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TRABAJO FIN DE GRADO EN ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS

EFFECTS OF WOMEN LEADERSHIP ON SPANISH REGIONS' CREDIT RISK

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Abstract

The objective of this paper is to analyze the effect that the presence of women in the autonomous communities' governments has on their risk and credit rating. First of all, the existing literature on gender differences in the attitude towards risk and financial risk, in business performance and in the government public policies is explained and developed. Then, by using the sample composed by the 17 Spanish autonomous communities from 2010, several hypotheses are tested, namely that the presence of women in public administration in the capacity of autonomic president and economy and finance councilor affects positively the credit rating of the Spanish regions. Furthermore, the effect of gender on other economic indicators, such as GDP and debt per capita is also explored. Thus, the paper delves into the effect of the presence of women in government on public finances.

Keywords: Female leader, credit risk, credit rating, president and councilor

Resumen

El objetivo de este trabajo es analizar el efecto que la presencia de mujeres en los gobiernos de las comunidades autónomas tiene sobre su riesgo y calificación crediticia. En primer lugar, se explica y desarrolla la literatura existente sobre las diferencias de género en la actitud hacia el riesgo y el riesgo financiero, en el desempeño empresarial y en las políticas públicas gubernamentales. A continuación, utilizando la muestra compuesta por las 17 comunidades autónomas españolas desde 2010, se contrastan varias hipótesis, a saber, que la presencia de mujeres en la administración pública en calidad de presidenta autonómica y consejera de economía y hacienda afecta positivamente a la calificación crediticia de las regiones españolas. Además, también se explora el efecto del género en otros indicadores económicos, como el PIB y la deuda per cápita. Así, el trabajo profundiza en el efecto de la presencia de mujeres en el gobierno sobre las finanzas públicas.

Palabras clave: Líder femenino, riesgo de crédito, calificación crediticia, presidente y consejero

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1. INTRODUCTION

The Covid-19 pandemic shed a light on the important role women leaders played during the crisis. The media informed that women leaders around the world were managing the crisis better than their male counterparts, reacting more quickly and communicating pandemic policies better. In fact, female leaders such as Angela Merkel (Germany), Jacinda Ardern (New Zealand), Mette Frederiksen (Denmark), Sanna Marin (Finland), Zuzana Čaputová (Slovakia) and Tsai Ing-wen (Taiwan) attracted a lot of attention because of how effective they were when the COVID-19 crisis happened.

For example, Jair Bolsonaro, Brazil's president, declared that Covid was just a flu.

On the other hand, Angela Merkel, former Germany's chancellor, declared early in those days (March 2020) that this virus was something that would affect 70% of the German population and should not be taken lightly. Another fast response came from the Taiwanese president, Tsai Ing-wen as she introduced 124 different measures to block the spread of covid without having to impose harder restrictions such as lockdowns. She managed to keep the epidemic controlled. In New Zealand, Jacinda Arden imposed one of the strictest lockdowns in the world since March 2020 and forbade the entry of foreigners as her ultimate goal was to eliminate Covid entirely from her country. Meanwhile, in Iceland, Prime Minister Katrín Jakobsdóttir, opted to offer free Covid testing to all the citizens to closely monitor the infection and mortality rates of Covid. In fact, Iceland screened five times as many people as South Korea did, being Iceland a much smaller country. Iceland did not establish complete lockdown. Instead, they adapted social distancing as its new way of living. Using the television to directly engage with the country's children and answer their questions and concerns was Erna Solberg's idea, the Norwegian prime minister. She used the public television as her platform during the outbreak of COVID-19 to reassure kids it was "okay to be scared" and how staying at home would help to contain the epidemic.

All these examples showed different approaches female leaders have taken in order to handle a stressful and difficult situation such as the COVID-19 situation. This phenomenon and previous literature evidence the differences in management due to gender. Furthermore, in addition to the differences in management, the literature has

previously shown differences in risk aversion between male and females (Barsky et al., 1997; Jianakoplos and Bernasek, 1998 and Croson and Gneezy, 2009).

Therefore, in this paper we intend to study whether there are differences in the credit risk of regions depending on the gender of their leader. To do so, we analyze the relationship between the credit rating obtained by the 17 autonomous communities that make up the Spanish territory and the gender of the person in power as president and/or as finance advisor. In other words, we want to see whether gender is a determining factor when it comes to obtaining a better or worse rating in public entities.

We have decided to focus the study on the Spanish Autonomous Communities, as this is a country on which not much research has been done, and even less on the effect of gender on the credit rating of public entities. There is research on the effect of gender on public policies adopted in countries such as the United States, Switzerland and India that will be explained afterwards (Chattopadhyay and Duflo, 2004, and Funk and Gathmann, 2006). But we have not yet found anything relevant about Spain on this topic.

The remainder of this paper will proceed as follows. Section 2 presents research on gender related differences on attitudes towards risk, on credit risk, on firm performance and gender representation in public financial decision making. Section 3 presents our data collection plan to study the relationship between credit rating and gender in public administrations. Finally, section 4 outlines the main results and section 5 condenses conclusions of the paper.

2. LITERATURE REVIEW

To better understand the rationale for this study and the need to investigate the position of women in power and its effect in public finance, we will review the research that has confirmed the effect of gender on risk perception, credit risk, corporate performance, and the impact on government policy.

2.1 Effect of gender differences on attitude towards risk and credit risk

First, we will discuss the relationship between risk attitude and possible behavioral differences between men and women in case of risky situations. There is a large academic literature on risk tolerance and risk aversion and how uncertainty affects people

subconsciously on their objectives. First, we will present several papers that deal with risk tolerance.

Barsky et al. (1997) measured the risk tolerance, the elasticity of intertemporal substitution and time preference of the U.S. society based on survey responses to hypothetical situations. The measures concern preferences over behaviors that are central to macroeconomics and finance, especially the willingness to take gambles over lifetime income and to substitute consumption over long periods. They found heterogeneity in preference parameters, which implies dispersion in risk preferences. Most of the respondents fell in the least risk tolerant category but a significant minority were in the higher risk tolerance categories. Measured risk tolerance is positively related to risky behaviors, including smoking, failing to have insurance, and holding stocks rather than treasury bills. These relationships are statistically and quantitatively significant. There were statistically significant differences in risk tolerance by sex as well. Women were less risk tolerant as men showed a higher propensity to choose the most risk tolerant option. As a conclusion of the work just presented, we could say that women have portfolios with assets that entail less risk (Jianakoplos & Bernasek, 1998), are less willing to accept financial risk and are more risk averse towards gambles (Levin et al., 1988).

