

The Impact of Gender Quotas on Female Labor Market Indicators

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Introduction

In the summer of 2017, an internal memo written by a now former Google employee went viral. The memo was widely criticized for stating that biological differences between men and women “may explain why we don’t see equal representation of women in tech and leadership” (Damore), implying that conscious or subconscious sexism is not the definitive source of gender gaps within the work force. However, regardless of what was stated within the memo, it was another moment in which society and companies needed to address the continued existence of gaps for women in leadership positions. A 2016 “Women in the Workplace” study published by McKinsey & Company found that women were underrepresented in every stage of the corporate ladder, from 46% representation in entry level positions to 19% representation in the C-Suite, which includes executives like CEOs, CFOs, etc. (McKinsey & Company, 2016). Specifically, in leadership roles, women only make up a 37% representation in managerial positions and 33% in senior management or director positions (McKinsey & Company, 2016). This discrepancy further elongates the existence of vertical segregation. This vertical segregation persists even as women are entering more management positions. From 1970 to 1998 there was a 32% increase in female managers, but by 2010 we saw the percentage of female managers drop by 4% even though the ratio of women in the labor force increased (Havesman and Beresford, 2012). This gap in female leadership also extends into politics where “less than 19% of legislators in the world today are female” (Pande and Ford, 2011). Even outside of leadership positions, the disadvantages women face in the labor force like wage inequality, careers being cut short, and receiving less career feedback have all been well documented.

Despite this disparity in female leadership, when women are in leadership, managerial, or executive positions, research has shown that both the women and the company or political institution perform well. Noland, Moran, and Kotschwar (2016) found that there is some positive correlation between the presence of female executives and firm performance. Of course this correlation does not imply causality, but it does suggest that having more diversity among the upper-levels of a company is associated with positive outcomes. They even found that profitable firms saw their net revenue margin increase by 15% when female leadership increased from zero to 30 percent (Noland, Moran, & Kotschwar, 2016). Similarly, research analyzing Norwegian firms by Nielsen and Huse (2010) found that increased ratios of female directors positively impacted a board’s strategic control and enhanced both strategic and operational control of boards (Nielsen and Huse, 2010). In politics, evidence from India has shown that exposure to female politicians can reduce bias against women in leadership roles (Beaman et al., 2009) and can increase educational outcomes and aspirations of young girls (Beaman et al., 2012).

With the combined evidence that institutions lack female leadership, but female leadership can lead to positive outcomes, gender quotas are introduced. Gender quotas are a policy mechanism that ensures women are given a certain level of representation within a decision-making body. As we see more women than men graduating from college and more women than men entering managerial positions (Pande and Ford, 2012), quotas are an effective way to promote the growing convergence between men and women in some important upper segments of the labor force. Better representation is important beyond achieving equity; an inclusive and larger labor market can result in increases to GDP, more economic productivity, and general economic growth (UN Women 2017).

Quotas are implemented in both political and corporate sectors and are aimed at increasing the female share of decision-making boards. This means that quotas are directed towards women already at the top of the managerial and political ladder. Research has shown

that when quotas are in place, benefits tend to assist those women already on executive boards or in leadership positions by strengthening their power, however the impacts on working women or women in less prominent positions are minimal (Matsa and Miller 2013). This contradicts with evidence that has found that in years when quotas are adopted, the quotas broadly and positively impact female representation (O'Brien and Rickne 2016). If this is the case, we should be seeing the positive outcomes of quotas also impact women who are not at the top. Can society reach gender equality if policy mechanisms intended to do so don't help all women?

The focus of this research is to better understand if women see positive changes in their labor market performance when gender quotas in political and corporate decision-making bodies are implemented. This will allow me to analyze if quotas have top-down effects on the labor market. I will be examining the effects on female labor market indicators when corporate and political quotas are introduced using a fixed effects model. The dataset used is a panel dataset for the EU 15, Norway, Latvia, and Estonia. Because the dataset is a cross-country time series, I control for country fixed effects, time fixed effects, and utilize country-specific time trends to account for any existing trends prior to quota implementation and any net changes as a result of the quota. For this same reason, I interact the quota and time trends.

To approach my research, I begin by analyzing employment trends and presenting stylized facts to provide an understanding of how the labor market has been evolving towards male and female employment convergence. My goal in presenting these stylized facts is to provide insight on what the final results are likely to show. In addition to the stylized facts, I ran a preliminary regression to assess if quotas are achieving their intended goal. This was key to my research because there should be evidence that quotas are working for my research to have any validity. It was found that political quotas do indeed increase female representation when using both fixed effects and time trends. While these results were positive and significant, their small numerical magnitude suggested that quotas may have that same limited impact on female employment. In the case of the final results found in my research, that is true; quotas have small to no effects on female employment. In some cases, there is even potential for the implementation and prolonged existence of quotas to harm female employment in the long run.

In the remainder of this paper, I will provide information on quotas and their history within the EU and then review supporting and relevant literature that adds to this research. Next, I will delve into the data used and describe its importance before introducing the empirical model. Finally, I will analyze the results, what the results suggest, and discuss my robustness checks. The paper will conclude by discussing the larger implications of this research and where research can go in the future.

Background

I. Quotas

Quotas have been implemented across the globe over the past four decades in efforts to attain gender balance in decision-making bodies. The UN Economic and Social Council supported this goal of gender equality, so in 1990, they set a 30% target for women on political decision-making bodies by 1995 (Pande and Ford 2012). Because female representation in political bodies was discussed on this global scale, we see political quotas being the first kind to be implemented on a large scale across countries, government, and parties. However, not all political quotas are the same.

There are three different kinds of political quotas that can be implemented by governments or political parties. First, there are voluntary political party quotas which are, as the

title suggests, voluntarily introduced by a party. These quotas set the minimum percentage for female representation on a candidate ballot. This ensures that when voting, women are given the same opportunity for a party nomination. The next kind of quota is a legislative quota. These are legal candidate quotas that have the same purpose as voluntary party quotas, but legislative quotas enforce the share of females by legal requirement. This can be mandated in the form of a constitutional amendment or changes to the electoral laws. Legislative quotas can also specify the ways in which women appear on the ballot; e.g. every other candidate must be a woman. Finally, reserved seat quotas are those that require a certain percentage of women to be elected, and these are also enforced by constitutional amendment or electoral laws.

