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The Interaction Among Capital Structure, Dividend Policy and Ownership structure

Evidence from the Iberian Markets

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Abstract: The objective of this study is to explore the interrelationship among ownership structure, capital structure and dividend policy, because prior empirical studies analysed the capital structure or the dividend policy in isolation, but these two corporate finance decisions can be interrelated, affecting each other. Finding this gap, this paper analyses the interrelationship among ownership structure, capital structure and dividend policy, using approaches to remove simultaneous bias. In order to analyse the association among these companies' decisions, we consider a sample of Portuguese and Spanish listed firms, for the period between 1992 and 2016, employing panel data regression, as well as the two stage least squares (2SLS) and the three stage least squares (3SLS) in order to address for endogeneity issues. Different estimation methods are implemented and compared by means of a robust residual analysis. The results indicate that the firm´s payout is affected by the firm size. Also, we find evidence that managerial ownership and firms' profitability have an impact on leverage, which is in accordance with the pecking order theory.

Keywords: Ownership structure; capital structure; dividend policy.

1 Introduction

Capital structure and dividend policy are among the widely addressed topics in corporate finance. Although the vast literature, the conclusions of the empirical studies are not consensual, as well as the determinants of these two strategic decisions. In its seminal study, Modigliani and Miller (1958) sustain that in a perfect capital market the firm value is independent of its capital structure. However, several studies conclude that capital structure choices influence firm value, namely because of market imperfections such as taxes, financial distress costs, information asymmetry, agency costs, and the personal characteristics of managers (Modigliani & Miller, 1963; Jensen & Meckling, 1976; Myers, 1984; Myers & Majluf, 1984; Graham et al., 2013; Ataullah et al., 2018).

Regarding dividend policy, Miller and Modigliani (1961) conclude that in the context of a perfect capital market, and given a certain investment policy, dividends are irrelevant for firms' value. Nevertheless, there are several studies supporting the relevance of dividend policy to firm's value, such as Brav et al. (2005), and Ofori-Sasu et al. (2017).

In addition, ownership structure is considered as a determinant factor in making strategic decisions, like capital structure and dividend policy (e.g., Khan et al., 2016). Moreover, it determines the corporate governance, an instrument to persuade managers to make decisions that act in shareholders' best interest, helping in reducing agency conflicts that arise between managers and shareholders (Spahr et al., 2012; Kumar & Zattoni, 2017).

Prior empirical studies analysed the capital structure or the dividend policy in isolation, but these two corporate finance decisions can be interrelated, affecting each other (Abbas et al., 2016). On the other hand, ownership structure can influence the capital structure and the dividend policy (e.g., Vo & Nguyen, 2014). Consequently, the relationship among these three factors is crucial in finance. However, there is a gap in the empirical literature concerning this relationship, needing research.

Moreover, managerial ownership, leverage and dividends can be seen as three internal monitoring forces that can be used to mitigate agency problems (Vo & Nguyen, 2014), alone, or simultaneously. Consequently, the three variables can be directly related to each other (Jensen et al., 1992; Chen & Steiner, 1999; Crutchley et al., 1999; Balachadran et al., 2019). This interrelationship has the potential to create an endogeneity problem so we will use simultaneous equation models, the 2SLS and 3SLS techniques.

In this context, we analyse the interrelationship among ownership structure, capital structure and dividend policy, considering a sample of Portuguese and Spanish listed firms, for the period between 1992 and 2016, using a panel data sample. We consider the Iberian market, since the research on this market is scarce. In addition, these markets have particular characteristics in what concerns shareholder protection, concentration of equity, asymmetry of information, and the fact that it is a bank-based system, which may influence results.

Overall, we find evidence that managerial ownership has a negative influence on leverage. In addition, the results show a negative relationship between firms' profitability and leverage. Finally, we find evidence that profitability influences negatively the leverage,

which is in accordance with the pecking order theory and that firm's size has a positive relationship with the firm´s payout.

The relationship among capital structure, dividend policy and ownership structure are crucial in finance. However, there is a gap in the empirical literature concerning this relationship, needing research. This study contributes to the literature in several ways. First, it provides evidence to reinforce the interrelationship among three corporate monitoring tools: managerial ownership, capital structure and dividend policy. Second, the study will be helpful for policy makers by providing new insights about these three strategic decisions: investors, helping them to make better investment decisions; and firm managers, when making corporate financial decisions. Third, it contributes to the empirical studies that uses 2SLS and 3SLS to remove simultaneous bias. Finally, in contrast with the richness of empirical studies studying the association between dividend policy and ownership around the world, there is a scarcity of studies for Iberian markets. To the best of our knowledge, it is the first study to analyse this interrelationship for Portuguese and Spanish listed companies. The Iberian markets show specific characteristics, such as weak protection of minority shareholders (Claessens et al., 2000), concentrated ownership (La Porta et al., 1999), and more underdeveloped stock markets when compared to Anglo-Saxon countries. The specific context of the Iberian market can provide a different understanding about the usefulness of strategic corporate finance decisions in different institutional settings than Anglo-Saxon dominions (Kumar & Zattoni, 2013).

