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Are Gender Board Quotas Effective?

A Synthetic Control Method Analysis of the Italian Case

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Abstract

The lack of women in leadership positions in the corporate sector is widespread throughout Europe. In this thesis, I study the efficacy of the Italian Gender Board Quota law no. 120/2011 in reducing such disparity in the Italian context. The impact of the policy is analysed with the innovative synthetic control methodology, which creates a no-policy scenario for Italy. By comparing the synthetic counterfactual with the actual evolution of number of board seats occupied by women, I find that this figure would not have increased without a policy intervention. Before the policy, women on boards of public listed companies were less than 50. After the policy, they rose to more than 150, while in a no-policy scenario they would be fixed at around 50. This finding suggests that affirmative action policies such as Gender Board Quota laws are important tools to improve diversity in historical male-dominated environments and to inspire other women to achieve similar leadership positions.

Key-words: gender board quota, labour market, inequality.

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1. Introduction

Women across the world have significantly increased their education levels in the past decades, overtaking the number of men enrolled in undergraduate degrees. However, large differences persist in the labour market in terms of average earnings as well as labour supply (Boyallian et al., 2019; Pande & Ford, 2011; Bertrand et al., 2010). Sometimes referred to as the *glass ceiling*, inequality at the top of the labour market is particularly severe, and it is present in countries that have historically high levels of gender equality, such as Norway, but also in those that are more traditional, such as Italy (Mensi-Klarbach & Seierstad, 2020). The persistence of inequality in the corporate world has called for direct government intervention in the market using tools like Quotas. Affirmative action policies like Quotas are designed to introduce more women in leadership positions up to a certain percentage or ratio, despite attracting many criticisms from the political and business world; they were adopted in several countries within and outside Europe (Bertrand et al., 2019).

The evaluation of affirmative action policies is crucial to understand their efficacy. So far, many studies have focused on understanding the effects of Gender Board Quotas on firm performance, profitability, and market value (Ferrari et al., 2021; Gregory-Smith et al., 2014; Matsa & Miller, 2013; Ahern & Dittmar, 2012). The focus of the literature on companies' business outcomes is easier to study compared to the effect of these policies on the labour market. Society-relevant effects may be visible in the long-term, but Gender Board Quota policies were only introduced less than two decades ago (Cao & Lu, 2019). While productivity is an important reason for which companies should appoint more women on their boards of directors, it is only one part of the story. Gregory-Smith et al. (2014) explained that female directors have different professional qualities, and they bring diversity to strategic decision-making, which could improve performance. However, appointing women is also a matter of equity when there are discriminatory barriers that impede women to access corporate leadership positions (Gregory-Smith et al., 2014). Pande and Ford (2011) considered demand-side barriers to career progression a valid reason for mandating Quotas. Among these, personal preferences for male directors that derive from lack of information on female performance on company boards. Consequently, this leads to re-elections of other men, as they are deemed more capable. Board Quotas are intended to overcome these dynamics, but there is a lack of studies on their efficiency.

In this thesis, I will focus on the Gender Board Quota law no. 120/2011 that was officially introduced in the Italian legal system in August 2012. I will look at the policy from an equity perspective, answering the following research question: *Was the Gender Board Quota a necessary policy to increase the number of women on the boards of Italian listed companies, or could these companies achieve the same result without the direct intervention of the government in the market?*

By focusing on this research question, my aim is to study the efficacy of the policy, and to bring an empirical, data-driven perspective to the long-lasting debate about whether the policy is useful. To answer this question, I use an innovative methodology, the synthetic control method developed by Abadie et al. (2010). This econometric technique allows me to compare the actual evolution of the number of women on boards of Italian listed companies with a synthetic scenario in which no mandatory policy was introduced and the number of women on Italian boards evolved naturally. To come up with the synthetic scenario, I create a fake counterfactual by using socio-economic data at the country level and by assigning weights to different countries that did not have a Gender Board Quota policy at the time when such a policy was introduced in Italy. My period of observation goes from 2003 to 2019, and because the policy was binding from 2012, the post-intervention period is long enough to evaluate the effects beyond the conventional short-run period. Moreover, since the data stop in 2019, my results will not be biased by the COVID-19 pandemic which significantly affected the labour market and female labour force participation rates.

The results of my empirical estimation point to a clear conclusion. Starting from less than 10% of women sitting on the boards of Italian listed companies in 2003, their representation was around 30% in 2019, signalling a decisive impact of the Gender Board Quota law. The comparison with the synthetic no-policy counterfactual shows that the percentage of women on boards would not have increased at all without the law no. 120/2011, remaining stagnant and gravitating around the same percentage of 2003. Thus, the contribution that my thesis brings to the literature is twofold. First, I use an unconventional empirical approach compared to the studies on the impact of Gender Board Quotas so far (Bruno et al., 2018; Bertrand et al., 2019; Maida & Weber, 2019; Ferrari et al., 2021). Using the synthetic control method compared to the common difference-in-differences guarantees a different viewpoint on the policy, which offers significant evidence on the usefulness of government intervention to address inequality in corporate leadership. Second, the use of country-level data instead of firm- or individual-level data allows to draw comparisons with other European countries.

Overall, my thesis represents an attempt to justify government intervention in the corporate sector from a human capital and equity perspective. While I do not consider productivity-related issues of forcing more women on the boards of the most profitable Italian companies, my findings suggest that the corporate world in a traditional country like Italy would not have embraced diversity if it was not for the Gender Board Quota law and its sanctions. As Pande and Ford (2011) described throughout their research, increasing the number of women in leadership positions in the corporate and political world is fundamental to bring more women into these sectors and to inspire others to climb the career ladder. In a gender-neutral environment, a candidate should be appointed on the board of directors based on her skills, not her gender (Gregory-Smith et al., 2014). Nevertheless, my thesis reveals that the traditional male-dominated corporate environment would not have changed in Italy without direct government action, which set the basis for changing future social norms.

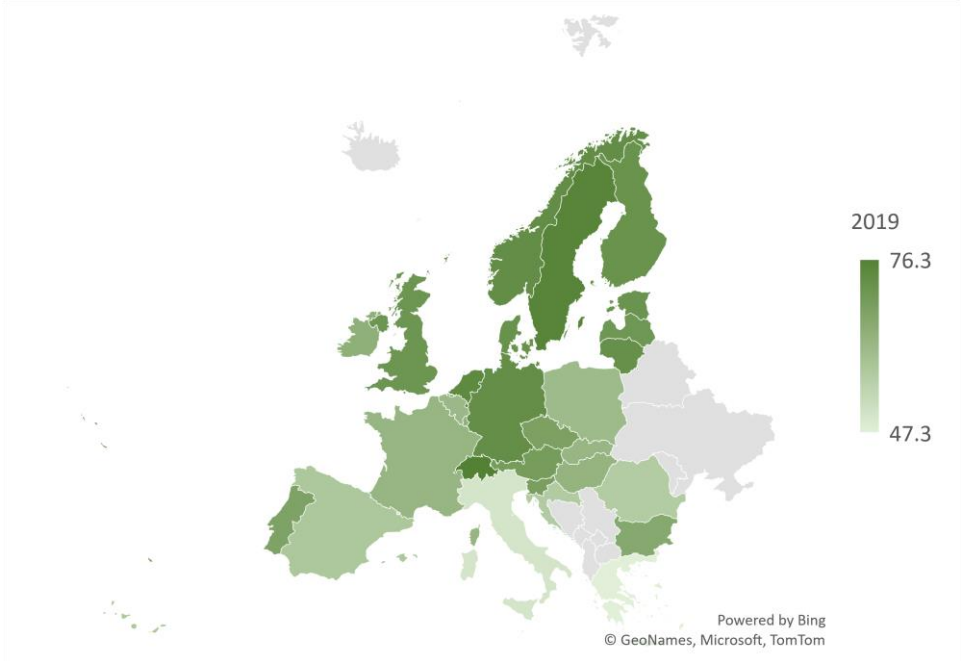
The structure of my thesis will be as follows. Chapter 2 will provide a background explanation to the Italian policy, which is the focus of my research, in perspective with other European countries that adopted a similar policy. Chapter 3 will be a review of the existing theoretical and empirical literature on the topic of Gender Board Quotas. Afterwards, Chapter 4 will be a thorough explanation of the empirical methodology that I chose to answer my research question, followed by Chapter 5 where I describe the data and the assumptions behind my empirical estimation. In Chapter 6, I will present my empirical results, of which a simple overview was given in this Introduction. Chapter 6 will also cover post-estimation tests that I conducted to assess the validity of my findings. Finally, Chapter 7 will position my results considering the existing literature on this topic, after which I will conclude by summarizing my thesis and suggesting areas worthy of future research.

2. Policy Background

2.1 Women in the Italian labour market

The labour market in Italy is notoriously stagnant and hostile to women (Ferrari et al., 2021). As Figure 1 shows, Italy has the lowest female labour force participation (FLFP) rate in Europe, besides Greece. At the start of the millennium, 46% of Italian women aged between 15 and 64 years old were employed, compared to an average of 59% in Europe. In 2019, FLFP rate in Italy rose to 57%, compared to the European average of 68% (ILO, 2021). However, consistent regional differences exist within the Italian border. In 2019, 60.5% of Italian women aged between 15 and 64 years old were employed in Northern regions, compared to 56.5% in the Centre and 33.2% in the South (ISTAT, 2021). Among the causes of the lower FLFP there are lower education levels, lower fertility rates and low average wages (Villar, 2017). While it is true that Italian mothers tend to trade labour time for time spent in childcare activities, fertility rates are among the lowest in Europe. The combination of low fertility and low employment rates are the result of poor public intervention for childcare services, short parental leave and lack of good-quality part-time employment (Villar, 2017).

Figure 1: Female employment rate in European countries, 2019.



Source: own calculations, data from Eurostat.

While there are several institutional barriers that prevent from improving the status of women in the Italian labour market, Italy registers one of the lowest gender pay gaps within Europe (Eurostat, 2022). Villar (2017) explains that the result is due to statistical assumptions. When

computing the unadjusted gender pay gap, if both genders were assigned time-fixed individual characteristics, such as education levels, the gender pay gap for median wage levels would have increased from 17% to 25% in a decade (Villar, 2017). In addition, the unadjusted gender pay gap does not account for education levels, misrepresenting the attributes of Italian working women. By including education levels, Italian female employees have on average higher education levels. Those that do not reach secondary or tertiary education degrees are not active in the labour market, nor they seek opportunities, thus they are excluded from gender pay gap statistics. Overall, the Italian female labour force is educated, and for those with tertiary degrees, the gender wage gap with male workers is small (Villar, 2017).

Explaining the divergent characteristics of the Italian labour market requires introducing the element of *culture*, that is crucial for encouraging women to enter the labour force. However, the focus of my thesis is on women at the top of hierarchy in the corporate world, those women that already entered in the labour market, broke the *glass ceiling,* and reached top positions. Culture plays a role in the corporate environment as well, where vertical segregation impedes women to reach managerial positions (Villar, 2017). In Italy, where culture determines a traditional view on gender roles in the labour market, ensuring female career progression to top positions is an important step to improve diversity at the managerial level, from a moral perspective, but also because women in position of power can manifest their view on family policies within companies, improving the working conditions at lower organizational levels (Pande & Ford, 2011; Matsa & Miller, 2013; Smith, 2018).