While the goals of having a quota policy are well-intentioned, even with legally mandated quotas, the possibility of them not working does exist. The effectivity of the quotas relies on “the actual rules [of the quota] and the possible sanctions for non-compliance” and potentially, the order in which women appear on the ballot (International Institute for Democracy and Electoral Assistance). In terms of sanctions for non-compliance, parties can have their ballots rejected prior to the election, or they can face financial repercussions. It has been found that rejecting the list is the most effective (Freidenvall and Dahlerup, 2013).

In the corporate sector, while both voluntary and legislated quotas are implemented, legislated quotas are the most fast-acting and effective. The legally enforced corporate quotas reflect political reserved seat quotas as companies are required to have some percentage of their board consist of women. Typically, boards aim for anywhere between 20% to 40%, with changes to representation occurring over time as a way to ease the transition of increasing female representation (Walby, 2013). Like political quotas, there is variance among countries in the percentage of women desired, the kinds of companies targeted by quotas, and sanctions for non-compliance.

II. Quotas in the EU

My research focuses on the EU, specifically the EU 15 and several other European countries. The EU is a strong sample for this study because of their variation in policies, female participation across member countries, and levels of economic development. The EU is still working towards reaching a gender balance in decision-making positions across the EU. In 2012, the European Commission proposed legislation that aimed to attain “a 40% objective of the under-represented sex in non-executive board-member positions in publicly listed companies” (European Commission, 2012). This proposal required state-owned companies to meet this requirement by 2018 and for publically listed companies in the EU to meet it by 2020. Despite the growth in quotas across the EU, a lack of significant quantitative changes in female representation on corporate boards required the Commission to accelerate the growth. And as of April 2016, women only made up 23.3% of board members in large public companies (European Commission).

The earliest quotas seen in Europe, included in my research, have been brought forth by Norway. They were the first country to adopt any form of political quotas, with their Social Left Party adopting a voluntary party quota in 1975. It required at least 40% representation of both genders on their election ballots (Pande and Ford, 2012). Norway also addressed gender disparity in public companies by passing a law in 2003 that required 40% representation of both genders on the board of directors. This example highlights an aforementioned challenge of quota sanctions. Most firms did not voluntarily follow the law, so the law had to become mandatory in 2006, and by 2008, if any firm did not comply, they were dissolved (Bertrand et al., 2017). With these rules established, the median percentage of women increased from 0% to 40% from 2003

to 2008 (Bertrand et al., 2017). Following Norway's lead, other countries in Europe began passing political and corporate quotas. Currently, corporate quotas are being implemented more frequently, in part due to European Commissions requirements, and in part due to more attention being given to inadequate female representation.

Literature Review

Existing literature on the quantitative impacts of gender quotas on the labor market is scarce, but there is indeed literature on quota implementation. This area of research primarily focuses on the effectivity of quotas on increasing female representation and how an increased share of women affects institutions. Evidence on political quotas identifies how quotas might alter policies, inspire social change, or what political environments are more conducive to the introduction of quotas. Evidence around corporate quotas evaluates how companies fare after female representation increases in terms of profitability, structural changes, and business success. This is where my research differs. My research will focus on the effects of quotas implemented at the top on the overall labor market convergence of women relative to men. Not only will I be examining the singular impacts of political and corporate quotas, but I will be analyzing if the magnitude of the quota makes a difference on labor market indicators. Additionally, examining the labor market separates my research because I will be looking at a sector of the economy that isn't the focus of the quotas.

Chen (2010) investigated if the introduction of gender quotas would increase female representation and change policy outcomes. Using a difference-in-difference approach with two sets of data for female representation in the lower chamber before and after quota implementation, Chen found that countries with quotas introduced have a 5.03 percentage point increase in female legislators. Chen's empirical specification uses a dummy variable to indicate a quota policy, includes country fixed effects, and controls for "the post-effect of gender quotas" and variables that might influence the dependent variable (Chen 2010). Tests for robustness include a variable for time trends to reduce bias estimators that can result from independent trends prior to quota implementation. The results show that there are varying increases in female legislators across several decades which can be attributed to the introduction of quotas.

Bertrand et al. (2017) examines how Norway's passage of a 40 percent representation quota of both genders on corporate boards impacted women inside and outside public companies. They used a linear probability model with data from public Norwegian companies and the Norwegian Registry to find positive results that more qualified women were elected to corporate boards after the quota was passed, and the inter-company wage gap decreased. While results showed young college women had increased confidence in business careers, there were also general increases across other majors, implying the quota may not have singularly made the positive impact. And even with more qualified and a greater number of women on boards, women within the company as a whole saw no spillover benefits and even saw some potential negative effects. This literature is of importance because it suggests that a quota mandate may leave benefits trapped to women already at the top, and "regular" working women may not see any difference. It also serves as a good paper to reference for empirical methodology.

Similarly, Matsa and Miller (2011) wrote about corporate spillovers in the workplace based on the representation of women. Although this paper does not look at quotas, it serves as evidence on whether increased female representation can have top-down effects. Looking at corporate and executive board members in the U.S from 1997 to 2009, they found that increased female board membership increases the likelihood of a female executive being elected and the

share of those female executives' compensation. Again, we see that more female representation is beneficial for women already at the top.

Beaman et al. (2012) use gender quotas in India to conduct a randomized and natural experiment that tests if the increase in female political leaders positively impacts career aspirations, educational attainment, and future labor market outcomes of young girls. Examining 495 Indian village councils in which some had reserved seat quotas for women and some didn't, based off survey results, Beaman et al. found that in villages with female councilors, adolescents reported a 10% increase in the desire to graduate and an 8.6% increase in a desire to have a job that required an education (Beaman et al, 2012). While this suggests that gender quotas are great in creating role models and might have implicit impacts, Beaman et al., did not find any explicit changes to the labor market outcome of women aged 16-30. We see that, although this literature used a survey to conduct the primary results of their experiment, the likelihood of seeing trickle down effects to the working woman may be little to none.

Comi, Grasseni, Origo, and Pagani (2017) contribute to the literature on corporate quotas with their working paper by analyzing firm performance across countries to identify why heterogeneous effects might be encountered. They utilized a triple-difference estimator in order to compare the performance of firms with and without quotas in countries with quota legislation and those in countries without legislation. Their model also includes a country-specific time trend. The analysis revealed that heterogeneity in firm performance after a quota is introduced relies on the design of the quota and the country where the quota is applied. Specifically, the authors mention that the positive results that have been seen with Norway's corporate quotas cannot extend to other countries. Understanding heterogeneity with quotas assisted in how I constructed my robustness checks.