The rest of the paper proceeds as follows. Section 2 presents the literature review and formulates the hypotheses. Section 3 describes the methodology and next section presents the results. Finally, the main conclusions are presented.

2 Literature Review and Hypotheses

2.1 Managerial ownership and capital structure

Managerial ownership may create conflict of interest between majority and minority shareholders. However, it can be seen as a mechanism of control, which minimizes the conflict of interest between managers and shareholders (Haque et al., 2011). Management equity is requested to align management incentives with those of external shareholders, reducing their incentives to use bonuses (Khan et al., 2016). In addition, large external shareholders are claimed to have incentives to control the egocentric behaviour of managers (Short et al., 2002).

The main theories related to capital structure include the trade-off theory, the pecking order theory, and the agency theory. The trade-off theory balances the advantages (tax benefit) and disadvantages (agency and bankruptcy costs) of debt (Myers, 1977). For higher levels of indebtedness, agency and bankruptcy costs become significant, and the tax benefits of debt are exceeded by bankruptcy costs. This theory proposes an optimal debt ratio, reached at the point where the costs of failure equal the tax benefits of debt. The pecking order theory (Myers 1984; Myers & Majluf 1984) suggests a hierarchy of funding sources, and not an optimal debt ratio. Firms prefer internal to external funds, and, when

retained earnings are not sufficient, they go for debt because it is cheaper than equity. Only in last resort, the managers raise additional sources by issuing new equity. Agency theory arise because of potential conflict of interest between the shareholders (principal) and the managers (agents) (Jensen & Meckling, 1976). Higher levels of leverage result in higher agency costs due to divergent interests between shareholders and lenders. On the other hand, debt can diminish agency costs by reducing free cash flows for implementing strategies for self-interested managers, merging managers and shareholder interests (Harris & Raviv, 1991). Managers who do not have a significant ownership in firms may have more incentives to make decisions that are not aligned with the best interest of shareholders (Vo & Nguyen, 2014). Consequently, managerial ownership can act as governance mechanism to align the interests of mangers and external shareholders (Sundaramurthy & Lewis, 2003). Firms with managerial ownership programs are likely to reduce their leverage in order to diminish the agency costs of debt and simultaneously reduce the agency costs of equity.

Some authors argue that there is a positive association between managerial ownership and leverage, in order to avoid cost of external equity (Brealey et al., 1977; Stulz, 1990) or control loosing (Kim & Sorensen, 1986). Anderson and Reeb (2003) and Rahmawati et al. (2018) find no effect of ownership on capital structure. However, there is a vast number of empirical studies that find a negative relationship between managerial ownership and the level of debt, such as Holdness and Sheehan (1988), Jensen et al. (1992), Kim et al. (2007), Vo and Nguyen (2014), Mulyani et al. (2016), Balachadran et al. (2019) and Balamuralikrishnan and Gnanasekar (2019). Based on the literature and empirical studies, we formulate the first hypothesis as follows:

H1: There is a negative relationship between managerial ownership and firms' debt.

2.2 Managerial ownership and dividend policy

The board of directors decide the firm's dividend policy. According to Rozeff (1982), firms with higher presence of internal shareholders are less likely to pay dividends. However, Balachandran et al. (2019) show that insider ownership is positively related to the payout ratio. Agency theory provides an important association between dividend policy and ownership structure (Jensen & Meckling, 1976; Rozeff, 1982; Easterbrook, 1984; Jensen, 1986) because dividends can provide indirect benefit of control, alleviating agency costs. Easterbrook (1984) suggests that dividends can be seen as an effective governance mechanism to control agency problems between managers and shareholders, since they decrease available cash, which could potentially be used unwisely and expropriated otherwise. Jensen and Meckling (1976) and Jensen (1986) argue that dividend payments reduce the level of free cash flow to be spent by managers, namely in unprofitable investment projects, and, consequently, reduce agency costs. Furthermore, according to the behavioural corporate finance, dividends will reduce the probability of overconfident managers to fund suboptimal projects (Balachadran et al., 2019).

In light of the entrenchment hypothesis, Farinha (2003) argue that insider ownership and dividends can be seen as substitute instruments, which lead to a negative association between these two variables. Firms with managerial ownership tend to reduce the dividend payout, since the purpose of dividends is the same as the managerial ownership, which is to reduce the agency costs.

Crutchely and Hansen (1989) conclude that manager's equity, leverage and dividend policy can help firms to reduce agency costs, and Bathala and Rao (1995) find a negative relationship

between internal ownership, leverage, and dividends. However, Ali, Mohamad and Bahariddin (2018), considering a sample of Malaysian listed firms, find evidence that ownership is positively related to dividend payout, concluding that the evidence is consistent with the view that dividend payout policy is a mechanism to reduce agency conflict between managers and shareholders.

