Received: 22 June 2015 | Revised: 11 January 2019 | Accepted: 9 March 2019

DOI: 10.1002/agr.21608

RESEARCH ARTICLE

WILEY Agribusiness An International Journal

The effect of gender diversity on the board of Spanish agricultural cooperatives on returns and debt: An empirical analysis

Carmen María Hernández-Nicolás | Juan Francisco Martín-Ugedo | Antonio Mínguez-Vera

Department of Management and Finance, Faculty of Economics and Business, Campus de Espinardo, University of Murcia, Murcia, Spain

Correspondence
Antonio Mínguez-Vera, Department of Management and Finance, University of Murcia, Campus de Espinardo, Faculty of Economics and Business, s/n, 30100 Murcia, Spain.
Email: minver@um.es

Funding information
Ministerio de Economía y Competitividad, Grant/Award Number: FEM2013-40578-P; Fundación Caja Murcia.

Abstract

This paper focuses on gender diversity on the boards of Spanish agricultural cooperatives. Specifically, it examines the effect that gender diversity on the board exerts on returns, debt level, and economic risk. Cooperatives differ significantly from investor-owned firms because cooperative members are producers, agents, and customers of the cooperatives. In Spain, there is an ongoing debate about the importance of women in business management. Spain is also a pioneer in terms of enacting specific legislation for the social economy. The sample examined includes 672 agricultural cooperatives. The results show that firms with greater female representation on their boards have higher returns and operational risk and lower levels of debt. [EconLit Classifications: J16, J54, Q13].

KEYWORDS
cooperatives, debt, gender, returns

1 | INTRODUCTION

Agricultural cooperatives perform important socioeconomic functions for their members. Specifically, they are suppliers of farm produce, marketers of agricultural commodities, and providers of services such as storage and transport (Ortmann & King, 2007).

The Spanish Cooperative Law (Ley 27, 1999) defines cooperatives as companies formed "by people who are associated, in free association and with voluntary withdrawal..., with structure and democratic functioning in accordance with the principles formulated by the International Cooperative Alliance (2012)." Members are linked by a cooperative partnership agreement and thus are entrepreneurs. Cooperatives are governed by seven

principles: voluntary and open membership, democratic member control, members' economic participation, autonomy and independence, education, training and information, cooperation among cooperatives and concern for community (ICA, 1995; Novkovic, 2006). The principle of voluntary and open membership means that there should be no social, political, religious, racial, or gender discrimination in a cooperative. Although in most countries gender discrimination is legally punished, the fact that the principle of voluntary and open membership explicitly addresses such discrimination has prompted some authors to claim that cooperatives are firms in which women should be able to more easily ascend the hierarchy and become directly involved in management (Mateos, Iturroiz, & Gimeno, 2009).

Worldwide, agricultural cooperatives constitute the major associative force that enables farmers with small- and medium-sized operations to act as global entrepreneurial organizations (Campos-Climent & Sanchís-Palacio, 2015). In the European Union, there are approximately 40,000 agricultural cooperatives with approximately 600,000 workers and a total business volume of more than 300 billion euros per year (General Confederation of the Agricultural Cooperatives of the European Union; COGECA, 2012). Cooperatives represent more than 50% of the supply of agricultural inputs and more than 60% of the collection, processing and marketing of agricultural products (COGECA, 2012). In Spain, there are 3,844 agricultural cooperatives with 98,999 employees and sales of more than 25,696 million euros (COGECA, 2014). These figures clearly indicate the relevance of agricultural cooperatives in the European Union in general and in Spain in particular.

In recent decades, there has been pressure from society, mainly in Europe, to include women on boards of directors and in top management positions. In the last years, the average number of women on European boards has increased and due to the establishment of gender quotas by certain European governments, this number is expected to continue to increase. However, female representation on European boards remains very low, with an average of 17% in 2013, and there are wide variations between countries. For example, Norway (39% female board representation), and to a lesser extent Sweden (27%) and Finland (27%), has the highest level of female board membership, whereas Poland (8%) and Portugal (8%) have the lowest (Heidrick & Struggles, 2014). At one time, the United States had more women on corporate boards than Europe. However, gender diversity is increasing very slowly in the United States, and Europe is closing the gap. For example, only 19.9% of the board seats of S&P 500 companies are held by women (Catalyst Report, 2015).

The evidence suggests that women managers may exert an important influence on the work style and processes of the board and consequently on company performance (Bilimoria & Piderit, 1994; Daily, Certo, & Dalton, 1999; Farrell & Hersch, 2005; Kesner, 1988). The relationship between gender diversity on the board and financial performance is a relatively new topic in the academic literature. However, an increasing number of studies have focused on this issue in the last several years (R. B. Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; D. Carter, D'Souza, Simkins, & Simpson, 2010; D. Carter, Simkin, & Simpson, 2003; Farrell & Hersch, 2005; Post & Byron, 2015; and Rose, 2007 among others). To the best of our knowledge, no study has focused on the relationship between gender diversity in agricultural cooperative board membership and subsequent financial performance.

Managers are in charge of the day-to-day operations of a business, and the board is a decision-making body with the power to control managers. This governance structure should work for all types of firms. Although this structure is particularly common for large and publicly traded firms, it is not as evident in other firms. In the case of cooperatives, the board tends to be less structured and members have a unique relationship with the organization because they are simultaneously owners, users (buyers and sellers), controllers, and beneficiaries (Kyriakopoulos, Meulenberg, & Nilsson, 2004; Nilsson, 1996; Richards & Manfredo, 2003). The fact that board members usually play several roles simultaneously may provide each member with a greater capacity for decision-making. Therefore, the influence of gender (diversity) could be stronger in this type of organization (cooperative), which makes it an interesting subject for studying women's contribution to management.

The objectives of cooperative members may be diverse. As owners (residual claimants), members share both the returns and the risk related to the firm's net cash flows. As controllers, members have residual rights to control

cooperative assets and thus generally to benefit from the use of those assets by the cooperative. Consequently, a cooperative may have either single- or multiple-objective goals. As a result of this variety, the literature on the economic performance of cooperatives is composed of a heterogeneous collection of theoretical and empirical studies. Economists studying cooperative performance usually view the cooperative as an independent firm with a single objective. According to Soboh, Lansink, Giesen, and Van Dijk (2009), a cooperative, as a vertically integrated firm, usually has the objective of conducting an optimal marketing program for its members. When the cooperative is considered as independent business enterprise, the objective usually is to maximize benefits for its owners. In the case of cooperatives as a coalition of firms, the objective depends on the type of the coalition members. When multiple-objective goals are considered, the price paid to members, the profit of cooperative, and the quantity processed are usually taken into account among the pool of objectives.[1]

The main contribution of this paper is its analysis of the impact of gender diversity among board members on the returns and risk in Spanish agricultural cooperatives. To our knowledge, there is no previous evidence on this topic for any country.

The remainder of this study is structured as follows: Section 2 presents the literature review; the sample, data, and methodology are presented in Section 3. The results and conclusions are summarized in Section 4 and Section 5, respectively.

2 | LITERATURE REVIEW

The progressive incorporation of women into the management of enterprises and the proliferation in various countries, including Spain, of legislation on gender equality has attracted researchers to the study of the presence of women on boards of directors (D. Carter et al., 2003 and Heidrick & Struggles, 2014 among others). In Spain, several measures have been adopted to balance opportunities between men and women in various social contexts. These measures include the Unified Code of Good Governance (CNMV, 2006; modified in 2013 and 2015), which recommends affirmative action to balance the representation of women and men on boards of directors, and the Equality Act (Ley de Igualdad, 2007), which aims to achieve 40% representation of women on the boards of directors of companies with more than 250 employees. However, these regulations are only recommendations and are focused on for-profit enterprises.

The International Cooperative Alliance (ICA) states that cooperatives should ensure the absence of barriers to membership based on gender and that women should participate equally in education and leadership development programs. Due to these features, the participation of women in cooperatives is higher on average than their participation in other enterprises (Mateos et al., 2009). Furthermore, the application of cooperative principles establishes a set of values such as equality, equity and solidarity, all of which promote the participation of women in decision-making bodies. Studies show that a larger number of women in the representative bodies of cooperatives can help both to improve working conditions and to achieve economic, social, and cultural balance in these organizations (Chávez, 1996; Fregidou, 2004; Gómez, 1998). Furthermore, younger cooperatives have a larger proportion of women in their governing bodies, which could reflect a change in conditions related to parity in business (Esteban, Gargallo, & Pérez, 2010).