In line with that work, Eckel and Grossman (2002) also measured risk tolerance paying attention to the gender of participants with the purpose of testing the general assumption that women engage in less risky situations in life and, in particular, in the financial field. They designed a decision task, to measure risk behavior and a forecasting one, to test what men and women expect from each other's attitude. These tasks were presented with 2 scenarios. One was where participants were paid 6$ for the completion of the Zuckerman Sensation-Seeking Scale (SSS), which is a 40-question survey to discriminate differences in values, demeanor, and activities. The risk consisted of the possibility of losing up to 6$. While in the second scenario, participants were not paid for finalizing the survey but at the same time, there was no chance of losing any money. This frame was meant to find whether women were risk-averse or loss averse. They wanted to see if female subjects were more sensitive to the possibility of losses than men. In relation to this, we must explain risk-aversion is not the same thing as loss-aversion. Risk aversion is the conduct of avoiding risk because more risk implies price volatility. Risk-averse refers to an investor who prefers the preservation of capital over the potential of a higher return on the investment. Whereas loss aversion is psychological reaction where a real or

potential loss is experienced more severely emotionally than an equivalent gain. Therefore, the experiment was aimed to distinguish risk aversion from loss aversion. This feature was somewhat innovative because researchers had not attached any importance to distinguishing variance and loss aversion in both genders. So far, Bateman et al. (1991) had previously confirmed that the general society suffers from loss aversion. This test filled the preexisting gap in gender research as Eckel and Grossman (2002) addressed the sex differences in loss aversion. Results gathered with these tests confirmed women are on average more risk averse than men in gambling games. Women chose the risk-free option four times more than men and only one-third is expected to choose the riskier option. These preferences have an impact on investment opportunities. Relying on the general sociodemographic characteristics of each sex, financial advisors will suggest less risky portfolios of assets to women than those offered to male investors, as Wang (1994) reported. Furthermore, this assumption of women's risk aversion has an impact on labor negotiation. As women are perceived to be less aggressive and competitive on bargaining, the initial offers made to women are lower and may face stronger bargaining, which results in women having lower salaries. Nonetheless, Eckel and Grossman (2002) did not find any evidence to sustain that women are more loss averse than men.

Following, we will discuss attitude towards risk and possible differences between genders due to the competitive environment that surrounds society. Thus, Atkinson et al. (2003) compared the risk, performance, and other attributes of male and female fixed-income mutual funds managers. They did not appreciate any difference in risk, performance, and other fund features based on gender. According to Croson and Gneezy (2009), women tend to evaluate outcomes of an operation and probability information differently than men. Value function is the same for both genders, although the probability weighting scheme varies.

From controlled experiments like the maze study (solving a maze in 15 minutes) carried out by Gneezy et al. (2003) and the race study (students were requested to run a short distance for their speed to be measured) ran by Gneezy and Rustichini (2004), it could be inferred that men performed better under the pressure of a competitive environment than women because male subjects reacted with extra effort when being rewarded on a competitive basis. Without introducing a competitive factor, they found no statistically significant difference in performance between men and women. But once the tournament design was used (payment is uncertain and it depends on the performance of

others), the performance of men increased in comparison with that of women. One possible explanation to this observation is that men are less risk-averse, so the introduction of uncertainty will affect women the most. Gender differences in competition also stem from nature (genetics and biology) and nurture (environment and education). All these differences affect them in the way they take economic decisions in consumption and labor markets. High profile jobs are still more favorable to men and are a major factor in the gender pay gap. However, more research should be done to deepen in this matter as there are many questions left unanswered.

Fehr-Duda et al. (2006) conducted a laboratory computerized experiment with monetary incentives and recruited a great number of men and women. They concluded that female subjects tend to underestimate large probabilities of gain in investment terms whereas male subjects do not. Risk taking behavior depends on probabilities. Apparently, "women are more risk averse in decisions with large probabilities in the gain domain and in decisions with small and medium probabilities in the loss domain". Their empirical investigation discovered a behavioral pattern: in those lotteries where both genders were risk averse, women were equally risk averse or even more so than men. And this also applies for the opposite, with some exceptions: in those lotteries where both genders were risk-seeking, women were as risk-seeking as men or even more. The findings imply that women are more risk averse in the domain of investment decisions when the probability of a gain is of medium or large size. While value functions do not change significantly between genders, female probability weighting curves (higher probabilities for losses than for gains) are more curved than male ones. Women are less sensitive to probability changes. Relative to men, women tend to be more pessimistic when winning gambles are framed in investment terms.

Niederle and Vesterlund (2007) examined if women avoid competition compared to men. They wanted to test if there were differences in competition depending on the gender and its consequent economic effect. In order to do so, a controlled laboratory experiment in which men and women carry a task under in a competitive (tournament) and noncompetitive environment (piece rate). Once they have experienced both compensation structures and are aware of their absolute performance, men and women choose which scheme they want to apply to their next task. Researchers did not find any difference in performance between genders but did appreciate that twice as many men than women chose the competitive compensation setting. 73% of men prefer the

tournament, in contrast to 35% of the women. They found that men are usually more overconfident about their performance in a random task than women. One possible explanation given for these competitive preferences is that women have lower expectations about their relative ability, are more risk averse, or are more reluctant to receive feedback on their relative performance. They concluded there are gender differences in the propensity to perform in a competitive setting and how it can be extended to other domains, such as the labor market. This may well explain why women are less represented in competitive jobs because if they compete less, they have fewer chances to succeed in obtaining more lucrative jobs and promotions.

Regarding risk-aversion, Jianakoplos and Bernasek (1998) used a U.S. sample data of household holdings of risky assets to see whether there are gender differences in financial risk-taking. Overall, they perceived that women are more risk-averse in financial decision-making than men. As wealth increases, the proportion of risky assets held increases by a smaller amount for women than for men, meaning that women have less risky asset portfolios with assets that entail less risk. Gender differences in financial risk-taking are also influenced by age, race, and number of children. Women's lower levels of wealth compared with men's can be explained by their greater financial risk aversion.

Croson and Gneezy (2009) studied the differences in risk, social and competitive preferences of both men and women. They reached the conclusion that social preferences and motivations differ from women to men as men are less sensitive to social cues. While women avoid risky situations, men feel motivated by them as they see them as potential challenges to overcome (Block, 1983). These conclusions are drawn from the general population. Nevertheless, if we narrow the study to a subsample of managers, gender differences in risk attitudes are smaller or almost unnoticeable. Moreover, Croson and Gneezy (2009) agreed that men tend to be more confident than women, not only in their investment actions but also in every domain of life. Men are more confident in their success than women in uncertain situations. Besides, men are more competitive than women because the latter are more hesitant to engage in bargaining (negotiating situations), auctions, and tournaments. To end the discussion of this paper, something remarkable that is brought up in it is the publication bias present in the literature on gender differences as journals will probably publish articles that find differences than those that do not. In order to avoid and correct this bias, researchers should always record the gender of participants whenever possible.

Charness and Gneezy (2012) explored the common, stereotyped idea that men are more willing to take risks than women. Every economical decision involves some level of risk, but they wanted to find out if there were any gender differences in the risk-taking behavior. They studied 15 experiments that had been conveyed before. Some of them were specifically looking for gender contrasts while others found some but initially were designed to study the importance of age, incentives, country in investment behaviors. Each test was carried out in different countries, methods, and durations. They did not use the same instructions or norms. As a result, researchers confirmed that women tend to make smaller investments in risky assets than men and that they are more risk-averse than men. Women's portfolios are less risky than men'.

2.2 Effect of gender differences on credit risk

With respect to credit risk (possible loss assumed by an economic agent due to the counterparty's failure to comply with its contractual obligations), we will comment on its relationship with gender.