The asymmetry of information between managers and shareholders assumes that the former knows better what the future perspectives of firms than the seconds are. The signalling theory (Bhattacharya, 1979; John & Williams, 1985; Miller & Rock, 1985) suggest that managers use dividends as a costly signal to convey their firm's future growth prospects to outsiders. Thus, a dividend increase signals an improvement on firm's performance, while a decrease suggests a worsening of its future profitability. Consequently, a dividend increase (decrease) should be followed by an improvement (reduction) in firm's value, and future earnings.

Rozzef (1982), Jensen (1986), Jensen et al. (1992) and Kim et al. (2007) argue that firms with higher insider ownership choose to pay lower levels of dividends, since firms with high levels of managerial ownership tend to use internal sources to finance investments, at the expense of low dividend payments. Balamuralikrishnan and Gnanasekar (2019) find that managerial ownership has a positive impact on dividend, while Rahmawati et al. (2018), Endang et al. (2020) and Nurdiandsari et al. (2021) find no relationship between these two variables. However, there are a significant number of empirical studies that find a negative relationship between ownership and dividends, such as Chen and Steiner (1999), Kim et al. (2007), Kouki and Guizani (2009), Afza and Mirza (2010), Gonzalez et al. (2017) and Purnamasari et al. (2020), pointing out that dividends reduce agency costs. Vo and Nguyen (2014) state that managerial ownership and dividends may be seen as substitute governance devices to mitigate agency costs. Therefore, we hypothesise that:

H2: There is a negative relationship between managerial ownership and firms' dividend payout.

2.3 Capital structure and dividend policy

Some empirical studies conclude that capital structure and dividend policy decisions affect each other. Consequently, dividend policy affects capital structure decisions (Sanchez-Ballesta & Garcia-Meca, 2011) and capital structure influences dividend payout (Ghosh & Sirmans, 2006). Thus, we want to see if these two variables will explain each other.

The pecking order theory (Myers & Majluf, 1984) suggests a positive relationship between capital structure and dividend payout. Firms prefer to finance its projects through retained earnings. However, when they pay a high level of dividends, it may lead to a reduction in free cash flow, and, if firms do not have sufficient internal sources, they will look for debt financing. Although Purnamasari et al. (2020) find no bidirectional causality between leverage and dividend policy, the main empirical studies suggest an inverse association between leverage and dividend payout. Jensen et al. (1992), Kumar (2006), Afza and Mirza (2010), Vo and Nguyen (2014), Mulyani et al. (2016), Gonzalez et al. (2017), Endang et al. (2020) and Purnamasari et al. (2020), among others, find a negative relationship between debt and dividends in different markets, such as the USA, India, Pakistan, Vietnam, Indonesia and Latin America. Indeed, firms with high levels of debt need to pay significant amounts of interests, and may not manage to pay high dividends. Based on the agency theory, Rozeff (1982), Jensen (1986), Jensen et al. (1992), Chen and Steiner (1999), Vo and Nguyen (2014), Mulyani et al. (2016) and Gonzalez et al. (2017), conclude that

leverage and dividends can be used as substitute monitoring strategies to reduce free cash flow that may be distorted by managers.

Considering the previous literature and the empirical evidence, we develop the last hypothesis:

H3: There is a negative relationship between leverage and firm's dividend payout.

3 Methodology

Our sample consists of Portuguese and Spanish listed firms on Euronext Lisbon and Stock Exchange of Madrid, respectively, covering the period between 1992 and 2016. Financial and sport firms were excluded as well as the ones with less than five years of available data for the variables under study[1].

From an initial set of 223 firms, we got to a final sample of 76 firms, referring to 1284 observations resulting from the available periods for each firm (from 7 to 24 years). We randomly selected a subset of 51 firms (training sample with 816 observations) and use this subsample to construct the estimates of our models, using the remaining set (validation sample with 468 observations) of 25 firms to test them. Data were obtained from SABI, a private database provided by Bureau van Dijk, complemented with hand-collected data from the firm's annual reports.

To test the formulated hypotheses, we consider three equations. Leverage, dividend payout and managerial ownership are defined as dependent variables in each equation. Other variables are defined as exogenous and are considered as instrumental variables to predict endogenous variables.

For all the following equations, the subscripts i and t represent firm and year, respectively with i=1,…,76;t=1992,…,2016.