Caul (2001) analyzed why certain political parties adopt quotas using data from 71 political parties across 11 advanced countries. Among all of the variables used, the one that is the most telling and significant is the variable for the percentage of women in a party's leadership. Using an event history analysis method that produces a maximum likelihood, Caul finds that a high ratio of women in a party increases the likelihood of adopting a quota by 8% (Caul, 2001). We can infer from this evidence that there is potential for political and corporate quotas to benefit other women due to the intervention of women at the top.

Not only do these papers serve as a foundation and references for where my begins, but it shows that quotas, although implemented with good intentions, can have a variety of impacts and vary in their influence of empowering all levels of working women.

Data Description

The most relevant data collected are those related to quotas: the year of implementation, the desired percentage of representation, and the kind of quota. For electoral quotas, all of this data is provided by a dataset compiled by the International Institute for Democracy and Electoral Assistance. This data base is managed by the International IDEA, the Inter-Parliamentary Union, and Stockholm University. This dataset allows for an individual to filter by region and filter the quotas by type (party, legislative, reserved), source (constitution, electoral law), and level of implementation (single/lower house, upper house, sub-national level). I will be analyzing quotas applied in the EU 15 plus Latvia, Estonia, and Norway over the time period of 1990-2015. Latvia and Estonia are controls as neither have any kind of quotas enacted. Norway is included due to being the first to implement any quotas. Additionally, I will only be utilizing legislative quotas, which make up 38% of all political quotas in place, as the form of political quota (Pande and

Ford, 2012). Legislative quotas are ideal for measuring the impact of political quotas because they are legally enforced, uniform, and there is more available data. The uniform enforcement of legislated quotas also ensures that the reason for an increase in political composition towards women can be attributed specifically to these quotas.

While there is no database for corporate quotas, I have been able to compile the data thanks to the research of other scholars who have studied corporate quotas. For example, Pande and Ford's (2012) research on both quotas has provided corporate quota information like country, the year introduced, target for female representation, and companies impacted for Norway, Spain, France, the Netherlands, Denmark, Finland, Ireland, and Italy. This data has also been supported and corroborated by a report from the European Parliament's Committee on Gender Equality.

The data on quotas is used to construct the three main policies variables that examine the impact of each quota individually and when they interact. The variables for the individual quotas will be separated into two variables. In one, they will be coded as dummy variables, indicating whether or not a quota is in place. The other will be representative of the magnitude of the quota; coded for 0 if there is no quota and coded between 0-0.5% depending on the percentage target of the quota. Because these policies variables only account for legislative quotas, I will use another dummy variable as a control to account for co-existing voluntary party quotas. Also related to the political quota variable, I will be including a variable that interacts the quota policy and time trends. This variable will only be applicable when coding the policy variables as a dummy variable. This variable will allow for the political quota to be fit with existing time trends.

Female labor market indicator data is sourced from the Organization for Economic Cooperation and Development's statistical database. This data will consist of the female to male employment to population ratio, the female employment to population ratio, the female to male unemployment ratio, and the share of females working part-time or full-time. I believe that this data addresses a variety of indicators that can tell us about how quotas are impacting the labor market as a whole and certain conditions within the market. Specifically, I included the female share of full and part-time work to analyze if quotas could alter a woman's preferences for the kind of work they did.

World Bank data will be used to account for the control variables of GDP growth per year and female to male graduation rates from secondary and tertiary education. Controls for the political leaning and gender of a country's head of government were obtained from the International Parliamentary Union's database on national parliaments.

Country and time fixed effects will be included, and I will also be including a country-specific time trend. The country-specific time trend variable is vital to capturing the impact of the quotas. If this variable was not included, the coefficient on the policy variables would evaluate any change caused by the quota as a change in the intercept without adjusting for a difference in trajectory. Whereas, using the country-specific time trend accounts for existing trends before a quota was implemented and picks up the net change caused by the quota. It controls for exogenous changes that could impact the dependent variable that haven't been addressed by other variables as well.

Overall, the dataset will be panel data because I will be observing the influence of the quotas overtime rather than looking at a "before" and "after" time period. Panel data is also the preferred form of data because it allows me to control for a range of variables that are both observable and non-observable.

Preliminary Results

With this data, we can compile preliminary stylized facts and results that allow us to gain an initial understanding about how quotas have been working thus far and if they have had an impact on female employment. The first stylized fact, presented in Figure 1 in Appendix A, is a chart graphing the percentage difference between male and female employment ratios over time. The closer a country's trend line is to the base of the axis, the smaller the difference between men and women and vice versa. Immediately, it is clear that all countries are on a downward and converging trend of the percentage of employment between men and women. The trend lines for each individual country also tend to follow the same slope, indicating a consistency in the downward trend over time. This may be applicable to the ways in which society and women have progressed towards better equality in the workforce in recent decades. As previously mentioned, with more women graduating college and entering managerial positions than men (Pande and Ford, 2012), this is a safe assumption to make. Women are indeed making positive strides to increase their employment relative to men in the labor force, and this chart reflects that. However, that also provokes a question about the importance of quotas. With the advancements that women are making over time as seen with the downward lines, quotas may not have much of an impact if there is naturally an employment convergence. This is further supported by the fact that Figure 1 has no discontinuities in the trend lines. There are no significant changes in the slopes of the lines in the period in which quotas are being enacted. This inability for quotas to significantly further impact female and male employment convergence suggests that quotas may have a limited impact.

Figure 2's stylized facts support the hypothesized results of Figure 1. Figure 2 is a more focused view on the changes to the female to male employment to population ratio for countries in which legislative quotas have been enacted. The vertical line which all countries' lines pass through indicates the year in which any of those countries imposed their quota. To the left of the axis is the female to male ratio prior to the quota and to the right of the axis is the ratio in years after. Similar to Figure 1, we see that the countries' employment to population ratio lines all follow the same trajectory and slope before and after a quota is in place. This is reflective of the continual downward trend presented in Figure 1, with quotas having little to no impact on employment. If there were the situation in which quotas were to have a significant impact on employment, we would be seeing the lines in Figure 2 jump up in intercept on the y-axis and then even have a steeper slope. Those changes would suggest that a quota would not only increase female employment but bring about a higher rate in which female employment was converging with male employment. But, we do not see that. Figure 2 again is presenting that quotas are likely to have limited impacts on female employment.