2.2 The Italian gender board quota law

Before 2011, Italian boards of directors were mostly made of men, as women represented less than 7%, the lowest percentage in Europe (Bruno et al., 2018; Ferrari et al., 2021). Considering the traditional view on women at the workplace that is present in Italy and knowing the importance of equal representation at the managerial level, the Parliament agreed on introducing a mandatory Gender Board Quota law. The law no. 120/2011 - also known as Golfo-Mosca or as Pink Quotas law - was introduced in August 2011, becoming effective in August 2012[1]. It mandated that companies listed in the Italian Stock Exchange had to appoint a minimum of 1/5th of the board members that identified with the least represented gender, for the 1st post-law election. This proportion would increase to 1/3rd after the 2nd post-law election,

[1] The law took the name of the first two members of the Parliament who signed it, Lella Golfo from the center-right and Alessia Mosca from the center-left (Ferrari et al., 2021).

following the same logic (Bruno et al., 2018; Maida & Weber, 2019; Ferrari et al., 2021). In addition, the Board Quota law made it mandatory for boards to lay down specific internal laws to foresee a gender-balanced board composition for three consecutive mandates starting from 1 year after the entry into force of the law. Thus, the law was programmed to expire for the 3rd post-law election, a case of the so-called *sunset clause*. In case on non-compliance, CONSOB would issue at first a 60-days warning[2]. If no action is taken after the warning, CONSOB would issue a penalty from 100,000€ to 1,000,000€, and a 3-months deadline to meet compliance. Eventually, if a company does not comply at all, its board will become illegitimate (Bruno et al., 2018).

Overall, the law no. 120/2011 is characterized by a time-limited duration, gradualism, follow-up sanctions and public-private sectors collaboration (Ferrari et al., 2021). The time-limited feature is consistent with the idea that the Pink Quotas law would come into the corporate legal system as a shock to the *old boys' club* dominating corporate culture, while leading the market to a new and more diverse equilibrium. Instead, gradualism is consistent with the view of Italy as a traditional country when it comes to gender roles, and thus the law considered this element, allowing time for firms to comply with it, turning cost-related changes into growth opportunities (Ferrari et al., 2021). Approving the law was not a smooth process. The public opinion and the Parliament were strongly divided, and still are today. The law proposal was presented in the Parliament in early 2009, though the discussion started 2 years later and because it was intense, before March 2011 no one expected that the law would obtain the majority of in-favour votes (Ferrari et al., 2021). Despite the scepticisms, before the proximate expiration of the Golfo-Mosca law and considering its success in increasing boards diversity, the law no. 160/2019 renewed the previous regulation. From January 2020, the mandatory quota of women on boards was increased from the initial 1/3rd, to 2/5th of the total members. Moreover, the applicability of the law was extended from three to six consecutive mandates post-reform, starting from the first board renewal following the law no. 160/2019 (Osservatorio Interistituzionale, 2021).

2.3 Gender board quota laws in Europe

Italy was not the first country to adopt a mandatory Gender Board Quota law in the Europe. Table 1 shows that following Norway in 2003, many countries implemented Gender Board Quota policies or mandated that companies disclosed their board composition, either in a softer

[2] CONSOB is the Italian public authority that regulates securities markets.

or harder way (Smith, 2018). Every country designed Gender Board Quota policies according to their historical activism and political support for gender equality. The policies differ in *hardness* and *progressiveness*. *Hardness*-based policies are characterized by enforcement sanctions and clear wording identification styles. *Progressiveness*-based laws are distinguishable for their early introduction into the legal system, the type of board target, as well as the coverage of the corporate sector in a country (Mensi-Klarbach & Seierstad, 2020).

Table 1: Adoption of board-diversity policies across European countries.

Country	Policy	Announcement	Implementation	Hardness	Progressiveness
Norway	Quota	2003	2008	Hard	-
Spain	Quota	2007	2015	-	-
Finland	Disclosure	2008	2010	-	-
Iceland	Disclosure	2010	2013	-	High
Belgium	Quota	2011	2017	-	Medium
France	Quota	2011	2014	Medium-Hard	High-Medium
Italy	**Quota**	**2011**	**2012**	**-**	**-**
United Kingdom	Disclosure	2011	2015	-	-
Denmark	Disclosure	2012	2013	-	-
Netherlands	Disclosure	2013	2016	Soft	-
Sweden	Quota	2014	2016	-	-
Germany	Quota/Disclosure	2015	2016	-	-
Austria	Quota	2017	2018	-	Low
Portugal	Quota	2017	2018	-	Medium-Low

Source: Cao & Lu (2019), Mensi-Klarbach & Seierstad (2020).

The governing bodies of the European Union also expressed the will to introduce an EU-broad Gender Board policy. In 2012, the European Commission presented a law proposal to achieve the objective of 40% female representation for non-executive directors in public listed companies, by 2020. While the proposal was approved by the European Parliament, it had to gain the qualified majority of votes by the European Council (Lückerath-Rovers, 2015). The consensus was never reached, and the issue was left to the single countries to deal with. Finally, in March 2022, following an important statement by the European Commission President Von Der Leyen, during which she highlighted the importance of breaking the *glass ceiling* and bringing women's perspective in decision-making, member states reached an agreement to have women occupy 40% of non-executive director positions and 33% of all board seats by the end of 2027 (Reuters, 2022).

3. Literature Review

The importance of analysing Gender Board Quota policies in a single country and across countries derives from the ongoing debate about affirmative actions designed to increase gender equality levels. On the one hand, the public opinion, corporate representatives and politicians argue that they may be an efficient way to bring female representation at the top of companies' management, reduce discrimination and biases against female business leaders and improve corporate performances (Beaman et al., 2009; Maida & Weber, 2019). On the other hand, inefficiencies can arise if a candidate is chosen based on her gender instead of her skills and experience, when another male candidate could be more qualified for the position of board member. Moreover, there are uncertainties on how female leaders affect corporate decision-making and firm value (Matsa & Miller, 2013). In this Chapter of the thesis, I will clarify the different views on the imposition of a Gender Board Quota that exist in the literature, from a theoretical perspective. Then, I will present the research findings on the effects of such policy in the countries that implemented it, from a more empirical viewpoint.

3.1 Theoretical literature

Women are unrepresented in boards of directors of the biggest companies, all over the world. Reasons for their absence can be divided between demand-side and supply-side. Among the demand-side causes of the lack of women in the boardroom there are taste-based discrimination and statistical discrimination (Boyallian et al., 2019). Taste-based discrimination takes place when male-dominated boards elect only new male members, because of their preference for conducting business relationships with other men. Misperception about gender attitudes leads to equally qualified women not to be considered for the position (Boyallian et al., 2019). Statistical discrimination is complementary with taste-based discrimination, and it happens when gender stereotypes lead to preferring a male to a female candidate. A woman is perceived as less skilled and effective for the powerful position of being a board member, possibly because of the existing lack of women in leadership positions, that does not provide evidence on their performance (Boyallian et al., 2019).

From the supply-side perspective, underrepresentation of women on boards can be explained by the network-driven selection process through which board members are appointed. Historically, women face hardship in advancing to senior management positions in the corporate world, in the U.S. as well as in Europe. Board members are usually selected from the

C-suite of companies, but female representation falls in senior management positions[3] (Pande & Ford, 2011). Thus, information and search costs for finding highly qualified women would be too high, and thus the appointing committee will avoid extensive research and rely on the existing pool of qualified male candidates (Boyallian et al. 2019). While education levels and professional experience have been increasing for women in the past decades, they are not correlated with a proportional increase in powerful corporate positions. This fact and demand-side discrimination are the main factors that justify government intervention through affirmative action such as Gender Board Quota policies (Pande & Ford, 2011; Boyallian et al., 2019).

The main arguments that support the adoption of this kind of policy concern equity and efficiency (Pande & Ford, 2011). From an equity perspective, a Gender Board Quota improves *descriptive* representation, in the sense that some position would hardly be occupied by women if it was not mandated by the government, the so-called path dependency of male-dominated environments (Bertrand et al., 2019). A Quota also improves *substantive* representation, namely it makes it possible to reflect policy interests of different sub-groups. Female directors have different preferences than their male colleagues, they usually adopt a long-term view on their strategic choices, and they have more consideration for employment policies. Matsa and Miller (2013) argued that female leadership gives greater incentive to employees' retention policies, even when it may go against profitability.

Efficiency of Board Quotas instead refers to the capacity of the policy to reduce taste discrimination, by increasing the number of women in the short run and changing social norms in the long run. Consequently, it increases information and evidence about performance (Pande & Ford, 2011). Beaman et al. (2009) found that in the Indian politics context, when voters were exposed to female politicians that entered in the political arena thanks to affirmative action policies, they learnt that they were as effective as male politicians in their job. Thus, their taste- and statistical-based discrimination declined, by improving information about "*expected effectiveness*" of future female politicians (Beaman et al., 2009). Pande and Ford (2011) took their efficiency argument further, explaining that a Board Quota produces positive externalities, reflected in future cohorts of women in position of power. Relevant externalities include role model and aspiration effects. The reasoning behind this effect is that women in powerful

[3] The term C-suite describes the most important senior executive roles within an organization. Usually, the job positions start with the letter "C", such as CEO, CFO and COO, thus the choice of C-suite.

positions would inspire other women to invest in certain types of degrees that were historically exclusive to men, but that are vital to improve women's chances for breaking the *glass ceiling*, overcoming gender stereotypes.

There are also counter arguments that view Gender Board Quota policies as inequitable and inefficient (Pande & Ford, 2011). First, they may generate a crowd-out effect. While these policies focus on the biggest division within society, the view that individuals are either male or female is narrow, and it does not account for other historically excluded ethnic and socio-economic groups. If there is an imposed quota only for female candidates, there will be less room for marginalized groups. Second, a Gender Board Quota may increase costs by assigning leadership positions to less qualified candidates based on their gender, worsening allocation mechanisms (Pande & Ford, 2011). Ahern and Dittmar (2012) found that Norwegian female board members appointed after the introduction of a Gender Board Quota had less CEO experience, they were younger, and they had more experience as non-executive managers. Although they also had higher education levels, Ahern and Dittmar (2012) argued that personal characteristics such as age, education and previous experience can affect a director's ability to supervise, control and guide organizational processes. Pande and Ford (2011) warned that Quotas may reduce women's incentives to invest in education, because it could lead them to believe that their career advancement would be facilitated. A Quota could also increase taste-based discrimination, when the public opinion disregards women that are appointed because of Board Quotas and it believes that they are less deserving.

The last argument that should be considered when arguing in favour or against a Gender Board Quota policy is the effect that a new board could have on firm value and profitability. In their seminal paper, Gregory-Smith et al. (2014) highlighted that the board of directors has the greatest marginal impact on firm value and on GDP at the aggregate level, through its impact on organizational strategy. Introducing more women is important to the extent that diversity leads to better decision-making processes than in homogenous, male-dominated boards. There is evidence that diverse boards are also more active when women are included. Gregory-Smith et al. (2014) also considered the economic impacts of discrimination. Following Becker (1957), a company that prefers discrimination will not realize the full productivity potential of its employees, or board members, resulting in a competitive disadvantage position. Eventually, discriminatory hiring practices may lead a company to exit the market. Many studies also researched the impact of introducing Gender Board Quotas on firm value in the stock exchange,

mainly because broader society effects take years to be realized[4]. Instead, the effects on the financial market are an immediate reaction to the introduction of a new policy (Cao & Lu, 2019). However, a consensus was not reached on whether the effects are positive, negative, or neutral.

3.2 Empirical literature

The empirical literature that studied the economic consequences of a Gender Board Quota policy mostly focused on the Norwegian case, because Norway was the first country to ever introduce that kind of policy. In this section, I present the studies that exist about Norway, comparing them with the few that analysed the Italian case as well. Most studies share common methodologies, namely difference-in-differences regressions before and after the exogenous policy "shock". Finally, I describe the studies that adopted the Synthetic Control method, which is the methodology that I also use for this thesis.

