third of board members of listed companies to be women. Similar to Ahern and Dittmar (2012), our results also indicate a

negative effect of the gender board quota on firm valuation. This could be subject to the reasoning that binding constraint by gender quota laws may have led to a board composition that does not maximize shareholder as well as firm value to the fullest (Ahern and Dittmar, 2012). A second potential reasoning could be that the chosen time frame for the research is not long enough to capture the holistic impact of the quota on the firm valuation. There is a possibility that the firms are still adjusting to the change in company dynamics (Isidro and Sobral, 2015). Moreover, our study attempted to evaluate investor sentiment by analyzing the firms' change in annual stock prices upon implementation of the quota law. In theory, positive annual stock price movements are associated with positive investor sentiments about the firm (Yu and Yuan, 2011). However, our results suggest that the change in board composition (higher share of women in board) due to the quota legislation led to declining annual stock prices over the years. This could possibly be driven by two reasons. First, investors may be hesitant to the change in board dynamics, which led to adverse effects on investor sentiments about the firms (Rixom et al., 2022). Surprisingly, over the years, these sentiments have not changed. One may also argue that these adverse sentiments did not improve due to consistent negative relation between higher share of women in board and firm valuation over the years. Second, women are known to be critical thinkers, making well-balanced decisions that prioritize firm survival (Bruna et al., 2019). There is a possibility that the women directors in the board may have taken a risk-neutral or risk averse approach in strategic decision-making which did not lead to much variation in firm's annual stock prices over the years (Faccio et al., 2016). However, in that case, the results should have indicated insignificant effects of the quota on company annual annual stock price.

In comparison to Matsa and Miller (2013), Eckbo's et al. (2018) and Yang et al. (2019) replication, our study found different results with respect to the accounting measures. The stated papers have found a negative effect of Norwegian gender board quota on accounting-based performance measures such as return on assets (ROA) and return on equity (ROE). However, our results present a positive and highly significant effect of gender board quota on roa and roe measures. A potential explanation for these contrasting results could be the difference in contextual settings (Norway vs Italy). These differences in contextual settings could fuel the difference in board's decision-making towards firm strategies which leads to altering consequences in firm's short-term performances.

Implications for Practice and Theory

Our results suggest a positive relationship between gender-diverse board dynamics and accounting returns, which supports the resource dependency as well as the human capital theory. Both the theories focus on the fact that every individual that belongs outside the organization possesses unique skills set. However, that is not always true.

Our results highlight that gender-diverse board has a negative association with market-based firm performances. According to Terjesen et al. (2009), women tend to have similar executive qualities as men, however, relatively lower experience and corporate exposure. In terms of human capital theory, this implies that women tend to have less human capital than men, on average. Since gender parity is known to influence the relationship with market-based performance measures rather than accounting-based measures (Ahern and Dittmar, 2012), differences in human capital levels between men and women could explain the potential impact on investors' perception of the firm's future projections in terms of returns and earnings.

Furthermore, an immediate swap of male executive with a female can cause disruptions at the firm-level, which is reflected through the lower score of long-term performance measures (market-based). According to the Social Psychology theory, these disruptions in the entire firm are driven by time-consuming and inefficient processes. Hence, our research does not quite support the idea that gender-balanced board will always lead to a better performance, in contrast to suggestions by various social categorization theories (Byrne, 1971).

Limitations and Future Research

The results can be accurately interpreted, according to the examination of the parallel trends assumption and the lead implementation. In essence, a significant DiD estimate would imply that the treatment effect alone is entirely responsible for the difference between the treatment and control groups. In other words, both groups should exhibit similar (parallel) trajectories prior to the intervention, and the only reason the groups differ after the intervention is due to the treatment. However, it is unfeasible to presume that this is the case. Based on our robustness test, the effect is different and significantly positive when using the restricted sample from 2008-2011 which implies that an additional unobserved effect is being captured by the board quota. Therefore, other unobserved effects not captured by the board quota would be a potential issue. Hence, I recommend extending the analysis by using multiple countries as a counterfactual group for future research. This is implemented by creating a 'synthetic' control group which entails including multiple countries and considering the weighted average of the estimators of the outcome variables for the various units in the counterfactual group.