Finally, Figure 3 looks at a broader measure of the difference between female and male employment to population ratios. This figure presents how female to male employment trends changed in years prior to and following the implementation of a quota. This is similar to Figure 2, but this figure presents numerical values. As the figure shows, on average, in the years before quotas were implemented, the ratio was negative meaning that females' employment to population ratios were falling compared to that of males. In contrast we see that in the years after quotas were implemented, the ratio is positive, showing a gain for women. While this supports a general finding of research that quota adoption will positively impact female representation (O'Brien and Rickne 2016), the 0.005 average increase in the ratio after quotas were implemented is incredibly small. This miniscule value reinforces the minimal impact of quotas that we have seen thus far.

While these stylized facts are key to providing a visual understanding of the impact of quotas on employment, quantitative results can tell us even more. Table 1 in Appendix B regressed the percentage of female legislators in national electoral bodies on political quotas and a political quota time trend. This regression checks if quotas “work.” Even if quotas are found to ultimately have a small impact, quotas should still be achieving their intended goal as they are a legally enforced policy mechanism. In the first column, in which only fixed effects were applied, we see a positive and significant coefficient which supports that quotas are indeed working. The 0.0343 coefficient on political quotas means quotas increase female legislators by 3.43 women. With this coefficient also being significant at 99%, it reinforces that quotas are achieving their proposed goal. However, in the second column with time trends applied, we see more challenging results. The coefficient on the political quota variable is significant but negative. While this may seem improbable, there is evidence of political quotas encountering push back and resistance. For example, in France, after a political quota was adopted in 2000 that required an equal number of females and males to be listed on candidate lists, male senators partook in party proliferation, or forming a new party to regain political power (Frechette, Maniquet, and Morelli 2008). Thus, the initial decrease in female legislators is possible due to political push back, implementation difficulties, or other challenges. But, this negative coefficient is in contrast with the positive and significant coefficient on the quota time trend variable. Time trends are of importance because they capture the overall trends brought about by quotas, so this variable tells us that over time, quotas do have a positive impact on female legislator representation albeit quite small.

These stylized facts and preliminary quota results are important because they provide us with a foundation of knowledge surrounding how and if quotas impact women in the labor force. From the above discussion, and as we move into the main regressions, it is likely we will continue to see the trend of quotas having a negligible impact on female labor market indicators.

Empirical Model

To examine the effect of gender quotas on female labor market indicators, I will be using a fixed effect regression with panel data to isolate the impacts of the quotas. A fixed effects model is effective because I am analyzing my data over time and can better understand the relationships between my key policy variables and dependent variables within the units of time and country. The coefficients will be interpreted as, “for a given country [and year], as X varies across time [and country] by one unit, Y increases or decreases by β units” (Bartels 2008). Since the time frame and country all have independent existing characteristics and trends, a fixed effects model also enables us to assess how these characteristics may influence the dependent variable when controlling for average differences. Using controls is necessary when we consider the assumptions of the fixed effects model. We assume that the individuality of years and countries will create some kind of bias within fixed effects, but these time-invariant factors are addressed by the model. With these time-invariant factors, we also assume that they are not correlated with other variables.

With any empirical model, there is a possibility for omitted variable bias and reverse causality. Although a fixed effects model has its benefits in reducing omitted variable bias due to controlling for fixed effects, omitted variable bias is something that always needs to be considered. My equation includes a variety of variables to ensure that I am accounting for influencing factors. In regards to reverse causality, there is a likelihood that it will be encountered because of the possibility of a labor market indicator like employment to population

ratio encouraging the passage of a quota. However, Figure 1 indicates that this may not be the case. But, I will still be implementing a country-specific time trend in my equation.

The equation that will be used to estimate quota impacts is as follows:

$$Y_{ct} = \delta_1 \text{Political}Q_{ct} + \delta_2 \text{Corporate}Q_{ct} + \beta_3 (\text{Pol}Q * \text{Corp}Q)_{ct} + \beta_4 \text{GDP}_{ct} + \beta_5 \text{femgrad}_{ct} + \beta_6 \text{leftright}_{ct} + \beta_7 \text{femHOG}_{ct} + \beta_8 Q + \beta_c (\text{time})_t + \delta_3 (\text{Pol}Q)_{ct} (\text{time})_t + \alpha_c + \alpha_t + \varepsilon_{ct}$$

The dependent variable, Y_{ct} , will consist of: the female to male employment to population ratio, the female employment to population ratio, the female to male unemployment ratio, and the share of females working part-time or full-time. The dependent variable of employment to population ratio of females to males will encompass all ages, rather than stratifying by age group. It should be noted that the minimum age in this data set is 15, which aligns with my education variable which also begins at age 15.

The first three variables, $\beta_1 \text{Political}Q_{ct}$, $\beta_2 \text{corporate}Q_{ct}$, and $\beta_3 (\text{Pol}Q * \text{Corp}Q)_{ct}$, are the most important because they represent if both kinds quotas are in place, only one is, or none are. Their coefficients will have the most telling results as to if their implementation is of any importance for women in the labor market. As previously mentioned the $\beta_1 \text{Political}Q_{ct}$ and $\beta_2 \text{corporate}Q_{ct}$ variables will be identified by either using a dummy to signify the presence of a quota or not or by using the magnitude of the quota (0 – 0.5). These two different forms of coding will allow me to assess which is better at indicating the effectivity of the quotas. The variable $\beta_8 Q$ is also a variable related to quotas. It is a control dummy variable to account for the existence of party quotas within a country. While my main quota variable focuses on legislative quotas, voluntary party quotas still need to be accounted for as they make up 61% (Pande and Ford, 2012) of all quotas in place across the globe.

$\beta_c (\text{time})_t$ and $\delta_3 (\text{Pol}Q)_{ct} (\text{time})_t$ are the country-specific time trend and the interaction of political quota and time trends. As previously mentioned in the data description, the country-specific time trend is important because it captures the overall trend and change in the slope of the line rather than just assessing for a change in the intercept. The interaction of the political quota and time trend is also important as we saw in Table 1. It more accurately reflects the impact of a quota rather than solely using country and time fixed effects.

Empirical Results & Discussion

Overall, the results show that there is little to no impact on female employment due to the implementation of any kind of quota. Significant coefficients were primarily found when running fixed effects regression, which would not assess for the overall trends of quotas. Of more interest, not only have I found that quotas have minimal impact, but on some indicators, the coefficients were negative, suggesting that quotas may hurt female employment. All of the following results for each dependent variable are performed using two forms of the quota variable: as a dummy and as one that reflects the magnitude of the quota.