Although the share of women among cooperatives' employees is approximately 40%, the share of women in decision-making positions is much lower (Martínez, Arcas, & García, 2011). Sajardo et al. (2009) estimate that women account for 28.1% of the management of enterprises in the social economy.[2] There is also evidence of discrimination against women in cooperatives. For example, women usually work in more traditional service roles and tend to work with smaller cooperatives (Freigidou, 2004 and Berenguer, Cerver, De La Torre, & Torcal, 2004).

[1]See Soboh et al. (2009) for more details about the different multiple-objective.

[2]For details about the social economy, see Moulaert and Ailenei (2005).

In this context, it is interesting to present diverse arguments regarding the contributions of women in top management positions.

Certain works have studied gender diversity in firm decision groups. Group diversity is defined as "the variety of individual attributes within a group" (Blau, 1977). In general, the effects of diversity on the functioning and performance of working groups is characterized as a "double-edged sword" (Milliken & Martins, 1996 and Nielsen & Huse, 2010b among others). In other words, diversity has both positive and negative effects on the functioning and performance of firms.

Studies of the gender diversity of boards have been conducted in many different areas of research and have adopted various theoretical perspectives depending on the focal level of the study, that is, the individual, board, firm, or industry/environment (Terjesen, Sealy, & Singh, 2009). These levels and theories usually overlap, which is why most empirical studies present arguments derived from several theories. Those comprise agency, resource dependence, human capital, and social psychology theory (e.g., D. Carter et al., 2010, Lucas-Pérez, Mínguez-Vera, Baixauli-Soler, Martín-Ugedo, & Sánchez-Marín, 2015, Mateos, Gimeno, & Nieto, 2012).

An agency relationship is a contract pursuant to which one or more persons (the principal/s) engage another person (the agent) to perform some service on their behalf. Agency thus involves the delegation of some decision-making authority to the agent (M. C. Jensen & Meckling, 1976). Accordingly, agents will endeavor to achieve their objectives, which may or may not coincide with those of their principals. Agency conflicts will be more pronounced when there is greater information asymmetry.

The board is the most important internal control mechanism. It is effective when it provides high-quality and impartial advice. For this reason, it is particularly important for board members to be independent (Fama, 1980). Many authors (D. Carter et al., 2003 and Lucas-Pérez et al., 2015, among others) argue that a more diverse board is more independent and thus is better at monitoring and controlling management. Consequently, board diversity will have a positive effect on firm value and returns.

Most arguments based on the resource dependence theory also support a positive effect of gender diversity on firm performance. According to this theory, the board serves as a link between the firm and other organizations. Thus, organizations are considered to operate in an open system and must exchange resources to survive, creating a dependency between the firm and external entities (Pfeffer & Salancik, 1978).

Following this reasoning, Robinson and Dechant (1997) argue that more diverse working groups have greater market knowledge and greater identification with customers and employees, thus increasing such groups' ability to penetrate markets. Similarly, a diverse group of board members will offer different views and perspectives and generate alternative solutions to a single problem, leading to more realistic decisions (Morrison, 1992). Thus, diversity increases creativity and innovation and improves problem solving (Robinson & Dechant, 1997). Moreover, Milliken and Martins (1996) suggest that diverse teams have access both to a wider network of contacts and to a broader set of information, knowledge, and support through that network.

This theory also notes the possibility that the presence of women on the board has a negative effect on returns because, on an average, women have fewer relationships with the boards of other companies (Zelechowski & Bilimoria, 2004) and are less likely to have business experience (Kesner, 1988).

The human capital theory suggests a positive effect of a board's gender diversity on the firm's performance. This theory examines the role of a person's stock of education, experience, and skills in enhancing cognitive and productive capabilities that can be used to benefit an organization (Becker, 1964). Several studies suggest that today, women in developed countries are as well qualified as men; therefore, board effectiveness will be positively affected by diversity because women contribute diverse and unique human capital (D. Carter et al., 2010; Terjesen et al., 2009).

The board has various functions, and its effectiveness depends on several factors. These functions have been classified in many ways (Baysinger & Hoskisson, 1990; Loden, 1985; and Nielsen & Huse, 2010a among others). One such classification distinguishes between strategic control and financial control (Baysinger & Hoskisson, 1990; Loden, 1985); the former is generally long-term and qualitatively oriented, whereas the latter is usually short-term

and quantitatively oriented. Loden (1985) notes that women are more qualitatively and less quantitatively oriented than men. In this regard, Loden (1985) asserts that women positively influence functions related to corporate social responsibility (Bear, Rahman, & Post, 2010 and Fernandez-Feijoo, Romero, & Ruiz-Blanco, 2014 among others) and strategic control (Nielsen & Huse, 2010a and Torchia, Calabrò, & Huse, 2011 among others). Consequently, board gender diversity, or at least the establishment of certain quotas for women on the board, should have a positive effect on firm returns.

Similarly, Hillman, Cannella, and Harris (2002) and Daily and Dalton (2003) argue that women provide perspectives, experiences, and unique styles of work that men cannot provide. The presence of women can improve board deliberations as their communication style is more participatory and process oriented. Women on the board also introduce more creative discussion and encourage more strategic options. Finally, the presence of women improves the company image, which has a positive effect on customer behavior (Smith, Smith, & Verner, 2006). In sum, these arguments suggest a positive effect of board gender diversity on returns.

However, certain authors assert that the presence of women on the board will not affect company performance. Their argument is that because women managers reject feminine stereotypes and values, they behave similar to male managers (R. Adams, Almeida, & Ferreira, 2002; Brancato & Patterson, 1999 and Powell, 1990).

Social psychology and related theories regarding social groups, such as social identification and social categorization theories, examine how individuals interact with people who share similar demographic profiles, perspectives, and values, which are reinforced through intragroup communication. These theories maintain that greater diversity adversely affects profits.

Social psychology theories predict that individuals with majority status exert a disproportionate amount of influence on group decisions. Consequently, these theories predict a negative effect of diversity on group outcomes (Westphal & Milton, 2000). According to these theories, individuals divide group members into in-groups and out-groups (individuals similar to themselves vs. dissimilar to themselves) and have a tendency to perceive the former positively and the latter negatively (Nielsen & Huse, 2010b). Heterogeneous groups present greater communication and coordination challenges, leading to lower levels of cohesion and interpersonal attraction, and less satisfying interactions among members (Forbes & Milliken, 1999; Milliken & Martins, 1996).

In addition, most corporate boards include a very small number of women (or none at all). Minorities are easily marginalized when their presence in a large group is modest. Due to their low level of representation, minority members may be viewed as tokens (Kanter, 1977), and thus are easily marginalized. For them, stereotyping could bar them from exerting influence on group decisions; moreover, they are often perceived negatively and not trusted. Thus, tokenism may lead to isolation and self-doubt.

Previous empirical evidence regarding the effect of gender diversity on returns and firm value in the United States is inconclusive, but mostly supports positive relationships (Erhardt, Werbel, & Shrader, 2003; Shrader, Blackburn, & Iles, 1997; and Welbourne, Cycyota, & Ferrante, 2007 among others). However, certain authors have found no relationship between gender diversity and firm performance (Farrell & Hersch, 2005; Richard, 2000 and Watson, Kumar, & Michaelsen, 1993) or even a negative relationship between the two (R. B. Adams & Ferreira, 2009).

The evidence is also inconclusive with respect to European firms. For Spain, Campbell and Mínguez-Vera (2008), for publicly traded companies, and Martín-Ugedo and Mínguez-Vera (2014), for small and medium enterprises, find a positive effect of gender diversity on corporate value and returns, respectively. Du Rietz and Henrekso (2000), who consider a sample of Swedish firms, and Smith et al. (2006) and Rose (2007), who study Danish companies, find no influence of the presence of women on the board on performance. Böhren and Ström (2007) find a negative relationship between the presence of female managers in Norwegian firms and enterprise value.

In sum, most theoretical arguments and most empirical evidence, particularly with respect to Spain, indicate a positive influence of female directors on returns.

Another factor influenced by the presence of women on the board is risk aversion. Most studies in psychology and economics show that women tend to be more risk-averse than men (Byrnes, Miller, & Schafer, 1999; Chaganti, 1986; Collerette & Aubry, 1990; Jianakoplos & Bernasek, 1998; S. Olsen & Currie, 1992; Scherr, Sugrue, & Ward, 1993 among others).