The analysis by Bertrand et al. (2019) on the Norwegian case is one of the most cited studies when describing the effects of a Gender Board Quota policy. They gather data from 1986 to 2010, a long span considering that the Norway passed the law in 2003. While the policy became officially mandatory in 2006, following the non-compliance of many public limited companies, Bertrand et al. (2019) chose 2003 as their exogenous shock year. First, they studied how the policy affected board composition. They found that the average age of a member of the board decreased, and that education gaps that existed pre-reform disappeared, meaning that women had degrees or MBAs just like their male counterparts. Interestingly, they found that becoming a board member increased the chances of entering in the C-suite of another company and being among the top 5% of earners in that company. The most important research question to which they try to answer is whether the Norwegian Gender Board Quota policy had effects on women working in lower hierarchy levels. Their identification strategy focused on the female employment share, on female MBA graduates hires and on female representation in the five highest paid positions in the organizations subject to the Quota. After performing an instrumental variable regression at the employee-level, Bertrand et al. (2019) found that more female representation in the boardroom increased the number of women within the C-suite of companies that were already public before 2003, but they do not find spillovers at lower organizational levels. In addition, they focused on studying the gender gap in earnings for

[4] For further resources see Ahern and Dittmar (2012), Matsa and Miller (2013), Gregory-Smith et al. (2014), Ferrari et al. (2021).

individuals with a probability of becoming board members above the 99.5th percentile, those with a business-related degree that are above the 98th percentile of earners. By using a difference-in difference method, they found a pre-reform gender gap between 14% and 16%. However, in the post-reform period, the gap decreased for board members, but once again there is no evidence of spillovers to the rest of high earners in a company, that would still be affected by gendered differences in remuneration.

Maida and Weber (2019) studied the Italian Gender Board Quota law no. 120/2011, with a similar approach to Bertrand et al. (2019). They built a firm-level dataset with all the public listed companies in 2013, gathering data about board members and employees from 2008 to 2016. The final sample covers 188 listed companies. Maida and Weber (2019) created a control group of non-listed firms, even though they report that the two groups have different average firm sizes. Moreover, unlisted firms have less highly qualified workers, less managers, and lower average wages. Since their observation period ends in 2016, Maida and Weber (2019) provided a short-run picture of the evolution of female board members in Italy. By selecting a difference-in-differences methodology, they demonstrated a parallel trend between the group of companies affected by the policy in 2012, the treatment year, and those that were not concerned. To do so, they used a propensity score matching technique, which confirmed the parallel trend, although certain differences in employees' characteristics persist. Their findings suggest that the law no. 120/2011 increased the number of women on boards, but in the short run there were no spillover effects on the lower ranking workers in Italian listed companies. Thus, Maida and Weber (2019) confirmed the evidence brought up by Bertrand et al. (2019). Although Norway and Italy are traditionally opposite in their gender equality stances, a Gender Board Quota law did not produce "trickle-down" effects in both cases, improving only the situation of those women that are already at the top of the corporate world. Maida and Weber (2019) finally suggested that the Board Quota policy should be extended to other types of companies, as the number of women on boards of listed companies is a purely representative figure compared to the pool of highly qualified Italian female employees. Ferrari et al. (2021) studied the Italian case as well, collecting individual- and firm-level data, from 2007 to 2014. Exploiting 2013 as their treatment year, their findings confirmed Maida and Weber (2019). Ferrari et al. (2021) found that there was an increase in the share of women on boards of listed companies, but no effects on the number of female presidents, though the share of female CEOs increased by 7% during the introduction of the law no. 120/2011 in the Italian legal system. Similar to Bertrand et al. (2019), Ferrari et al. (2021) noticed that post-reform boards had a

lower average age, and that newly appointed women had more degrees in economics-related subjects.

After the introduction of the Gender Board Quota law in Norway in 2006, Swedish companies began thinking that they could also be affected by the same policy, as Norway and Sweden are neighbouring countries with similar views on gender norms, and because Swedish politicians publicly expressed the will to introduce a similar law. Jannson and Tyrefors (2017) exploited the potential threat from the Norwegian policy as an exogenous shock, to estimate the effects of a potential Gender Board Quota policy on Swedish listed companies. During the building process of their methodology, they noticed that listed and not listed companies did not satisfy the assumption of pre-treatment parallel trends necessary to implement a difference-in-differences methodology. Thus, they conducted a robustness check using the synthetic control method developed by Abadie et al. (2010). With firm-level data from 1998 to 2012, and by choosing 2002 as the year which the Norwegian "threat" started, Jannson and Tyrefors (2017) found that Swedish board of directors increased female appointments by 8 percentage points after 2002, as an anticipatory reaction to the potential introduction of a Gender Board Quota policy in Sweden. Cao and Lu (2019) also adopted the synthetic control methodology to analyse the short- and long-term effects of Gender Board Quota policies in a cross-country study, motivated by the fact that labour market outcomes are often observable at an aggregate level, and many impact evaluation on Quotas used micro-level data only. They gathered data from 2003Q1 to 2018Q4 for 23 European countries, whilst selecting the ratio of female to male part-time employment as the main variable that identifies the integration of women in the labour market. As treatment year, they chose the quarter of the year in which any Gender Board Quota or mandatory disclosure policies were announced, therefore including potential anticipatory effects. Their findings provide evidence that a larger number of women on boards led to a 10% decrease in part-time employment, a figure that suggests that more female employees chose to work full-time instead of part-time.

The discussion of the various pieces of literature brings me to the main hypothesis of this thesis, which is that the introduction of the law no. 120/2011 was necessary for Italian listed companies to appoint more women in their board of directors. The literature agrees that the adoption of Gender Board Quota policies in Europe increased the number of women on boards, lowered the average age of members and increased their average education level. However, there is no evidence on how the number of female board members would have evolved without mandatory government intervention. As I described throughout the Policy Background Chapter, and in part

of the Literature Review, Italy is characterized by a traditional view on the position of women in society, and women in top corporate positions are still a small group, despite large progress in female education attainment. Thus, there are reasons to expect that a *hardness*-based policy was the appropriate tool to fight demand-side pull factors that had impeded several women to reach the top before 2011, in the Italian case. In the next Chapter, I will present the methodology that I will use to precisely study this hypothesis, with an innovative econometric technique that was never used before for a case study focused on Italy.

4. Methodology

The evaluation of the impact of the law no. 120/2011 introduced in the Italian legislation is identifiable as a natural experiment type of study. As discussed before, the Gender Board Quota law was an exogenous shock, and listed companies were forced to comply. To understand whether the impact of the policy was effective, compared to a scenario in which no policy was established, I used the technique of the synthetic control method. In this Chapter, I first motivate my choice of using a synthetic control to understand the true impact of a policy at the country level. Second, I describe how the model works, presenting the equation that is the baseline for building a synthetic control group that is used through my thesis. Finally, I describe inference, or post-estimation tests that are a fundamental step in the synthetic control methodology, to assess the validity of the model.

4.1 Motivation

The analysis of the impact of a policy at the country level is suitable to a classical natural experiment empirical approach. A method such as difference-in-differences (DID) is the most used in the literature when a treatment like an exogenous event or policy takes place at a specific point in time. Researchers usually select two groups, the treatment and control group, that follow parallel pre-treatment trends, and that will differ afterwards solely due to the treatment effects. One will be affected by the treatment, and one will not. Thus, the difference-in-differences methodology allows to isolate the effect of a natural experiment and to interpret the causal relationship, if any (Bertrand et al., 2004). However, this kind of comparative empirical study requires strict assumptions about pre-treatment comparability of the treated and control units, which is often ambiguous and driven by subject assumptions (Abadie et al., 2010). Moreover, comparative case studies rely on disaggregated data and inferential techniques that measure only the uncertainty about aggregate values of data in the population sampled. If aggregate data were used, uncertainty would remain about the post-treatment comparability of the counterfactual outcome that the control group would follow in the absence of the treatment (Abadie et al., 2010).

For the specific context of the policy that I will analyse, in which the units subject to the treatment are countries, it would be difficult to find an untreated comparison unit that follows the same pre-treatment pattern of Italy, the treated unit, when it comes to the number of women on companies' boards. While the control unit should be a country, no existing country is directly

comparable to Italy. Therefore, I will implement the methodology of synthetic control method that generates an artificial comparison unit made of a weighted average of different untreated units, all potential candidates for comparison. This set of comparison units is called "donor pool". The goal of a synthetic control methodology is the same as a difference-in-differences. However, the former is a data-driven technique that reduces uncertainty in the choice of a comparison control unit, and that demonstrates the similarities between affected and unaffected units using observable and quantifiable characteristics that derive from the sample of data used for the study (Abadie at al., 2010; Abadie, 2021). The synthetic control method allows to expand the field of comparative case studies that has been limited so far, because of the difficulties just explained. This innovative and transparent approach has great potential for the evaluation of policies or events in settings that are not traditionally suitable to comparison, as a combination of units is often a better comparison source then any single unit alone. As such, the synthetic control methodology constitutes a preventive check against unsuitable counterfactuals with excessive differences (Abadie et al., 2010).

The choice of the synthetic control method is thus an important contribution to the case study literature on the impact of Gender Board Quotas that used a difference-in-differences technique (Jannson & Tyrefors, 2017; Bertrand et al., 2019; Maida & Weber, 2019). Additionally, because the selection of the control group is obtained through a data-driven process using country-level data, this study provides more reliable findings focused only on listed companies before and after the policy, while previous studies such as Maida and Weber (2019) used not listed companies as a comparison group, that are not directly comparable. This is another important innovation which makes this case study suitable for cross-country comparisons within Europe. Finally, as the donor pool groups together a relatively small number of European countries, using the synthetic control method offers superior performance compared to other methods when it comes to sample size, and it reduces potential confounding factors (Cao & Lu, 2019).

4.2 Structure

The most relevant literature that describes the empirical methodology behind the synthetic control method is based on the work of Abadie et al. (2010, 2015) and Abadie (2021). Following the literature, the starting point in the development of a synthetic control methodology concerns gathering all the potential units of observations, which for this thesis will be $J + 1$ countries, indexed by j. When $J = 1$, it is defined as "treated unit", the only country exposed to the intervention of interest in the study, and that will be subject to the policy uninterruptedly after

an initial intervention period (Abadie et al., 2010). The remainder units $J = 2, \ldots, J + 1$ make up the "donor pool", the set of all the untreated countries not affected by the policy (Abadie, 2021). The countries in the donor pool are untreated during the pre-intervention period $t \in \{1, \ldots, T_0\}$, thus T_0 defines the number of pre-intervention periods. Let Y_{jt}^N represent the observed outcome for country i for the whole duration of the pre-intervention period T_0. Instead, Y_{jt}^I describes the outcome for the treated country i at time t, if country i is exposed to the treatment in period T_{0+1} (Abadie et al., 2010). Assuming that $Y_{jt}^N = Y_{jt}^I$ in the pre-intervention period, the effect of the policy in period $t > T_0$ will be:

$$(1) \quad \alpha_{1t} = Y_{1t}^I - Y_{1t}^N.$$

A fundamental assumption for a solid estimation with the synthetic control methodology is that the treatment has no effect on the selected outcome Y_{jt} before the implementation period T_{0+1}, while there could be this possibility trough anticipatory effects. In this eventuality, the time of the intervention T_{0+1} should be re-defined to the time when the outcome variable may have first reacted to the intervention threat (Abadie et al., 2010). In the case of the law no. 120/2011, the choice of the intervention period is made according to this reasoning. While the law was officially introduced in Italy in 2012, the debate within and outside the Parliament was intense already in 2011, thus 2011 is chosen as the period T_{0+1}. The second crucial assumption regards the rational and objective selection of the units in the donor pool, because it is important for an unbiased estimation of a synthetic counterfactual to the observed unit of interest. Thus, while the units in the donor pool should be untreated by the kind of policy that affected the country $J = 1$ in the post-intervention period, they should also follow the same trends in the pre-intervention period and have similar structural characteristics (Abadie et al., 2015). For this reason, the units chosen in this study are countries within European geographical and political boundaries, that share the same goals of reaching equality between genders at the workplace, but not only.