Schmit and Marrez (2010) studied the credit risk of an important microfinance institution based in Magreb based on its loan portfolio. They managed a data set of 11,444,770 contracts formalized between 1997 and 2007 to learn more about credit risk and loss distributions of MCI loan portfolios. After conducting a quantitative analysis, they observed microfinance clients show different loss rate distributions depending on their gender. The only reason that explains this event is that men have a higher risk of default than women. Nevertheless, recovery rates are similar for both genders. Loan portfolios of female clients were more diversified than those of male clients. As a result, the proportion of diversifiable risk in total risk is higher for female loan portfolios. Finally, they found a resemblance in operating between big well-managed MFI and retail banks. Loss rates observed were like those found in retail banking portfolio. Women resembled AAA-A rated private debt whereas men resembled BBB rated private debt.

Li (2018) also tried to increase awareness about gender differences in credit market experiences, especially after the change in credit conditions in the early 2000s due to multiple defaults and foreclosures. He worked with a sample of consumers and their respective payment histories, debt portfolios, credit scores, and demographic information, comparing basically single men and single women younger than 40 years old. Li found

that single women have on average, lower credit scores than single men with comparable demographic characteristics. Although, credit score gaps show that single women use credit more intensively and have experienced more difficulties to repay their debts in the past than single men. These differences may be caused by different economic circumstances, labor market experiences, attitudes towards borrowing and potential different treatment given by credit market and institutions.

2.3 Effect of gender differences on firm performance

Moving on, we will see if gender differences in risk attitudes may or may not affect overall firm performance. Huang and Kisgen (2013) tested whether gender heterogeneity in corporate executive roles has an impact on the financial decision-making and end results. Their dataset targeted major US corporations. In 2005, 7.5% of Chief Financial Officers and 1.5% of Chief Executive Officers were women, whereas in 1994, only 3% of CFOs and 0.5% of CEOs were women. The goal was to determine if female managers take different financing or acquisition decisions than male executives. Also, they wanted to try the already existing idea that men are overconfident in corporate finance decisions compared to female executives. Applying a diff-in-diff approach, the authors identified that companies with female managers grew slower and were less likely to make acquisitions. However, the acquisitions made by women were expected to generate higher returns. Female executives were less likely to issue debt as well. But returns for debt offerings were higher with a woman in charge. They did not appreciate any significant modification in the financial leverage (borrowed money to invest in assets) when there was a female executive.

Pletzer et al (2015) tested the relationship between female representation on corporate boards and firm financial performance. According to the authors, corporate boards are still male-dominated, and their role is essential in the firm performance as they establish the corporate strategy and corresponding objectives. They gathered data from 20 studies on 3097 companies published in peer-reviewed academic journals. Half of these enterprises were located in developing countries and the other half in developed higher income countries. On average, the boards in those companies were composed of almost 8 members and 14% of the board was composed by women. There was a small positive, but not statistically significant correlation between the percentage female representation on corporate boards and the combined mean of the three organizational

performance measures: ROE, ROA and Tobin's Q. The outcome of the analysis was not statistically significant, which means the association between gender diversity on corporate boards and firm financial performance is not strong. They suggest diversity and gender equality in board composition would be reasonable and desirable as the incorporation of women does not affect the financial outcome. Women should be considered and prioritized for promotions if they are equally qualified.

However, more research has been conducted on the subject and it has been possible to demonstrate the positive relationship between the presence of women on the board of companies and better corporate performance. Post and Byron (2015) examined this topic in order to reconcile the previous conflicting results. They statistically aggregated the conclusions of 140 individual studies to get robust effects and checked whether the socio-cultural context and national firms' regulatory affect the financial results. They developed a contingency model of female representation on boards and firm performance that takes into account the national circumstances and legal system in the board composition. They also explore if boards with a greater female presence differ in taking on monitoring tasks and firm strategy. They reached the conclusion that companies with greater female board representation tend to have higher accounting returns. This positive relationship is even more remarkable in countries with stronger shareholder protection. They found support that not only boards with female participation improve the corporate ability to generate profits from its assets and investments female directors but also promote monitoring activities and board strategic involvement. Lastly, they warn that industries with short supply of female directors should make efforts to achieve board gender diversification with the aim of taking advantage of the varying life experiences, knowledge and values between men and women.

2.4 Gender representation and public financial decision making

Once we have already explained gender differences in risk preferences, we should discuss the relationship between gender representation and public financial decision. This connection has been severely understudied because most of the literature focuses on gender and private business performance.

Bratton and Haynie (1999) found gender differences in legislative interests and priorities. Since 1970, in the United States, the number of women elected to public office

has increased dramatically. The representation of women in state legislatures has also risen, which has had an impact on state policymaking. These researchers investigated the effect of women on the behavior of state legislators. They established the hypothesis that women would be more likely to introduce "women's interest" bills than men and will be as likely as men to achieve passage of their legislative proposals. They used a binomial regression analysis focused on the number of bills introduced that year and the number of female legislators. The results of their analysis showed that indeed women are more likely than men to introduce women's interest bills. They also appreciated that women have a different policy-making approach. They are more likely to introduce legislation pertaining to education, health policy, children's matters, and welfare than white male colleagues because they sponsored this kind of measures more than men. However, results did not support the hypothesis that women would be as likely as men to achieve passage of their legislation. In Maryland, women are less likely than men to achieve passage of the legislation introduced, while in California, they are more likely than men to do so. Consequently, they proved women pursue varying legislative policies and agenda-setting.

Bratton and Ray (2002) analyzed childcare services in 400 Norwegian municipalities in 1975, 1979, 1983, 1987 and 1991. They wanted to demonstrate the proportion of women elected in local governments has a direct effect on public policy outcome. They used ordinary least squares regression to predict the availability of childcare coverage. The OLS regression brought results that support the thesis that policy outcomes increasingly change as the number of female councilors rises in 1975 and 1979. In 1983 and 1987, the proportion of women in the government had a positive but not so significant effect on childcare. Results in 1991 show that once the policy area has matured, gender diversity does not produce an exponential effect. Female representation affects policy results but this relationship changes over time and according to the level of female serving in local councils. Therefore, having women in the government bring other priorities to the table and subsequently, influences the public policies adopted.

In the same line as the work of Bratton and Ray (2002), Chattopadhyay and Duflo (2004) studied the impact of women's leadership on policy decisions. Their dataset was focused on 265 village councils in West Bengal and Rajasthan. In India, women are underrepresented in politics relative to their share of the population. In 1993, an amendment to the constitution required the state to give more power to local village

councils and to reserve at least one third of all positions of chief or village representatives to women. They conducted a survey of all investments in local public goods in the districts of West Bengal and Rajasthan. The reserved seats for women affect policy choices because they currently better reflect women's preferences. The results indicated that the gender of representatives affect the provisions of public goods. For example, in West Bengal, women were worried mostly about drinking water and roads, followed by welfare programs, housing and electricity. Whereas men in West Bengal were worried about roads, irrigation, drinking water and education. A chi square test confirmed that women do not have the same complaints as men. In addition to this, the data verified that the gender of representative affect the investment in public goods. For example, since there are women in the government, the investment in drinking water has increased significantly as they are the ones who complain more often about this issue.

Funk and Gathmann (2006) reflected the fact that government spending has changed since women's suffrage. Their empirical analysis set in Switzerland as it was the last European country to adopt suffrage. The fiscal consequences of women voting rights were ambiguous because in several policy areas, there was an increase in government expenditure, taxes, and subsidies, whereas in some others, there was a decrease. This paper demonstrates that women are more supportive of government intervention and spending for public goods like the environment, public transport and education and they oppose spending for the military and agricultural subsidies. The gender gap is particularly high for spending on environmental protection (14%). As an illustration of the financial consequences, we should highlight how federal spending went up 70 million Swiss Francs per year ever since women voting preferences opposed to reducing unemployment benefits. All in all, the results of the regression showed that adopting women suffrage reduced canton expenses, deficit, and revenues though only the first one was statistically significant. Expenses decreased by 3.3%. This negative effect on government size and expenditures confirms that women were indeed more fiscally conservative than men when women suffrage was adopted.