For example, R. Olsen and Cox (2001) investigate gender differences in attitudes toward risk among investors with professional training and find that women investors give more weight to risk attributes, such as the possibility of loss, than do their male colleagues. Lundeberg, Fox, and Punccohar (1994) suggest that women are less secure in their investment decisions. This difference in confidence can cause differences in risk behavior. S. Carter and Shaw (2006) find that the presence of women in management is associated with lower debt, and Hernández-Nicolás, Martín-Ugedo, and Mínguez-Vera (2015) find that the participation of women in decision-making processes tends to result in lower levels of debt with a lower cost and greater maturity.[3]

Moreover, C. Miller, Burker, and Glick (1998) and Watson et al. (1993) among others, argue that in homogeneous groups, minor interpersonal barriers lead to risky decisions and aggressive strategies. Therefore, diversified groups tend to adopt less risky decisions.

As noted in the discussion regarding the relation between gender diversity and returns, there is a small body of literature that suggests that women managers may reject feminine stereotypes and values, and thus exhibit behavior similar to that of male managers. R. B. Adams and Funk (2012) hypothesize that women's risk aversion may vanish when they break through the glass ceiling, resulting in an attitude similar to that of men. Indeed, they observed in a sample of Swedish firms that women exhibited more risk-seeking behavior than men.

Based on the majority of the arguments discussed above (i.e., low levels of corporate debt in firms run by women and greater risk aversion of women and diversified groups), we expect a negative effect of female directors on both debt ratio and economic risk.

3 | DATA AND METHODOLOGY

Data for the sample were obtained from the SABI database. This database provides financial statements from Spanish and Portuguese firms. Firms included in the sample must be based in Spain, must have been legal cooperatives in 2011, and must belong to the agricultural sector. According to COGECA (2012), there were 3,844 agricultural cooperatives in Spain; the SABI database provides information for 1,281 of them, or 33%. We removed from the final sample all agricultural cooperatives with inconsistent or missing data (i.e., clear errors in their financial statements or omitted data). The final sample includes 672 agricultural cooperatives, including both farming (crops, NACE codes A01.1 and A01.2) and ranching cooperatives (livestock, NACE code A01.4).

Research studies use many methods to measure returns. Because this study does not include publicly traded firms, it was impossible to use variables that take market value into account, such as Tobin's Q. Another alternative is economic value added (EVA), but to estimate EVA, the weighted average cost of capital (WACC) must be estimated first. Estimating the cost of the equity, which is necessary to estimate WACC, also presents difficulties and is subjective for nonlisted firms. Therefore, most studies examining nonlisted firms employ return on assets (ROA) as a dependent variable (Lerman & Parliament, 1991). ROA is computed as the ratio of earnings before interest and taxes to total assets (Alghifari, Triharjono, & Juhaeni, 2013).

However, as previously discussed, the profitability of cooperatives might not be directly comparable to that of, for example, investor-owned firms as cooperatives are nonprofit entities. Consequently, the average returns of cooperatives should be close to zero, which is lower than the average for other firms. For the present sample, the average ROA is 1.2% (see Table 1), which is significantly lower than that of the entire Spanish food

[3]For a review of the literature, please see Croson and Gneezy (2009).

TABLE 1 Descriptive statistics

Variable	Mean	Median	Standard deviation
WOMENRATIO	0.140	0.000	0.243
BLAU	0.123	0.000	0.193
SHANNON	0.184	0.000	0.279
ROA	1.185	0.659	1.532
FIXED	0.418	0.387	0.248
LEV	0.549	0.592	0.263
SIZE	7.445	7.415	1.963
AGE	2.317	2.338	0.093
CAPEX	0.127	0.051	0.195
ERISK	0.767	0.532	0.860
IND	0.385	0.000	0.487

Note. Variables: AGE: natural logarithm of the years since establishment; BLAU: Blau diversity index; CAPEX: capital expenditure ratio; ERISK: standard deviation of ROA in the previous 6 years, as a percentage; FIXED: fixed assets divided by total assets; IND: dummy variable that takes a value of 1 when the cooperative belongs to the ranching industry and 0 when it belongs to the farming industry; LEV: total debt divided by total assets; ROA: return on assets; SHANNON: Shannon diversity index; SIZE: natural logarithm of total assets; WOMENRATIO: number of women on the board divided by total number of board members.

manufacturing sector, which is 5.04% (Hirsch, 2014). One way to overcome this problem is either to use abnormal returns (and abnormal risk) by adjusting returns (and risk) by their mean values across firms. This measure would indicate the extent to which individual cooperatives can outperform other cooperatives in terms of returns (and risk).

Thus, following Cornett, Marcus, Saunders, and Tehrainan (2007), we decide to measure cooperative returns using abnormal returns, adjROA, that is, the ROA adjusted by the mean value across cooperatives.[4]

Several measures of the presence of women on the board are used. First, the variable WOMENRATIO is calculated as the number of women directors divided by the total number of directors. Second, two diversity indexes have been used. The BLAU index is defined as $1 - \sum_{i=1}^{n} P_i^2$, where $_{Pi}$ refers to the proportion of female directors and i to each cooperative. This index takes values between 0 and 0.5, where 0.5 indicates the same number of male and female directors. The SHANNON index is defined as $-\sum_{i=1}^{n} P_i \ln P_i$, where P_i is calculated as it is for the Blau index. The values of this index range from 0 to 0.69, with the higher figure corresponding to the greatest possible diversity (Harrison & Klein, 2007; Stirling, 1998). These variables are included in the model with a lag of 1 year to reflect the long-term effects of gender diversity on the management of the cooperatives. Given the low representation of women on the boards of agricultural cooperatives in Spain (see Table 1), the WOMENRATIO variable and the diversity indexes are complementary measures rather than alternative ones. Hence, to assess the robustness of the results with respect to the indicator used, we present separate results for each measure.

The following control variables were identified as important for the analysis of firm returns by the previous literature (Chaddad & Mondelli, 2013; Gschwandtner & Hirsch, 2018 and Nakano & Nguyen, 2012): debt ratio (LEV), measured as the ratio between total debt and total assets; firm size (SIZE), calculated as the natural logarithm of total assets; firm age (AGE), calculated as the natural logarithm of the number of years since the cooperative was established; and capital expenditures ratio (CAPEX), calculated as capital expenditures divided by sales.

[4]The adjustment consists in subtracting the mean from each of the i sample observations. For a more detailed discussion of return measures for cooperatives, please see Hirsch (2014) and Hirsch and Hartmann (2014), among others.

The proposed model is as follows:

$$\text{AdjROA}_i = \beta_0 + \beta_1 \text{lagGEN}_i + \beta_2 \text{SIZE}_i + \beta_3 \text{LEV}_i + \beta_4 \text{AGE}_i + \beta_5 \text{CAPEX}_i + \beta_6 \text{IND}_i + u_i, \quad (1)$$

where $i = 1,\ldots,n$, denotes the cooperative, and lagGEN includes the previously defined variables related to the presence of women on the board.

Regarding the control variables, the effect of cooperative size on firm performance is not clear a priori. Viner (1931), Bain (1956), and Modigliani (1958) suggest that the productive unit is more efficient as its size approaches the dimension at which unit costs are minimized. Based on the collusion hypothesis, Demsetz (1973) argues that size improves profitability due to the exercise of market power. Camisón (1996) argues that large firms have advantages in economies of scale, experience, financing, human, marketing, and technological resources. In contrast, Lawler (1997) suggests that small and medium firms benefit from greater flexibility and the capacity to adapt quickly to change, both of which are greatly facilitated by a less bureaucratic and more people-oriented organizational environment. The empirical evidence for agricultural cooperatives is also mixed. For example, Barton, Schroeder, and Featherstone (1993), Hirsch and Hartmann (2014), and Hirsch and Gschwandtner (2013) find a positive effect of size on performance, whereas Lerman and Parliament (1991) and Katz (1997) find the opposite relationship. About the firm age, Hirsch and Gschwandtner (2013) indicate that ageing decreases costs due to learning effects within the firm and learning spill-overs from other firms. However, Loderer and Waelchli (2010) point out the obsolescence of endowments, rent-seeking behavior, organizational rigidities, seniority rules, and organizational memory to justify a negative relationship between firm age and profitability. We expect that younger firms will have higher levels of profitability (Lee, 2006). On the basis of M. Jensen's (1986) free cash flow theory, we predict a positive influence of debt ratio on firm performance. Finally, according to the arguments of Li, Moshirian, Nguyen, and Tan (2007), firms with higher capital expenditures are expected to have lower levels of short-term performance as they are focused in the results of their investments in the long-term.