3.1 Leverage equation

$$\mathbf{LEV_{i,t}} = \boldsymbol{\alpha_1} + \boldsymbol{\beta_{11}}\mathbf{MGO_{i,t}} + \boldsymbol{\beta_{12}}\mathbf{ROA_{i,t}} + \boldsymbol{\beta_{13}}\mathbf{TANG_{i,t}} + \boldsymbol{\beta_{14}}\mathbf{DPO_{i,t}} + \boldsymbol{\varepsilon_{i,t}}. \quad (1)$$

Leverage (LEV) is the dependent variable calculated as the ratio between the book value of total debt and the book value of total assets (e.g., Vo & Nguyen, 2014). Managerial ownership (MGO) is an independent variable, calculated as the ratio of the number of shares held by directors and members of the board to total outstanding shares (Vo & Nguyen, 2014). We control for the return on asset (ROA), an accounting measure of profitability, fixed assets (TANG) and dividend payout (DPO) due to their possible influence on the level of firms leverage (e.g., Anderson & Reeb, 2003). ROA is calculated as earnings before interest and tax (because it is unaffected by any changes in capital structure, which determines the corporate tax base) divided by total assets (Anderson & Reeb, 2003; Li et al., 2015).

[1] This period is conditioned with the availability of data and the database.

According to the pecking order theory and previous empirical evidence (Sadaf, 2014; Abbas et al., 2016; Balachadran et al., 2019), we expect a negative relationship between ROA and LEV.

3.2 Dividend equation

$$\mathbf{DPO_{i,t} = \alpha_2 + \beta_{21} MGO_{i,t} + \beta_{22} SIZE_{i,t} + \beta_{23} GRTH_{i,t} + \varepsilon_{i,t}.} \quad (2)$$

The dependent variable is DPO and the independent variables are MGO, SIZE and sales growth (GRTH). We control for SIZE and GRTH because it may influence dividends payout. According to the results reported by Sadaf (2014), Abbas et al. (2016) and Balachandran et al. (2019), the SIZE of a firm is positively related to the likelihood of paying dividends, which is consistent with the previous findings of Fama and French (2001) and DeAngelo et al. (2006). Thus, it is supposed to find a positive signal for the SIZE variable.

3.3 Managerial Ownership equation

$$\mathbf{MGO_{i,t} = \alpha_3 + \beta_{31} DPO_{i,t} + \beta_{32} ROA_{i,t} + \beta_{33} FCF_{i,t} + \varepsilon_{i,t}.} \quad (3)$$

The dependent variable is MGO, and the independent variables are the DPO. The control variables are the ROA and the free cash flow (FCF). We control for the ROA and the FCF due to its possible influence on managerial ownership. Based on the information asymmetry, higher levels of profitability and the capability to generate high levels of cash flow are more prone to favour demand for firms' shares. Consequently, positive coefficients for ROA and FCF are expected. Table 1 presents the variables as well as their measurement.

Table 1. Definition and measurement of variables

Variables	Abbreviation	Measures
Leverage	LEV	Quotient between the book value of total debt and the book value of total assets
Dividend payout	DPO	Ratio of dividend per share to earnings per share
Managerial Ownership	MGO	Ratio of the number of shares held by directors and members of the board to total outstanding shares
Sales growth	GRTH	Percentage of annual sales change
Free cash flow	FCF	Remaining cash after paying expenses and capital expenditures
Return on Assets	ROA	Earnings before interest and tax divided by total assets
Firm size	SIZE	Natural logarithm of the book value of total assets
Fixed assets	TANG	Ratio of the book value of fixed assets to the book value of the total assets

The nature of the data suggests different approaches to perform the analysis. We have data recorded over different periods, so we have to take account for dependence over time of the observations for different companies. Panel data methodology deals with this

kind of data. On the other hand, we face problems of endogeneity present in the equations, demanding for simultaneous equations model (SEM) methodology. We used panel data methodology, performing some tests to evaluate de most suitable model: fixed effects model or random effects model (e.g., Baltagi, 2013). Subsequently, we run the F-statistic, the Breuch-Pagan statistic and the Hausman test (Hausman, 1978) in order to choose the most appropriate model.

In addition, we employ the 2SLS method and the 3SLS technique (which is the combination of 2SLS and Seemingly Unrelated Regression - SUR) to determine the interrelationship among ownership structure, dividend policy and capital structure, and to obvious the problem of endogeneity. Indeed, these techniques provide estimates that are efficient and consistent in the presence of simultaneous bias.

In panel data analysis, we have a regression model with equation (Baltagi, 2013).

y_it=α+x_it β+μ_it,i=1,…,N;t=1,…,T; (4)

i representing firms and t for time; $\alpha \in IR$, β represents a ($Kx1$) matrix and $\boldsymbol{x}_{it}$ represents the *i-th* observation with K explanatory variables and μ_{it} is the random error term. We consider this random error as the sum of two different components:

μ_it=μ_i+v_it, (5)

where μ_i accounts for the non-observed effect due to the firms and v_it for the rest of the random variation, not explained by the variables present in the model. Note that as invariant in time, this error term will identify any firm effect present regardless the time factor.

When applying fixed effects methodology, we consider μ_i as fixed parameters to estimate, v_it as independent and identically distributed (iid) random variables (r. v.) with zero mean and variance σ_v^2 and x_it and v_it independent, ∀i,t. Applying ordinary least squares (OLS) to the transformed variables we get the estimated coefficient β^_EF.

