

Female directors and corporate cash holdings in the presence of internal dealings

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Abstract

Purpose

Internal dealings might shape female directors' incentives to affect corporate financial policies. We explore what impact female directors have on corporate cash holdings in the presence of internal dealings.

Methodological approach

We apply panel data regressions that allow us to address endogeneity concerns. The initial sample includes all non-financial Spanish listed firms from 2005 to 2019.

Findings

Conditional on the existence of internal dealings, we show that the presence of two or more female directors decreases corporate cash holdings. Results seem consistent with independent female directors becoming an effective monitoring mechanism for corporate financial policies in the presence of internal dealings. Furthermore, our findings could be explained by independent female directors providing valuable resources and external linkages which, in the presence of internal dealings, help to reduce the firm's need to hold cash to cope with external uncertainties.

Originality

Our work meets the increasing demand for more research on gender diversity in order to better capture the potential benefits that may result from appointing women on boards. To the best of our knowledge, this is the first study to examine the influence of female directors on corporate cash holdings in the presence of internal dealings.

Practical Implications

Our results provide practical implications by suggesting that in the presence of internal dealings, regulators and policy makers should pay greater attention to board gender diversity so as to reduce agency problems associated with free cash flows. We also contribute to prior academic debate regarding the importance of female directors in providing critical resources

and external linkages to cope with uncertainty and to the importance of considering not only the presence of women on boards but also their number and specific roles.

Keywords

Cash holdings, female directors, internal dealing, related party transactions.

1. Introduction

Financial studies on gender diversity have mainly focused on their effect on firm value, firm performance or corporate risk-taking behaviour (Ahern and Dittmar, 2012; Dezsö and Ross, 2012; Matsa and Miller, 2013; Faccio *et al.*, 2016). However, studies into what effect gender diversity has on corporate cash holdings are scarce and their results are far from conclusive (Zeng and Wang, 2015; Loukil and Yousfi, 2016; Adhikari, 2018; Cambrea *et al.*, 2019; La Rocca *et al.*, 2019; Atif *et al.*, 2019). Moreover, to the best of our knowledge, no previous study has examined what role female directors play in corporate cash holdings in the presence of internal dealings. These transactions provide the firm with financial flexibility in investment decision-making and decrease the role of external finance in funding new investment opportunities. In this sense, some previous studies (Myers and Majluf, 1984; Williamson, 1975) have posited that internal capital markets might alleviate firms' financial constraints. Furthermore, the reduced need to resort to external capital markets to raise funds in order to face new investment opportunities decreases the firm's exposure to the scrutiny of external capital markets, including financial analysts, the press and institutional investors (Rozeff, 1982). In line with the above, the presence of internal dealings might alter female directors' incentives to affect corporate financial policies and, particularly, the level of cash holdings. In this sense, the current work aims to examine what effect female directors have on corporate cash holdings, conditional on the existence of these internal dealings.

Previous studies (Zeng and Wang, 2015; Loukil and Yousfi, 2016; Adhikari, 2018; Cambrea

et al., 2019; La Rocca *et al.*, 2019) have evidenced that women in executive roles promote corporate cash holdings for precautionary motives. However, in the presence of internal dealings, these motives might not be the main driver of the relation between female directors and corporate cash holdings because the financial flexibility promoted by these internal transactions might decrease female directors' incentives to hold cash for the aforementioned reasons. This is so because firms engaging in these internal dealings have an alternative and less costly way to undertake profitable investment opportunities without needing to incur in costly external financing.

In contrast, internal dealings might isolate the firm from capital market scrutiny, including financial analysts, institutional investors and the press, thereby increasing insider incentives to tunnel corporate resources with relatively immunity and so accentuating the free cash flow problem (Jensen, 1986). This is particularly true in the Spanish context where low investor protection and litigation risk (Djankov *et al.*, 2008; La Porta *et al.*, 1998) decrease the likelihood of insiders being sued when they opportunistically deviate corporate cash for private gains.

In the presence of internal dealings, our results reveal a negative relation between female directors and corporate cash holdings. Our results are consistent with female directors becoming an effective corporate governance mechanism regarding corporate financial policy. The lower cash holdings promoted by female directors thus evolves as a monitoring device aimed at reducing agency costs derived from free cash flows. Furthermore, in line with the resource dependence theory, our results are also consistent with female directors helping to reduce uncertainties and promoting easy access to external resources. In a setting where internal dealings provide alternative and less costly sources of funding and decrease the need to hold cash for precautionary motives, having better access to external resources helps to reduce the need to hold cash when needing to cope with external uncertainties. Furthermore,

in line with the critical mass theory, our results evidence that the negative effect of female directors on corporate cash holdings is conditional upon the presence of two or more women on the board.