We control for industry effects by introducing a dummy variable, IND, into all models. IND takes a value of 1 when the cooperative belongs to the ranching industry (livestock, NACE code A01.4) and a value of 0 when it belongs to the farming industry (crops, NACE codes A01.1 and A01.2).

For the analysis that focuses on risk, we consider two dependent variables: debt ratio, LEV, as defined above, and economic risk, ERISK, which is computed as the standard deviation of ROA for the 6 years before 2011 (K. Miller & Bromiley, 1990). The economic risk variable has been adjusted by the mean value across cooperatives (adjERISK; Faccio, Marchica, & Mura, 2011). When the dependent variable is the debt ratio, the following factors are used as control variables (G. Jensen, Solberg, & Zorn, 1992): the proportion of fixed assets, FIXED, which is calculated as the ratio of fixed assets to total assets; adjusted return on assets, AdjROA; and adjusted economic risk, AdjERISK, as defined above. When the dependent variable is adjusted economic risk, AdjERISK, the control variables used are debt ratio, LEV; firm size, SIZE; firm age, AGE; capital expenditure ratio, CAPEX; and industry dummy, IND. These variables are defined above.

The proposed models are as follows:

$$\text{LEV}_i = \beta_0 + \beta_1 \text{lagGEN}_i + \beta_2 \text{FIXED}_i + \beta_3 \text{AdjROA}_i + \beta_4 \text{AdjERISK}_i + \beta_5 \text{IND}_i + u_i, \quad (2.1)$$

$$\text{AdjERISK}_i = \beta_0 + \beta_1 \text{lagGEN}_i + \beta_2 \text{LEV}_i + \beta_3 \text{SIZE}_i + \beta_4 \text{AGE}_i + \beta_5 \text{CAPEX}_i + \beta_6 \text{IND}_i + u_i, \quad (2.2)$$

where $i = 1,\ldots,n$, denotes the company and lagGEN includes the variables related to the presence of women on the board. This leads to three systems of three equations each.

Regarding the control variables, for Equation 2.1, a positive effect of FIXED (Scott, 1997) and AdjROA (Hovakimian, Hovakimian, & Tehranian, 2004) on debt ratio (LEV) and a negative influence of AdjERISK on debt ratio (LEV) are expected (R. B. Adams, Almeida, & Ferreira, 2005). For Equation 2.2, firms with higher debt ratios (Coles, Daniel, & Naveen, 2006), smaller firms (Cheng, 2008), and younger firms (Nakano & Nguyen, 2012) are

expected to be riskier. Finally, according to Li et al. (2007), firms with larger capital expenditures are expected to have lower levels of operational risk.

Table 1 shows the descriptive statistics for the variables used in this study. The average percentage of women on boards was 14% in 2010, which is slightly higher than the value of 10% for large Spanish companies (Carrasco & Laffarga, 2007) and 8.4% for Spanish small and medium-sized enterprises (Martín-Ugedo & Mínguez-Vera, 2014). However, this percentage is far from the 40% share recommended by the European Union to ensure equal representation. Therefore, we observe that more than 50% of the coops have no women on the board (median of zero in all the gender variables). These values are common in Spain (also for listed firms before the Equality Act, Ley de Igualdad, passed in 2007; Campbell & Mínguez-Vera, 2008).

The average return on assets is 1.18%, whereas the average return on equity is 4.15%. The average level of debt is 54.9%, and the average level of economic risk is 0.77%.

A three-stage least squares (3SLS) methodology is used in this study. This methodology controls for the endogeneity of explanatory variables by using a system of simultaneous equations (Chamberlain, 1982). It is used here due to the peculiar characteristics of the sample, which includes data for only 1 year, 2011. Because it is only possible to identify the presence of women in decision-making in the SABI database for a single year, it is not possible to use a more powerful panel data methodology. The alternative method that can be used to control for endogeneity, two-stage least squares (2SLS), produces consistent estimators but is not efficient. In particular, 2SLS does not account for the interdependence of the equations and calculates an instrumental variables regression, equation-by-equation. 3SLS is based on 2SLS methodology but improves the estimators and is more efficient.[5]

In the first stage of this methodology, the estimation generates auxiliary regressions. Each auxiliary regression uses the remaining variables as independent variables and is estimated using ordinary least squares methodology (OLS).

In the second stage, the predictions obtained for the dependent variables through the auxiliary regressions conducted in the first stage are used instead of the dependent endogenous variables (adjROA, LEV, and AdjERISK) in the initial equations (models 1, 2.1, and 2.2). This estimation also employs an OLS methodology. The use of estimated explanatory values (dependent variables) avoids the presence of stochastic regressors related to the random error term (the original explanatory variables are random, whereas their estimated values from the reduced form are not).

The third stage is the estimation of all models simultaneously using generalized least squares. For this estimation, the matrix of the variances and covariances of the error terms is used to estimate the coefficients of the entire model.[6] This methodology is a form of instrumental variables estimation that permits correlations of the unobserved disturbances across several equations; it also allows restrictions among coefficients of different equations and improves upon the efficiency of equation-by-equation estimation by taking into account correlations across equations.

The three dependent variables AdjROA, LEV, and AdjERISK are potentially endogenous due to reverse causality. According to 3SLS methodology, the independent variables of each equation are used as instruments. With respect to gender measures, the possible reverse causality comes from the work of Farrell and Hersch (2005). They argue that because there is a lack of women to fill top positions, they may choose to serve better-performing firms. This suggests a positive relationship between firm value and the presence of women on the board. Thus, it is possible that the two variables are endogenously defined (Campbell & Mínguez-Vera, 2008). This argument can also justify the reverse causality between women's presence in top management positions and firm risk (financial risk and operative risk). However, it is logical to think that although this argument is valid for publicly traded firms, it is not for cooperatives because the appointment of women in these entities is

[5]For details on the differences between these methods, see Dhrymes (1969) and Agunbiade (2011).

[6]This methodology has been applied using the command "reg3" in Stata software.

related to family ties, type of production and the geographical zone of the business. For this reason, the variables WOMENRATIO, BLAU, and SHANNON are considered exogenous.

Furthermore, IND and AGE are also potentially exogenous (Vathunyoo, Gonzalez, & Hagendorff, 2016) because performance and risk do not determine the age of the firm or the industry in which it operates.

Finally, the variables CAPEX, SIZE, and FIXED are considered endogenous because they are likely correlated with unobserved management decisions that are included in the error term. As instruments we use two period lagged variables.

The validity of all the instruments for the endogenous variables has been tested using the Sargan–Hansen test of overidentifying restrictions (Hansen, 1982 and Sargan, 1958) The *p* value for this test of overidentifying restrictions is higher than 0.1 for the estimation of the different systems. Specifically, the numbers for the systems that use WOMENRATIO, BLAU, and SHANNON as independent variables present a Hansen–Sargan over-identification statistic (*p* value) of 2.520 (0.1124), 1.557 (0.2120), and 0.980 (0.3221), respectively (Liang, 2015). This result does not reject the joint null hypothesis that the instruments are uncorrelated with the error. Additionally, the weakness of the instruments has been analyzed using the *F* statistic of the first stage regressions according to the Staiger and Stock (1997) rule of thumb which declares the instruments weak when the first stage *F* statistic is less than 10. The values obtained in all the regressions for the endogenous dependent variables are above the critical value (Tables 2 to 4).

TABLE 2 Estimation of the influence of gender on AdjROA

Model	WOMENRATIO	BLAU	SHANNON
Constant	−12.312**	−9.372	−12.140**
	(−2.27)	(−1.37)	(−2.01)
lagGEN	4.255**	5.597**	4.441***
	(2.21)	(2.14)	(2.76)
SIZE	−0.407	−0.443	−0.376
	(−1.43)	(−1.62)	(−1.55)
LEV	0.396***	0.386***	0.354***
	(4.05)	(3.87)	(4.28)
AGE	−2.399	−3.812	−2.126
	(−0.76)	(−1.06)	(−0.74)
CAPEX	0.606	0.706	0.579
	(0.23)	(0.27)	(0.24)
IND	−0.556	−0.518	−0.710
	(−0.46)	(−0.44)	(−0.68)
Adjusted R^2	0.460	0.494	0.497
$\chi 2$	96.98***	110.09***	129.61***
Hansen–Sargan	2.520 (0.1124)	1.557 (0.2120)	0.980 (0.3221)
F first stage	45.39***	53.52***	53.09***

Note. Hansen–Sargan Test overidentification statistic: *p* value (significance); Z-Statistic in parentheses; χ^2: Test of explanatory variable.

