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An empirical analysis of women's influence on management of financial risk in local governments

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ABSTRACT

This study analyse the impact of female on the management of financial risk faced by local governments (LGs), through political and population variables. We conduct a statistical analysis of panel data to examine the financial behaviour of 133 large LGs in Spain during the period 2009-2017. The results reveal that LGs with a female mayor are at lower risk of default. Likewise, we found that the number of female members of the city council and the degree of political fragmentation are inversely associated with the risk of default. This risk is also alleviated by population variables, such as a larger female population, a larger rate of unemployment among women and a smaller population of women aged over 65 years. Our findings have important implications and usefulness for a wide range of stakeholders, including policymakers, managers, practitioners and fiscal authorities concerned by solvency, financial risks and possible default in LGs.

Un análisis empírico de la influencia de la mujer en la gestión del riesgo financiero en los gobiernos locales

RESUMEN

En este estudio se analiza el impacto de la mujer en la gestión del riesgo financiero de los gobiernos locales (LGs), a través de variables políticas y demográficas. Se realiza un análisis estadístico de datos de panel para examinar el comportamiento financiero de 133 grandes LG en España durante el período 2009-2017. Los resultados revelan que los LGs con un alcalde mujer tienen un menor riesgo de impago. Asimismo, descubrimos que el número de mujeres miembros del ayuntamiento y el grado de fragmentación política están inversamente asociados al riesgo de impago. Este riesgo también se ve aliviado por variables poblacionales, como una mayor población femenina, una mayor tasa de desempleo entre las mujeres y una menor población de mujeres mayores de 65 años. Nuestras conclusiones tienen importantes repercusiones y utilidad para una amplia gama de interesados, incluidos los encargados de formular políticas, administradores, profesionales y autoridades fiscales preocupados por la solvencia, los riesgos financieros y el posible incumplimiento en los LGs.

1. Introduction

There has been a notable increase in the participation of women in public-sector government in recent years (OECD, 2019; CAWP, 2019; UN, 2015). In the OECD countries this participation rose from 25.1% in 2012 to 27.8% in 2017, in local governments (LGs) in Europe from 14.6% in 2009 to 19.1% in 2017, while in the USA 20.9% of mayors were women in 2018. These figures, however, show that women continue to be politically under-represented, whilst accounting for half of the world's population (OECD, 2019; UN, 2019).

In this respect, UN Sustainable Development Goal No. 5, for the 2030 "Gender Equality" Horizon, is to "achieve gender equality and empower all women and girls", in the view that this will "fuel sustainable economies and benefit societies and humanity at large. Concretely, the target 5.5. is "ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life", and the target 5.C is"adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels" (UN, 2019).

Previous studies have drawn interesting conclusions about the participation of women in Public Sector governance. Ferraz et al. (2018) and Tavares & Da Cruz (2017) observed that female participation in LGs benefits financial transparency, while Rodríguez et al. (2018) concluded that, due to contrasting interpretations of social reality, women tend to adopt a different leadership style from that of men. In addition, the presence of female councillors in a LG may affect its budget decisions (Holman, 2017) and that of a female mayor can have a direct impact on the financial sustainability of public services (Rodríguez et al., 2018). Similarly, Balaguer-Coll & Ivanova-Toneva (2019) found that the gender of the mayor (woman) has positive effects on debt level, and Hernández et al. (2018) concluded that when the city mayor is female, interest rates and borrowing levels are reduced. In this same line, Otero & Bouzas (2020) have identified the effect of women leaders on the governance of public administrations as an interesting research line and they propose recommendations for redefining local gender mainstreaming in a post-crisis scenario, which motivates the opportunity and relevance of our empirical work.

In parallel, academic researchers and international organisations have confirmed the severe impact on government finances caused by the global economic crisis (or Great Recession) that began in 2007, and have stressed the need to investigate how these negative effects may be prevented or mitigated in the future. So, this research could be very interesting to face current and future economic crises, such as those derived by the COVID-19 pandemic. Among European LGs, the Great Recession provoked financial insufficiency, insolvency, fiscal unsustainability and cuts in essential public services, among other problems, which may recur in the coming years (Navarro-Galera et al., 2019; IMF, 2019; EC, 2019).

Following the recommendations of international organisations (BCBS, 2017; EC, 2019; Worldwide Bank Group, 2015), researchers have sought to identify factors that may influence levels of municipal borrowing and to determine the causes of bank loan default (Navarro-Galera et al., 2017; Balaguer-Coll et al., 2016; Benito et al., 2015; Benito et al., 2003). A better understanding of this question might contribute to alleviating the negative effects of future economic difficulties (Navarro-Galera et al., 2019; Rodríguez et al., 2018; Lara-Rubio et al., 2017).

In this context, studies have addressed the presence of women in LGs, with respect to their influence on budget decisions (Holman, 2017), financial transparency (Ferraz et al., 2018), financial sustainability of public services (Rodríguez et al., 2018), interest rates and borrowing (Hernández et al., 2018), financial risk aversion (Suzuki & Avellaneda, 2018) and taxation-spending policies (Cabaleiro & Buch, 2018). Nevertheless, research into the specific influence of female participation in government on these questions remains insufficient and none of the above studies focus specifically on the relationship between gender and LG default.

Additionally, in line with the recent recommendations of international organisations (UN, 2019; OECD, 2019), some authors have suggested that it would be useful to study the relationship of female with the management of financial risk, in order to prevent and/or reverse the negative repercussions of future economic crises, such as that derived from COVID-19 pandemic (Buendía-Carrillo et al., 2020; Navarro-Galera et al., 2019; Suzuki & Avellaneda, 2018; Cabaleiro & Buch, 2018; Lara-Rubio et al., 2017).