Krogstrup and Wälti (2011) investigated whether female economic and political empowerment affects the government budget deficit. As women have a varying economic behavior to that of men, they wanted to measure the effect of their progressive introduction in the labor market and political picture on the budget deficit or public saving level. Using a diff-in-diff regression for Switzerland, they found that female participation

reduces cantonal government budget deficits. The effect of granting the right to vote to women on the deficit reduction is statistically significant about a decade after the enfranchisement. They discussed the underlying drivers of this public debt level reduction and they referred to female characteristics such as patience, altruism, and prudence towards risk as possible causes. It is unlikely that female labor force introduction caused this budget deficit decrease. In the end, they suggest that placing more power on women has the potential to change macroeconomic performance.

Meier and Melton (2014) suggest that administrative management is different when a man or a woman is in charge because their life experiences and preferences are different. These authors did their research along the line of the theory of representative bureaucracy that suggests that political and administrative positions should represent existing social groups. They consider that this identity between public representation and citizens translates into a better and more effective service because policies are more tailored to their needs. Therefore, it is understood that it is better that public positions are filled by both men and women because it would contribute positively to society.

Besides, as we have stated before, women have different attitudes and priorities from men. Consequently, when women are part of the government, public policies adopted change. Holman (2014) presented the relationship between the gender of local officials in U.S. cities and social welfare policies. Quantitative research of female leaders in cities exhibited that having females as city mayors increases the participation and funding of social welfare plans. Women in office support female-friendly, child-friendly and social welfare programs at a higher rate than their male counterparts although women are also constrained by institutional and political factors. The mayoral position holds substantive power to determine spending priorities in cities and a female mayor increases the monetary provisions a city dedicates to this redistribution activities.

Suzuki and Avellaneda (2018) examined how local financial and fiscal decision making is affected by female representation in municipal and administrative positions. They focused on a panel data set of 764 Japanese city governments from 2007 to 2012 to better understand how female representation affected local finances. Japan is an advanced society with low female representation. Japan's political setting is male-dominant and is far behind from other developed societies in terms of gender equality. According to Estévez-Abe (2013), its gender gap is significant as it ranks very low in maternal

employment rates and in proportion of women in management positions. Also, it holds a significant wage gap between men and women. In addition to this, the Organization for Economic Co-operation and Development Countries issued in 2015 that Japanese local structures faced the highest debt to GDP ratio in the OECD. In order to achieve their goals, they focused at municipal level on the issuance of bonds per year, investment in public companies and budget deposited for reserve funds. Both issuing public bonds and contributing to public or quasi-public corporations exemplify risk taking behaviors in financial decision-making. On the other hand, reserve funds, which adds to the financial stability of municipalities and gives the institution a certain room for manoeuvre to cope with unexpected expenses or to launch new projects, illustrate a risk averse attitude in local finances. Suzuki and Avellaneda (2018) found there was a link between female political representation and results in local public finance. Local female councilors and a conservative ideology are positively associated with a risk-averse behavior in financial decision-making. Precisely, female participation in city councils is negatively correlated with issuing municipal bonds and local investment in public companies. The study confirmed the literature written about gender and financial decision-making relationship in private corporations holds for public entities. Equally, they observed an inverse correlation between a conservative ideology and the issuance of municipal bonds and budget allocation to reserve funds. However, they did not see that having women in executive and mid-level managerial positions influenced local finances. In addition, female representatives' expertise also did not seem to have an effect on municipal financial decision-making.

These works allow us to lay the foundations for the work proposed in this end of degree thesis. Our objective is to further investigate the relationship between gender and risk in the public sector, which is an area that has received much less attention because most of the literature is centered on gender differences in risk and its effect on the private sector. Hereinafter, we will try and see if the gender of the president and tax advisor has an effect on the credit rating of Spanish autonomous communities.

2.5 Hypotheses setting

The academic work on gender impact in finance previously explained has led us to propose that the gender of political representation at an autonomous level is associated with the credit score obtained by public institutions. It would be interesting to see whether the gender of the president of the autonomous communities as well as the gender of the

economy and finance councilor affect the public financial situation. Thus, we generate three related hypotheses that we will put to the test later on:

H.1) The rating is lower when the leader is a woman.

H.2) GDP per capita is higher when the leader is a woman

H.3) Debt per capita is lower when the leader is a woman

3. SPANISH CONTEXT, DATABASE AND CREDIT RISK

3.1 Spanish context

The participation of women in the different spheres of political power has increased notably in Spain in recent years. The Organic Law 3/2007 for the effective equality of women and men, devotes special attention to the promotion of the principle of balanced presence or composition, understood as the presence of women and men in bodies and positions of responsibility, so that the persons of each sex do not exceed 60% nor are they less than 40%. The political spheres in which there is currently a balanced presence of both sexes are very limited, with great variability depending on the political body considered; the presence is very low in some constitutional bodies and is balanced in the case of most autonomous assemblies, (Instituto Nacional de Estadística, 2021)

Since 2007, the average percentage of women in autonomous parliaments has exceeded the 40% established by the Equality for a balanced composition, although it has not reached 50%. After the regional elections held in Catalonia and in Madrid in 2021, the average percentage of women in regional parliaments as a whole is 47.2%. The Basque Country, Navarre, and Galicia are the three Autonomous Communities with more than 50% female participation in the autonomic parliament (Instituto Nacional de Estadística, 2021).

3.2 Database

As already mentioned, in our study, we are going to focus on the government of the 17 Spanish autonomous communities. More specifically, on the gender of the people who hold the position of president of the autonomous community or the position of councilor of Economy and Finance. We have focused on the period from 2000 to 2022 due to the

greater ease of finding the information and making it smoother to process data. All the information has been obtained from the official web pages of the autonomous communities as well as from publications of the appointments in the BOE and press clippings.

We collected monthly data on the existence of a female president and a female finance councilor. Once we got the monthly information, we converted it to annual. If in a year, there was a woman for a minimum of 3 months, we considered that there had been a woman at the head of the presidency or finance councilor office. It should be pointed out that in some autonomous communities, the economic councilor is different from the tax councilor; while in other communities, it is a joint councilor. Therefore, we have searched for data of all departments and subsequently grouped them together to describe the existing situation and make it easier to interpret.

As we can see in Table 1, until 2003, there was no woman president of an autonomous community. From 2004 to 2010, only one Autonomous Community is governed by a woman, which is Madrid. In 2011 and 2012, there are already 4 autonomous communities presided by a woman, which are Madrid, Aragón, Castilla la Mancha and Navarra. Aragón, Castilla la Mancha and Navarra continued in the same situation until 2014. However, Madrid ceases to have a woman president in 2013. Andalusia in 2013 has a woman at the head of the government. 2015 is the year in which more presidencies are held by women in Spain. There are 6 autonomous communities: Andalucía, Balearic Islands, Madrid, Navarra, Aragon, Castilla la Mancha. Finally, from 2016 to 2022, again falls to 4 the number of female presidents, being Balearic Islands, Navarra, and Madrid a constant. Andalucía has a female president in 2017 and 2018 and la Rioja from 2019 to 2022. On the other hand, there are communities that have never had a woman as president of the community in this period of time and they are Canarias, Cataluña, Cantabria, Castilla y León, Comunidad Valenciana, Extremadura, Galicia, País Vasco, Asturias and Murcia.