After the building blocks of the methodology have been laid out, it is possible to generate weights. In fact, the synthetic control model can be defined as "*the weighted average of the units in the donor pool*" (Abadie et al., 2015, p. 497). The synthetic control then allows to estimate the potential evolution of the outcome of interest in the absence of the specific policy that was introduced in Italy. Following Abadie (2021), the synthetic control is described as a vector $J \times 1$ of weights, $W = (w_2, \ldots, w_{J+1})'$. For each value of W, an important condition is that

$w_j \geq 0$ for $j = 2,\ldots, J+1$ and $w_2 + \ldots + w_{J+1} = 1$ (Abadie et al., 2010). Given W, the synthetic control estimators of Y_{1t}^N and α_{1t} are, respectively:

$$(2) \quad \hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j \, x \, Y_{jt},$$

and

$$(3) \quad \hat{a}_{1t} = Y_{1t}^I - \hat{Y}_{1t}^N.$$

Considering that Y_{1t}^I is observable, the estimation of $\hat{a}_{1t}$ requires to find Y_{jt} (Abadie et al., 2010). I will estimate Y_{jt} as a factor model, always based on the work by Abadie et al. (2010), as:

$$(4) \quad Y_{jt} = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it}.$$

Equation (4) will be the baseline model for the empirical work of this thesis project. In the equation, δ_t is an unknown constant common factor across countries. Z_i is a vector ($r \; x \; 1$) of observable covariates unaffected by any policy about Gender Board Quotas, while θ_t is a vector ($r \; x \; 1$) of unknown parameters. λ_t stands for a vector ($F \; x \; 1$) of unobserved common features, while μ_i if a vector ($F \; x \; 1$) of unknown factor loadings[5]. Finally, ε_{it} accounts for unobserved shocks at the country level, with mean value equal to zero.

Choosing the weights requires additional computations. Each value of W represents a different set of weighted control countries, but the synthetic controls selected should be those that best replicate the characteristics of the treated unit (Abadie et al., 2015). The value of the outcome variable for each synthetic control in W is represented by the following equation:

$$(5) \quad \sum_{j=2}^{J+1} w_j Y_{jt} = \delta_t + \theta_t \sum_{j=2}^{J+1} w_j Z_j + \lambda_t \sum_{j=2}^{J+1} w_j \mu_j + \sum_{j=2}^{J+1} w_j \varepsilon_{jt}.$$

Following equation (5), Abadie et al. (2010) further demonstrated that for each year leading to the treatment, thus as long as $t < T_0$, a set of weights $(w^*_{2,\ldots,} \, w^*_{J+1})$ exists such that the synthetic

[5] In the context of the synthetic control methodology, factor loadings of the synthetic control unit represent the weighted average of the factor loadings of the control units (Abadie, 2021). In econometrics, factor loadings are correlation coefficients between observed variables and latent common variables, a measure of shared variance, usually unobservable.

outcome variable reflects the value of the observed outcome variable *J=1*. This reasoning produces the following equation:

$$(6)\ \sum_{j=2}^{J+1} w *_j Y_{j1} = Y_{11}, \sum_{j=2}^{J+1} w *_j Y_{j2} = Y_{12}, \dots, \sum_{j=2}^{J+1} w *_j Y_{jT_0} = Y_{1T_0}, \text{and} \sum_{j=2}^{J+1} w *_j Z_j = Z_1.$$

Abadie et al. (2010) specified that no set of weights exists to perfectly comply with equation (6). Thus, once the synthetic control is estimated, it is suggested to evaluate case by case whether it represents a good fit with the treated unit. A poor fit may be due, among other factors, to the assumption that the weights should be non-negative and sum up to 1. Although this clause could be relaxed, it would allow extrapolation, and thus Abadie (2021) suggested complying with it. If a good quality of fit is reached, there may be the issue of interpolation (Abadie et al., 2010). Interpolation is a source of concern when the counterfactual created with the weights comes from a donor pool in which the units (countries) present divergent characteristics with the treated unit, Italy. Thus, Abadie et al. (2010) suggested that choosing an unbiased estimator that allows the best fit for Y_{jt} would be possible only if:

$$(7)\ \sum_{j=2}^{J+1} w *_j Z_j = Z_1 \; and \sum_{j=2}^{J+1} w *_j \mu_j = \mu_1.$$

However, equations (7) are impossible to verify, as long as $\mu_j, \dots, \mu_{j+1}$ are unobservable. While with this argument it seems unfeasible to estimate a good synthetic control, Abadie et al. (2010) took their explanation further. They clarified that the model presented through equation (4) hints that a synthetic control can fit Z_1 and pre-treatment observed outcomes $Y_{11}, \dots, Y_{1T_0}$ only if it can also fit Z_1 and μ_1. For the scope of this thesis, this information means that under good pre-estimation considerations, equations (7) hold approximately, and it is therefore possible to proceed with the estimation of the treatment effects in equation (3) and consequently equation (4).

4.3 Implementation

The development of a synthetic control model starts from assigning weights to a *(J x 1)* vector $W = (w_2, \dots, w_{J+1})'$, introduced in previous paragraphs. Based on Abadie et al. (2010), let X_1 be a *(k x 1)* vector that groups together pre-treatment characteristics of treated units, while X_0 is a *(k x J)* matrix that contains the same set of pre-treatment characteristics of untreated units. Pre-treatment characteristics are defined as predictor variables, and they represent the

foundation for building the best synthetic match with the treated unit. The weights of the vector W^* will be assigned with the goal of minimizing the distance $||X_1 – X_0W||$, which represents the difference between pre-treatment treated units X_1 and untreated units X_0. As already remarked, vector W^* will assign weights based on the assumption that they are non-negative, and their sum equals 1. To monitor the divergence between X_1 and X_0W, the literature suggests considering $||X_1 – X_0W||V$, where V is a $(k \times k)$ matrix that assigns different weights according to the importance of each predictor variable in creating a synthetic control. V is chosen through a data-based method, to minimise the mean square prediction error (MSPE) in the pre-intervention period (Abadie et al., 2010; Abadie, 2021).

4.4 Inference

In comparative case studies, typical of synthetic control method estimations where the sample size is relatively small, and there is absence of randomization, it is difficult to apply traditional statistical inference methods to assess the validity of the model chosen (Abadie et al., 2015). Nonetheless, in the case of synthetic controls, there is a wide array of qualitative and quantitative inference tests that can be performed as "falsification tests" (Abadie et al., 2015, p. 499). These tests are known as placebo tests, and they are built on the assumption that the authenticity of the synthetic control estimate observed for the treatment under study would be critically weakened if the effects obtained were the same in case the treatment was not introduced (Abadie et al., 2015). Placebo studies are divided between "in-time" and "in-space" placebos.

In-time placebos can be carried out if there is a large enough number of pre-treatment periods. In this case, the goal would be to assess whether the treatment effect would change if the year of the treatment was moved either backwards or onwards, in a time without any exogenous shock. An example of this type of placebo test can be found in Peri and Yasenov (2015). They applied the synthetic control methodology to study the Mariel Boatlift in Miami, in 1979, and the impact of the shock on high-school drop-outs, with the consequent change in wages and employment that it caused. After selecting the donor pool, made of 43 metropolitan areas in the US, they validated their synthetic control model by considering a different treatment year, 1994, when no Mariel Boatlift happened. Thanks to this test, they noticed discontinuity between Miami, their treated unit, and the synthetic control. However, this did not lead to any noticeable change in the outcome variables, mainly because there was no effective shock in 1994.

The second type of placebo test known as in-space placebo is implemented by applying the treatment to every member of the donor pool (Abadie et al., 2010; Abadie et al., 2015). The assumption behind this type of test is that large treatment effects would not be present if the treated unit of observation was chosen randomly, instead of being the one truly affected (Abadie et al., 2010). By creating a synthetic control estimate for each unit in the donor pool, it is possible to analyse the distribution of placebo effects against the effects for the unit of interest. Another way of carrying out comparison between the synthetic control of interest and the one generated by permutation tests is to look at their p-values. The fraction of p-values equal or greater than the effect generated for the treated unit of interest allows to understand if the effect of the synthetic control is significant compared to the distribution of p-value across placebos (Abadie et al., 2015).

Overall, the relevant literature on synthetic controls by Abadie et al. (2010), Abadie et al. (2015) and Abadie (2021) remarks that to have a solid methodology, pre-estimation considerations are as important as post-estimation tests. First, units in the donor pool should not be affected by similar policies as the treated unit of interest. If some units are exposed to shocks concerning the outcome variable during the pre-treatment period, they should be excluded. Additionally, the units in the donor pool should present characteristics similar to the treated unit, to avoid interpolation as well as overfitting. Finally, as remarked throughout this Chapter, running a credible synthetic control methodology requires a consistent number of pre-intervention periods.

5. Data

The analysis of the effect of the policy that mandated a mandatory number of women on boards in Italian listed companies requires the use of country-level data. Besides the use of the synthetic control methodology, macro-level data are an expansion on the current literature that exploited micro-level data at the individual- and firm-level for members of boards in Italy (Bruno et al., 2018; Maida & Weber, 2019; Ferrari et al., 2021). In this Chapter, I describe the data gathered to build the outcome variable of interest, namely the number of women on boards of Italian listed companies, as well as presenting the predictor variables chosen to estimate the synthetic control. Then, I show how I selected the treatment year and the units that constitute the donor pool for this study. Finally, I describe the summary statistics of the final version of the dataset obtained.

5.1 Outcome variable

This study is focused on one outcome variable, the number of women on boards. To understand if the Gender Board Quota policy introduced in Italian law was effective in enhancing the number women on boards, compared to a non-policy scenario, I gather data from the European Institute of Gender Equality (EIGE). EIGE (2021) provided updated information about the number of women on boards, which covers all the differed positions within a board of directors, for instance the chair, non-executive directors, senior executives as well as employee representatives, within the largest listed companies in 38 European countries. The largest listed companies are those listed in the "Blue-Chip Index" of the national stock exchange of a country[6]. These companies have the largest market capitalization and market trades, and they are listed in stock exchanges such as FTSE MIB for Italy, CAC 40 for France and DAX40 for Germany, just to mention few notable examples (EIGE, 2021). The fact that only the largest companies are covered by the data means that the actual number of listed companies and relative board members may be lower than the total number of companies listed in the stock exchange (EIGE, 2021). Overall, data was available for the second semester of the year from 2003 to 2011, and for both semesters from 2012 to 2021. For accountability reasons, I selected data for second semesters only, from 2003 to 2021, so that data in my sample would be homogenous.

[6] The Blue-Chip Index is a financial index that tracks the performance of the most famous and financially stable publicly traded companies, those that provide constant positive returns to investors.

5.2 Predictor variables

The choice of predictor variables is a fundamental step in the design of the synthetic control (Abadie, 2021). Predictor variables should not raise concerns about the validity of the model, but rather be the foundation on which the model is built on. Therefore, to create an optimal synthetic control unit that resembles Italy as much as possible, I selected various economic and socio-demographic variables. All the predictor variables are potential drivers of the number of women on boards of companies, in a geo-political setting such as Europe. By this, I mean that for instance, no democracy indicator has been chosen, as countries in the European area are known to have a similar score on worldwide democracy indices. The choice of predictor variables was narrowed to represent some instances that may describe if a country and its specific working culture may be suitable and encouraging to make women rise at the top of the corporate ladder.

The first economic predictor variable that I selected is GDP per capita, from Eurostat (2021). GDP per capita is calculated at purchasing power standard (PPS), an imaginary currency that levels differences in purchasing power of different countries within the group of the EU 27 in 2020. The value is expressed at market prices, in euros. The second economic predictor is the annual employment ratio, calculated as the ratio between female employment rate and male employment rate. Both female and male employment rates are presented as a percentage, and they include individuals registered either as employees or as self-employed. These measures are available from Eurostat (2021). The ratio is calculated to express female employment relative to male employment, as it expresses a more comprehensive information about sex-disaggregated labour market participation, instead of the female employment rate taken alone, following a similar approach by Cao and Lu (2019).