I. Quotas on Female to Male & Female Only Employment

Table 2 in Appendix B presents the results on female to male and female only employment to population ratios when coding the quotas as a dummy variable. For the female to male ratios, when looking at the fixed effects results in column 2, it is clear that the quotas do have an impact. The coefficients on political and corporate quotas are not only positive, but statistically significant. Even though these coefficients are small, they initially suggest that quotas can potentially assist female employment in respect to men. However, only looking at the

fixed effects would be a grave mistake. If we think intuitively and reference Figure 1 in which all the countries were experiencing convergence in male and female employment to population ratios, this is why we are seeing these positive coefficients. They are picking up the existing downward trends and changes to just the intercept which fails to provide an encompassing view of quotas on employment. Solely looking at fixed effects would imply that quotas have more of a positive effect than they really do. What is more reflective of the impact of quota is in column one, and when we include time trends, all coefficients lose their significance. Thus, overtime, women will not be seeing improvements to their employment as a result of quotas. This is especially clear as the specific coefficient for quota time trends is without significance and numerically small at 0.000772.

Comparing the female to male ratios to the columns for only females, we do see that there is significance for both fixed effects and time trends. Positive and significant coefficients on the fixed effects has been discussed, but it is worth discussing why there is a difference in significance in time trend coefficients between the female to male ratio and females only. The significant, positive coefficients for females only for the political and corporate quota variables suggests that when we only look at female employment, there are positive results that come with quotas. However, in respect to males, the gains that females are making are either insignificant or do not outweigh the employment growth of males or both. Ultimately, once again, there is importance on the quota time trend variable for females only. It is -0.00436 and significant. This suggests that over time as quotas remain in place, quotas may do more to hurt than help female employment.

Table 3 presents this same dependent variable but uses the quota variables coded in regards to the target percentage of women they seek. For the female to male ratio of employment, once again we see that significance is only apparent when running fixed effects. However, in contrast to Table 2, when using time trends, there is a positive and significant 0.0195 coefficient for corporate quota targets. This may suggest that corporate quotas may fare better and have more influence when focusing on the targeted percentage of women in their quotas rather than just broadly enforcing the quotas. Not too much emphasis can be placed on that hypothesis because when we look to the female only coefficients, most of those coefficients are without statistical significance.

II. Quotas on Female to Male & Female Only Unemployment

The tables for the impact of quotas on unemployment are in Appendix C as they do not present unexpected results. These results support those just discussed on employment to population ratios. However, we will still discuss them to further suggest the limited impact of quotas on female employment.

Table 5 uses the quota dummy to analyze impacts to unemployment. We can see that for both the female to male and female only indicators, there is limited significance. But for both indicators, the coefficient of quota time trends when regressing with time trends is statistically significant. For the female to male ratio, the coefficient is expectedly negative, supporting the notion that quotas will decrease unemployment, potentially providing women certain avenues to enter the work force. But as we've seen in previous tables, this coefficient is very small. For females only, the coefficient is actually positive and this again, supports the previous results in Table 2. It seems that it is probable that quotas, over time, can specifically harm females in their employment outcomes.

Table 6, which codes quotas in respect to their magnitude, does not provide us with any additional results that we have not already discussed. It informs us what we know; quotas tend to have minimal effects on female employment.

III. Quotas on Female Share of Full and Part-Time Employment

These final two tables can provide us with an inside view of the labor market with how certain women may change their employment preferences after quotas are in place. In Appendix B, Table 4 shows the impacts of quotas on the female share of full-time employment. Examining column one, which shows the coefficients when quotas are coded as dummies and time trends are in place, we see that only political and corporate quotas have significance, while the quota trends coefficient does not. A negative and significant coefficient on the political quota variable can be interpreted in different ways. Some may see that a decrease in full-time work implies that more females in politics means better female and family-friendly policies. These policies would then allow women to leave full-time work (Freidenvall and Dahlerup 2008). If we step away from this assumption, the negative coefficient may purely just mean that political quotas don't have the reach to positively impact labor market indicators for women. We see the same kind of negative and significant coefficient when using political quota target variables. For corporate quotas, the positive, significant coefficient makes sense if we intuitively believe that more women on corporate boards would seek to hire more female employees. However, research by Bertrand et al. (2017) and Matsa and Miller (2011) doesn't support this which may be reflected in the incredibly small numerical value of the coefficient.

Appendix C is where Table 7 presents the results of the female share of part-time employment. As the data for full-time and part-time shares come from the same OECD data set, the results are exactly the same numerically but just reversed in sign. With the results from these tables, we can conclude that similar to quota impacts on employment and unemployment, quotas have a miniscule and even potentially negative impact on the employment choices of women.

Extensions & Robustness Check

When we consider heterogeneity that is present across countries and parties based on quota format as described by Comi, Grasseni, Origo, and Pagani (2017), country-specific time trends and quota trends aren't fully able to capture this. The model used thus far does not account for causes of variability including when a country may introduce a quota and then repeal it or when a country initially introduces the quota and when they make it mandatory. It is then necessary to account for these to check the robustness and validity of the results. The year when a corporate quota is introduced and then when it becomes mandatory will be two separate dummy variables. A dummy variable will also be included to represent if a country has non-compliance sanctions for their political quota. These sanctions can include losing funding or not being allowed in the next election if a party does not meet the legislative quota percentage.

Table 8 in Appendix C tests for the robustness of Table 2. First, if we look at the female to male ratio columns and at the political and corporate quota variables that were present in Table 2, we see they maintain their insignificance when being regressed with time trends but gain a negative sign. Their lacking of statistical significance reiterates what has been discussed thus far; that quotas have negligible impacts on female employment. However, it is of interest that both of these variables gained a negative sign when checking for robustness. This may potentially suggest that the intricacies of quotas have some influencing power on their impact. Also similar to Table 2, the variables for the extension checks are only significant when only fixed effects are present. Once again, we are seeing that with time trends, overall there is little

impact to female employment. The results are similar when analyzing only the female employment to population ratio. Most variables have no statistical significance except for the political quota variable when using time trends. This variable maintained significance in both tables, so we can hypothesize that a well-formatted quota with introduction and mandatory dates as well as sanctions has potential to aid women but likely to a very small degree.