From a theoretical standpoint, there is considerable value in determining the influence of female gender on LG default. According to *McGregor's Theory*, women are more attracted than men to the notion of responsibility and have greater concern for the ideals of others (Eagly & Karau, 2002; Eagly et al., 2003). A greater female presence in LG could affect levels of municipal spending and, therefore, the corporation's ability to repay its loans. Similarly, taking into account *Agency Theory*, it seems reasonable to believe that women's attitudes towards government commitments, distinct from those of their male counterparts, could affect LG austerity and debt-reduction measures and, therefore, the risk of default (Rodríguez et al., 2018). In another approach, Ribeiro & Scapens (2006), among others, refer to the postulates of *Institutional Theory*, according to which it may be useful to consider whether the size and characteristics of the female population might also affect LG spending and the risk of default. Finally, *Stakeholder Theory* highlights the relevance of a possible relationship between the profile of the female population and the effectiveness of LG financial management, in which the possibility of default is an overriding concern.

Thus, empirical research, international organisations and theoretical considerations underscore the timeliness and interest of analysing the effect of gender-related issues on decision making of financial risk in LGs. Accordingly, the aim of the present study is to determine the influence of female presence in LG on management of the risk of bank loan default. We address this aim by analysing political and demographic variables related to women in this context.

Based on a sample of 133 large Spanish municipalities, we perform a statistical analysis of data panels on municipal financial behaviour during the period 2009-2017.

The findings presented in this paper have important implications for a wide range of stakeholders, including policymakers, managers, practitioners and fiscal authorities concerned by solvency, financial risks and possible default in LGs. The empirical results empirically support that the presence of female policymakers in LG and of the female population in general influences decisions making and reduces the risk of financial default. In municipalities where the mayor is a woman, the influence of the female population, in itself, may tend to reduce the risk of default. Specifically, the results and conclusions of our research may contribute to achieving Sustainable Development Goal No. 5 "Gender Equality" (UN, 2019) and foster the adoption of precautionary measures against future economic difficulties, about which the IMF (2019b) and the EC (2019) have recently warned.

2. Theoretical framework and study hypotheses

It is important to understand how political and population variables may impact on the risk of LG default. These variables have been considered in studies of the influence of the female population on the economic decisions of governments in general and on the possibility of LG default in particular (Hernández et al., 2018; Suzuki & Avellaneda, 2018; Cabaleiro & Buch, 2018; Ferraz et al., 2018; Navarro-Galera et al., 2019; Cohen et al., 2019).

The impact of gender issues on the risk of LG default can be studied by reference to various theoretical frameworks. For example, with respect to the effects of political factors on the financial management of public entities (see, for example, Rodríguez et al., 2018), the McGregor Theory and/or Agency Theory have been considered.

According to McGregor's *Theory X and Theory Y* (1960), two exclusive perceptions of human behaviour are adopted by managers, according to their gender. Women inspire the sensibility of others, urging them to look beyond their own interests for the good of the collective. Women are characterised as being people-oriented, and as applying a motivational approach to help the organisation achieve its goals (Bass & Avolio, 1994). From this standpoint, women would be more concerned for the common good than for the needs of any single organisation, and would favour public policies expected to benefit society at large. So, female policymakers would tend to increase public spending, which would require greater financial resources and might provoke difficulties in meeting loan repayment obligations.

Agency Theory. This theory assumes that each individual is motivated solely by their own interest (Baiman, 1990), that the individuals are completely rational and have well-defined preferences and beliefs (in accordance with the *Expected Utility theory*) (Bonner & Sprinkle, 2002). In the LG context it seems reasonable to believe that voters (the principal) will elect responsible politicians, who will invest municipal resources efficiently, in the interest of the community. However, the characteristics of LG managers, one of which is their gender, may influence their commitment to proper financial management and therefore affect the financial risks assumed.

Previous studies have analysed the influence of gender on management style (Kim & Shim, 2003; Rodríguez et al., 2018) and on questions such as municipal borrowing (Balaguer-Coll & Ivanova-Toneva, 2019; Hernández et al., 2018), balancing spending and tax revenues (Cabaleiro & Buch, 2018), financial sustainability (Rodríguez et al., 2018), financial transparency (Ferraz et al., 2016; Tavares & Da Cruz, 2017) and financial risk aversion (Suzuki & Avellaneda, 2018). Taking into account the theories discussed and previous research findings, we propose the following hypotheses:

H.1: The presence of women in government may affect the risk of LG default.
H.1.1: The gender of the mayor may affect the risk of LG default.
H.1.2: The existence of an absolute majority in the government when the mayor is female may affect the risk of LG default
H.1.3: The proportion of female councillors may affect the risk of LG default.
H.1.4: The political allegiance of a female mayor may affect the risk of LG default.
H.1.5: The political strength of the governing party when the mayor is a woman may affect the risk of LG default.

H.1.6: The degree of political fragmentation when the mayor is a woman may affect the risk of LG default.
H.1.7: The level of ideological alignment between a female mayor and the leader of the regional government may affect the risk of LG default.
H.1.8: When both the mayor and the leader of the regional government are female, this coincidence may affect the risk of LG default.

According to the conceptual framework (*McGregor's Theory and Agency Theory*) we hope to accept all these hypotheses.

With regard to the impact of population factors on the risk of LG default, previous studies (Sinervo, 2014; Ribeiro & Scapens, 2006) have observed that approaches such as Stakeholder Theory and Institutional Theory can be useful.