Another strong limitation stems from the chosen time frame as well as data availability of the study. The chosen time frame of 2008 till 2021 facilitates accurate interpretation possible for short-term effects more than long-term effects. According to Yang et al. (2019), long-term effects might disappear as a result of businesses hiring more women with networks and knowledge comparable to men's, which in turn implies that it would be difficult to distinguish between female and male directors in the long-term. Therefore, further research should focus on exploring ways to assess the long-term effects of the board quota on firm performance.

Lastly, the generalizability of the results could be questioned. Every European country somehow differs amongst each other in terms of values for the quota, sanctions, and rules (Arndt and Wrohlich, 2019). For instance, Italian listed companies were given a span of one year to implement the quota, whereas France six years and Norway was given five years. Thus, the results based on my institutional setting (Italy) could be perceived specific for it to be generalized across various countries. Thus, researchers must explore other research settings to continue the analysis between gender board quota and firm performance.

Parallel Trends Assumption

A crucial presumption in difference-in-differences (DiD) analysis and other quasi-experimental methods is the parallel trends assumption. The assumption asserts that the trends in the outcome variable for the treatment and control groups should have parallel courses over time in the absence of the treatment (intervention). In other words, if neither group had received the treatment, both the groups would have gone through similar changes in the outcome over time. In our study, the parallel trends assumption does not hold (Appendix Figure B - F). Due to the violation of the parallel trends' assumption, the estimated treatment effect may be biased, and it comes difficult to evaluate whether the observed differences in the outcome variables are due to the treatment or other unobserved factors. In simple words, since the PTA fails to hold, the estimated treatment effect of the study might not precisely represent the treatment's true casual effects. Instead, additional unobserved factors that are causing changes between the treatment and control groups over time may have an impact on the estimated effect. However, I have considered several robustness checks in the study to ensure the validity of its results.

Secondly, the data for control group (Spain) between for the years 2008-2009 had a lot of missing values, due to which this research only considers 2010 has a pre-intervention year for the counter-factual group. In terms of assessment of the parallel-trends assumption, the chosen time frame deems insufficient. Thus, a potential recommendation would be to use a different setting, instead of Italy. This would encourage the researchers to explore other countries as counterfactuals that may have potential accessible data for analysis.

Conclusion

Many researchers have focused on studying the correlation between gender diversity at board-level and performance measures at firm-level. These studies have also taken a more causal approach, focusing on a specific institutional setting. I contribute to the literature by choosing a different exogeneous variation for the study which alters the institutional setting and attempts to evaluate whether the results could be generalized. Specifically, I use a Difference-in-Difference method that examines the effect of gender board quota of Italy, which was implemented in 2011. The treatment group consists of Italian listed firms and the control group of Spanish listed firms. I find that the quota significantly increases the number of women at the board level. Additionally, the quota has a performance-enhancing effect when firm performance is measured in terms of accounting parameters (ROA and ROE). On the other hand, the firm experiences a performance-reducing effect of the gender board quota when performances measures are based on market parameters (Tobin's q and Year-end closing price). Although our robustness tests indicate the results to be partially robust, the interpretations still constitute an element of ambiguity due to persistent other unobserved factors.

In addition to the recommendations made before, researchers can extend the analysis of this study by including more board characteristics such as educational qualifications, average age, average tenure, etc. This approach could further validate the robustness of the results (Yang et al., 2019).

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Appendix

Table (A): Primary Classifications of the SIC Codes

Range of SIC Codes	Division
10 – 99	Agriculture, Forestry and Fishing
100 – 149	Mining
150 – 179	Construction
180 – 199	Not Defined
200 – 399	Manufacturing
400 – 499	Transportation, Communications, Electric, Gas and Sanitary Srervice
500 – 519	Wholesale Trade
520 – 599	Retail Trade
600 – 679	Finance, Insurance and Real Estate
700 – 899	Services
910 – 999	Public Administration

Note: This table provides an overview of the primary classifications of the SIC codes. The left column indicates the range of the 3-digit SIC Codes, and the right column the corresponding primary business activity of a company. The SIC codes range from 10 to 999.