Table 1: Gender of the presidents of the autonomous communities from 2000 to 2022

President	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Years with Women in office
Andalucía	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	6
Aragón	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	5
Islas Baleares	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8
Canarias	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cantabria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Castilla La Mancha	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	5
Castilla y León	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cataluña	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Com. de Madrid	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	17
C.F. Navarra	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	12
Com. Valenciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Extremadura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galicia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
País Vasco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Princ. de Asturias	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Region de Murcia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Rioja	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	4
Ceuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Melilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regions with Women in office	0	0	0	0	0	1	1	1	1	1	1	1	4	4	4	4	6	4	4	4	4	4	4	4	

1 denotes the president of the autonomous community being a woman, and 0 being a man.

The community that has been governed by a woman for the most years is Madrid, followed by Navarra. Madrid has had a woman at the helm for 17 years and Navarra for 12. Followed by the Balearic Islands, Andalusia, Aragon, and La Rioja, which were presided over by a woman for 8, 6, 5 and 4 years respectively.

Table 2 describes the situation of the Department of Economy and Finance in the 17 autonomous communities. In 2000, there are 5 female economy and finance councilors, and they are located in Andalusia, Castilla la Mancha, Castilla y León, the Basque Country and Asturias. From 2001 to 2004, there are 4 women councilors in Andalusia, Castilla la Mancha, Castilla y León and the Basque Country. In 2005 and 2006, there are still 4, but the autonomous communities vary slightly: Castilla la Mancha, Castilla y León, Basque Country and Murcia. In 2007 and 2008, there are 5 female counselors in Extremadura, Castilla la Mancha, Castilla y León, the Basque Country, and Asturias. In 2009 and 2010, the number of female board members is 7 in Extremadura, Castilla la Mancha, Castilla y León, Murcia, Galicia, and Andalusia. The Basque Country has a female advisor in 2009 but no more in 2010. The reverse is true for the Balearic Islands, which has no female councilor in 2009 but has a female councilor in 2010. From 2011 onwards, there is a minimum of 8 female councilors. Between 2016 and 2021, there are more than 11 female board members.

Table 2: Gender of the councilors of economy and finance of the autonomous communities from 2000 to 2022

Councilor of Economy & Finance	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Years with Women in office
Andalucía	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	16
Aragón	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8
Islas Baleares	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1	10
Canarias	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8
Cantabria	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	9
Castilla La Mancha	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	20
Castilla y León	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	20
Cataluña	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Com. de Madrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	5
C.F. Navarra	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	1	1	8
Com. Valenciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Extremadura	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	14
Galicia	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	6
País Vasco	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Princ. de Asturias	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	12
Region de Murcia	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	11
La Rioja	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	12
Ceuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8
Melilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8
Regions with Women in office	5	5	4	4	4	4	4	4	5	5	7	7	9	8	8	9	15	12	12	12	13	11	11	12	

1 denotes the councilor of economy and finance of the autonomous community being a woman, and 0 being a man.

The year in which there have been more female economy and finance councilors is 2015, which coincides with the year in which there have been more female presidents of government in power. The years with the fewest female economy and finance councilors are from 2000 to 2008. Indeed, we have calculated the correlation coefficient between these two variables, and it is 0.137, close to zero.

The two Autonomous Communities that have had more female councilors have been Castilla y León and Castilla la Mancha, with 20 years in total with a woman at the head of the Department of Economy and Finance. It is surprising that Madrid, being the region that has been presided over by a woman for the longest time, has only had a woman as councilor of Economy and Finance for 5 years. In contrast, Catalonia and Valencia have never had a woman councilor.

3.3 Credit risk and other economic indicators

In order to measure credit risk, due to the nature of the issue, we will use the credit rating. Specifically, we take the rating issued by the main rating agencies Moody's, Standard & Poor's, and Fitch, on the credit quality of the 17 Spanish autonomous communities for the period 2000 to 2022. Since we use the three agencies' ratings, we code the rating for every community by using the credit rating equivalences, expressed in the Table 3. This coding therefore shows that higher rating values are associated with higher credit risk.

Table 3: Rating conversion code table

Quality	Moody's	S&P	Fitch	Code
Main	Aaa	AAA	AAA	1
High degree	Aa1	AA+	AA+	2
	Aa2	AA	AA	3
	Aa3	AA-	AA-	4
Upper middle degree	A1	A+	A+	5
	A2	A	A	6
	A3	A-	A-	7
Lower middle degree	Baa1	BBB+	BBB+	8
	Baa2	BBB	BBB	9
	Baa3	BBB-	BBB-	10
Non-investment grade	Ba1	BB+	BB+	11
Speculative	Ba2	BB	BB	12
	Ba3	BB-	BB-	13
Highly speculative	B1	B+	B+	14
	B2	B	B	15
	B3	B-	B-	16
Substantial risk	Caa1	CCC+	CCC+	17
	Caa2	CCC	CCC	18
	Caa3	CCC-	CCC-	19
Extremely speculative	Ca	CC	CC	20
			C	21
Little prospect of recovery				22
Default				23
				24
				25
Unclassified				26

Source: Bank for International Settlements.

Apart from the credit risk of the communities, we must take into account Spain's economic situation. To do so, we have decided to focus on the most widely used and general macroeconomic indicators, which are GDP per capita, debt per capita and the credit risk of the autonomous communities. The information searched is from 2000 until 2020 in the case of GDP and until 2021 in the case of debt. Likewise, with the annual data of female president and female board member, we created a new dummy variable, in which we considered that there was a woman if there was a female president and/or female board member.

With all this, Table 4 shows the main descriptives of these variables for the 17 communities, maximum, mean, median, and minimum values as well as the standard deviation in order to get the compound for the entire Spanish country. Table 4 shows an average of all the regions for the time series studied in the paper (2000 to 2022). It also exhibits the mean and standard deviation of women in the positions of president, economic councilor or either one of the two in all of Spain.

Table 4: Summary of the economic situation in Spain from 2000 to 2022

	Economic Indicators			% Women		
Statistics	**Rating**	**GDP PC**	**Debt PC**	**President**	**Councilor**	**Either**
Mean	7.83	21816.04	3103.98	14.58%	43.22%	49.10%
Standard Deviation	3.79	5077.48	2444.22	35.30%	49.59%	50.05%
Minimum	1	10,149	297			
Median	9	21,024	2,501			
Maximum	26	36,049	10,726			

PC: per capita.

The average rating is 7.82 in this period of time with a minimum of 1 and a maximum of 26. If we look at the table of equivalencies above, we see that a rating of 8 is in the lower middle range, exhibiting satisfactory credit quality although there may be long-term stresses. A minimum of 1 is the best possible rating as it indicates maximum credit quality, while a maximum of 26 is the worst possible rating as it implies general default.

This wide range is due to the fact that the economy varies greatly from one region to another. In Spain, there are some Autonomous Communities with a much more powerful and buoyant economy than others. The median is 9, which is close to the mean. This implies that the frequency distribution is quite symmetrical.