Stakeholder Theory. According to Freeman (1984), a stakeholder is a group or individual that can affect or be affected by an organisation's efforts to achieve its objectives. This theory holds that the goal of management (including government) is the long-term maximisation of stakeholders' welfare (Rusconi, 2007). Women comprise half of the world's population and are stakeholders in almost all activities; one area in which their interests and priorities may have a particular impact is that of public spending and the need to meet repayment commitments.

Institutional Theory. Following this theory organisations must comply with social requirements in order to receive support and legitimacy. These bodies seek not so much efficiency as legitimacy, i.e. acceptance by the environment, which is considered essential to their survival and success (Dowling & Pfeffer, 1975). Accordingly, the characteristics of the population, one of which is gender, may influence managerial decisions, as policymakers attempt to legitimise their actions. In local government, this outlook may impact on spending decisions and on the municipality's ability to repay its bank loans.

In line with these two theories, researchers have analysed the influence of population volume on LG default (Greer, 2016; Lara-Rubio et al., 2017; Navarro-Galera et al., 2017) and the influence of gender on the representation of women's interests (Höhmann, 2020), on attention to issues prioritised by female voters (Atchison & Down, 2019) and on the adoption of women-friendly public policies (Meier & Funk, 2017). Based on *Stakeholder Theory* and *Institutional Theory*, as well as the findings of previous research in this field, we propose the following hypotheses that we hope to accept:

H.2: The presence of women in the population may affect the risk of LG default.
H.2.1: The size of the female population may affect the risk of LG default.
H.2.2: The size of the female immigrant population may affect the risk of LG default.
H.2.3: The rate of unemployment among the female population may affect the risk of LG default.
H.2.4: The size of the female dependent population may affect the risk of LG default.

3. Research method

3.1. Sample selection

Our empirical study focuses on Spanish LGs. We think this country is adequate for our empirical research, taking into account the concerns expressed by international organisations (EC, 2019; Aldasoro & Seiferling, 2014) and by other

researchers in this field (Balaguer-Coll et al., 2016; Navarro-Galera et al., 2017) regarding current levels of LG bank debt in Spain, which are among the highest in Europe.

Likewise, in Spain is that a major consequence of the Equality Act, adopted on 15 March 2007, was the introduction of obligatory gender parity in electoral lists, at the local, regional and state levels, which significantly increased the proportion of women holding political positions. Thus, in 2019, 35.6% of all councillors in Spanish LGs were female, compared to an EU-wide average of 32.6% (EIGE, 2020). Moreover, the Spanish population is 51% female (approximately one million more women than men) (INE, 2020), which highlights the need to understand the influence of gender-related factors on government borrowing and the risk of insolvency.

The sample analysed in this study is composed of large LGs, which is in line with previous studies of municipal finance (Suzuki & Avellaneda, 2018; Lara-Rubio et al., 2017). Taking into account the provisions of Act 57/2003, of 16 December, on LG modernisation, we examine 133 municipalities, each with more than 50,000 inhabitants, taking data for the period 2009-2017. The database thus obtained contains 1,197 observations. The results should be interpreted taking into account that since 2012, Spanish municipalities are subject to the spending limit approved by Act 2/2012, on budgetary stability and financial sustainability.

This sample is appropriate for our study aims, for the following reasons: a) Act 27/2013, on the rationalisation and sustainability of local governments, was adopted in recognition of the fact that large LGs were facing significant problems of insolvency; b) many of these administrations currently present large volumes of bank debt (Bank of Spain, 2019; Benito & Martínez, 2002; Benito et al., 2015; Navarro-Galera et al., 2017); c) the EC (2019) and rating agencies (Moody's, 2013) have observed that the financial situation of large LGs in Spain is among the most worrying in the eurozone; d) these LGs represent 38.7% of all local spending and 56% of the Spanish population, and are responsible for providing a wide range of services, including public transport, wastewater treatment, waste disposal and sports facilities (IGAE, 2018).

3.2. Dependent variable

According to Gordy (2000), an LG is considered to be in default if its ability to pay at a certain point in time, APP_{it}, falls below its credit obligations (c_{it}); in such a situation, there may be reasonable doubts that the administration will be able to repay the amounts borrowed according to the contractual conditions. From this standpoint, we measure the default in a Spanish municipality at a given time t as a random, dichotomous variable Y_{it}, such that:

$$Y_{it} = \begin{cases} 1 \text{ if the municipality enters into default} \\ \quad \text{at moment } t. \ APP_{it} \leq c_{it} \\ \\ 0 \text{ if the municipality does not enter into} \\ \quad \text{default at moment } t. \ APP_{it} > c_{it} \end{cases} \quad (1)$$

Furthermore, the dependent variable is defined taking into account both the concept of default as set out in the Basel III regulations (BCBS, 2017) and the limitations on LG borrowing imposed by the Local Government Finance Regulatory Act of 2004 (RDL 2/2004). Thus, following the criteria established in previous analyses of LG finance (Moody's, 2013; Benito et al., 2015; Navarro-Galera et al., 2017; Buendía-Carrillo et al., 2020), we assume that a LG's APP_i will be lower

than its credit obligations when one or more of the following financial criteria or indicators is met:

- *Default 1:* $Y_{it}(k_1) \epsilon \{0, 1\}$. *Cash surplus available for general expenses <0.* This situation is considered indicative of a deterioration in LG financial solvency, in accordance with Article 193 of the Local Government Finance Regulatory Act and with Articles 220 and 221 of the Basel III regulations.

- *Default 2:* $Y_{it}(k_2) \epsilon \{0, 1\}$. *Legal Borrowing Limit >110% of current income,* as established in Article 53.2 of the Local Government Finance Regulatory Act.