To build a control group comparable to Italy, socio-demographic measures are also included as the predictor variables. The first is total public social expenditure, expressed as percentage of GDP, from OECD (2019). Total public social expenditure includes cash benefits and in-kind contributions, for a broad range of social protection needs (retirement, health, disabilities, family policies, active labour market participation, unemployment benefits, housing benefits). By including this measure, I will account for the fact that greater social spending encourages higher female employment rate, especially at the life stage when women are often confronted with a choice between career and family, if little child-care is available (ILO, 2019). The last variable included concerns education. Precisely, the ratio of female to male graduates in majors

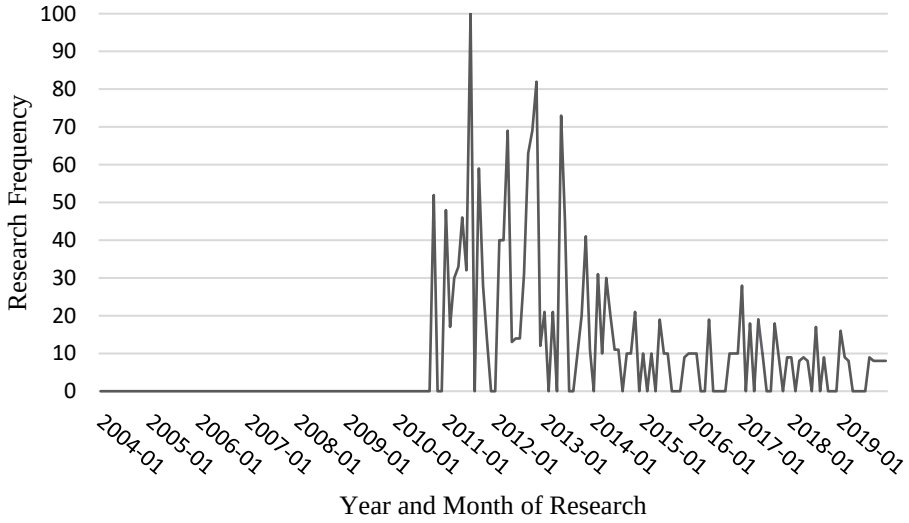
within the field of Business and Administration, with number of graduates taken as the sum of bachelor's and master's level (OECD, 2012; OECD, 2021). Again, the ratio is taken to account for a broader measure instead of the simple number of female graduates, the same mechanism adopted for the employment ratio. Data from 2003 to 2012 refer to ISC34 standards for tertiary education, while from 2013 to 2019 they are based on the updated version of ISC2011 (OECD, 2012; OECD, 2021). This education proxy is essential inasmuch a higher number of women in boards of directors is achievable only if there is a relevant number of graduates, often in business-related subjects (Boyallian et al., 2019).

5.3 Treatment

The treatment in my analysis will be the year in which the Gender Board Quota law was introduced in the Italian legislation, making it mandatory for companies to compel with it. As the classification of the law no. 120/2011 expresses, the law was first accepted by both the Italian Parliament and Senate in 2011, and officially introduced in law books in 2012 (Bruno et al., 2018). While the law was mandatory from 2012 onwards, companies may have reacted already in 2011 by changing their board composition or adopting new policies to enhance gender diversity. Abadie (2021) described how, in the context of a synthetic control method, anticipatory effects may bring the treated unit to modify the outcome variable of interest before the law, and it is important to consider these effects when choosing the treatment year, for truthful results. Moreover, an analysis of Google searches about the Gender Board Quota law in Figure 2 shows that there was growing interest in the law already at the start of 2011, while it was approved only in August 2011[7]. Thus, companies may have started rethinking their board election strategy for the business year 2011, which led me to choose 2011 as the treatment year for my research.

[7] Searches on Google Trends about "quote rosa cda", translatable in English as "pink quota law board of directors".

Figure 2: Google searches about the Italian Gender Board Quota law, 2003-2019.



Source: own calculations, data from Google Trends.

5.4 Donor pool

After choosing the treatment year, one of the most important steps to estimate an unbiased synthetic control consists in establishing a donor pool, the group of untreated units that will be assigned weights according to characteristics that resemble Italy. The countries that will enter in the donor pool should not have been affected by any policy on mandatory disclosure about the number of women on boards, or any policy mandating gender-balanced boards, up to and including 2011. In total, the data collected generated a sample of 37 countries, or units: Albania, Austria, Belgium, Bosnia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malta, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom.

Following Cao and Lu (2019), and after describing which European countries have implemented policies like Italy in the Chapter 2.3, the countries that will be excluded from the donor pool are Belgium, Finland, France, Iceland, Norway, Spain and the United Kingdom. As for the remainder countries, although the choice of those that will make up the synthetic control group is data-driven, some considerations must be made for the choice to be reasonable. With a sample made of European countries not affected by any Gender Board Quota policy, those countries that are particularly less populated than Italy or that have opposite socio-economic attributes would not be a realistic source of comparison, and thus will be excluded. Among

these, micro countries had many missing data for what concerns outcome and predictor variables, and thus are dropped. The countries excluded are Albania, Bosnia, Bulgaria, Croatia, Cyprus, Estonia, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malta, Montenegro, Romania, Serbia and Switzerland. Thus, the dataset is left with countries most likely to represent a good source of direct comparison with Italy, and they are ideal to build a synthetic control group. The countries in the final donor pool are 13, besides Italy: Austria, Czech Republic, Denmark, Germany, Greece, Hungary, Ireland, the Netherlands, Poland, Portugal, Slovak Republic, Slovenia and Sweden.

5.5 Summary statistics

After choosing the appropriate variables, I proceeded with merging them to create my main dataset. I first cleaned the data from the missing values, as well as dropping the countries that were not a good comparison source for Italy. Eventually, as Table 2 shows, the dataset was made of 238 observations in total. The ratio of female to male Business and Administration graduates has slightly less observations, 228, because there were some missing observations in certain years, that however do not constitute a source of concern. From Table 2, the average number of women on European boards appears to be around 38. Another interesting statistic from Table 2 is that the employment ratio is on average less than 1, which shows how women across Europe present lower employment rates than men. Instead, the ratio of female to male Business and Administration graduates is higher than 1, a proof of the higher enrolment rate of female students in this subject, and of their consequent academic success.

Table 2: Summary statistics averaged at the country level, 2003-2019.

Variables	Observations	Mean	Std. Dev.	Min.	Max.
Number of women on boards	238	37.92	34.77	0	166
GDP per capita	238	26,259.65	8,348.26	10,090.70	59,530.40
Social Expenditure (% of GDP)	238	22.45	4.035	13.363	29.927
Employment Ratio (Female to Male)	238	.83	.08	.61	.97
Business Graduates Ratio (Female to Male)	228	1.45	.53	.67	2.51

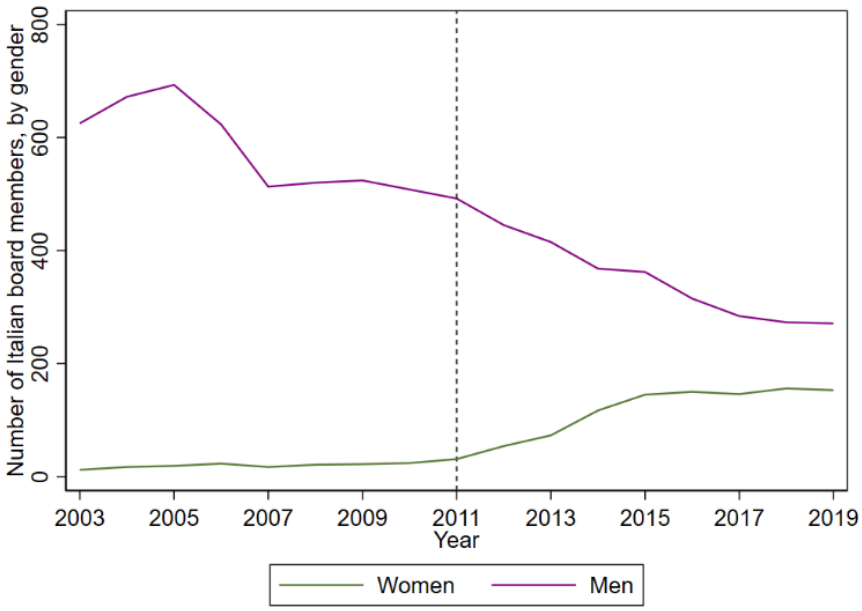
Before proceeding to the estimation of the synthetic control, I calculated the correlation between variables, to see if there was any correlation among the predictor variables. Available in Table A in the Appendix, the correlation matrix does not show any extreme value. I also checked whether every variable followed approximately a normal distribution, which turned out to be true, therefore, I did not convert any of them into a logarithmic format.

6. Empirical Analysis

6.1 Descriptive results

Preliminary descriptive results in Figure 3 show that the number of women, in green, and men, in purple, on boards of Italian listed companies changed dramatically over the years covered in the analysis. In 2003, the gap between male and female board members is enormous, because the number of women members nears 0. The number of men on boards dramatically decreases from around 700 in 2005 to 500 before 2008, without a complementary increase in the seats occupied by women. This plunge coincides with the beginning of the Financial Crisis in late 2007, and it might be due to the bankruptcy or delisting of some companies and the consequent general decrease of board members in Italian listed companies. The number of female board members starts increasing mildly only before 2011, which coincides with the first discussion of the mandatory female board representation law. The representation gap becomes narrower only in 2015, when male board members are slightly less than 400, and women slightly less than 200. Although a 2:1 ratio remains, it is a notable improvement from 2003. In 2019, at the end of the observed period, the gap looks smaller than ever, highlighting a positive trend for the achievement of equal representation at the top of business positions. In the next section, I will try to understand if this result would have been possible without explicitly introducing a Gender Board Quota law.

Figure 3: Number of women and men on Italian board of directors, 2003-2019.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

6.2 Synthetic results

In this section, I will present the estimation of the synthetic control unit following the same steps presented in the Chapter 4. To understand whether the Gender Board Quota policy was required in order to increase the number of women on boards of listed companies, I estimated a synthetic Italy where no policy was introduced, and then compared the two situations. Table 3 lists the weights that were assigned to the 13 European countries in the sample that did not adopt any policy concerning gender diversity within boards, before 2011. Table 3 stands for the vector W^* made of non-negative weights, whose sum equals 1, that generate the synthetic Italy. Thus, the countries chosen to represent the synthetic Italy are the Netherlands, Poland and Portugal. The fact that Italy is based on the Netherlands for the 75% is an unexpected result, because the two countries are different for what concerns their economic structures as well as for their views on gender roles, as the Netherlands scores on average higher than Italy in gender equality statistics, while Italy is known as traditional (EIGE, 2020). Instead, Poland and Portugal appear as more reasonable comparison units for Italy, as they share traditional views on the role of women in society, obtaining homogenous results in gender equality rankings (EIGE, 2020).

Table 3: Synthetic control weights to create the synthetic Italy.

Country	Synthetic Control Weight
Austria	0
Czech Republic	0
Denmark	0
Germany	0
Greece	0
Hungary	0
Ireland	0
Netherlands	.752
Poland	.222
Portugal	.026
Slovak Republic	0
Slovenia	0
Sweden	0

After looking at which countries constitute the synthetic control, Table 4 presents the values of the predictor variables for Italy, the synthetic control, and the donor pool of untreated European countries, averaged for the period 2003-2019. The values of the synthetic Italy are rather close to those of Italy. For GDP per capita, the difference between Italy and synthetic Italy is of

2,096.67 Euros, and while the value for the European sample is closer to Italy than the synthetic control itself, the value of the synthetic Italy is considerable as good. The rest of the predictor variables are also substantially close to Italy values. In the last three rows, the average values of women on boards in 2003, 2007 and 2010 are chosen to estimate the synthetic control in these specific pre-treatment years. As can be seen from Table 4, the synthetic control follows the same pattern of Italy. While the values of Italy and its synthetic control do not match at perfection, they can be considered as good. In synthetic control methodology, it is not possible to control directly for heteroskedasticity, standard errors, or coefficient of determination. Therefore, the extent to which there are errors in the modelling is dealt with in the selection of the donor pool. In doing so, I accounted for all the possible considerations following the literature by Abadie et al. (2010), Abadie et al. (2015) and Abadie (2021), in the construction of an unbiased donor pool. A measure to assess the lack of fit between the path of the outcome variable and that of the synthetic control is the root mean square prediction error (RMSPE), which measures the ratio of post-intervention fit relative to pre-intervention fit. The ratio itself does not indicate relevant information if other data are not considered, such as the match between the average predictor variables for the treated unit and the synthetic counterpart (Abadie et al., 2015). For the estimation of this study, RMSPE equals 3.016.