Variables: AdjROA: return on assets adjusted by its mean value across firms; AGE: natural logarithm of the years since establishment; BLAU: the Blau diversity index; CAPEX: capital expenditure ratio; IND: dummy variable that takes a value of 1 when the cooperative belongs to the ranching industry and 0 when it belongs to the farming industry; lagGEN: alternatively, the 1-year lagged values of WOMENRATIO, which is the number of women on the board divided by the total number of board members; LEV: total debt divided by total assets; ROA: return on assets; SHANNON: Shannon diversity index; SIZE: natural logarithm of total assets; WOMENRATIO: number of women on the board divided by total number of board members.

*, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

TABLE 3 Estimation of the influence of gender on debt level (LEV)

Model	WOMENRATIO	BLAU	SHANNON
Constant	45.829***	43.935***	45.217***
	(6.21)	(9.94)	(5.00)
lagGEN	−29.194**	−51.620*	−36.542*
	(−2.20)	(−1.87)	(−1.86)
FIXED	20.447	28.064	26.553
	(1.39)	(1.43)	(1.28)
AdjROA	6.040**	7.574**	7.373**
	(2.48)	(2.26)	(3.40)
AdjERISK	−11.913	−15.408	−14.397
	(−0.80)	(−0.85)	(−0.81)
IND	5.840	7.637	7.555
	(0.91)	(0.94)	(0.95)
Adjusted R^2	0.298	0.299	0.301
χ^2	59.82***	47.48***	50.29***
Hansen–Sargan	2.520 (0.1124)	1.557 (0.2120)	0.980 (0.3221)
F First stage	11.59***	12.26***	12.63***

Note. Hansen–Sargan Test overidentification statistic: *p* value (significance); χ^2: test of explanatory variables; Z-Statistic in parentheses.

Variables: AdjERISK: standard deviation of ROA in the previous 6 years adjusted by its mean value across firms, as a percentage; AdjROA: return on assets adjusted by its mean value across firms; BLAU: the Blau diversity index; FIXED: fixed assets divided by total assets; IND: dummy variable that takes a value of 1 when the cooperative belongs to the ranching industry and 0 when it belongs to the farming industry; lagGEN: alternatively, the 1-year lagged values of WOMENRATIO, which is the number of women on the board divided by total number of board members; SHANNON, the Shannon diversity index; LEV: total debt divided by total assets; WOMENRATIO: number of women on the board divided by total number of board members.

*, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

4 | RESULTS

The results of the analysis of the influence of gender on returns are presented in Table 2.

Both the presence of women on the board (WOMENRATIO) and the gender diversity of the board (measured by the Blau and Shannon Indexes, BLAU, and SHANNON) have positive effects on the AdjROA. These results are consistent with previous evidence regarding for-profit enterprises, which shows that the presence of women and diversity in managerial and decision-making bodies has a positive influence on various measures of business performance and company value (D. Carter et al., 2003; Redondo & Jimeno, 2005; Smith et al., 2006; and Welbourne et al., 2007 among others).[7]

Regarding the control variables, the debt ratio of the cooperative has a positive influence on adjusted performance, which is in line with the free cash flow theory (M. Jensen, 1986). Debt may be used as a disciplinary mechanism either to reduce managerial cash flow waste (Grossman & Hart, 1982) or to create pressure to generate cash flows to service debt (M. Jensen, 1986). In these situations, debt has a positive effect on firm performance (Margaritisa & Psillaki, 2010).

[7]The same results are obtained when return on equity, ROE, is included as the dependent variable.

TABLE 4 Estimation of the influence of gender on the level of adjusted economic risk (AdjERISK)

Model	WOMENRATIO	BLAU	SHANNON
Constant	−0.702	−0.478	−0.713
	(−0.81)	(−0.55)	(−0.82)
lagGEN	0.507***	0.926***	0.672***
	(2.70)	(3.60)	(4.05)
LEV	0.028***	0.025**	0.023***
	(2.80)	(2.56)	(2.69)
SIZE	−0.039	−0.041	−0.037
	(−1.37)	(−1.53)	(−1.51)
AGE	−0.184	−0.235	−0.096
	(−0.43)	(−0.55)	(−0.24)
CAPEX	−0.475*	−0.447*	−0.476*
	(−1.74)	(−1.77)	(−1.91)
IND	−0.333***	−0.338***	−0.347***
	(2.71)	(−2.93)	(−3.21)
Adjusted R^2	0.318	0.370	0.367
χ^2	125.48***	165.49***	173.50***
Hansen–Sargan	2.520 (0.1124)	1.557 (0.2120)	0.980 (0.3221)
F First stage	37.06***	46.70***	44.75***

Note. Hansen–Sargan Test overidentification statistic: *p* value (significance); Z-Statistic in parenthesis; χ^2: test of explanatory variables.

Variables: AdjERISK: standard deviation of ROA in the previous 6 years adjusted by its mean value across firms, in percentage; AGE: natural logarithm of the years since establishment; BLAU: the Blau diversity index; CAPEX: capital expenditure ratio; IND: dummy variable that takes a value of 1 when the cooperative belongs to the ranching industry and 0 when it belongs to the farming industry; lagGEN: alternatively, the 1-year lagged values of WOMENRATIO, which is the number of women on the board divided by total number of board members; LEV: total debt divided by total assets; SHANNON: the Shannon diversity index; SIZE: natural logarithm of total assets; WOMENRATIO: number of women on the board divided by total number of board members.

*, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

The results obtained from the analysis of the influence of gender on the debt level and the level of economic risk, are presented in Tables 3 and 4, respectively.

Table 3 shows that a greater percentage of women on the board, or a gender-diversified board, is related to a lower level of debt. These results are consistent with most previous studies and can be explained by the greater risk aversion of women (Borghans, Golsten, Heckman, & Meijers, 2009; Orser, Riding, & Manley, 2006), who tend to make less risky decisions (Jianakoplos & Bernasek, 1998; Scherr et al., 1993). Moreover, it is more difficult to reach agreement when the board is heterogeneous. In this context, the need to reach agreement usually leads to less risky decisions (Jianakoplos & Bernasek, 1998).

Regarding the control variables, we find a positive influence of performance on debt ratio. According to Hovakimian et al. (2004), higher profitability leads to potentially greater tax savings from debt, a lower likelihood of bankruptcy, and a greater likelihood of overinvestment. Thus, profitability may lead to a higher debt ratio.

Table 4 shows the results of the analysis of the impact of gender on the level of economic risk assumed by cooperatives. We find a positive relationship between the presence of women on the board and the level of economic risk assumed by cooperatives. Similar results are observed when analyzing the influence of the diversity indexes on the level of economic risk. These findings are not on the line of previous literature about the risk aversion of women.

These results contrast with that observed in Table 3, which posits that a larger presence of women on the board reduces company risk through lower debt levels. This discrepancy may be because operational risk includes external situations that are not controlled by firms (Ortiz, 2005), such as variability in sales or input prices (Moyer, McGuigan, & Kretlow, 2005). In contrast, financial risk depends more on managerial decisions. The above results can also be explained by the mean-variance theory (Markowitz, 1952, 1959), which predicts a positive relationship between risk and expected returns. Consequently, if (on average) more women on the boards of cooperatives lead to higher returns, one would also expect (on average) a higher level of economic risk.

Regarding the control variables, a positive effect of debt ratio, LEV, and a negative effect of capital expenditure, CAPEX, are found at the level of economic risk. According to Margaritisa and Psillaki (2010) on the relationship between leverage and performance (positive) and Li et al. (2007) on the relationship between capital expenditure and profitability (negative), this result is consistent with Markowitz's portfolio selection theory. Finally, we find a negative effect of the industry dummy, IND, on adjusted economic risk, adjERISK, which indicates that farming cooperatives involve less economic risk than ranching cooperatives.[8]

5 | CONCLUSIONS

Gender and its influence on different firm variables has attracted scholarly attention. Several studies have revealed differences in business management approaches between women and men and show the impact of gender diversity on workgroups (Campbell & Mínguez-Vera, 2008; D. Carter et al., 2003; Heidrick & Struggles, 2014). However, to our knowledge, no previous work has focused on agricultural cooperatives.