Table (B): Effect of Quotas on the Firm Performance where Spanish firms are the treatment group and Italian firms are the control group

Variables	**ROA**	**ROE**	**Ln(Tobin'sQ)**	**Year-end Closing Price**
Treatment x Post (2008)	0.609 (0.287)	0.009 (0.245)	0.405** (0.034)	-135.733** (0.015)
Board Size	0.157 (0.388)	0.002 (0.332)	0.011 (0.505)	0.162 (0.966)
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	2,786	2,786	2,786	2,786
R-squared	0.313	0.246	0.422	0.019

Note: This table illustrates the regression of the firm performance measures on the treatment variable. The period I consider ranges from 2008 until 2021. 2008 until 2011 is considered as the preintervention period, whereas 2012 until 2021 is considered as the postintervention period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Industry and time fixed effects are included in all regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Table (C): Effect of Quotas on the Firm Performance where Italian firms are the treatment group and Swiss firms are the control group

Variables	**ROA**	**ROE**	**Ln(Tobin'sQ)**	**Year-end Closing Price**
Treatment x Post (2011)	9.997* (0.058)	0.236* (0.957)	-1.144* (0.065)	-1906.881*** (0.001)
Treatment Group (Italy)	-13.288*** (0.008)	-0.284** (0.024)	0.494*** (0.002)	1296.873 (0.139)
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	3,646	3,646	3,646	3,646
R-squared	0.249	0.197	0.304	0.028

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Industry and time fixed effects are included in all regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Table (D): Effect of Quotas on the Firm Performance where Italian firms are the treatment group and Swiss firms are the control group

Variables	**ROA**	**ROE**	**Ln(Tobin'sQ)**	**Year-end Closing Price**
Treatment x Post (2011)	6.059*** (0.006)	0.152*** (0.001)	-1.947*** (0.007)	-981.938 (0.111)
Treatment Group (Italy)	-8.738** (0.015)	-19.078*** (0.003)	1.467** (0.034)	355.233 (0.532)
Fixed effects	No	No	No	No
Number of observations	3,646	3,646	3,646	3,646
R-squared	0.051	0.037	0.422	0.019

Note: This table illustrates the regression of the firm performance measures on the treatment variable using the years from 2011 until 2021 as post treatment period. The standard errors are clustered on firm level and are presented in parentheses below the coefficients. Industry and time fixed effects are not included in all regressions. The p-values are denoted in the following way: ***p < 0.01, ** p < 0.05, * p < 0.1

Figure (A): Graphical Illustration of the Parallel Trends Assumption for the share of Women