The average GDP per capita is 21816.04€ in this time interval with a minimum of 1,0149€ and a maximum of 36,049€. Also, the median is 21,024€, which is very close to the mean. This indicates that the data set is symmetrical.

The average debt per capita is 3,103.98€ for the Spanish set from 2000 to 2022 with a minimum of 297€ and a maximum of 10,726€. This makes the deviation quite high, being of 2,444.22€ The median is 2501 and is lower than the mean. So, we can say that the data set is skewed to the right or positively skewed.

The percentage of women measures the presence of women in the positions of president and councilor of economy and finance in the 17 autonomous communities over the last 22 years (from 2000 to 2022). We have calculated both the mean and standard deviation. As shown in Table 4, it is more likely to see a woman as a councilor of economy and finance than as president of a community, since the percentage is higher; in fact, it is three times higher. The total female presence in either of the two positions in

that time interval is 50%. This indicates that the highest representation of the communities, the presidency, is still not held by too many women. The average percentage is still low.

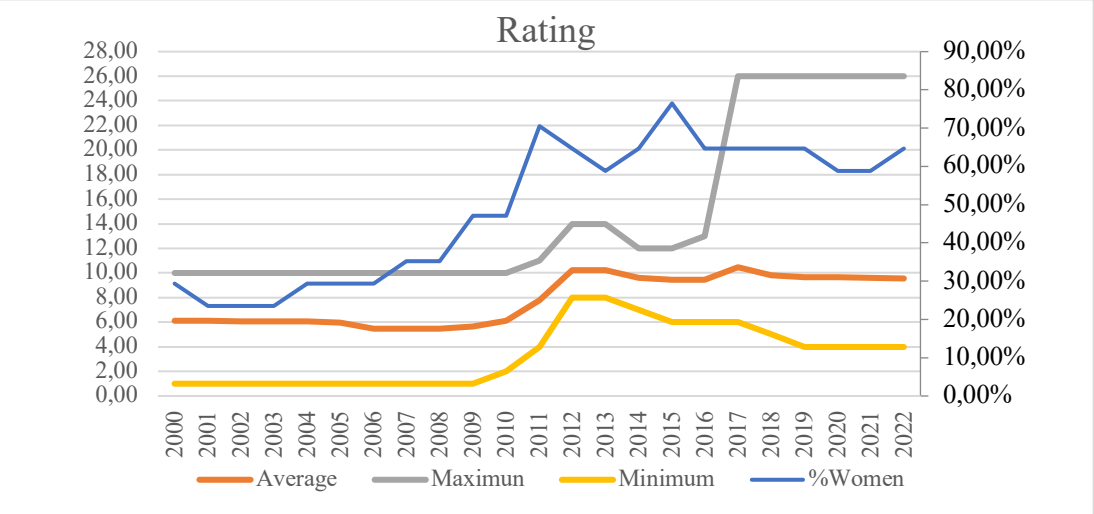
4. RESULTS

In this study, we focus on the economic situation and risk-taking behavior in autonomic public finance. Specifically, we consider the economic indicator of GDP per capita and in addition, we operationalize financial decision making with the indicators of debt per capita and credit rating of the autonomous communities. We will look at the temporal evolution of these measurements and then, we will see if the gender of the presidents and economic and finance councilors has any effect on them.

4.1 Evolution over time

Next, we will show the evolution over time of the rating, GDP per capita and debt per capita. They allow us to see how the financial situation has evolved in Spain. In addition, Figures 1 to 3 show the evolution over time of female participation in the autonomous community, both as president and as economic councilor, by means of the blue line.

Figure 1. Rating of the Autonomous Communities from 2000 to 2022.



We consider it important to highlight that, from 2009 onwards, almost 50% of women are present as president or as economic councilor. However, from 2000 to 2006, female participation in either position did not exceed 30%. In 2007 and 2008, the presence of women rose to around 35.29%. It jumped to 47.06% in 2009 and 2010. One of the highest percentages was reached in 2011, exceeding 70%. From 2012 onwards it moves

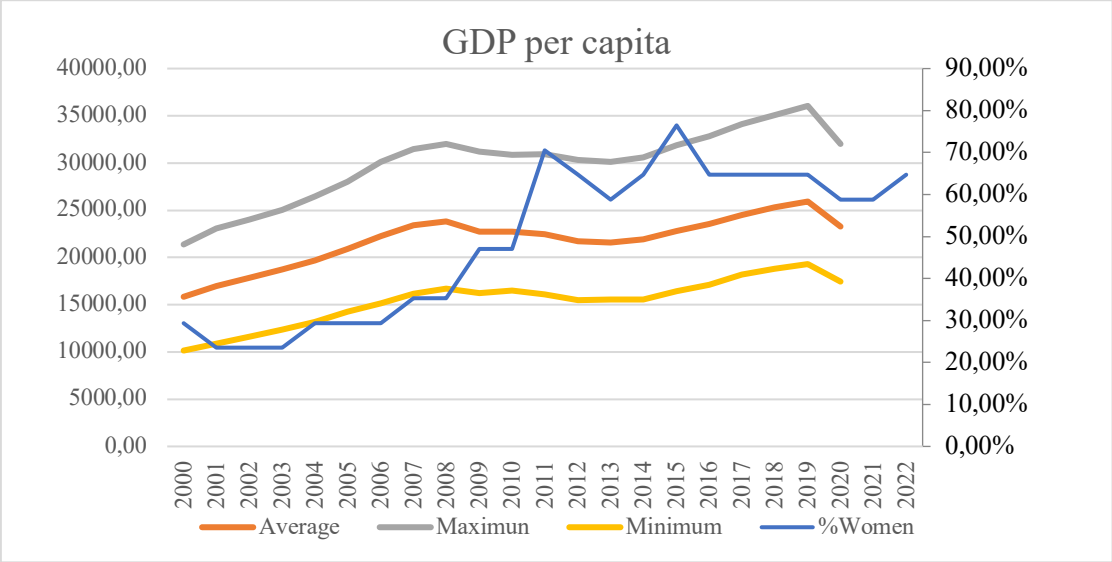
around 60%, being the maximum percentage of female participation in 2015 with 76.47%. The trend in recent years is to maintain a presence around 60% above or below.

Looking at Figure 1, the average annual rating of the autonomous communities, we see that from 2000 to 2010 it has been around 6, equivalent to an A, a medium-higher grade, which means that the credit quality is good. From 2006 to 2008, the rating is lowest are 2006 to 2008. In 2011, the rating starts to grow considerably. It rises to 10.24 in 2012 and 2013, being in a lower medium grade and the credit quality being satisfactory. From 2014 to 2016, it remains below 9.6. Being 2017 the year in which the highest value of the rating is obtained with 10.47. From 2018 onwards, it takes values between 9.53 and 9.82 with a timid downward trend.

Since 2009, the presence of women in the autonomous government is more pronounced but the rating has been increasing since that date, which means a worsening of the credit quality. We do not know if this can be attributed to the factor of greater female political participation because during this period several economic crises occurred in Spain.

As can be seen in Figure 2, from 2000 to 2008, GDP grew steadily. However, from 2009 onwards, it starts to decrease slightly until 2014. In 2015, it begins to recover until 2019 when the average GDP per capita reaches 25,924.59€. In 2020, it drops to 23,274.06€, the figure reached by Spain in 2007. That is, it returns to GDP levels of 13 years ago.