In a random effects model, μ_i is assumed to be a r. v. with zero mean and variance σ_u^2, v_it a r. v. with zero mean and variance σ_v^2 and μ ,v assumed to be independent for ∀i,t. It is also assumed that the variables x_it are independent of μ_i and v_it,∀i,t. In this case we have to use the generalized least square method (GLS) in order to get the estimated β^_GLS.

To decide which model is more adequate we use the Hausman test (Hausman, 1978). This test compares the two estimators, $\widehat{\boldsymbol{\beta}}_{EF}$ and $\widehat{\boldsymbol{\beta}}_{GLS}$. Both of them are consistent if $E(\mu_{it}/\boldsymbol{x}_{it}) = 0$ but they present different behaviour otherwise. If we do not reject the hypothesis H_0: $\widehat{\boldsymbol{\beta}}_{GLS} - \widehat{\boldsymbol{\beta}}_{EF} = 0$, then it can be shown that $\widehat{\boldsymbol{\beta}}_{GLS}$ is a BLUE (Best Linear Unbiased Estimator) for the parameters β. Note however, that if we reject the null hypothesis we cannot conclude that the fixed effect model is the one; in this case we should perform a deeper analysis, see Baltagi (2013) for more details.

If data presents signs of heteroscedasticity, violating the assumptions relative to σ_μ^2 and σ_v^2, we need to look for an alternative solution because the estimators are no longer

efficient. In that case we have to estimate the error covariances and look for a feasible GLS (FGLS) estimator, $\widehat{\boldsymbol{\beta}}_{FGLS}$.

SEM is a statistical model characterized by a system of equations, which explain relations of dependence between variables, in which simultaneously the existence of interdependence between equations. We can look at this model like a generalization of a multivariate regression model. With this kind of model, we consider the possible heteroscedasticity as well as the correlation with regressors if it exists. It has two types of variables: variables that depend upon other variables in the system (endogenous variables) and variables determined outsider the system of equations (exogenous variables). This is an appropriated model to describe relations where there are dependence and interactions among the explanatory variables. Several econometrics books include a chapter on SEM, including the model characterization and main estimation methods suitable for estimating SEM parameters (Judge et al., 1988; Mittelhammer et al., 2000; Gujarati, 2003).

Consider matrices of endogenous and exogenous variables, Y and X, structural parameters matrices Γ and B, and a random error matrix, E. We write the model in its SF form as:

$$Y\Gamma+XB+E=0 \quad (6)$$

and we write the RF version as:

$$Y=X\Pi+V, \quad (7)$$

with $\Pi = -B\Gamma^{-1}, V = -E\Gamma^{-1}$.

For the SF of the model, we assume that the errors are generated by a multivariate stationary process, not correlated over time, that the errors are uncorrelated with the exogenous variables and follow a multivariate Normal distribution with mean vector zero and covariance matrix Σ.

Typically, we estimate the SEM parameters with least squares method but we have to take some precautions: estimating each equation in (7) leads to non-consistent estimators, due to the fact that there are endogenous variables that are explanatory variables in the model and, consequently, there is a correlation between regressors and errors. It is possible to overcome this problem by considering instrumental variables. These variables are correlated with the regressors but are not correlated with the errors.

With the 2SLS methodology, the process of estimation is accomplished in two steps: S1 - Estimate the parameters in the model (7) by the least squares method; and S2 - With the obtained estimated values we get the predicted values, $(Y\_i)\hat{}$, which are used in the second step to estimate the parameters of each equation in the model (6) by least squares. This kind of approach allows you to obtain consistent estimators for structural parameters, but does not consider the correlation between the different equations.

The next procedure deals with that kind of correlation as the estimation process consider all the equations simultaneously. The 3SLS methodology is accomplished in three steps: S1 - Estimate the parameters in the model (7) by least squares method getting the

predicted values $(Y\_i)\hat{}$; S2 - Calculate 2SLS estimates for the parameters of each equation as well as the correspondent residuals Obtain an estimate of the covariance matrix of the errors, $\Sigma\hat{}$, by the sample covariance matrix of those residuals; S3 - Obtain 3SLS estimates for the parameters of all equations of the system by means of generalized least squares (GLS) with covariance matrix estimate $\Sigma\hat{}$, obtained in the previous step. The 3SLS estimator is consistent and asymptotically efficient in relation to the 2SLS estimator being both obtained based on the instrumental variables' technique.

4 Results and discussion

For each of the variables we have performed an exploratory analysis so we could extract the main characteristics of the data. All the analysis was performed with the support of R Statistical Software (v4.1.2; R Core Team, 2021). Table 2 presents the descriptive statistics.