Table 9 presents the extensions for Table 3. Table 3 presented the employment to population ratio as the dependent variable while using representation targets to code the quota variables. While the results in this table supports the robustness of Table 3, there are still interesting coefficients. The coefficient on the political quota target in Table 9 is -0.0669 and very significant when including time trends. The negative value suggests that the specific formatting of a political quota in regards to the magnitude may prove to be problematic to employment for women. In contrast, the political quota sanctions variable is positively significant with time trends for females only. Not only does this reinforce that quota impacts are ambiguous but formulating an effective quota is a challenging task.

Based on the robustness checks on the most pertinent dependent variables, we can conclude that the initial results are robust as the results supported the initial conclusions presented by Tables 2 and 3.

Conclusion

In conclusion, the results from the regressions show little promise that quotas can positively influence women in the labor market. Existing research that has found limited spill-over effects to the regular woman after the implementation of quotas is supported by the findings in this paper. Overwhelmingly, from the stylized facts to the findings on the three different dependent variables, it is apparent that quotas have little to no impact on female labor market indicators. The stylized facts emphasized that countries tend to be converging in male and female employment rates with quotas doing little to assist these trends. Robustness checks supported this conclusion as the same results were found. Furthermore, Tables 2 and 3, which showed the impact of quotas on employment, reinforced that both political and corporate quotas have no significance to women in the labor force. These tables also highlight the importance of using time trends, specifically in this research. Had I only used fixed effects and neglected to use country-specific and quota time trends, there would have been false conclusions that quotas have a significant positive influence. The time trends showed that we have to look beyond existing employment trends and initial quota implementation for women and analyze what the long-term impact of quotas are. And what the presented research shows is that when we look at the impact and influence of quotas over time, women seem to fare just as fine as if quotas had never been in place.

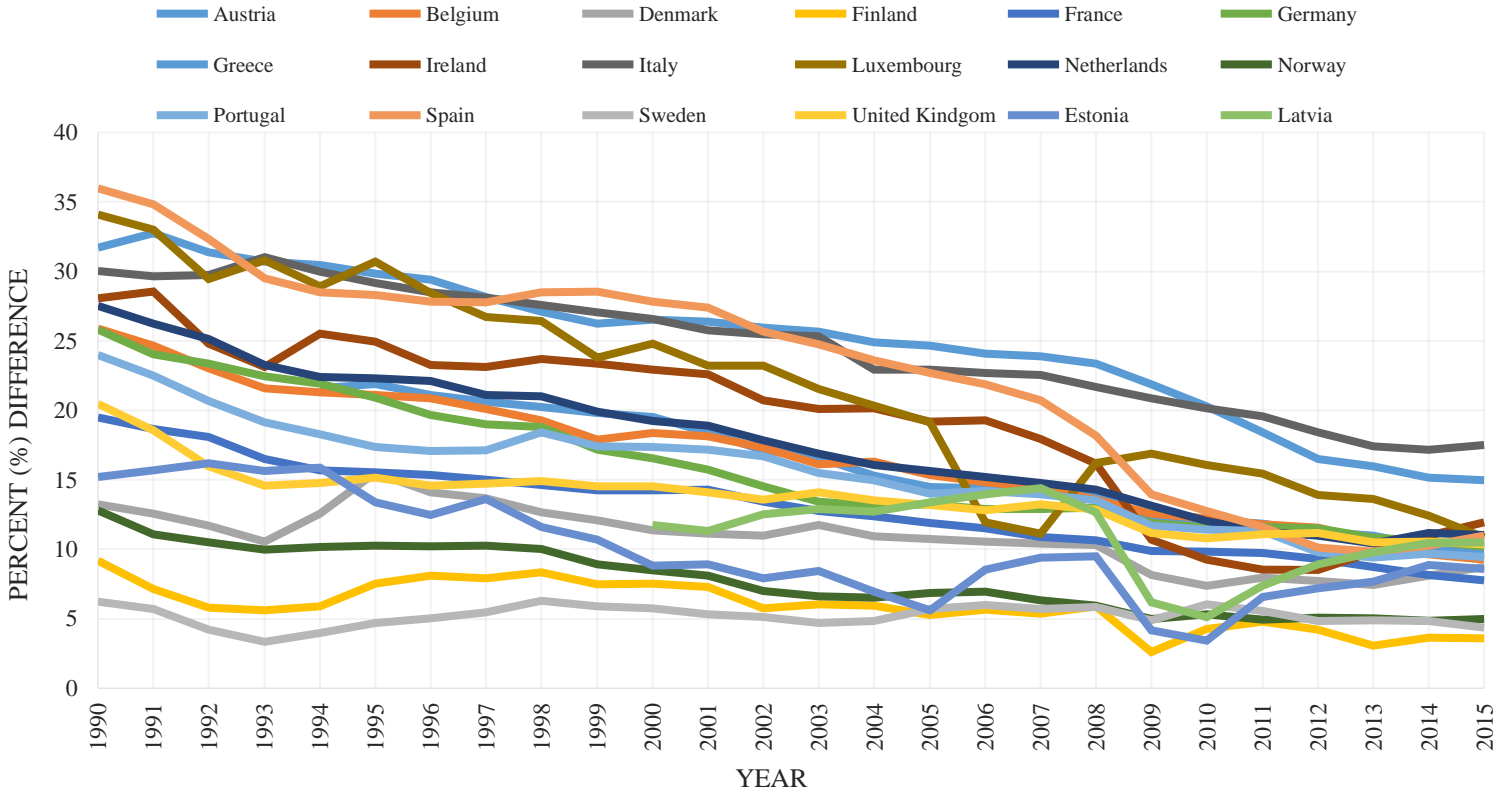
While this research paper only analyzes a fraction of quotas and their implementation, it supports research that has found that corporate quotas have minimal top-down effects in the labor market. Because research looking at the relationship between political quotas and the labor market has been limited, I believe that some of the results in this paper can serve as suggestions as to where future research on political quotas can go. Broadly, much more research needs to be done on both political and corporate quotas and their effects beyond certain decision-making bodies. As more countries adopt, maintain, or change their quotas, more research can be done to better understand the long lasting impacts they may have on not just women, but society as a whole.

The intent of this research was to identify if political and corporate gender quotas had top-down effects for regular women in the labor market. We see weak results that quotas, which are intended increase female representation in decision-making bodies, bring much change. Continued data collection on quotas, how they change, and how they're implemented will help advance our knowledge, understanding, and research on how society can continue to make strides to support equal opportunities for women in the labor market.