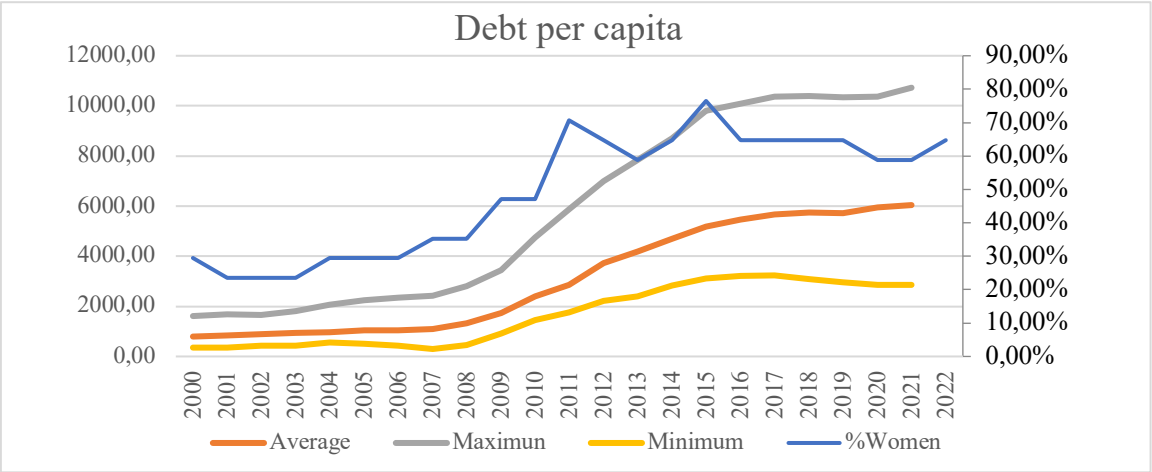
Figure 2. GDP per capita of the Autonomous Communities from 2000 to 2022.



From 2009 onwards, female participation is more considerable and manifest while the GDP decreases. But this can be rather due to the real estate bubble, the crisis in the financial sector and the lack of liquidity of companies. Then, the economy starts to recover and in 2020, it decreases again due to the COVID crisis. In other words, the most fundamental and determining factors affecting GDP have to do with issues other than the gender of the politicians in power in the autonomous communities.

The debt per capita starts very low in 2000, below €800, as can be seen in Figure 3. It grows gradually until 2008, when it reaches €1,331.94. From 2009 onwards, the debt assumed by the Autonomous Communities increases considerably until it reaches a maximum of €6041.29 in 2021. There is a parallelism between the growth of debt and the presence of women in the regions, but as in the case of GDP, this is not the only factor that may be relevant when interpreting the increase in assumed debt.

Figure 3. Debt per capita of the Autonomous Communities from 2000 to 2022



4.2 Effects of gender on credit risk

In order to analyze in greater detail the possible differences that have been visually detected for the credit risk, a mean difference analysis is carried out in Gretl between the total data on credit rating and the gender of autonomic presidents and economy and finance councilors. The goal is to detect the existence of any statistical relationship between this economic variable and the gender of the politicians in Spanish regions.

We have performed a test of variances and means for credit ratings according to whether the position of president, economic councilor, or either of the two positions is held by a woman. Table 5 shows the contrasts of variance differences and mean differences for the rating variable of all autonomous communities distinguishing by gender. In the right column, we compute the difference between the values obtained for women and men. As for the p-value, * indicates a significance of less than 10%, ** indicates a significance of less than 5% and *** indicates a significance of less than 1%.

Table 5. Effect of gender on the credit rating of all autonomous communities

		Rating		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	2.96	16.09	-13.13***
	Mean	8.40	7.73	0.67**
Councilor	Variance	23.01	7.35	15.66***
	Mean	7.39	8.16	-0.77**
President or Councilor	Variance	20.57	8.00	12.57***
	Mean	7.54	8.11	-0.57*

The variance contrast is parametric and is a necessary preliminary step to perform the test of means. If the p-value obtained is less than 0.1, we reject the null hypothesis that assumes equality in the variance of the rating for the sample of men and women. In this case, all the results have led us to reject the null hypothesis. Therefore, when performing the contrast of means, we have not assumed the common population standard deviation.

The null hypothesis of the contrast of means is that the average rating is the same whether a man or a woman is in charge in any of the situations (president, economic councilor or either of the two). As shown in Table 5, all the p-values are lower than 0.1 and lead us to reject the null hypothesis. We cannot assume that the average rating of all autonomous communities is the same for the sample of men and of women. The average rating is better when there is a male autonomic president as the mean is lower. However, the average rating is better when the councilor of economy and finance or any of the two positions is filled by a woman.

Likewise, we have performed the same statistical tests for all the autonomous communities except for Madrid, since it is the community that has been governed by a woman for the longest time as we wanted to see if this fact had affected the overall results. Table 6 shows the tests of variance differences and mean differences for the rating variable of all autonomous communities except for Madrid distinguishing by gender. In the right column, we compute the difference between the values obtained for women and men.

Table 6. Effect of gender on the credit rating of all autonomous communities except Madrid

		Rating		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	4.03	16.36	-12.33***
	Mean	8.15	7.71	0.44
Councilor	Variance	23.64	7.92	15.72***
	Mean	7.34	8.08	-0.74**
President or Councilor	Variance	22.36	8.23	14.13***
	Mean	7.39	8.08	-0.69**

We observe that the results extracting Madrid are not the same as with the full sample in the test where we compare the rating information with the gender of autonomic presidents. This indicates that Madrid has actually conditioned the results of the previous test. In the other two tests, results are the same as in the complete sample. Accordingly, we can say that the results of mean tests of all the autonomous communities rating compared with the gender of the economy and finance councilor and dummy variable are robust since they provide the same results.

Finally, we have made the same statistical tests with the data of the President, the Councilor of Economy and Finance or any of the two positions in the year prior to the economic index data in order to see if the gender of the politician of the previous year affects the results of the following year. Table 7 shows the contrasts of variance differences and mean differences for the rating variable of all autonomous communities considering the gender of the president and economic councilor of the previous year (lagged data).

Table 7. Effect of gender of the previous year on the credit rating of all autonomous communities

		Rating		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	2.82	15.97	-13.15***
	Mean	8.38	7.74	0.64**
Councilor	Variance	23.49	7.43	16.06***
	Mean	7.46	8.09	-0.63*
President or Councilor	Variance	21.04	8.00	13.04***
	Mean	7.58	8.05	-0.47

Results are the same as before, where female presidents have a worse credit rating for their community, while female councilors of economy and finance in general get a better rating.

In the end, we can say results are somewhat ambiguous, depending on the variable chosen for gender (president or councilor) and on the sample (full, without Madrid or with lagged), so we cannot say they fully support Hypothesis 1.

4.3 Effects of gender on GDP per capita

In order to analyze in greater detail, the possible differences that have been visually detected for the GDP per capita, a mean difference analysis is carried out in Gretl between the total data on GDP per capita and the gender of autonomic presidents and economy and finance councilors. The goal is to detect the existence of any statistical relationship between this economic variable and the gender of the politicians in Spanish regions.

We have performed a test of variances and means for GDP per capita according to whether the position of president, economic councilor, or either of the two positions is held by a woman. Table 8 shows the results of the test of variance differences and mean differences for the GDP per capita of all autonomous communities distinguishing by gender.