- *Default 3:* $Y_{it}(k_3) \epsilon \{0, 1\}$. *Solvency indicator (current assets / current liabilities) <1.* This indicator is commonly used in financial analysis and is implicitly included in Articles 220 and 221 of the Basel III regulations.

- *Default 4:* $Y_{it}(k_4) \epsilon \{0, 1\}$. *Gross Budget Savings (current income less current expenses) <0.* This parameter is defined in Article 53.1 of the Local Government Finance Regulatory Act and in Article 221 of the Basel III regulations.

Therefore, the dependent variable that is ultimately used as an indicator of LG default is $Y_{it}(k_1, k_2, k_3, k_4,) \epsilon \{0, 1\}$, where 0 indicates no default and 1 represents default.

$$Y_{it}(k_1, k_2, k_3, k_4) = \max \{0, \ \max(k_1, k_2, k_3, k_4)\} \quad (2)$$

Under Basel III rules, if $Y_{it}(k_m) = 1$ ($for \ m = 1, 2, 3, 4$) $Y_{it}(k_4) = 1$ in at least one of the four indicators, the observation is classed as default. However, although the value 1 of any $Y_{it}(k_1, k_2, k_3, k_4)$ is a sufficient condition for default to be declared, our empirical observations show that over half of the LGs in this situation present two or more such indicators (33.6% are in default according to two indicators, 13.8% according to three and 3.2% according to all four). Furthermore, the Royal Legislative Decree 2/2004 (of March 5, approving the revised text of the Law Regulating Local Finance) establishes that to consider a local government at financial risk, it is sufficient to meet any one of these four indicators.

3.3. Independent variables

Based on section 2, and in accordance with previous research findings, in this study we consider two types of explanatory variables – political and population factors. Table 1 presents the definition and expected sign of each proposed explanatory factor. A positive sign means that an increase in the value of the independent variable is associated with an expected increase in probability of default (PD).

3.3.1. Political variables

Previous research has highlighted the existence of differences between men and women in the decision-making process, notably that women have a different interpretation of social reality and, therefore, tend to adopt a different leadership style (Otero & Bouzas, 2020; Kim & Shim, 2003).

According to Eagly et al. (2003), women are more receptive to the ideals of responsibility, caring and interconnection and, moreover, show greater concern for others. In fact, Holman (2014) found that cities with female mayors tend to dedicate a larger proportion of the municipal budget to social welfare programmes. However, Hernández et al. (2018)

Table 1. Political and population variables

Variable	Description	Expected sign (β)
	Political variables	
GEN	Gender of the mayor. Dummy variable: (0) Male; (1) Female. Source: Ministry of the Interior.	-
Absol_Maj	Absolute majority. Dummy variable: (0) Absolute majority, (1) No absolute majority. Source: Ministry of the Interior.	+
Coun_w	Female councillors as a proportion of total councillors. Continuous variable between 0 and 1. Source: Ministry of the Interior	-
Political_Sign	Political sign. Dummy variable: (0) Conservative; (1) Progressive. Source: Ministry of the Interior	+
Herfindahl_Index	Councillors belonging to party i (in power) as a proportion of total councillors. Continuous variable between 0 and 1. Source: Ministry of the Interior	+/-
Frag	Ratio between the number of parties represented in the municipal corporation and the total number of councillors. Continuous variable between 0 and 1. Source: Ministry of the Interior.	+
Reg	Ideological alignment between the local and regional governments. Dummy variable: (0) No alignment (1) Alignment. Source: Ministry of the Interior.	+
Reg_Gen	Gender of the regional President. Dummy variable: (0) Male (1) Female. Source: Ministry of the Interior.	-
	Population variables	
Female population	Ratio of female population to the total population. Continuous variable between 0 and 1. Source: INE.	+
Female Imm Pop	Ratio of the female immigrant population to the total immigrant population. Continuous variable between 0 and 1. Source: INE.	+
Female Unemployment	Ratio of female unemployment to total unemployment. Continuous variable between 0 and 1. Source: SEPE.	+
Female Depend Pop <16	Ratio of the female dependent population aged under 16 years to the total dependent population aged under 16 years. Continuous variable between 0 and 1. Source: INE.	+
Female Depend Pop >65	Ratio of the female dependent population aged over 65 years to the total dependent population aged over 65 years. Continuous variable between 0 and 1. Source: INE.	+

INE, Spanish Institution of Statistics; SEPE, Spanish Employment Service.

concluded that municipalities with female mayors tend to have lower levels of borrowing, which could have its origin in a more efficient economic management. So, we hypothesise that the mayor's gender may also affect the LG's debt repayment capability. We expect to obtain a negative sign for the GEN variable, since even though the policies implemented by female policymakers would be associated with higher levels of spending, better economic management could lead to lower levels of debt and greater ability to pay. Therefore, we hope to accept hypothesis 1.1. with a negative sign between variables.

If a female mayor's party had an absolute majority in the council, the LG might be more likely to adopt certain expansive spending policies. However, studies have concluded that when the party governing a LG has an absolute majority in the council, the municipality has a greater income-generating capacity and, therefore, has lower borrowing requirements (Benito et al., 2010; Ashworth et al., 2005). Accordingly, and also taking into account that female mayors tend to have lower levels of borrowing (Hernández et al., 2018), we expect that the variable *Absolute majority* could affect positively to the LG's status regarding bank loan default. We hope that if the female mayors govern with an absolute majority the probability of the council's default will be reduced, and consequently we hope to obtain a positive sign for the variable *Absol_Maj*. We hope to accept hypothesis 1.2. with a positive sign between variables.