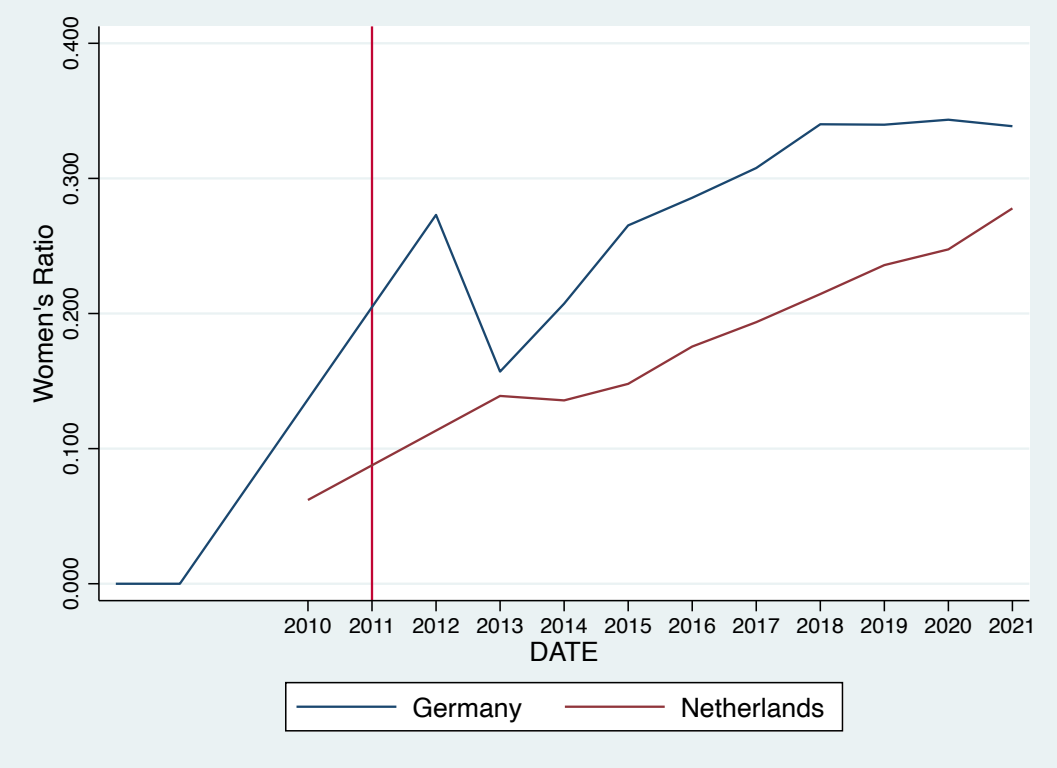

Figure (B): Graphical Illustration of the Parallel Trends Assumption for the natural logarithm of Tobin's Q

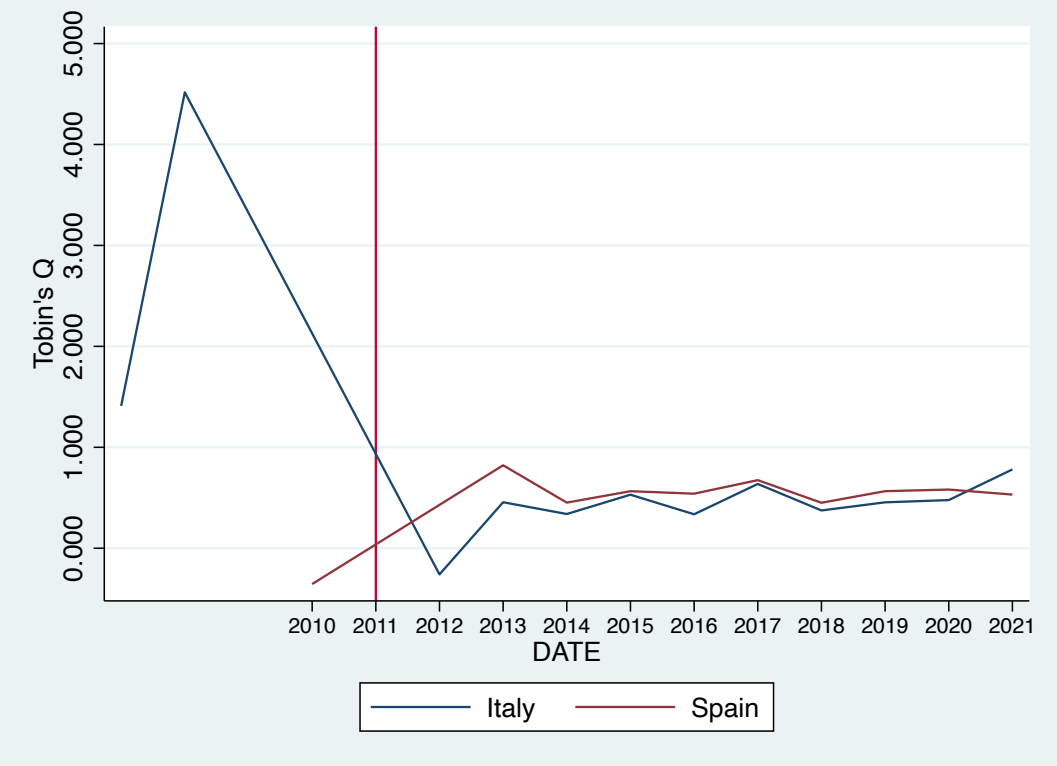

Figure (C): Graphical Illustration of the Parallel Trends Assumption for the Return on Equity (ROE)