Table 8. Effect of gender on the GDP per capita of all autonomous communities

		GDP per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	3,189,345.95	19,801,677.62	- 16,612,331.67**
	Mean	26,321.59	21,099.24	5,222.35***
Councilor	Variance	23,062,522.68	25,340,580.45	- 2,278,057.77
	Mean	21,286.00	22,200.12	- 914.12**
President or Councilor	Variance	26,892,012.58	22,403,073.47	4,488,939.11
	Mean	22,014.61	21,633.47	381.14

As shown in Table 8, the null hypothesis of equality in the average GDP per capita is rejected in the first 2 cases as the p-value is lower than 0.1. In the contrasts where GDP per capita is compared separately with the gender of presidents and with the gender of the councilor of economy and finance, we can neither assume that the average GDP per capita is the same when the president is a man or a woman nor that the average GDP per capita is the same when there a is male or female councilor of economy and finance. In fact, average GDP per capita is better when the president is a woman, and it is better when the councilor of economy and finance is a man because the mean is higher. In the last case, the null hypothesis is confirmed as the p-value is greater than 0.1. We cannot reject that average GDP per capita is the same when there is a woman in charge in any of the situations (president or councilor of economy and finance).

Likewise, we have performed the same statistical tests for all the autonomous communities except for Madrid, with similar results.

Table 9. Effect of gender on the GDP per capita of all autonomous communities except for Madrid

		GDP per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	24,770,982.35	19,525,533.00	5,245,449.35
	Mean	24,006.21	21,007.81	2,998.40***
Councilor	Variance	17,985,775.46	22,761,246.02	- 4,775,470.56*
	Mean	20,847.79	21,663.03	- 815.24**
President or Councilor	Variance	19,265,916.41	22,176,796.65	- 2,910,880.24
	Mean	21,095.85	21,497.87	- 402.02

Finally, we have run out the same statistical tests with the data of the President, the Councilor of Economy and Finance or any of the two positions in the year prior to the economic index data. Table 10 shows the contrasts of variance differences and mean differences for the GDP per capita of all autonomous communities considering the gender of the president and economic councilor of the previous year (lagged data), where we observe that the results do not vary, offering robustness for the previous results.

Table 10. Delayed effect of gender on the GDP per capita of all autonomous communities

		GDP per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	31,939,797.01	20,158,965.58	11,780,831.43**
	Mean	26,341.18	21,163.37	5,177.81***
Councilor	Variance	23,428,114.05	24,959,715.39	- 1,531,601.34
	Mean	21,210.64	22,234.94	- 1,024.30**
President or Councilor	Variance	27,407,867.24	22,116,012.72	5,291,854.52*
	Mean	21,940.58	21,707.80	232.78

Ultimately, we can say that hypothesis 2 is not fully supported hypotheses because results show average GDP per capita is better when the president is a woman, but also when the councilor of economy and finance is a man.

4.4 Effects of gender on debt per capita

In order to analyze in greater detail, the possible differences that have been visually detected for the debt per capita, a mean difference analysis is carried out in Gretl between the total data on debt per capita and the gender of autonomic presidents and economy and finance councilors. The goal is to detect the existence of any statistical relationship between this economic variable and the gender of the politicians in Spanish regions.

We have performed a test of variances and means for debt per capita according to whether the position of president, economic councilor, or either of the two positions is held by a woman. Table 11 shows the contrasts of variance differences and mean differences for the debt per capita of all autonomous communities distinguishing by gender.

Table 11. Effect of gender on the debt per capita of all autonomous communities

		Debt per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	2,759,347.50	6,070,892.26	- 3,311,544.76***
	Mean	4,602.04	2,856.63	1,745.41***
Councilor	Variance	4,517,281.30	6,974,503.16	- 2,457,221.86***
	Mean	3,362.45	2,912.83	449.62**
President or Councilor	Variance	4,267,592.22	7,467,592.22	- 3,200,000.00***
	Mean	3,395.49	2,830.58	564.91**

In the variance contrast, we reject the H_0 in all cases. Thus, in all the contrasts of means, we do not assume the common population standard deviation.

Looking at the debt average for men and women, we find that it is significantly higher when the president, economic councilor or any of the two is a woman. Likewise, we have performed the same statistical tests for all the autonomous communities except for Madrid, with similar results.

Table 12. Effect of gender on the debt per capita of all autonomous communities except for Madrid

		Debt per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	1,942,894.85	6,148,211.68	- 4,205,316.83***
	Mean	5,163.65	2,870.73	2,292.92***
Councilor	Variance	4,590,401.64	7,415,999.81	- 2,825,598.17***
	Mean	3,314.71	2,953.88	360.83*
President or Councilor	Variance	4,470,321.07	7,606,576.13	- 3,136,255.06***
	Mean	3,404.43	2,853.49	550.94**

Finally, we have made the same statistical tests with the data of the President, the Councilor of Economy and Finance or any of the two positions in the year prior to the economic index data. Table 13 shows the contrasts of variance differences and mean differences for the GDP per capita of all autonomous communities considering the gender of the president and economic councilor of the previous year (lagged data), showing similar results.

Table 13. Delayed effect of gender on the debt per capita of all autonomous communities

		Debt per capita		
	Statistics	**Women**	**Men**	**Difference**
President	Variance	2,566,061.62	6,008,481.87	- 3,442,420.25***
	Mean	4,761.04	2,854.14	1,906.90***
Councilor	Variance	4,491,722.61	6,933,330.69	- 2,441,608.08***
	Mean	3,389.37	2,901.98	487.39**
President or Councilor	Variance	4,280,919.97	7,290,202.84	- 3,009,282.87***
	Mean	3,448.33	2,797.88	650.45***

Accordingly, we can affirm that the gender of the president and councilor affects the debt per capita assumed. In all cases, looking at the debt average for men and women, it is much better when the president, economic councilor or any of the two is a man because the average debt per capita is always lower for the male sample than for the female sample. In the end, we should say results failed to support hypotheses 3 because average debt per capita is consistently lower when the public administration is led by a man.

5. CONCLUSIONS

This study has contributed to a better understanding of public finance, a sector that has received much less attention from academics than the private industry. We have conducted a review of the existing research on the relationship between gender and risk, financial risk, firm performance and public policy outcome.

We have studied the relationship between the gender of elected leaders and risk behavior by examining the gender representation in politics in the Spanish territory. We have seen that in recent years, the female presence has increased significantly, reaching 50% of the composition of autonomic governments.

We have carried out several mean tests. Regions with female councilors of economy and finance have a lower credit rating than those with a male councilor. However, it has also been observed that communities led by a male president have a better credit rating. In terms of GDP per capita, the results have indicated just the opposite of what was expressed in the case of the rating. Communities with a female president have a higher average GDP per capita, which also happens when the councilor of economy and finance is a man. Finally, it is clear that the debt assumed by public administrations is lower when the president and economic councilor are men.

To sum up, we consider that gender does have an effect on the economic performance of public administrations. In light of the results, it is unclear if the impact is positive or negative. It would be necessary to study the subject further, using other econometric tools to complete the analysis and monitoring other factors that may affect the results such as political circumstances or investment decisions. Although women's public management has received more attention since the Covid-19 crisis, it would be interesting to dig deeper into women leadership and its effect on finance in the future.

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