Regarding the proportion of female members of the city council, some researchers have concluded that male councillors present a stronger degree of political commitment than their female counterparts (Piotrowski & Van Ryzin 2007). However, others have found that an increased presence of women in the governing party is associated with higher tax revenues (Geys & Revelli, 2011), while Hernández et al. (2018) and Navarro-Galera et al. (2017) reported that when there are more women in the council, the risk of LG default is lower. So, we expect to obtain a negative sign for the variable *Coun_W*. We hope to accept hypothesis 1.3. with a negative sign between variables.

Analysis of the mayor's political ideology (conservative vs. progressive) has shown that in large LGs a progressive stance is associated with higher levels of borrowing and a greater risk of default (Benito et al., 2015; Navarro-Galera et al., 2017). Accordingly, we expect to obtain a positive relationship for the variable *Political_sign*. We hope to accept hypothesis 1.4. with a positive sign between variables.

In the present study, we examine, from a gender perspective, whether political strength is related to the risk of default. To do this, we follow previous research practice in calculating the Herfindahl index (see Table 1). Numerous studies (Lago & Lago, 2009; Ashworth et al., 2005) have concluded that greater political strength is associated with higher levels of debt and deficit, so we could expect a positive sign for this variable. However, under the assumption that when the mayor is a woman a greater political strength could facilitate lower levels of debt (Hernández et al., 2018), we could expect to obtain a negative sing for the variable Herfindahl_Index. In light of the above, the sign of the estimator could be either positive or negative. Therefore, we hope to accept hypothesis 1.5., although the sign could be positive or negative between variables.

The degree of political fragmentation has been analysed previously, but not from a gender perspective. Nevertheless, Geys & Revelli (2011), Volkerink & De Hann (2001) all concluded that greater political fragmentation increases budget deficits and therefore aggravates municipal debt. Therefore, we expect to obtain a positive sign for this variable. We hope to accept hypothesis 1.6. with a positive sign between variables.

Finally, Navarro-Galera et al. (2017) concluded that ideological alignment between the party governing a LG and that of the regional government has a positive influence on the probability of default.

As a novel consideration, in addition to political alignment, we also address the question of gender alignment, hypothesising that if both the local mayor and the head of the regional government are female, not only will they be more responsive than male politicians to voters' demands (and thus inclined to increase spending), but in addition such a gender alignment could generate greater affinity between the

two levels of government, thereby creating an environment more favourable to expansive spending policies. However, gender alignment could generate better economic management could lead to lower levels of debt and greater ability to pay. In accordance with these considerations, we expect to obtain positive sign for the *Reg* and negative sign for the *Reg_Gen* variable. We hope to accept hypothesis 1.7. and 1.8 with a positive and negative sign between variables, respectively

3.3.2. Population variables

Previous studies have reported empirical evidence of the influence of municipal population size on LGs' non-compliance with borrowing limits (Benito et al., 2015) and on default problems (Greer, 2016; Lara-Rubio et al., 2017; Navarro-Galera et al., 2017), since larger populations involve higher levels of government spending, and this may increase borrowing requirements and heighten the risk of default. Other researchers have shown that in various European countries (Austria, Belgium, Finland, United Kingdom and Spain) the gender perspective has been incorporated into the budget process (Jubeto-Ruiz, 2017), thus increasing spending on policies related to gender equality. In large municipalities this variable is associated with increased borrowing, a greater risk of default and reduced sustainability (Lara-Rubio et al., 2017; Benito et al., 2015).

Furthermore, research into the political representation of women has shown that female mayors defend women's interests more strongly than their male counterparts (Höhmann, 2020). Specifically, women in public office are more likely to prioritise issues related to the female electorate (Atchison & Down, 2019; Holman, 2014, 2017; Schumaker & Burns, 1988), and advocate policies favourable to women's interests (Meier & Funk, 2017). In view of these considerations, we hypothesise that the proportion of women voters among the electorate will influence the management decisions of female mayors. To our knowledge, this question has not been examined in previous research. In conclusion, we expect the sign for the *Female population* variable to be positive. We hope to accept hypothesis 2.1. with a positive sign between variables.

According to stakeholder theory, LG policies are especially subject to the influence of population groups with special needs, such as immigrants, the unemployed and the dependent population. Taking into account that female mayors tend to allocate a greater share of municipal spending to issues related to the female population (Funk & Philips, 2019), and that LGs are expanding their social security provisions and benefits (Hernández et al., 2018), we hypothesise that the population variables related to groups in need among the female population would be directly related to the risk of LG default.

Although evidence shows that the size of the immigrant population is positively associated with the level of public borrowing, previous studies of this question have not taken female immigration into account, despite women's importance as users of public services. In a related field, Palumbo & Zaporowski (2012) and Kloha et al. (2005) have concluded that in large LGs rising unemployment is associated with a greater volume of public debt. However, these authors did not study the possible effects of female unemployment on LG default. Our study, by contrast, incorporates the variables *Female Immigrant Population* and *Female Unemployment*. In both cases, we expect to obtain a positive sign. So, we hope to accept hypothesis 2.2. and 2.3 with a positive sign between variables,

respectively.

Finally, previous studies have concluded that in large municipalities a larger dependent population is associated with a greater volume of public borrowing and a higher risk of default (Benito et al., 2015; Navarro-Galera et al., 2017; Lara-Rubio et al., 2017). Buendía-Carrillo et al. (2020) analysed the impact of the proportion of women among the dependent population, verifying that the gender of this population is relevant to the probability of LG default. Accordingly, in this study we include, as a novel aspect, two variables concerning the proportion of women among the dependent population, distinguishing between those aged under 16 years and those aged over 65 years, in the view that these population groups may affect the probability of default in different ways. In both cases, we expect to obtain a positive sign. Therefore, we hope to accept hypothesis 2.4. and 2.5 with a positive sign between variables, respectively.