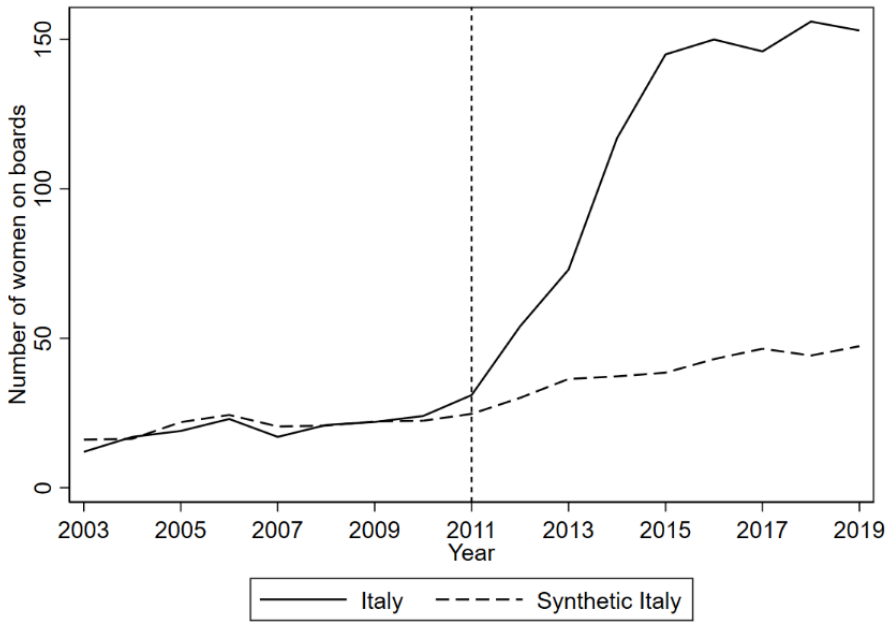
Table 4: Average value of the predictor variables.

	Italy	Synthetic Italy	European sample
GDP per capita	25,596.67	27,693.14	26,259.65
Social Expenditure (% of GDP)	24.86	18.66	22.45
Employment Ratio (Female to Male)	.66	.82	.83
Business Graduates Ratio (Female to Male)	.91	1.09	1.45
Women on Boards (2003)	12	16.08	29.36
Women on Boards (2007)	17	20.50	23.36
Women on Boards (2010)	24	22.41	25

The last step of the synthetic control methodology generates the most important finding, which confirms that the Italian law no. 120/2011 was an essential policy instrument to increase the number of women on boards of listed companies. Figure 4 shows the main comparison of Italy and synthetic Italy, for what concerns the trend of the number of women on boards. The solid line that represents Italy starts from about 20 women in 2003, to more than 100 in 2019. The policy introduced in 2011 and which was implemented starting from 2012 was decisive, because from 2011 to 2015 there was a sharp increase in the board seats occupied by women, from less than 50 in 2011 to nearly 150 in 2015. Instead, the dashed line that stands for the synthetic Italy in which no policy was introduced shows a discouraging scenario. If the law no.

120/2011 was not approved by the Parliament back in 2011, there would still be less than 50 women in the most valuable Italian companies in 2019. Besides the relevance of the main findings, Figure 4 adds strength to the use of a synthetic control in the context of this analysis. As Figure 4 demonstrates, Italy and synthetic Italy share a good pre-treatment match, and diverge after the exogenous shock that affected Italy from 2011 onwards.

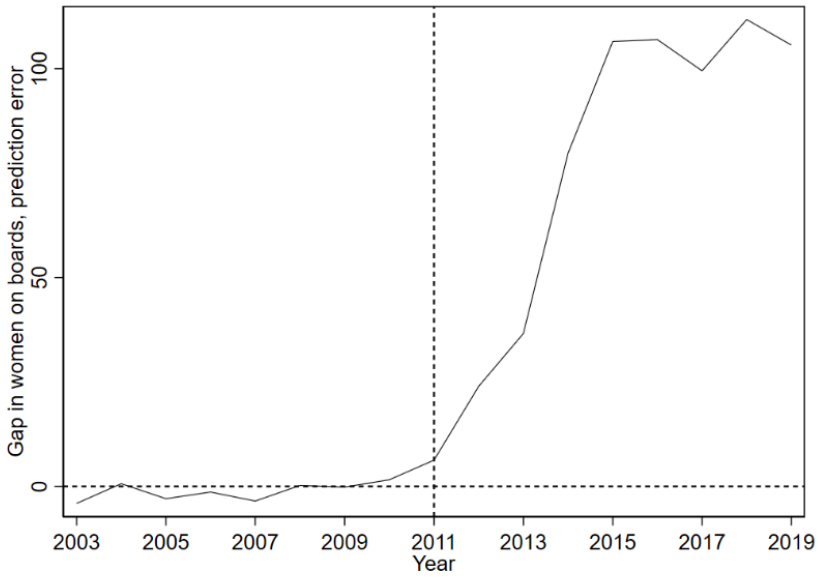
Figure 4: Number of women on boards, Italy vs synthetic Italy, 2003-2019.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

Figure 5 focuses exclusively on showing the gap, or difference, in the outcome variable between the treated unit and the synthetic untreated unit. The gap is non-existent in the pre-treatment period, before the dashed line which coincides with the introduction of the Gender Board Quota law of 2011, in Italy. This means that on average, Italy, the Netherlands, Poland and Portugal all had the same low number of board seats occupied by women. After 2011, the gap starts increasing, at first slowly but then it overtakes 100. It means that 100 seats in Italian listed companies were occupied by women in 2019, thanks to the Golfo-Mosca law. The largest difference appears after the policy was introduced, while around 2015 the difference is evened out because the objective of the law of reaching 1/3 of the board seats occupied by women was nearly reached. In addition to Figure 5, Table B in the Appendix shows that the post-treatment estimation of the number of women on boards in Italy versus the synthetic Italy is highly statistically significant, which adds to the overall statistical relevance of my findings.

Figure 5: Gap for the number of women on boards, Italy vs synthetic Italy, 2003-2019.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

6.3 Post-estimation tests

The last passage necessary to assess the validity of the findings presented in the previous section is to conduct post-estimation tests. Following the theory presented in Chapter 4 based on Abadie at al. (2010), Abadie et al. (2015) and Abadie (2021), in this section I will carry out placebo and robustness test. These post-estimation assessments are required to estimate the extent to which the results of the synthetic control are true and reasonable. Only after this estimation it will be possible to discuss the findings and compare them to previous literature.

6.3.1 In-time placebos

The first permutation method that I performed was the "in-time" type. It was a natural choice to move the treatment year forward by one year, namely 2012, when the law no. 120/2011 was officially introduced in the Italian jurisprudence. Before estimating the synthetic control method with the different treatment year, the donor pool was subject to an adjustment. Following the extensive explanation in Chapters 4 and 5, all the units in the donor pool should be untreated in the pre-treatment period. Thus, when moving the treatment year onwards, Denmark is dropped from the donor pool because it announced a mandatory disclosure policy for the composition of boards in 2012. After this check, I proceeded with changing the treatment year. According to Abadie et al. (2015), obtaining larger results with an in-time placebo test than with the actual synthetic control methodology would compromise the efficacy of the predictor variables. The results for this placebo test confirm the findings from the previous

section. In Figure C in the Appendix, the graph does not change compared to Figure 4. Only the dashed line for Synthetic Italy is slightly different, but the effect is the same and it is evident from Figure C that the gap between Italy and Synthetic Italy is starting before 2012. In Table D in the Appendix, the synthetic control weights assigned to each unit in the donor pool do not show relevant changes, because the largest weight is still assigned to the Netherlands. Finally, Table E in the Appendix presents the average predictor variables for Italy and the new Synthetic Italy. Interestingly, they show a rather precise match compared to the main estimates of Table 4. However, the RMSPE for the in-time placebo test is equal to 7.48, higher than the 3.016 of the main results. This strengthens the validity and credibility of the initial results of Figure 4, because the higher RMSPE shows that the pre-intervention fit is lower than the post-intervention, highlighting discrepancies.

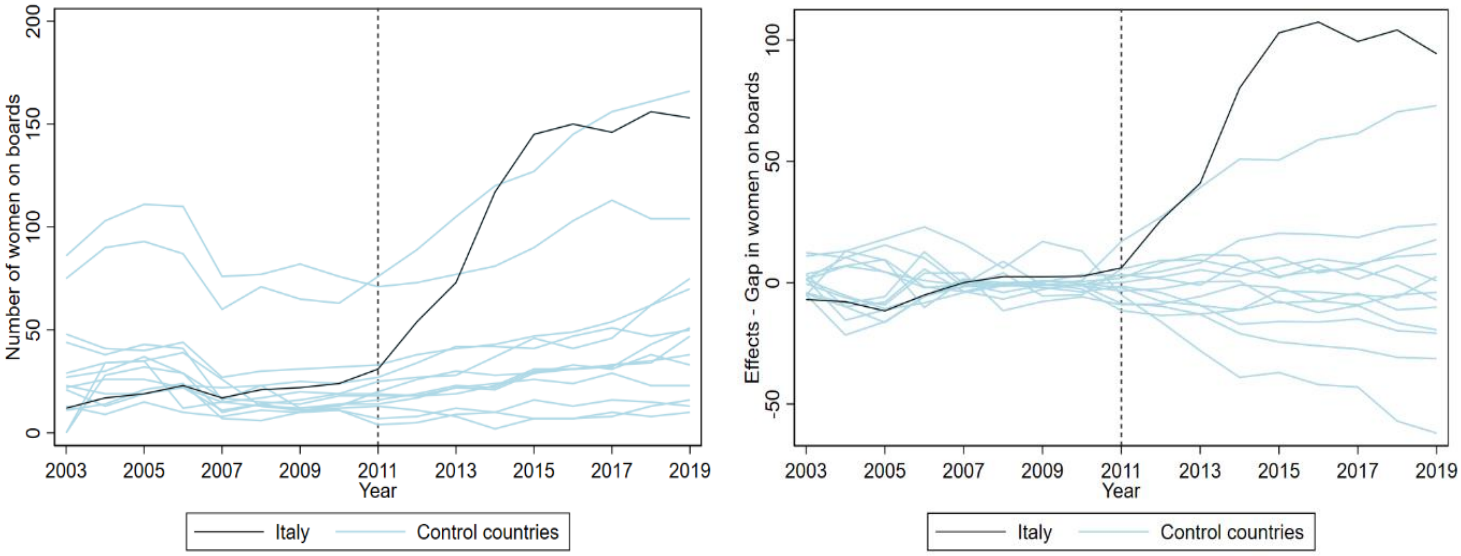
6.3.2 In-space placebos

The second placebo test that I conducted is the "in-space" placebo. This step involves moving Italy to the donor pool, and consequently moving a different country from the donor pool to become a treated unit, each time (Galiani & Quistoff, 2017). With this process, Abadie et al. (2010) and Abadie et al. (2015) explained that there should not be equal or larger results than the main results of a synthetic control, otherwise those results would not be credible. Figure 6a presents the placebos for the number of women on boards for every country in the donor pool, assuming that in each case there is a policy in 2011 that mandates public disclosure or specific election rules for board of directors. There, two countries seem to be starting from a higher number of women on boards in 2003, and only one of them reaches a higher level of women on boards in 2019. That country is Germany. However, the important in-space placebo test is the one in Figure 6b. Figure 6b illustrates the gap in the number of women between the actual scenario in which the law no. 120/2011 was enforced in Italy, in black, and the synthetic scenario for each country in the donor pool, in blue. The closest blue line to the solid line of Italy is once again Germany. However, it is not a source of concern for the validity of the main results because Germany is not given any weight in the main synthetic control method estimation. Moreover, the results of Figure 6b are neither equal nor larger than the results for Italy, and thus this case does not enter in the potential invalidity scenario that Abadie et al. (2010) and Abadie et al. (2015) warned against. Overall, the placebo tests conducted in this section ensure the reliability of the main results generated in Chapter 6.2. Together, they demonstrate the efficacy of a mandatory Gender Board Quota policy, demonstrating that

without it, the trend of the number of women on the boards of Italian listed companies would have been extremely slow and lower than the European average.