Table 2. Descriptive statistics of the study variables

	LEV	*DPO*	*MGO*	*ROA*	*SIZE*	*FCF*	*TANG*	*GRTH*
nobs	390	390	390	390	390	390	390	390
Minimum	0.1	-15521.39	0	-1.12	9.52	-911377	0	-0.99
Maximum	1.71	50466.94	1	0.82	16.5	1995996	0.94	12.44
1. Quartile	0.37	0	0.82	0.04	11.46	4379.63	0.04	-0.16
3. Quartile	0.71	261.75	1	0.12	13.87	90964.95	0.21	0.04
Mean	0.55	548.61	0.86	0.1	12.72	85939.4	0.18	0.07
Median	0.55	0	0.98	0.08	12.59	23599.03	0.12	-0.06
Stdev	0.24	3228.73	0.25	0.13	1.58	239246.44	0.21	1.02
Skewness	0.68	10.41	-2.19	-0.4	0.21	3.76	1.99	8.56
Kurtosis	1.55	153.74	3.81	22.75	-0.73	24.86	3.58	87.15

The observed data shows that LEV values go from a minimum value of 0.1 to a maximum of 1.71. The mean value and the median are similar, which might be a sign of a symmetric distribution. Those values indicate that the central tendency points to a book value of debt not greater than half of the book value of assets and only half of the considered firms have a leverage value over 0.55. Dividend payout presents a highly asymmetric distribution, showing evidence of more frequent low values. In fact, the median value is zero, meaning that 50% of the observed firms did not distributed dividends. This result is consistent with some evidence that the propensity to pay dividends have decreased in the last decades (Fama & French, 2001; Fatemi & Bildik, 2012). The value of the standard deviation reveals a high variability on the behaviour of the firms present in the study regarding distribution of dividends. Most of the firms analysed present a large value of the ratio MGO; 75% have a value greater than 0.82. This tendency is also confirmed by the negative asymmetry. The standard deviation value (0.25) reflects a small dispersion with a mean value of 0.86, meaning that there is a common tendency of high values of MGO over the firms in the study. This evidence suggest that Latin firms have concentrated ownership,

which is in accordance of some Portuguese and Spanish evidence (Alves, 2012; Miguel et al., 2004).

The correlation coefficients, as well as the variation inflation factor (VIF) are presented in Table 3.

Table 3. Correlation coefficient and the variation inflation factor (VIF)

	LEV	DPO	MGO	ROA	SIZE	FCF	TANG	GRTH
LEV	1	0.02	-0.24	-0.26	0.27	-0.06	-0.01	0.14
DPO		1	0.08	0.03	0.14	0.17	-0.05	0
MGO			1	0.27	0.04	0.17	-0.06	-0.16
ROA				1	0.03	0.2	-0.08	-0.28
SIZE					1	0.46	-0.04	0.07
FCF						1	-0.04	-0.04
TANG							1	0
GRTH								1
VIF	1.25	1.04	1.15	1.23	1.45	1.4	1.01	1.1

The correlation coefficient values do not appear to be sufficiently large to cause concern about multicollinearity problems. One possible indicator of multicollinearity is the VIF. If there is no collinearity this indicator takes the value one and its value increases in the presence of collinearity, with a value of 10 denoting serious problems of collinearity. As we can see in Table 3, all the VIF values are lower than 1.5, suggesting no problematic degree of collinearity (Gujarati, 2003).

After a preliminary analysis, we considered the FGLS estimates of the parameters in the equations (1), (2) and (3) ignoring endogeneity. We used the R package *plm* (Croissant Y, Millo G, 2008) to estimate the parameters for the three equations.

In order to estimate the SEM estimation, we applied the R package *systemfit* (Henningsen A, Hamann JD, 2007) to obtain the structural estimated parameters by 2SLS and 3SLS.

Table 4 presents the results of the applied processes of estimation, including the estimated coefficients for all the explanatory variables present in the three considered equations (1), (2) and (3). The parameters were obtained with the training sample.

The equation (1) explains Leverage variation with MGO, ROA, TANG and DPO explanatory variables. With FGLS method all the explanatory variables are statistically significant. The results suggest that MGO and ROA have a negative effect on firms leverage, as TANG and DPO influences positively the leverage. Since the MGO coefficient is negative and statistically significant, we find evidence supporting the hypothesis that there is a negative relationship between managerial ownership and firms leverage (H1). This evidence is consistent with the results of several authors, such as Holdness and Sheehan (1988), Jensen et al. (1992), Kim et al. (2007), Vo and Nguyen (2014), Mulyani et al. (2016), Balachadran et al. (2019) and Balamuralikrishnan and Gnanasekar (2019). This result suggests that firms with managerial ownership are more prone to reduce leverage in order to reduce the agency costs of debt. The increase in managerial ownership will force

managers as shareholder to align their personal interests with the interests of shareholders, making managers more careful in the decision-making process about the use of debt. Since the relationship between dividends and leverage is positive, contrary to the expected signal, we cannot support the hypothesis of a negative relationship between these two variables (H3). However, our result in is line with the ones of Prianda et al. (2022), who find a positive relationship, and Purnamasari et al. (2020) and Zainuddin and Manahonas (2020), who find no bidirectional causality between leverage and dividend policy. These results suggest that firms will try to maintain the distribution of dividends to shareholders to signal to the market it has good prospects to the future (signaling theory), even with high or low levels of debt. In addition, the evidence suggests that leverage and dividends are not being used as substitute monitoring strategies. The negative relationship between ROA and LEV is in accordance with the pecking order theory, as well as previous evidence (Sadaf, 2014; Abbas et al., 2016; Balachadran et al., 2019). With the other methods, only MGO and TANG are significant variables to explain Leverage.