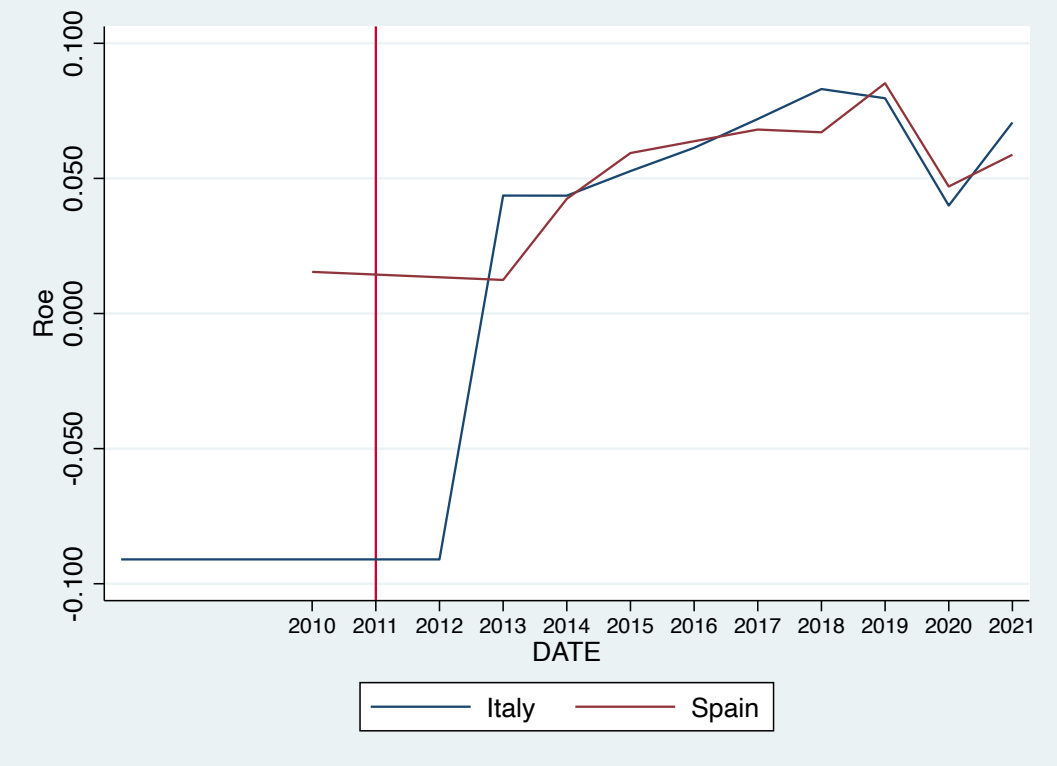

Figure (D): Graphical Illustration of the Parallel Trends Assumption for the Return on Assets (ROA)