Figure 6a: In-space placebo test. Number of women on boards, Italy VS countries in the donor pool.

Figure 6b: In-space placebo test. Gap in the number of women on boards, Italy VS countries in the donor pool.



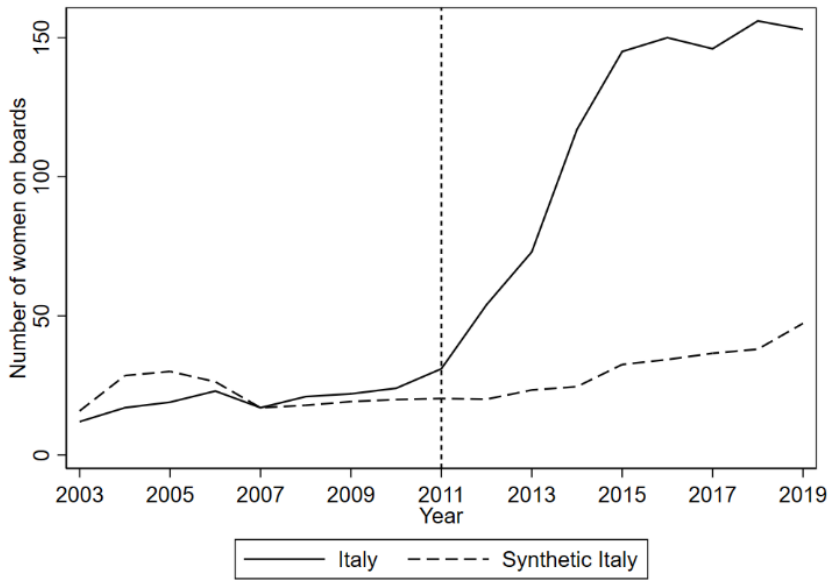
Source: own calculations, data from European Institute for Gender Equality (EIGE).

6.3.3 Leave-one-out robustness test

As part of the post-estimation tests, I change the design of the study to further understand the validity of the results. Following Abadie (2021), the choice of units in the donor pool is one of the main elements that could change the estimated results. A powerful way of assessing the validity of the donor countries is to leave out from the donor pool each of the countries that were given a positive weight to create the synthetic control unit, one at a time (Abadie, 2021). In this study, the countries that need to be excluded one by one are the Netherlands, Poland and Portugal. While there are no concerns for the weights given to Poland and Portugal, given their similarities to Italy when it comes to the role of women in society (EIGE, 2020), the Netherlands raises more doubts. Moreover, while the Netherlands implemented a Gender Board Quota policy in 2016, it announced the policy in 2008, including it in the Dutch Civil code in 2013. Thus, both the Netherlands and Italy may have experienced anticipatory effects that led the companies listed in the Stock Exchange to change their boards prior to the introduction of the law (Lückerath-Rovers, 2015). In this case, it would not be appropriate to include it in the donor pool, and the robustness check is necessary to assess if it is the case.

Figure 7a shows the synthetic control built by excluding the Netherlands from the donor pool. The synthetic control does not seem to follow a different trend compared to the main results of Figure 4. Tables F and G in the Appendix present the weights assigned to the units left in the donor pool and the average of the predictor variables, respectively. The weights in the donor pool without the Netherlands go to Ireland, Germany and Poland, a new combination compared to what has been seen so far. Figure 7b depicts instead the synthetic control estimation without Poland[8]. Finally, Figure 7c represents the estimation without Portugal[9]. Mainly, from looking at the three Figures 7a, 7b and 7c, the main results of the actual effects of the law no. 120/2011 of Figure 4 are nothing but further validated. Synthetic Italy follows the same trend in Figure 7a, 7b and 7c, and despite excluding on purpose one component from the donor pool, the methodology is built as such that the new weights that make up the synthetic control unit change without changing the outcome of the synthetic control, in the hypothesis in which no Gender Board Quota law was implemented. These findings ultimately communicate that there is strong evidence supporting the hypothesis that laws prescribing positive actions like Quotas are an effective tool in achieving higher levels of gender equality.

Figure 7a: Leave-one-out robustness test, Italy VS synthetic Italy, excluding the Netherlands.

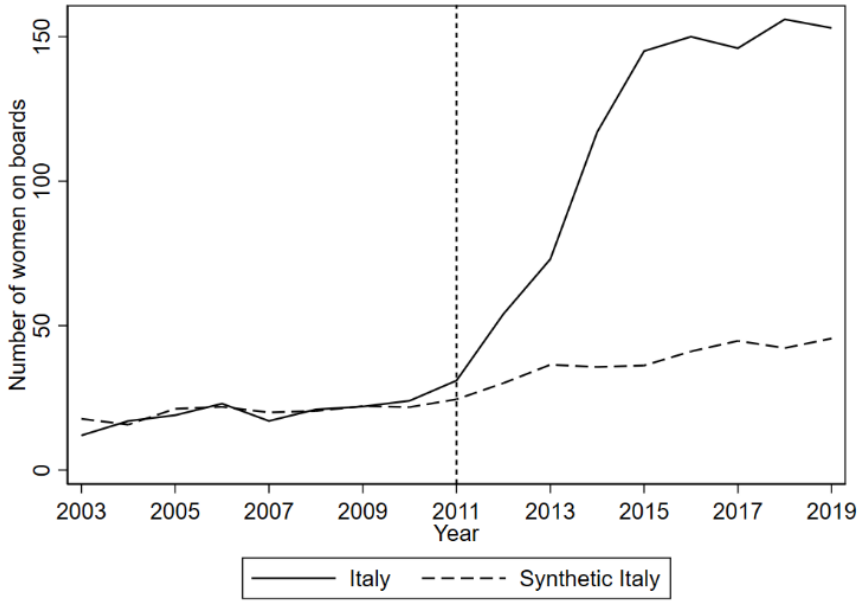


Source: own calculations, data from European Institute for Gender Equality (EIGE).

[8] For further analysis, Table H and Table I in the Appendix show the weights assigned to the units left in the donor pool and the average of the predictor variables, respectively, when excluding Poland.

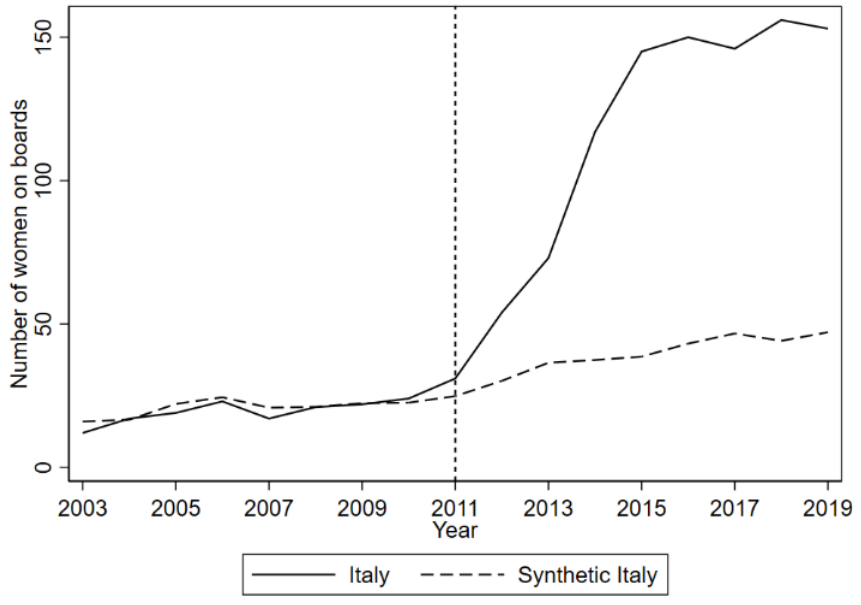
[9] For further analysis, Table J and Table K in the Appendix present the weights assigned to the units left in the donor pool and the average of the predictor variables, respectively, when excluding Portugal.

Figure 7b: Leave-one-out robustness test, Italy VS Synthetic Italy, excluding Poland.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

Figure 7c: Leave-one-out robustness test, Italy VS Synthetic Italy, excluding Portugal.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

6.3.4 Different outcome variable

Before concluding the estimation of the synthetic control methodology, a reasonable question to investigate is whether introducing a mandatory quota for the number of women that should be represented in the board of directors has effects at lower levels of the corporate hierarchy.

With data from UNECE (2022), I estimated a synthetic control with the percentage of women in senior and middle management positions as the outcome variable. This study serves both as a further robustness test as well as an informative study on the effectiveness of introducing gender equality in top positions only. After collecting the data and conducting the study, the graph in Figure L in the Appendix does not show a good pre-treatment match. The percentage of women in senior and middle management in Italy appears to be stagnant, not slightly affected by the Gender Board Quota policy, while the Synthetic Italy follows an upward trend. However, this example does not lead to solid conclusions, because this outcome variable was not the focus of my study and as I explained in the Methodology in Chapter 4, an accurate estimation of the synthetic control method requires many assumptions that are case-specific. Thus, the assumptions and predictor variables chosen to estimate the number of women on boards are not the same that may be needed to influence the outcome of number of women in senior and middle management positions.

7. Discussion and Concluding Remarks

My thesis is, to the best of my knowledge, the first attempt in estimating how the number of women elected as board members in the Italian largest companies would have evolved without the law no. 120/2011, which raised conflicting opinions from within the business world and politics. So far, the existing literature on the topic has focused only on understanding the impact of the policy on the labour and financial markets, both in Italy and in other countries. However, considering the debate on the unfairness and economic inefficiency of such a policy, there is no study that tried to empirically assess how the situation would have changed if the law no. 120/2011 was not made mandatory for all listed companies. The recent extension of the original 2011 law with the newly approved law no. 160/2019, together with the will of the president of the European Commission Von Der Leyen of extending a mandatory 40% Gender Board Quota to all EU countries enhances the research need to understand if a government intervention is necessary to guarantee a gender-equal board representation.

Estimating the descriptive evidence on the number of women elected on the boards of Italian listed companies in Figure 3, I provided evidence of the slow increase of female presence over the period analysed, with a complementary decrease of male presence. Afterwards, I applied the synthetic control methodology to the data collected, and I was able to generate a matching synthetic Italy that shown similar socio-economic characteristics to the actual Italy, made in different weights by the Netherlands, Poland and Portugal. As the synthetic control method is based on graphical analysis, Figure 4 represents the most significant piece of evidence to answer the research question that I laid out in the beginning of the thesis. That is, without the introduction of an affirmative action policy such as the law no. 120/2011, the number of women that hold a seat in a board of directors in Italy would have increased only slightly, while with the policy, the number of female board members increased dramatically. My findings are also a strong argument that justify the reason why the law no. 120/2011 was renewed in 2019, to bring female representation on the boards of Italian listed companies to $2/5^{th}$ for six post-reform board elections.