Research on gender diversity has recently increased following the emergence of laws and discussions on gender equality in many countries, including Spain. Several measures have been adopted in Spain to balance opportunities between men and women in various social settings. For example, the Equality Act (Ley de Igualdad, 2007) aims to ensure equal treatment and opportunities for women and men in every area of life, particularly in the political, civil, labor, economic, social, and cultural spheres.

In the social economy in general and in cooperatives in particular, ensuring equal opportunities is one of the objectives that make this analysis interesting. Another point of interest is the different leadership styles of women and men. This paper evaluates the influence of gender on the management of Spanish agricultural cooperatives by examining accounting information for the year 2011.

The presence of women on the board is shown to increase the returns of a cooperative. This result could be due to an enhanced competitive advantage, increased innovation and the promotion of tasks related to corporate social responsibility, all of which are associated with gender diversity. This result could also be because women weigh the possibility of loss more heavily than men do. However, according to mean-variance theory (Markowitz, 1952, 1959), our results show that the presence of women in top management positions in Spanish cooperatives increases operational risk.

This study, similar to other studies focusing on gender diversity, has important implications. First, it has economic implications because the results show that the presence of women on the board affects the management of the company and thus may influence company value, return and risk, among other firm variables. It also has important implications for ethical considerations and for the implementation of quotas (Campbell & Mínguez-Vera, 2008; D. Carter et al., 2010).

If the presence of women on the board had no impact on company results, gender diversity would be an ethical and quota issue. Specifically, it is immoral to exclude women from boards of directors, and gender diversity will lead to a more equitable society. Furthermore, the presence of women on the board would be considered an end in itself (Brammer, Millington, & Pavelin, 2007).

[8]We have also included lagged variables related to LEV and CAPEX in the different models. Because we do not find a significant change in the results, these results are not presented here.

However, the results of this study show a positive influence of boardroom gender diversity on the returns of Spanish cooperatives (although the results regarding risk are inconclusive). Thus, there is an economic argument for promoting the inclusion of women on boards of directors. This evidence also provides support for gender equality legislation that has been developed in Spain and in many other countries. To date, this legislation has focused on large and publicly traded firms, neglecting small and medium-sized firms and firms involved in the social economy, which generate significant employment and economic activity. Thus, the evidence provided in this manuscript, together with evidence provided by similar studies, may encourage governments to develop gender legislation for these previously neglected firms.

This study has the limitation that the sample considered only covers a single year due to database limitations on the ability to identify the presence of women on boards of cooperatives. Consequently, it was not possible to employ panel data econometrics.

This manuscript provides inspiration for future lines of research. The clearest extension of this study may be to expand it to a broader area, for example, including agricultural cooperatives in other countries and possibly across the entire European Union.

ACKNOWLEDGMENTS

This study is part of the Project FEM2013-40578-P financed by the Ministerio de Economía y Competitividad. Authors also acknowledge financial support from Fundación Caja Murcia.

ORCID

Antonio Mínguez-Vera http://orcid.org/0000-0002-6879-2089

REFERENCES

Adams, R., Almeida, H. & Ferreira, D. (2002). *Diversity and incentives in teams: Evidence for corporate boards* (Dissertation). University of Chicago, IL.

Adams, R. B., & Ferreira, D. (2009). Women on the boardroom and their impact on governance and performance. *Journal of Financial Economics*, *94*(1), 291–309.

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science*, *58*(2), 219–235.

Adams, R. B., Almeida, H., & Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. *Review of Financial Studies*, *18*, 1403–1432.

Agunbiade, D. A. (2011). Effect of multicollinearity and the sensitivity of the estimation methods in Simultaneous Equation Models. *Journal of Modern Mathematics and Statistics*, *5*(1), 9–12.

Alghifari, E. S., Triharjono, S., & Juhaeni, Y. S. (2013). Effect of Return on Assets (ROA) against Tobin's Q: Studies in food and beverage company in Indonesia Stock Exchange. Years 2007–2011. *International Journal of Science and Research*, *2*, 108–116.

Bain, J. S. (1956). *Barriers to New Competition*. Cambridge: Harvard University Press.

Barton, D. G., Schroeder, T. C., & Featherstone, A. M. (1993). Evaluating the feasibility of local cooperative consolidations: A case study. Agribusiness: *An International Journal*, *9*(3), 281–294.

Baysinger, B., & Hoskisson, R. (1990). The composition of boards of directors and strategic control: Effects on corporate strategy. *Academy of Management Review*, *15*, 72–87.

Bear, S., Rahman, N., & Post, C. (2010). The impact of board diversity and gender composition on corporate social responsibility and firm reputation. *Journal of Business Ethics*, *97*(2), 207–221.

Becker, G. (1964). *Human capital*. Chicago: University of Chicago Press.

Berenguer, G., Cerver, E., De La Torre, A., & Torcal, V. (2004). El estilo directivo de las mujeres y su influencia sobre la gestión del equipo de trabajo en las cooperativas valencianas. *CIRIEC-España, Revista de Economía Pública, Social y Cooperativa*, *50*, 123–149.

Bilimoria, D., & Piderit, S. K. (1994). Board committee membership: Effect of sex-based bias. *Academy of Management Journal*, *37*, 1453–1477.

Blau, P. (1977). *Inequality and heterogeneity*. New York: The Free Press.

Borghans, L., Golsten, B., Heckman, J., & Meijers, H. (2009). *Gender differences in risk aversion and ambiguity aversion*. IZA Discussion (Paper no. 3985). Retrieved from https://www.econstor.eu/bitstream/10419/35728/1/592897184.pdf

Brammer, S., Millington, A., & Pavelin, S. (2007). Gender and ethnic diversity among UK corporate boards. *Corporate Governance: An International Review*, *15*(2), 393–403.

Brancato, C., & Patterson, D. (1999). *Board diversity in U.S. corporations: Best practices for broadening the profile of corporate boards* (Research Report No. 1230-99-RR): The Conference Board. Retrieved from https://www.conference-board.org/publications/publicationdetail.cfm?publicationid=411

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, *125*(3), 367–383.

Böhren, Ø., Ström, R. (2007). *Aligned, informed, and decisive: Characteristics of value-creating boards*. Chicago, IL: The University of Chicago. Booth Social Science Research Network (SSRN).

Camisón, C. (1996). Competitividad y teoría de la estrategia: Un análisis aplicado a la cohabitación pyme-gran empresa. *Revista Asturiana de Economía*, *6*, 63–101.

Campbell, K., & Mínguez-Vera, A. (2008). Gender diversity in the boardroom and firm financial performance. *Journal of Business Ethics*, *83*, 435–451.

Campos-Climent, V., & Sanchís-Palacio, J. R. (2015). How much does size matter in agri-food firms? *Journal of Business Research*, *68*(7), 1589–1591.

Carrasco, A., & Laffarga, J. (2007). La diversidad de género en el Código Unificado español y en la práctica empresarial. *Pecnia*, *4*, 1–25.

Carter, D., D'Souza, F., Simkins, B., & Simpson, W. (2010). The gender and the ethnic diversity of US boards and board committees and firm financial performance. *Corporate Governance: An International Review*, *18*, 396–414.

Carter, D., Simkin, B., & Simpson, W. (2003). The corporate governance, board diversity, and firm value. *The Financial Review*, *38*, 33–53.

Carter, S., & Shaw, E. (2006). *Women's business ownership: Recent research and policy developments* (Report to the Small Business Service, No. 8962). Retrieved from https://strathprints.strath.ac.uk/8962/1/SBS_2006_Report_for_BIS.pdf

Catalyst Report (2015). *Catalyst Census: Women and men board*. New York, NY: Catalyst.

Chaddad, F. R., & Mondelli, M. P. (2013). Sources of firm performance differences in the US food economy. *Journal of Agricultural Economics*, *64*(2), 382–404.

Chaganti, R. (1986). Management in women owned enterprises. *Journal of Small Business Management*, *24*, 18–29.

Chamberlain, G. (1982). Multivariate regression models for panel data. *Journal of Econometrics*, *18*(1), 5–46.

Cheng, S. (2008). Board size and the variability of corporate performance. *Journal of Financial Economics*, *87*, 157–17.

Chávez, M. (1996). El papel de la ACI en el progreso de la mujer en las cooperativas. *Revista de la Cooperación Internacional*, *1*, 8–16.

CNMV (2006). *Código Unificado de Buen Gobierno*. Madrid: Comisión Nacional del Mercado de Valores.

COGECA (2012). *The future of the Common Agricultural Policy (CAP): How European farmers can ensure food security for innovative and cost-effective way?* Budapest: European Agri-Cooperatives.