Appendix A

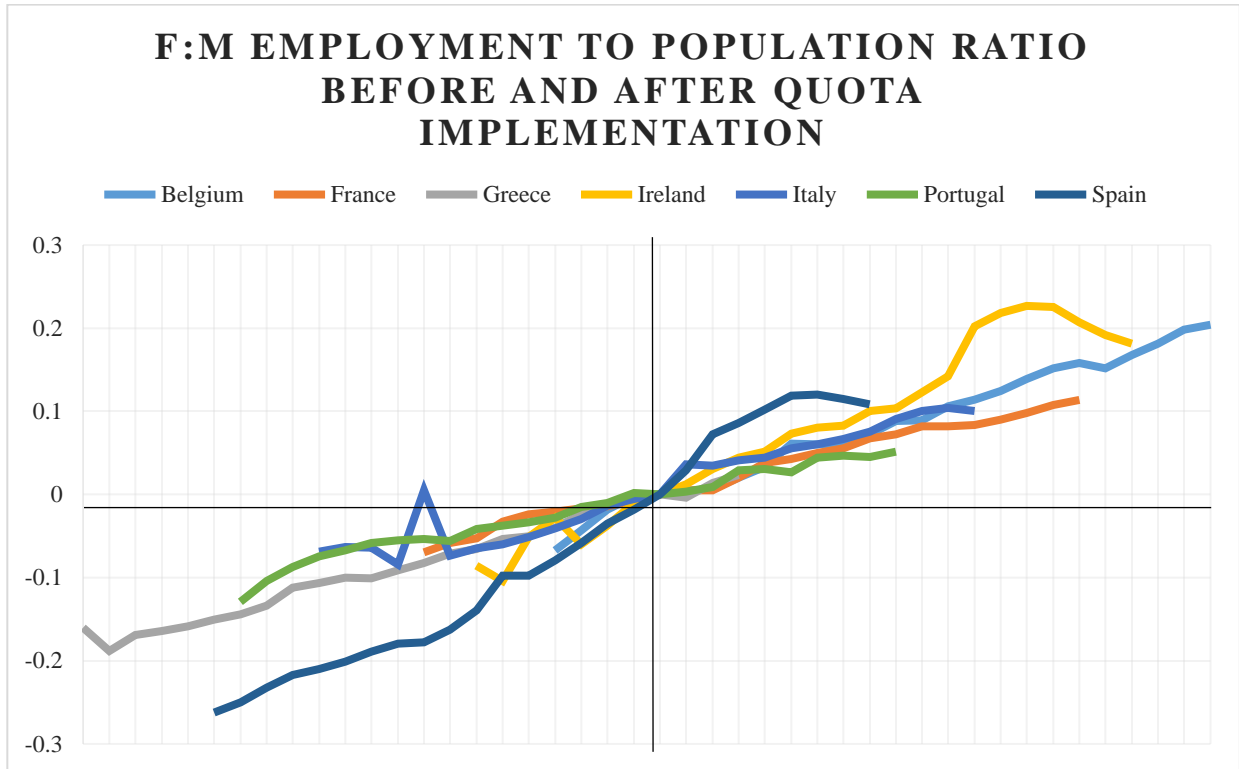
FIGURE 1 – *Female to Male Employment to Population Ratio Comparison*

PERCENTAGE DIFFERENCE IN MALE & FEMALE EMPLOYMENT TO POPULATION RATIOS, 1990-2015



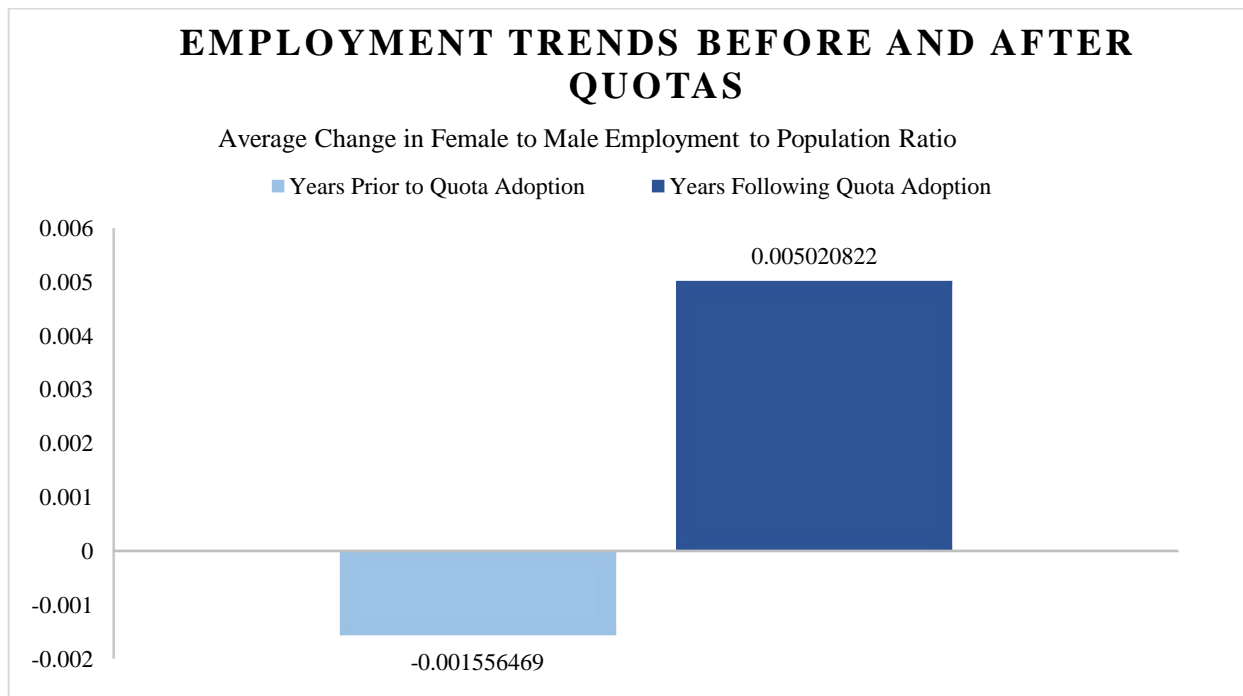
Note: Employment to population ratio data from OECD

FIGURE 2 – Female to Male Employment to Population Ratio Trends: Before and After Quotas



Note: Employment to population ratio data from OECD.

FIGURE 3 – Female to Male Employment to Population Ratio Trends: Before and After Quotas



Note: Employment to population ratio data from OECD.