3.4. Logistic regression analysis of panel data

In this study of the causes of financial risk, PD is used as a financial indicator. It is measured by assigning the value 1 when one or more of the above-defined conditions for LG default is met, and 0 otherwise. The study data were obtained from a sample of 133 Spanish municipalities, with the dependent variable and 13 independent variables comprising population and political factors expected to influence LG default. The PD of LG_i at time t is defined as follows:

$$PD_{it} = PD(Y_{it} = 1) = P(APP_{it} \leq c_{it}) \qquad (3)$$

The relationship over time between the PD and the population and political factors considered was explored using panel data analysis, which separates the cross-section data from the time-series data. Panel data regression models were obtained by applying the logistic function to the following equation:

$$Y_{it} = \alpha + \beta_i X_{it} + \gamma_i Z_{it} + \mu_{it} \qquad i = 1 \ldots \ldots N, \quad t = 1 \ldots \ldots T \quad (4)$$

Following the methodology described in previous research on financial risk (Lara-Rubio et al., 2017; Navarro-Galera et al., 2017), in the present analysis the risk factors that influence PD are assumed to be of two types: population (X_{it}) and political (Z_{it}). The parameters or estimators of the corresponding population and political variables are termed β_i and γ_i, respectively, and μ_{it} represents the remaining effects associated not only with individual heterogeneity but also with the time period considered.

The relationship between the dependent variable and the risk factors can be established using a probit or logit model, either of which allows us to estimate the PD of the LG at time t as a function of the local population and of the corresponding political factors. Taking into account the linear panel data model defined in (3), the PD is obtained from the following equations:

$$\begin{aligned} PD\,(Y_{it} = 1 | X_{it}, \; Z_{it}) &= PD\,(APP_{it} \leq c_{it} | X_{it}, \; Z_{it}) = \\ &= PD\,(Y_{it} = \alpha + \beta_i X_{it} + \gamma_i Z_{it} + \mu_{it} | X_{it}, \; Z_{it}) = \\ &= PD\,(Y_{it} = \mu_{it} \leq \hat{\alpha} + \hat{\beta}_i X_{it} + \hat{\gamma}_i Z_{it} \Big| X_{it}, \; Z_{it}) = \\ &= F(\hat{\alpha} + \hat{\beta}_i X_{it} + \hat{\gamma}_i Z_{it}) \end{aligned} \qquad (5)$$

where *F(.)* represents the standard normal distribution function of the error term μ_{it}.

Therefore, the PD of LG_i at time t is a function that depends on population and political factors, which are estimated using a logit data panel, in accordance with equation (6) (Train, 2003):

$$PD\left(APP_{it} \leq c_{it}|X_{it},\ Z_{it}\right) = \frac{e^{\widehat{\alpha}_i + \widehat{\beta}_i X_{it} + \widehat{\gamma}_i Z_{it}}}{1 + e^{\widehat{\alpha}_i + \widehat{\beta}_i X_{it} + \widehat{\gamma}_i Z_{it}}} \qquad (6)$$

The model parameters $\widehat{\alpha}$, $\widehat{\beta}_i$ and $\widehat{\gamma}_i$ are obtained by maximising the value of the likelihood function, and by determining whether a fixed or random-effects regression should be applied, after testing the degree of correlation between latent effects and the model predictors (Hausman, 1978).

In our study, logistic regression analysis of random effects panel data is carried out on a sample of 133 large LGs, for the period 2009-2017, with a binary dependent variable.

Finally, the main study aims are addressed by means of three statistical models: a) *Model 1*, using the entire sample; b) *Model 2*, focusing on the explanatory factors of LG default where the mayor is female; c) *Model 3*, considering LGs where the mayor is male.

4. Results and discussion

The results obtained show that for the LGs studied during 2009-2017, in 772 observations (65.50%) there is a risk of default, according to the definition of the dependent variable, while 425 observations (35.50%) do not there is that risk.

Assuming a low level of correlation between the variables, Table 2 shows the estimated coefficients, transformed into odds ratios (OR) or the exponential of or in the logistic regression analysis of the random effects panel data for the three models considered. The classification matrix of the estimated and observed values (Table 3) shows the correct percentage of classification obtained by each model.

In this respect, Model 2 was the most accurate, correctly classifying 77.58% of the cases. In other words, the municipalities with female mayors produce the highest rates of accurate classification, which is indicative of the explanatory strength of the variables considered and hence of the model's consistency and robustness.

The results also show that the average PD of all municipalities is 63.51%. For those with female mayors, the PD is 59.73%, while for those with male mayors, it is 64.55%. Thus, a LG with a female mayor is at less risk of default than one with a male mayor, which extends the findings of previous research (Ferraz et al., 2018; Tavares & Da Cruz, 2017; Hernández et al., 2018; Rodríguez et al., 2018). These authors analysed the influence of female policymaker participation on the financial transparency, borrowing and financial sustainability of LGs, but they did not study its impact on the risk of default.

The results obtained for Model 1 show that the gender of the mayor is relevant to the probability of default, which is lower when the mayor is female (the variable GEN was found to be statistically significant, with a negative sign for the estimator). The result obtained coincides with the expected and supports hypothesis 1.1. In addition, it corroborates the validity of the McGregor Theory and justifies the development of models 2 and 3, used to study PD in LGs where the mayor is female (Model 2) or male (Model 3).