Table 4. Results of the applied processes of estimation, including the estimated coefficients for all the explanatory variables present in the three considered equations (1), (2) and (3)

	Equation 1: Leverage			**Equation 2: Dividend**			**Equation 3: Managerial**		
	Method			Method			Method		
Variables	FGLS	2SLS	3SLS	FGLS	2SLS	3SLS	FGLS	2SLS	3SLS
Intercept	0.03***	0	0	0.02***	0	-0.002	0.02***	0	0
LEV				0	0.13	0.15			
DPO	0.02***	0.12	0.28				0.05***	-0.69+	-0.68+
MGO	-0.17***	.1**	-0.83*	0.07***	0.53*	0.55*			
ROA	-0.02***	0.11	0.04				0.14***	0.14**	0.15***
SIZE				0.14***	0.14***	0.14***			
FCF							0.06***	0.27**	0.25**
TANG	0.12***	0.09*	0.14***						
GRTH				-0.002***	0	0.01			

+ (p-value<0.05); * (p-value<0.01); ** (p-value<0.001); *** (p-value≅0).

In the Dividend equation (2), we consider the MGO, SIZE and GRTH as explanatory variables. The results show a positive effect of MGO and SIZE and a negative effect of GRTH on DPO. All the considered explanatory variables are statistically significant to explain DPO, according the FGLS results, and only GRTH is not identified as statistically significant by the other methods. Consequently, we find no support for the hypothesis that there is a negative relationship between managerial ownership and firms' dividend payout (H2). The evidence of no support for H2 is in line with the studies of Rahmawati et al. (2018), Balamuralikrishnan and Gnanasekar (2019), Endang et al. (2020), Zainuddin and Manahonas (2020) and Nurdiandsari et al. (2021). The positive relationship between MGO and dividends may be explained by the fact that entrenched managers do not consider

dividends and debt as substitutes at high ownership levels, increasing dividends as ownership levels increase (Florackis et al., 2015). In what concerns the SIZE variable, we find a positive relationship between this variable and the DPO, according to what is expected and to previous evidence (Fama & French, 2001; DeAngelo et al., 2006; Sadaf, 2014; Abbas et al., 2016; Balachandran et al., 2019). The negative effect of GRTH on DPO is in line with the results of Subramaniam et al. (2011) and Subramaniam et al (2014).

In the equation (3), we take ROA, DPO and FCF to explain MGO variation. All the considered explanatory variables are statistically significance indicating that these variables are important to explain MGO variation, which is related with the predictions of the information asymmetry theory.

Because R^2 might present some issues with 2SLS and 3SLS estimators (Gujarati, 2003; Vo & Nguyen, 2014), we propose a different method to compare the estimated models used in this work. Comparison of the results obtained with the different methods is made based on a residual analysis. We compared the residuals obtained with each fitted model using the validation sample. We formed a matrix with the residual values and then we calculated the classic Mahalanobis distance (MD) of the residual's vectors. The MD of a vector x_i, of the dataset $\boldsymbol{X} = [\boldsymbol{x_i}]$ is defined by:

$$\mathbf{MD_i} = \sqrt{(\mathbf{x_i} - \mathbf{T(X)})\mathbf{C(X)^{-1}}(\mathbf{x_i} - \mathbf{T(X)})'}, \quad (4)$$

where T(X) is the means vector, and C(X) the covariances matrix from the sample. We also obtained the robust Mahalanobis distance (RMD) of the residuals vectors, which is calculated using location and scale robust estimators with minimum covariance determinant (MCD) in C(X) and T(X) respectively, in the expression (8).

Table 5 presents the descriptive statistics of the MD and RMD of residuals.

Table 5. Descriptive statistics of the Mahalanobis distance (MD) and the robust Mahalanobis distance (RMD) of residuals

	MD				**RMD**			
	$\bar{x}$	*Med*	*sd*	MAD^2	$\bar{x}$	*Med*	*sd*	*MAD*
FGLS	2.99	0,93	9.22	0.92	74.72	3.04	365.05	2.41
2SLS	2.99	0.94	9.14	0.73	65.26	3.22	300.65	2.90
3SLS	2.99	1.01	8.82	0.81	58.81	3.18	265.20	2.81

Table 5 shows that the best fit for the observed data is achieved with 3SLS method. This can be seen by lower values of location and dispersion measures of residuals MD and RMD. We can also observe that it is easier to understand the way the three different residuals are distributed with RMD. We see that the mean and the standard deviation values are increased by some atypical residual values. This may be observed through the graphs in Figure 1.