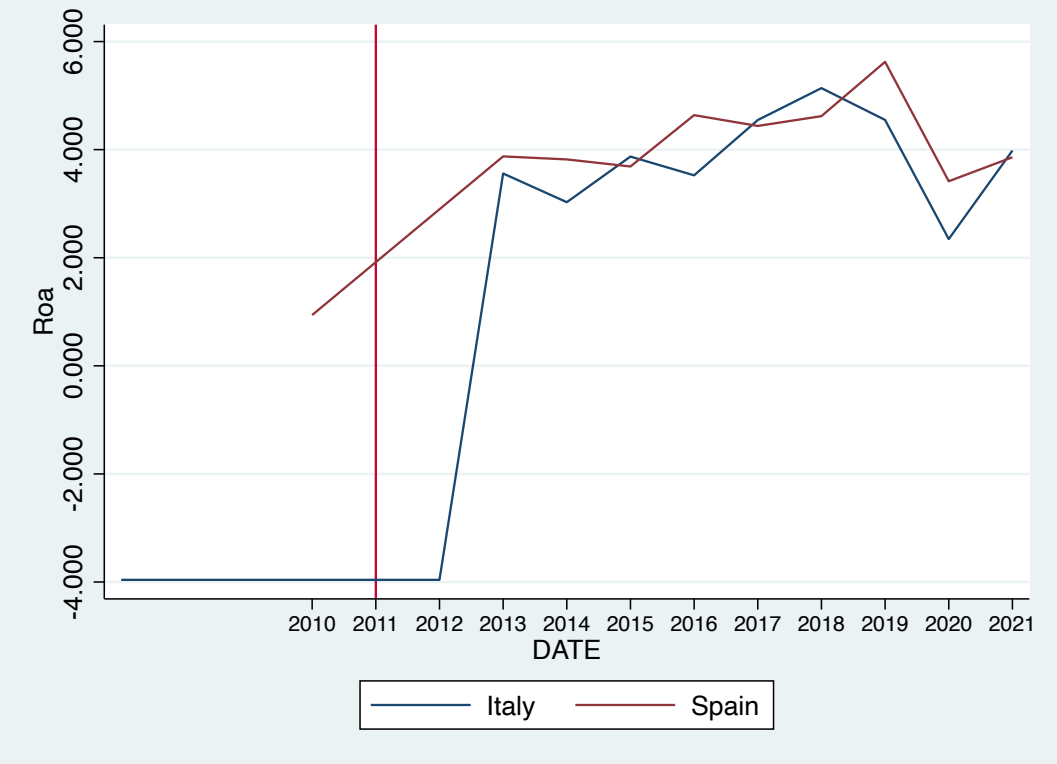

Figure (E): Graphical Illustration of the Parallel Trends Assumption for the Year-End Closing Price

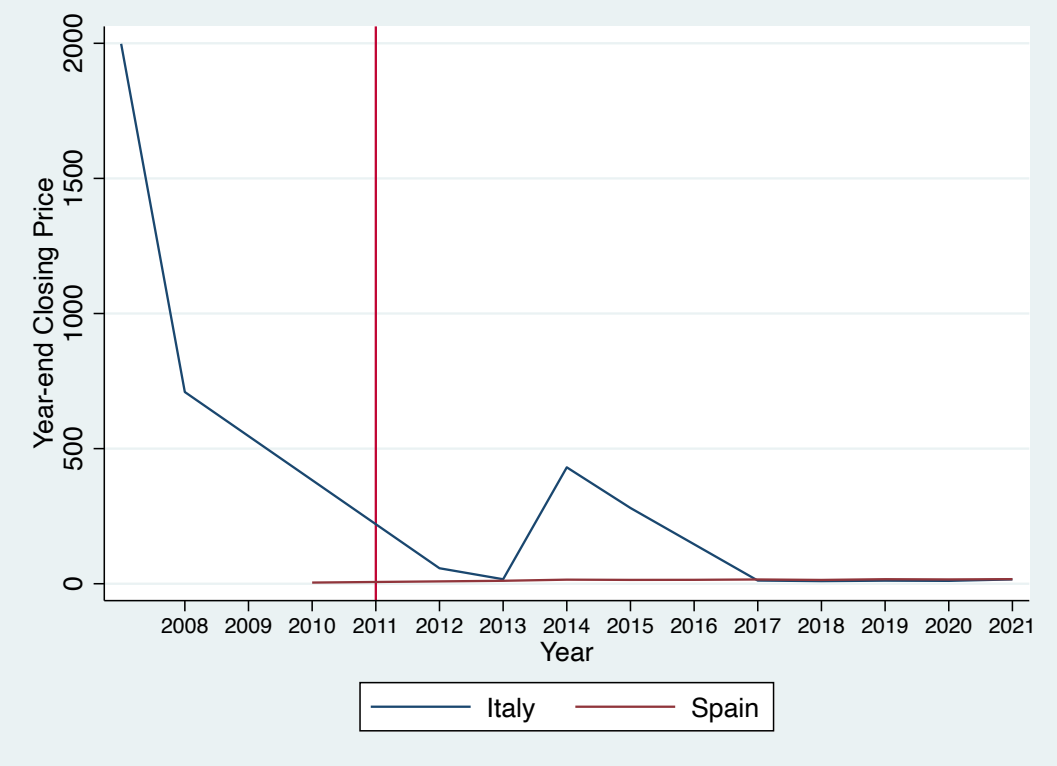

Figure (F): Performance of Year-end closing price of Italian-listed companies over the years