COGECA (2014). *Development of agricultural cooperatives in the EU 2014*. Brussels: European Agri-cooperatives.

Coles, J., Daniel, N., & Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of Financial Economics*, *79*, 431–468.

Collerette, P., & Aubry, P. G. (1990). Socio-economic evolution of women business owners in Quebec. *Journal of Business Ethics*, *9*, 417–422.

Cornett, M. M., Marcus, A. J., Saunders, A., & Tehrainan, H. (2007). The impact of institutional ownership on corporate operating performance. *Journal of Banking & Finance*, *31*, 1771–1794.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 448–474.

Daily, C., Certo, S., & Dalton, D. (1999). A decade of corporate women: Some progress in the boardroom, none in executive suite. *Strategic Management Journal*, *20*, 93–99.

Daily, C., & Dalton, D. (2003). Women in the boardroom: A business imperative. *Journal of Business Strategy*, *24*, 8–9.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Laws and Economics*, *16*, 1–9.

Dhrymes, P. J. (1969). Alternative Asymptotic Tests of Significance and related aspects of 2SLS and 3SLS estimated parameters. *The Review of Economic Studies*, *36*(2), 213–226.

Erhardt, N., Werbel, J., & Shrader, C. (2003). Board of directors diversity and firm financial performance. *Corporate Governance: An International Review*, *11*, 102–111.

Esteban, M., Gargallo, A., & Pérez, F. (2010). Composición del Consejo Rector y género en las cooperativas turolenses. *Revesco. Revista de Estudios Cooperativos*, *101*, 7–27.

Faccio, M., Marchica, M. T., & Mura, R. (2011). Large shareholder diversification and corporate risk-taking. *Review of Financial Studies*, *24*(11), 3601–3641.

Fama, E. F. (1980). Agency problems and the theory of the firm. *The Journal of Political Economy*, *88*(2), 288–307.

Farrell, K., & Hersch, P. (2005). Additions to corporate boards: The effect of gender. *Journal of Corporate Finance*, *11*, 85–206.

Fernandez-Feijoo, B., Romero, S., & Ruiz-Blanco, S. (2014). Women on boards: Do they affect sustainability reporting? *Corporate Social Responsibility and Environmental Management*, *21*(6), 351–364.

Forbes, D., & Milliken, F. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Academy of Management Review*, *24*, 489–505.

Fregidou, M. (2004). Es necesario equilibrar el poder en las cooperativas entre mujeres y hombres? *CIRIEC-España*, *Revista de Economía Pública*, *Social y Cooperativa*, *50*, 151–163.

Grossman, S. J., & Hart, O. (1982). Corporate financial structure and managerial incentives. In J. McCall (Ed.), *The Economics of Information and Uncertainty* (pp. 107–140). Chicago: University of Chicago Press.

Gschwandtner, A., & Hirsch, S. (2018). What drives firm profitability? A comparison of the US and EU food processing industry. *The Manchester School*, *86*(3), 390–416.

Gómez, L. (1998). Women in co-operatives: The policy of the international cooperative alliance. *Journal of Co-operative Studies*, *93*, 33–56.

Hansen, L. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, *50*(4), 1029–1054.

Harrison, D., & Klein, K. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, *32*, 1199–1228.

Heidrick & Struggles. (2014). *European Corporate Governance Report: Towards Dynamic Governance*. Report for 2014. Paris: Heidrick & Struggles International, Inc.

Hernández-Nicolás, C. M., Martín-Ugedo, J. F., & Mínguez-Vera, A. (2015). The influence of gender on financial decisions: Evidence from small start-up firms in Spain. *E&M Economics and Management*, *18*(4), 93–107.

Hillman, A., Cannella, A., & Harris, I. (2002). Women and racial minorities in the boardroom: How do directors differ? *Journal of Management*, *28*, 747–763.

Hirsch, S. (2014). *Abnormal profits and profit persistence: evidence from the European food industry*. (Dissertation) University Bonn. Retreived from http://hss.ulb.uni-bonn.de/2014/3567/3567.htm

Hirsch, S., & Gschwandtner, A. (2013). Profit persistence in the food industry: Evidence from five European countries. European. *Journal of Agricultural Economics*, *40*(5), 741–759.

Hirsch, S., & Hartmann, M. (2014). Persistence of firm-level profitability in the European dairy processing industry. *Agricultural Economics*, *45*(S1), 53–63.

Hovakimian, A., Hovakimian, G., & Tehranian, H. (2004). Determinants of target capital structure: The case of dual debt and equity issues. *Journal of Financial Economics*, *71*, 517–540.

ICA (1995). *Statement on the Co-operative Identity* (No 5/6). Retrieved from http://www.co-op.org/ica/info/enprinciples.html

Jensen, G., Solberg, D., & Zorn, T. (1992). Simultaneous determination of insider ownership, debt, and dividend policies. *The Journal of Financial and Quantitative Analysis*, *27*(2), 247–263.

Jensen, M. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, *76*, 323–329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behaviour, agency costs and structure. *Journal of Financial Economics*, *3*, 305–360.

Jianakoplos, N., & Bernasek, A. (1998). Are women more risk averse? *Economic Inquiry*, *36*, 620–630.

Kanter, R. M. (1977). *Men and women of the corporation*. New York: Basic Books.

Katz, J. (1997). Managerial behaviour and strategy choices in agribusiness cooperatives. *Agribusiness: An International Journal*, *13*(5), 483–495.

Kesner, I. (1988). Directors' characteristics and committee membership: An investigation of type, occupation, tenure and gender. *Academy of Management Journal*, *31*, 66–84.

Kyriakopoulos, K., Meulenberg, M., & Nilsson, J. (2004). The impact of cooperative structure and firm culture on market orientation and performance. *Agribusiness: An International Journal*, *20*(4), 379–396.

Lawler, E. E. (1997). Rethinking organization size. *Organizational Dynamics*, *26*(2), 24–35.

Lee, J. (2006). Family firm performance: Further evidence. *Family Business Review*, *19*, 103–114.

Lerman, Z., & Parliament, C. (1991). Size and industry effects in the performance of agricultural cooperatives. *European Review of Agricultural Economics*, *6*(1), 15–29.

Ley 27 (1999), de 16 de julio, de Cooperativa.

Ley de Igualdad, (2007). Ley Orgánica 3/2007, de 22 de marzo, para la Igualdad Efectiva de Mujeres y Hombres.

Li, D., Moshirian, F., Nguyen, P., & Tan, L. W. (2007). *Managerial ownership and firm performance: Evidence from China's privatizations. Research in International Business and Finance*, *21*(3), 396–413.

Liang, J. (2015). How Fixed Mobile Usage Interact? Does FTTH deployment influence the Interaction? Retrieved from https://ssrn.com/abstract=2635055 or https://doi.org/10.2139/ssrn.2635055

Loden, M. (1985). *Feminine leadership, or how to succeed in business without being one of the boys*. New York: Times Books.

Loderer, C., & Waelchli, U. (2010). *Firm age and performance*. Bern: University Bern.

Lucas-Pérez, M. E., Mínguez-Vera, A., Baíxaulí-Soler, J. S., Martín-Ugedo, J. F., & Sánchez-Marín, G. (2015). Women on the board and managers' pay: Evidence from Spain. *Journal of Business Ethics*, *129*(2), 265–280.

Lundeberg, M., Fox, P., & Punccohar, J. (1994). Highly confident but wrong: Gender differences and similarities in confidence judgments. *Journal of Educational Psychology*, *86*, 114–121.

Margaritisa, D., & Psillaki, M. (2010). Capital structure, equity ownership and firm performance. *Journal of Banking & Finance*, *34*(3), 621–632.

Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, *7*, 77–92.

Markowitz, H. (1959). *Portfolio Selection: Efficient Diversification of Investments*. New York: John Wiley.

Martínez, I., Arcas, N., García; M. (2011). La influencia del género sobre la responsabilidad social empresarial en las entidades de economía social. *REVESCO: Revista de Estudios Cooperativos. Monográfico: La economía social y la igualdad de género*, *105*, 143–172.

Martín-Ugedo, J. F., & Mínguez-Vera, A. (2014). Firm performance and women on the board: Evidence from Spanish small and medium-sized enterprises. *Feminist Economics*, *20*(3), 136–162.

Mateos, R., Gimeno, R., & Nieto, M. J. (2012). Gender diversity on European banks' boards of directors. *Journal of Business Ethics*, *109*, 145–162.