Appendix B

TABLE 1 - *Female Representation in National Electoral Bodies*

	FE Only (1)	Time Trends (2)	With Controls (3)
Political Quotas	0.0343*** (0.00719)	-0.0707*** (0.0133)	-0.0601*** (0.0128)
Quota Time Trends		0.00525*** (0.000926)	0.00427*** (0.00091)
GDP			-0.0884 (0.0546)
Secondary Edu.			-0.0152 (0.0445)
Tertiary Edu.			7.44E-05 (0.0152)
Left or Right Leaning Gov't			0.0115*** (0.00306)
Female Head of Gov't			0.00308 (0.0091)
Observations	468	468	456
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Country Specific Time Trend	NO	YES	YES
Quota Trend	NO	YES	YES

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 2 - *Employment to Population Ratios Using Quota Dummy*

	1 - F:M Ratios		2 - Female Only	
	Time Trends (1)	FE Only (2)	Time Trends (3)	FE Only (4)
Political Quotas	0.00305 (0.00743)	0.0528*** (0.00636)	0.0542*** (0.00791)	0.0161*** (0.00493)
Corporate Quotas	0.00545 (0.00385)	0.0197*** (0.00596)	0.00746* (0.0041)	0.0171*** (0.00462)
Quota Time Trends	0.000772 (0.000527)		-0.00436*** (0.000561)	
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trend	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 3 - *Employment to Population Ratios Using Quota Targets*

	1 - F:M Ratios		2 - Female Only	
	Time Trends	FE Only	Time Trends	FE Only
	(1)	(2)	(3)	(4)
Pol. Quota Targets	0.0124 (0.0113)	0.0599*** (0.0165)	0.0133 (0.0129)	0.0154 (0.0122)
Corp. Quota Targets	0.0195* (0.0113)	0.0745*** (0.0174)	0.00809 (0.0128)	0.0511*** (0.0128)
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	NO	YES	NO
Country Specific Time Trend	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 4 - *Female Share of Full Time Employment*

	1 - Quota Dummy		2 - Quota Target	
	Time Trends	FE Only	Time Trends	FE Only
	1	2	3	4
Political Quotas	-0.0283*** (0.00823)	-0.0453*** (0.00717)		
Corporate Quotas	0.00884** (0.00428)	-0.00417 (0.00671)		
Quota Trends	0.000674 (0.000585)			
Political Quota Target			-0.0490*** (0.0125)	-0.112*** (0.0175)
Corporate Quota Target			0.0182 (0.0125)	-0.00662 (0.0185)
Observations	443	443	443	443
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trend	YES	NO	NO	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

Appendix C

TABLE 5 - *Unemployment Using Quota Dummy*

	1 - F:M Ratios		2 - Female Only	
	Time Trends	FE Only	Time Trends	FE Only
	1	2	3	4
Political Quotas	-0.098 (0.065)	-0.371*** (0.0341)	-0.0731*** (0.0103)	-0.00366 (0.00544)
Corporate Quotas	-0.00385 (0.0337)	0.00698 (0.032)	-0.00362 (0.00532)	-0.0235*** (0.0051)
Quota Time Trends	-0.0113** (0.00461)		0.00734*** (0.000727)	
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trend	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 6 - *Unemployment Using Quota Target*

	1 - F:M Ratio		2 - Females Only	
	Time Trends	FE Only	Time Trends	FE Only
	1	2	3	4
Political Quota Target	-0.290*** (0.103)	-0.728*** (0.0875)	-0.0063 (0.0175)	-0.0321** (0.0132)
Corporate Quota Target	-0.11 (0.102)	-0.0668 (0.0924)	0.00817 (0.0174)	-0.0616*** (0.014)
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 7 - Female Share of Part Time Employment

	1 - Quota Dummy		2 - Quota Target	
	Time Trends	FE Only	Time Trends	FE Only
	1	2	3	4
Political Quotas	0.0283*** (0.00823)	0.0453*** (0.00717)		
Corporate Quotas	-0.00884** (0.00428)	0.00417 (0.00671)		
Quota Time Trend	-0.000674 (0.000585)			
Political Quota Target			0.0490*** (0.0125)	0.112*** (0.0175)
Corporate Quota Target			-0.0182 (0.0125)	0.00662 (0.0185)
Observations	443	443	443	443
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trend	YES	NO	NO	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 8 - Extensions Check of Table 2

	1 - F:M Ratio		2 - Female Only	
	Time Trends	FE Only	Time Trends	FE Only
	(1)	(2)	(3)	(4)
Political Quotas	-0.0229 (0.0175)	0.0137 (0.0173)	0.0377** (0.0187)	-0.0636*** (0.013)
Corporate Quotas	-0.00469 (0.00775)	0.00774 (0.015)	0.00676 (0.00827)	0.0131 (0.0113)
Corp. Quota - Introduced	0.00984 (0.00803)	0.0288* (0.0157)	0.00234 (0.00857)	0.00717 (0.0118)
Corp. Quota - Mandatory	0.0016 (0.00496)	-0.0380*** (0.00831)	-0.00676 (0.00529)	-0.0205*** (0.00625)
Pol. Quota - Sanctions	0.0223 (0.0139)	0.0367** (0.0184)	0.0157 (0.0148)	0.0865*** (0.0138)
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trends	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

TABLE 9 - Extensions Check of Table 3

	1 - F:M Ratio		2 - Female Only	
	Time Trends	FE Only	Time Trends	FE Only
	1	2	3	4
Political Quota Target	-0.0669*** (0.0227)	-0.150*** (0.0277)	0.0365 (0.0254)	-0.0568*** (0.0214)
Corporate Quota Target	-0.0107 (0.022)	-0.013 (0.0391)	-0.0237 (0.0246)	0.00965 (0.0302)
Corp. Quota - Introduced	0.00765 (0.008)	0.0288* (0.0151)	0.0122 (0.00893)	0.0115 (0.0117)
Corp. Quota - Mandatory	0.00101 (0.00493)	-0.0283*** (0.00832)	-0.00284 (0.0055)	-0.0168*** (0.00643)
Pol. Quota - Sanctions	0.00354 (0.0115)	0.0439** (0.0178)	0.0668*** (0.0128)	0.0900*** (0.0137)
Observations	448	448	448	448
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Specific Time Trend	YES	NO	YES	NO
Quota Trends	YES	NO	YES	NO

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. There are 18 countries.

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