The empirical findings of my thesis are the main contribution to the branch of the literature that aims at understanding if affirmative action policies are useful in advancing the position of women in society, or if they are government-led distortions that bring the market away from equilibrium and an efficient allocation of resources. Clearly, Figure 4 shows that the Italian Gender Board Quota policy met its goals. My findings are in line with those by Maida and

Weber (2019) and Ferrari et al. (2021), that focused on the Italian case, although I used aggregate data at the country level, while Maida and Weber (2019) and Ferrari et al. (2021) used individual-level data. Together, my study and previous related research support the case for the introduction of affirmative policies such as Board Quotas in the corporate environment, when there are demand-side limitations that would not change without active government intervention. As Boyallian et al. (2019) highlighted, taste-based and statistical discrimination are typical demand-side causes for why there are not enough women in leadership and powerful corporate positions. If there are equally qualified women and men, electing a new board member should not be made on gender considerations (Gregory-Smith et al., 2014). However, when there are long lasting path-dependency mechanisms of boards predominantly made of men that appoint new members from networks of mostly male individuals, an intervention is necessary. Villar (2017) reported that Italian women active in the labour market have a high level of education and higher average wages. Thus, the lack of qualified candidates is not a valid reason for why women were nearly missing from Italian boards at the beginning of the observed period.

Increasing the number of women in leadership positions has broader implications than merely achieving equal representation at the top of the corporate ladder, both in Italy and abroad. Matsa and Miller (2013) found that in Norway, the impact of a Gender Board Quota on companies' performance was not led by characteristics like directors' ability, rate of corporate activity, or self-centrism tendencies. Rather, the change in the style of boards' decision-making complied with the evidence that leadership style differs by gender. While male directors praise self-achievement, power, respect of tradition and conformity, female directors prioritize universalism, altruism, directionality and constant improvement. Matsa and Miller (2013) reported evidence that these qualities had significant implications for corporate outcomes. Among these, corporate strategy experienced a considerable shift. The main tasks of a board concern hiring CEOs, advising C-suite management and monitoring corporate control activities. While boards are not directly involved in setting corporate strategy, the increase in female members has led to the appointment of CEOs and executives that are stakeholder-conscious, and patient. These considerations, together with the element of equity and fairness mentioned by Gregory-Smith et al. (2014) constitute the "why" in the debate for larger female representation in the corporate sector. Moreover, with the rising importance of environmental, social and governance (ESG) criteria in business standards, and the meaning that ESG holds for a sustainable future, governments have a further responsibility in intervening in the market.

By putting more women in leadership positions, they would represent the interests of a larger and more diverse part of the population, the "S" part of ESG. ESG-related actions match with the qualities and interests of female directors, and female board members are more likely to campaign for ESG-oriented policies and improve business performance in those areas (Ginglinger & Raskopf, 2020).

Overall, my thesis provides significant empirical evidence on the importance of government intervention for increasing female representation on boards of directors, for the case of Italy. Nonetheless, some limitations remain. Although I considered the most important socio-economic predictor variables in the structure of my empirical model, future research could go further by including cultural-related variables as well. While my study focused on Italy, a country with traditional social values, previous analyses on the topic of Gender Board Quota were set in Norway, a much more open-minded country when it comes to family and gender roles. The findings for both countries were similar, but there is a valid reason to assume that by including culture data in the analysis, future research could be useful in understanding whether different countries need the same type of government intervention to ensure gender-balanced board representation, which is missing from this thesis. In addition, new studies could be centred on understanding whether including women on boards instead of other under-represented groups is enough to advance corporate diversity, or if it gives rise to other discrimination. Innovative methods such as synthetic controls together with increasingly available gender-disaggregated data will facilitate the analysis of new research questions. Regardless of the precise topic, any research that provides more evidence on women's needs is welcome, for a future without discriminations for all.

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Appendix

Table A: Pairwise correlation matrix for the variables in the dataset.

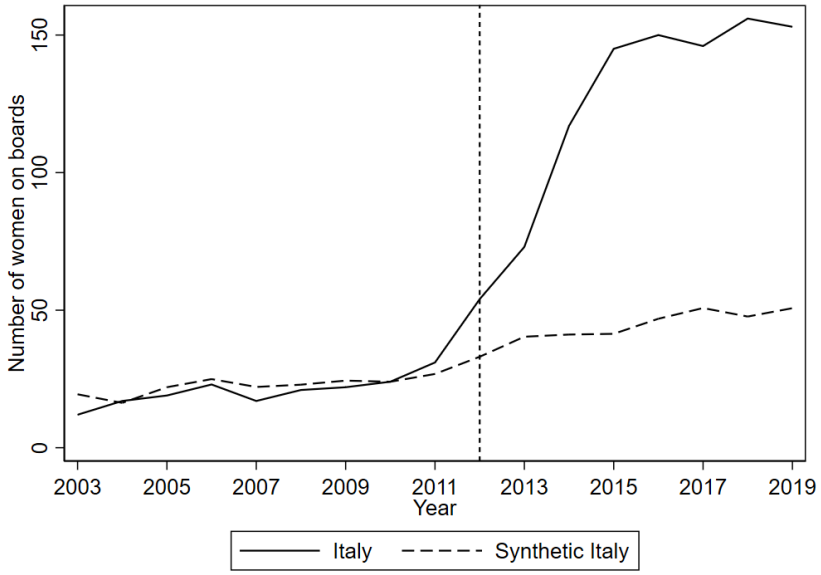
Variables	(1)	(2)	(3)	(4)	(5)
(1) Number of women on boards	1.000				
(2) GDP per capita	0.426	1.000			
(3) Social expenditure (% of GDP)	0.480	0.134	1.000		
(4) Employment Ratio (Female to Male)	0.301	0.403	0.256	1.000	
(5) Business Graduates Ratio (Female to Male)	-0.275	-0.619	-0.322	-0.100	1.000

Table B: Statistical significance estimation of the synthetic control in the post-treatment years.

	Estimates	p-values	Standardized p-values
c1	6.096	.308	.308
c2	25.667	.077	.077
c3	40.952	0	.077
c4	80.227	0	0
c5	102.975	0	0
c6	107.43	0	0
c7	99.429	0	0
c8	104.161	0	0
c9	94.351	0	.077

Note: c1 to c9 represent the post-treatment years, and the (standardized) p-values indicates for whether the number of the women on boards for the synthetic control estimate (Italy) is significant or not, after the policy intervention.

Figure C: In-time placebo test. Number of women on boards, Italy vs Synthetic Italy, 2003-2019, with treatment year equal to 2012.



Source: own calculations, data from European Institute for Gender Equality (EIGE).

Table D: In-time placebo test. Synthetic control weights to create the synthetic Italy, based on the number of women on boards, when the treatment year equals 2012.

Country	Synthetic Control Weight
Austria	0
Czech Republic	0
Germany	.019
Greece	0
Hungary	0
Ireland	0
Netherlands	.858
Poland	.123
Portugal	0
Slovak Republic	0
Slovenia	0
Sweden	0

Note: When the treatment year equals 2012, Denmark is dropped from the donor pool, compared to the main estimation of Table 3 in Chapter 6.2.

Table E: In-time placebo test. Average values of the predictor variables, when treatment year equals 2012.

	Italy	Synthetic Italy	European sample
GDP per capita	25,751.11	30,176.07	25,753.79
Social Expenditure (% of GDP)	25.06	18.34	22.02
Employment Ratio (Female to Male)	.66	.83	.82
Business Graduates Ratio (Female to Male)	.93	.93	1.49
Women on Boards (2003)	12	19.44	29.36
Women on Boards (2007)	17	22.11	23.36
Women on Boards (2010)	24	24	25

Table F: Leave-one-out robustness test. Synthetic control weights when leaving out the Netherlands from the donor pool.

Country	Synthetic Control Weight
Austria	0
Czech Republic	0
Denmark	0
Germany	.029
Greece	0
Hungary	0
Ireland	.622
Poland	.349
Portugal	0
Slovak Republic	0
Slovenia	0
Sweden	0

Table G: Leave-one-out robustness test. Average values of the predictor variables, when leaving out the Netherlands from the donor pool.

	Italy	Synthetic Italy
GDP per capita	25,596.67	25,852.51
Social Expenditure (% of GDP)	24.86	19.13
Employment Ratio (Female to Male)	.66	.80
Business Graduates Ratio (Female to Male)	.90	1.50
Women on Boards (2003)	12	15.85
Women on Boards (2007)	17	17
Women on Boards (2010)	24	19.93

Table H: Leave-one-out robustness test. Synthetic control weights when leaving out Poland from the donor pool.

Country	Synthetic Control Weight
Austria	0
Czech Republic	.119
Denmark	0
Germany	.002
Greece	0
Hungary	0
Ireland	.622
Netherlands	.794
Portugal	.085
Slovak Republic	0
Slovenia	0
Sweden	0

Table I: Leave-one-out robustness test. Average values of the predictor variables, when leaving out Poland from the donor pool.

	Italy	Synthetic Italy
GDP per capita	25,596.67	29,712.17
Social Expenditure (% of GDP)	24.86	18.35
Employment Ratio (Female to Male)	.66	.82
Business Graduates Ratio (Female to Male)	.90	.95
Women on Boards (2003)	12	17.76
Women on Boards (2007)	17	19.97
Women on Boards (2010)	24	21.8

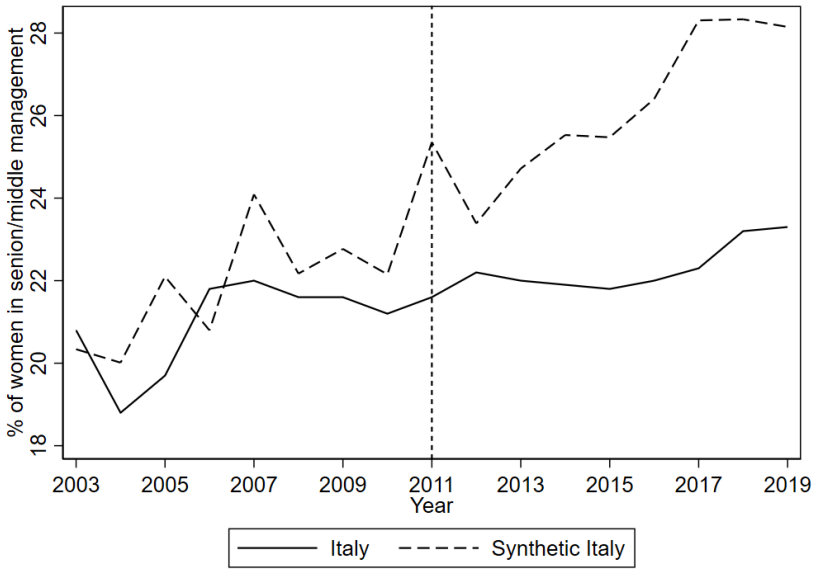
Table J: Leave-one-out robustness test. Synthetic control weights when leaving out Portugal from the donor pool.

Country	Synthetic Control Weight
Austria	0
Czech Republic	0
Denmark	0
Germany	0
Greece	0
Hungary	0
Ireland	0
Netherlands	.76
Poland	.24
Slovak Republic	0
Slovenia	0
Sweden	0

Table K: Leave-one-out robustness test. Average values of the predictor variables, when leaving out Portugal from the donor pool.

	Italy	Synthetic Italy
GDP per capita	25,596.67	27,679.76
Social Expenditure (% of GDP)	24.86	18.59
Employment Ratio (Female to Male)	.66	.82
Business Graduates Ratio (Female to Male)	.90	1.10
Women on Boards (2003)	12	15.96
Women on Boards (2007)	17	20.8
Women on Boards (2010)	24	22.56

Figure L: Different outcome variable. Proportion of women in senior and middle management positions, Italy VS synthetic Italy, 2003-2019.



Source: own calculations, data from UNECE.