Mateos, R., Iturroiz, J., & Gimeno, R. (2009). La participación financiera y el papel de la mujer en la toma de decisiones de las sociedades cooperativas: Los consejos de administración. *Revista Europea de Dirección y Economía de la Empresa*, *18*(3), 65–82.

Miller, C., Burker, L., & Glick, W. (1998). Cognitive diversity among upper-echelon executives: Implications for strategic decision processes. *Strategic Management Journal*, *19*, 39–58.

Miller, K., & Bromiley, P. (1990). Strategic risk and corporate performance: An analysis of alternative risk measure. *Academy of Management Journal*, *33*, 759–779.

Milliken, F., & Martins, L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Journal*, *21*, 402–433.

Modigliani, F. (1958). New developments on the oligopoly front. *Journal of Political Economy*, *66*(3), 215–232.

Morrison, A. (1992). *The new leaders: Guidelines on leadership diversity in America*. San Francisco, CA: Jossey Bass.

Moulaert, F., & Ailenei, O. (2005). Social economy, third sector and solidarity relations: A conceptual synthesis from history to present. *Urban Studies*, *42*(11), 2037–2053.

Moyer, R., McGuigan, J., & Kretlow, W (2005). *Contemporary financial management*. (10th ed.). Mason, OH: South Western Publishers.

Nakano, M., & Nguyen, P. (2012). Board size and corporate risk taking: Further evidence from Japan. *Corporate Governance: An International Review*, *20*(4), 369–387.

Nielsen, S., & Huse, M. (2010a). The contribution of women on boards of directors: Going beyond the surface. *Corporate Governance: An International Review*, *18*(2), 136–148.

Nielsen, S., & Huse, M. (2010b). Women director's contribution to board decision-making and strategic involvement: The role of equality perception. European. *Management Review*, *7*, 16–29.

Nilsson, J. (1996). The nature of cooperative values and principles. *Annals of Public and Cooperative Economics*, *67*(4), 633–653.

Novkovic, S. (2006). Co-operative Business: The role of co-operative principles and values. *Journal of Co-operative Studies*, *39*(1), 5–15.

Olsen, R., & Cox, C. (2001). The influence of gender on the perception and response to investment risk: The case of professional investors. *Journal of Psychology and Financial Markets*, *2*, 29–36.

Olsen, S., & Currie, H. (1992). Female entrepreneurs: Personal value systems and business strategies in a male dominated industry. *Journal of Small Business Management*, 49–57. January

Orser, B., Riding, A., & Manley, K. (2006). Women entrepreneurs and financial capital. *Entrepreneurship Theory and Practice*, *30*(5), 643–666.

Ortiz, A. (2005) *Gerencia financiera y diagnóstico estratégico* (Editorial). Bogota: McGraw Hill Interamericana, S. A.

Ortmann, G., & King, R. P. (2007). Agricultural cooperatives I: History, theory and problems. *Agekon*, *46*(1), 40–68.

Pfeffer, J., & Salancik, G. (1978). *The external control of organizations: A resource-dependence perspective*. New York: Harper and Row.

Post, C., & Byron, K. (2015). Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal*, *58*(5), 1546–1571.

Powell, G. (1990). One more time: Do female and male managers differ? *Academy of Management Perspectives*, *4*, 68–75.

Redondo, M., & Jimeno, F. (2005). Perfil económico-financiero de la empresa y perspectiva de género en el gobierno corporativo. *XIII Congreso AECA*, Oviedo, 22–24 September.

Richard, O. (2000). Racial diversity, business strategy, and firm performance: A resource-based view. *Academy of Management Journal*, *43*, 164–177.

Richards, T. J., & Manfredo, M. R. (2003). Post-merger performance of agricultural cooperatives. *Agricultural Finance Review*, *63*(2), 175–192.

Du Rietz, A., & Henrekso, M. (2000). Testing the female underperformance hypothesis. *Small Business Economics*, *14*(1), 1–10.

Robinson, G., & Dechant, K. (1997). Building a business case for diversity. *Academy of Management Executive*, *11*, 21–30.

Rose, C. (2007). Does female board representation influence firm performance? The Danish evidence. *Corporate Governance: An International Review*, *15*(2), 404–413.

Sajardo, A., Ribas, M., Benavent, M., Saz, I., Serra, I., & Vilar, M. (2009). La responsabilidad social interna de las empresas en España. *Valencia: Tirant lo Blanch*, 263.

Sargan, J. D. (1958). The estimation of economic relationships using instrumental variables. *Econometrica*, *26*, 393–415.
Scherr, F., Sugrue, T., & Ward, J. (1993). Financing the small firm start-up: Determinants of debt use. *The Journal of Small Business Finance*, *1*(1), 17–36.
Scott, J. H., Jr. (1997). A theory of optimal capital structure. *Bell Journal of Economics*, *7*, 33–53.
Shrader, C., Blackburn, V., & Iles, P. (1997). Women in management and firm financial value: An exploratory study. *Journal of Managerial Issues*, *9*, 355–372.
Smith, N., Smith, V., & Verner, N. (2006). Do women in top management affect firm performance? A panel study of 2,500 Danish firms. *International Journal of Productivity and Performance Management*, *55*, 569–593.
Soboh, R. A., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: The gap between theory and practice. *Review of Agricultural Economics*, *31*(3), 446–469.
Staiger, D., & Stock, J. (1997). Instrumental variables regression with weak instruments. *Econometrica*, *65*, 557–586.
Stirling, A. (1998). *On the economics and analysis of diversity. Science Policy Research Unit (SPRU)*. Electronic Working Papers Series (Paper 28). Retrieved from http://sro.sussex.ac.uk/id/eprint/28823/
Terjesen, S., Sealy, R., & Singh, V. (2009). Women directors on corporate boards: A review and research agenda. *Corporate Governance: An International Review*, *17*(3), 320–337.
Torchia, M., Calabrò, A., & Huse, M. (2011). Women directors on corporate boards: From tokenism to critical mass. *Journal of Business Ethics*, *102*(2), 299–317.
Vathunyoo, S., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk. *Journal of Corporate Finance*, *36*, 26–53.
Viner, J. (1931). Cost curves and supply curves. In C. J. Stingler, C. J., & K. E. Boulding (Eds.), *Readings in Price Theory* (pp. 198–226). Chicago: Chicago University Press. reprint 1952
Watson, W., Kumar, K., & Michaelsen, L. (1993). Cultural diversity's impact on interaction process and performance: Comparing homogeneous and diverse task groups. *Academy of Management Journal*, *36*, 590–602.
Welbourne, T., Cycyota, C., & Ferrante, C. (2007). Wall Street reaction to women in IPOs: An examination of gender diversity in top management teams. *Group and Organization Management*, *32*(5), 524–547.
Westphal, J. D., & Milton, L. P. (2000). How experience and network ties affect the influence of demographic minorities on corporate boards. *Administrative Science Quarterly*, *45*, 366–398.
Zelechowski, D., & Bilimoria, D. (2004). Characteristics of women and men corporate inside directors. *Corporate Governance: An International Review*, *12*, 337–342.

AUTHOR'S BIOGRAPHIES

Carmen María Hernández Nicolás is PhD in Business Administration at the University of Murcia. At present she is an Adjunct Professor of Corporate Finance at the same university. Her main research topics are related to corporate finance and corporate governance. She has published in referred international journals such as Feminist Economics and E&M Economics and Management Journal, among others.

Juan Francisco Martín-Ugedo is Diploma of Advanced European Studies at the College of Europe (Brugge) and PhD in Business Administration at the University of Murcia. At present, he is an Associate Professor of Corporate Finance at the same university. His main research topics are related to corporate finance and corporate governance. He has published in referred international journals such as Journal of Business Research, Journal of Business Ethics, Journal of Business Finance & Accounting and Feminist Economics, among others.

Antonio Mínguez-Vera is PhD in Economics and Business (Technical University of Cartagena). At present, he is an Associate Professor of Financial Economics at the University of Murcia. His main research topics are related to gender diversity, corporate finance, and corporate governance. He has published in refereed international journals such as Journal of Business Ethics, International Journal of Human Resource Management and Feminist Economics.

How to cite this article: Hernández-Nicolás CM, Martín-Ugedo JF, Mínguez-Vera A. The effect of gender diversity on the board of Spanish agricultural cooperatives on returns and debt: An empirical analysis. *Agribusiness*. 2019;1–18. https://doi.org/10.1002/agr.21608