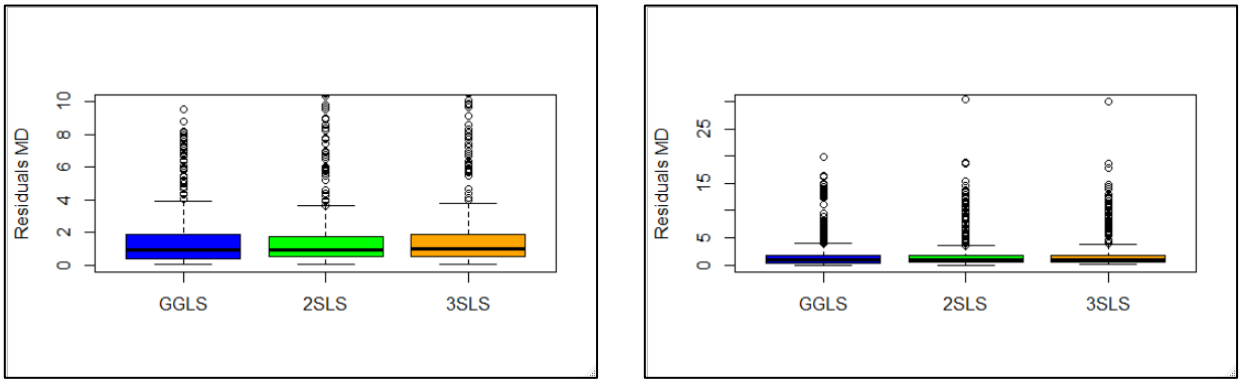

Figure 1. Boxplot with Mahalanobis distances for each one of the methodologies. Left side of the figure we have MD and the right side RMD

The more robust measures, namely the median (Med) and the median absolute deviation (MAD), are less affected by the atypical residual values turning clearer the identification of these values. The Robust Mahalanobis distance makes a better job evaluating different results depending on the chosen approaches. The three different applied ways of estimation conducted to similar results, but it is clear the different degree of sensitivity of the methods to the presence of atypical residual values. This reinforce the importance of detecting the presence of outliers in the preliminary analysis and the relevance of applying robust estimation methods.

5 Conclusion

The present study focuses on the interrelationship among ownership structure, capital structure and dividend policy. To test the formulated hypotheses, we employed panel data analysis, as well as the 2SLS and 3SLS techniques in order to address for endogeneity issues, considering a sample of Portuguese and Spanish listed firms, between 1992 and 2016.

The results show evidence supporting the hypothesis that there is a negative relationship between managerial ownership and leverage (H1). This result suggests that firms with managerial ownership are more prone to reduce leverage in order to reduce the agency costs of debt, which agrees with the results of Holdness and Sheehan (1988), Jensen et al. (1992), Kim et al. (2007), Vo and Nguyen (2014), Mulyani et al. (2016), Balachadran et al. (2019) and Balamuralikrishnan and Gnanasekar (2019). This result suggests that firms with managerial ownership are more prone to reduce leverage in order to reduce the agency costs of debt.

The ROA coefficient is negative and statistically significant, which goes along with pecking order theory and previous evidence (Sadaf, 2014; Abbas et al., 2016; Balachadran et al., 2019). With respect to the hypothesis that there is a negative relationship between managerial ownership and dividend payout (H2), we find no evidence supporting it. Recent studies also find no evidence for this relationship (Rahmawati et al., 2018;

Balamuralikrishnan and Gnanasekar, 2019; Endang et al., 2020; The results show a positive effect of firms' size on the dividend payout, consistent with previous evidence (Fama & French, 2001; DeAngelo et al., 2006; Sadaf, 2014; Abbas et al., 2016; Balachandran et al., 2019). We find no evidence supporting the hypothesis that there is a negative relationship between leverage and dividend payout (H3), which is consistent with the conclusion of Purnamasari et al. (2020) and Nurdiandsari et al. (2021), suggesting that, according to the signaling theory assumptions, firms tend to signal favorable the market, maintaining the distribution of dividends, independently of having high or low levels of debt.

This study represents a contribution to identify the nature of relation among the consider variables at the Iberian market, not yet explored in this context. This study presents theoretical and practical implications. Academics and researchers may find this paper an interesting foundation for further studies as it identifies a gap in the literature when studying the interrelationship among ownership structure, capital structure and dividend policy. We are aware of some research limitations due to the small size of the sample, resulting mainly from the small size of the Portuguese capital market. It remains to clearly understand - which is the best methodology to be applied in such kind of models and with this type of data. One possible way of proceeding with research in this fields might include some simulation studies over different scenarios, comparing the performance of the several estimation methods applied. In future research, it will be interesting to explore whether there are other factors influencing capital structure and dividend policy decisions, such as strategic, environment factors, managerial characteristics and behavioral factors.

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