Continuing with the political variables, the results show that, regardless of the mayor's gender, when there is a higher percentage of female councillors the PD is reduced. Our results match the expected sign based on previous research, and extend previous findings (Navarro-Galera et al., 2017), showing that when, in addition, the mayor is female the impact of the former variable on PD is even greater. On consideration of the results obtained, we conclude (corroborating previous observations by Geys & Revelli, 2011) that the presence of a greater proportion of women in the governing party is associated with the LG obtaining higher tax revenues, which would enhance the possibilities of debt repayment. We find that an increase in the number of female councillors reduces the default probability more sharply when the mayor is a woman, rather than a man. Thus, we accept hypothesis 1.3.

With Model 1, greater political strength (measured by the Herfindahl index) is associated with an increase in PD (the estimator has a positive sign), which corroborates previous research findings (Navarro-Galera et al., 2017; Lago & Lago, 2009) regarding the effect of this variable on LG borrowing and deficits. However, the results for Model 2 show that when the mayor is female, the impact of greater political strength on PD (for which a negative sign was obtained) is

Table 2. Distribution of the sample

Variable	Model 1			Model 2			Model 3		
	Coef. (β, γ)	Std. Err.	Odds Ratio	Coef. (β, γ)	Std. Err.	Odds Ratio	Coef. (β, γ)	Std. Err.	Odds Ratio
GEN	-0.3703[(***)]	1.2329	0.6905	-	-	-	-	-	-
Absol_Maj	-1,2993	1,0657	0,2727	-0.13573	0.5136	0.8731	-0.1357	0.5135	0.8731
Coun_w	-3.3917[(***)]	5.5868	0.0336	-2.3244[(***)]	8.7441	0.0978	-0.8492[(***)]	3.3015	0.4277
Political_Sign	0.0495	0.9664	1.0507	0.0546	0.9998	1.0561	0.0234	0.7864	1.0237
Herfindahl_Index,	0.8791[(*)]	5.0979	2.4087	-0.8853[(*)]	6.1437	0.4126	2.3818	2.7039	10.8246
Frag	-0.8859[(***)]	3.2654	0.4124	-0.8079[(*)]	0.5851	0.4458	-0.8887[(*)]	5.1199	0.4112
Reg	0.3485	0.5668	1.4170	0.3493	0.3264	1.4180	0.3493	0.3264	1.4180
Reg_Gen	-0.3692	1.6243	0.6913	0.0001	1.6243	1.0001	0.001	1.6243	1.0001
Female population	-1.1342[(***)]	38.3808	0.3217	-2.9472[(***)]	96.2537	0.0525	-0,6385	41,5899	0,5281
Female Immigr Pop	1,2098	15,7404	3,3529	-1.1055	11.4345	0.3311	-1,1055	11,4345	0,3311
Female Unemployment	-2.9234[(***)]	4.5857	0.0537	-2.6740[(***)]	9.1795	0.0690	-2.6749[(***)]	5.5075	0.0689
Female Depend Pop <16	-0,9618	39,1970	0,3822	4,7798	49,1964	119,0796	4.7798	49.1964	119.0796
Female Depend Pop >65	0.6696[(***)]	16.9546	1.9534	1.3331[(***)]	40.9807	3.7926	0.4516[(***)]	18.5590	1.5708
_cons	2,7002	20,6851		9,0519	40,5946		8,2441	25,5419	
	Log likelihood: 256.84			Log likelihood: 217.19			Log likelihood: 346.42		
	Wald Chi-square: 75.75; sig.: 0.000			Wald Chi-square: 68.82; sig.: 0.000			Wald Chi-square: 86.22; sig.: 0.000		
	Chi-square: 44.78; sig.: 0.000			Chi-square: 43.27; sig.: 0.000			Chi-square: 58.38; sig.: 0.000		
	Hausman (1978) Test: 14.44; sig.: 0.1099			Hausman (1978) Test: 10.94; sig.: 0.1258			Hausman (1978) Test: 23.14; sig.: 0.0933		

[(*)], [(**)], [(***)] Significance of 10%, 5% and 1%, respectively.

contrary to previous research findings, a contradiction that highlights the need to examine the variable from a gender perspective. A possible explanation for this result could be that, as we expected, when the mayor is a woman, a greater political strength could lead to more efficient economic management, resulting in lower levels of debt and, therefore, a lower probability of default. The result obtained coincides with the expected result, and supports hypothesis 1.5, which is therefore accepted.

Finally, in all three models, the variable *Political fragmentation* was found to be statistically significant, with a negative sign; thus, regardless of the mayor's gender, an increase in political fragmentation is associated with a lower probability of LG default, a result that contrasts with previous research findings (Geys & Revelli, 2011; Volkerink & De Hann, 2001). This relationship might be explained by the indecision and stagnation associated with political fragmentation (Ashworth et al., 2005), which, as we show, exists regardless of the gender of the mayor. These results do not match the expected sign based on previous research, but support hypothesis 1.6, which therefore we accept.

Turning to the population variables, the analysis we present broadens our understanding of these questions, showing that as the relative size of the female population increases, the probability of default is reduced, especially when the LG has a female mayor.

These results confirm the validity of Institutional Theory as a means of explaining LG default in terms of gender issues, although the sign obtained is contrary to that expected based on previous research. As a possible explanation of this finding, we suggest that increased spending on policies favouring gender equality (Jubeto-Ruiz, 2017; Meier & Funk, 2017), especially when the LG has a larger proportion of female politicians, tends to produce more efficient economic management. Our results corroborate previous research findings that female representation in LGs heightens risk aversion in financial decisions (Suzuki & Avellaneda, 2018) and is associated with lower interest rates and hence less onerous repayment obligations (Hernández et al., 2018). Moreover, our results confirm that management styles differ between men and women (Kim & Shim, 2003) and that this difference impacts on LGs' credit risk. Although the sign obtained is opposite to that expected, our results support hypothesis 2.1, which is therefore accepted.

According to our results, the rate of female unemployment is inversely related to PD, regardless of the mayor's gender. This contradicts previous research findings (Rodríguez et al., 2018; Benito, 2010; Ashworth et al., 2005). Although the latter authors did not study unemployment from a gender perspective, they concluded that rising unemployment was associated with greater social expenditure and higher levels of borrowing. Our results do not match the expected sign based on previous research, but confirm the relevance of gender in the analysis of PD in LG, and so hypothesis 2.3 is accepted.

The variable *Dependent female population aged over 65 years* is positively associated with PD, which confirms and extends previous findings (Palumbo & Zaporowski, 2012; Benito et al., 2010) according to which an increase in the dependent population tends to worsen the budget deficit. In addition, our results show that as this population segment grows, the PD is more strongly affected when the municipality has a female mayor, rather than a man. Assuming that women are better placed to represent women's interests in public policies (Meier & Funk, 2017), we suggest that spending in municipalities governed by women is increased in or-

der to meet the growing needs of the female population. Our results are consistent with the expected results based on previous research, and support hypothesis 2.4.

Finally, we found no empirical evidence of any influence on PD of the remaining political variables (absolute majority, political sign, ideological alignment or gender alignment of the regional president and the mayor) or population variables (dependent population of women aged under 16 years and size of the female immigrant population). Our findings do not match the expected results based on previous research. Consequently, our results do not support hypotheses 1.2, 1.4, 1.7, 1.8 or 2.2.

Table 3. Classification matrix (%) of the three models

MODEL 1			
Observed		Predicted	
		Y	
	Payment	Default	Accuracy (%)
Y Payment	311	109	74.05
Default	171	601	77.85
Accuracy (%)			**76.51**

Optimum cutoff point: 0.48. Sens.: 64.52%; Spec.: 84.64%

MODEL 2			
Observed		Predicted	
		Y	
	Payment	Default	Accuracy (%)
Y Payment	92	30	75.41
Default	44	164	78.85
Accuracy (%)			**77.58**

Optimum cutoff point: 0.49. Sens.: 67.65%; Spec.: 84.53%

MODEL 3			
Observed		Predicted	
		Y	
	Payment	Default	Accuracy (%)
Y Payment	223	80	73.59
Default	131	433	76.77
Accuracy (%)			**75.66**

Optimum cutoff point: 0.50. Sens.: 62.99%; Spec.: 84.40%

5. Conclusions

Our empirical results show that the financial management of female mayors reduces the PD, compared to LGs with male mayors. This extends previous research findings, which merely show that the presence of a female mayor is associated with lower levels of government borrowing. Furthermore, our results indicate that female presence in the city council (as mayor and/or councillors) contributes to reducing the risk of bank loan default.

The study results also demonstrate the influence of other gender-related political factors on the risk of financial default. Thus, our statistical analysis indicates that PD is reduced when there is a greater proportion of female members in the city council, especially in municipalities with a high degree of political fragmentation. Thus, we corroborate the consistency and validity of McGregor's Theory and of Agency Theory regarding the influence of female policymakers in reducing the risk of LG loan repayment default.

Our study results also show that the impact made on PD by the female presence in government is not due to political factors alone. Empirical findings show that gender-related population factors, too, are relevant. Thus, a larger population of female residents, a higher proportion of women among the unemployed population and a lower proportion of the population composed of women aged over 65 years all

contribute to reducing the risk of default. These findings on population factors corroborate the value of Stakeholder Theory and of Institutional Theory as frameworks for explaining the contribution of women in government to enhancing municipal risk management and avoiding financial default.

These results show that the greater presence of women in the city council and among the resident population is associated with a lower risk of LG default. This finding is interesting for a wide range of stakeholders, including policymakers, municipal managers, voters, banks, tax and audit authorities and citizens at large affected by LG solvency, financial risks and possible default.

Our results highlight the existence of marked differences between municipalities governed by a female mayor and those where a man holds this position. In the first case, the favourable influence associated with the presence of female members of the city council is greater than in LGs where the mayor is a man. Therefore, the female-gender alignment between mayor and councillors reduces the risk of financial default. Moreover, in municipalities with a female mayor (but not in male-governed ones), greater political strength (i.e., less fragmentation) and the existence of a larger female population are associated with a lower risk of default. In addition, the reduced probability of default observed in municipalities with a smaller proportion of female residents aged over 65 years is more apparent in LGs with a female mayor than in those governed by a man.

Overall, thus, our findings empirically support the hypothesis that the presence of female policymakers in LG and that of the female population in general influences political decisions and reduces the risk of financial default. We conclude, therefore, that when Sustainable Development Goal No. 5 (Gender Equality) is met, this contributes to reducing the financial risk of governments.

Our results help to understand the benefits of the participation of women in public management and, therefore, can contribute to increase the full and effective participation of women in government decision-making and encourage the formulation of policies and laws that promote gender equality. More specifically, our findings support the convenience of increasing the participation of women in government economic decisions, in line with objective 5.5. and with goal 5.C (Sustainable Development Goal No. 5)

These findings should be taken into account by policymakers seeking to reduce the financial risks of local governments. The conclusions we present suggest that the corrective measures taken at present to address problems of financial default vary considerably between municipalities governed by female mayors and with large numbers of female councillors, versus those governed by men.

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Conflict of interests

The authors declare no conflict of interests.

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