By using an integrated theoretical approach which combines agency, resource dependence and critical mass theories, we contribute to the literature in several ways. First, we provide novel evidence regarding the role female directors play in corporate cash holdings by using a unique dataset that considers the existence of internal dealings. Second, we add to studies which explore whether women behave differently in a variety of settings (Johnson and Powell, 1994; Ahmed and Atif, 2021) by examining the role of women directors in a context where internal capital markets provide the firm with both financial flexibility and lower external capital market scrutiny. Third, in the Spanish context, where private benefits of control are high (Nenova, 2003; Dyck and Zingales, 2004) and where insiders can easily deviate cash holdings for private gains, our results contribute to studies that examine the monitoring role of female directors (Gul *et al.*, 2008; Gul *et al.*, 2008; Adams and Ferreira, 2009; Ferreira, 2010; Anderson *et al.*, 2011; Srinidhi *et al.*, 2011; Ben-Amar *et al.*, 2017; Cambrea *et al.*, 2019; Atif *et al.*, 2019; Ongsakul *et al.*, 2021) by showing that independent female directors might constitute an effective corporate governance mechanism that is able to reduce the agency costs associated with the free cash flow problem. Furthermore, we also contribute to studies that examine what role female directors play in providing valuable resources to cope with external uncertainties (Milliken and Martins, 1996; Yermack, 1996; Hillman *et al.*, 2007). By providing valuable links between the company and its external environment, women on boards thus help to reduce the firm's need to hold cash to cope with these risks in a context where the presence of internal dealings curbs female directors' tendency to hold cash for precautionary motives. Finally, we add to studies addressing the importance that female representation has on boards in terms of growing from being only a token presence to becoming a critical mass (Kanter,

1977; Ely, 1994; Konrad *et al.*, 2008; Torchia *et al.*, 2011; Chang *et al.*, 2018; You, 2021) so as to effectively impact board decision levels and company performance outcomes.

The rest of the paper is organized as follows. Section 2 includes the theoretical background and the hypothesis. Section 3 shows the research design, while section 4 includes the empirical results. Conclusions are presented in section 5.

2. Theoretical background

Companies need cash for different reasons, such as supporting the firm's operation, funding future investment opportunities, or providing a response to future contingencies. Precautionary reasons, transaction costs or insiders' desire to spend on perks are often cited as potential determinants of corporate cash holdings (Opler *et al.*, 1999; Bates *et al.*, 2009). The literature on the drivers of corporate cash holdings is extensive (Opler *et al.*, 1999; Ozkan and Ozkan, 2004; Kusnadi and Wei, 2011; Hu *et al.*, 2019; Clarkson *et al.*, 2020; Habib *et al.*, 2021), whereas studies exploring the presence of women in corporate roles and their effect on corporate cash holdings are scarce and quite recent. Zeng and Wang (2015) evidence that female CEOs tend to hold higher amounts of cash in privately held Chinese firms. The authors attribute their results to the existence of precautionary motives; namely, female CEOs being more concerned with the need to hold cash to meet unexpected contingencies. Using an international sample from 18 European countries, Loukil and Yousfi (2016) find a positive relationship between the presence of women occupying executive roles in the firm and cash holdings. The authors attribute their results to women making more conservative choices, probably because they are more risk averse than men. In the US, Adhikari (2018) finds that female executives promote corporate cash holdings due to their greater risk-aversion. Using a sample of Italian listed firms, Cambrea *et al.* (2019) show that females in executive roles increase corporate cash holdings to avoid risk-taking and for safeguarding purposes. La Rocca *et al.* (2019) find that women in executive positions tend to be less likely to take risks than their

male counterparts and consequently, for precautionary reasons, tend to hold greater amounts of cash to cope with future contingencies that might prevent the company from capturing growth opportunities. Altogether, previous studies are generally consistent with women in executive roles encouraging corporate cash holdings.

However, to the best of our knowledge, no previous study has considered how the presence of internal dealings might shape female directors' incentives to hold cash. Compared to the market control system of corporate governance, the large shareholder control system (common in continental Europe) is characterized by the prevalence of ownership concentration, with families and banks playing a prominent role as large shareholders (La Porta *et al.*, 1999). Capital markets are therefore relatively illiquid and have limited control ability, and there is no active market for corporate control (Cuervo, 2002). In such a setting, external funds are uncertain and costly and internal dealings might help companies to reduce financing frictions by providing financial flexibility which may help deserving projects to be financed (Khanna and Palepu, 1997).

In line with the above, in the presence of these internal transactions, the relation between female directors and corporate cash holdings is hard to explain on the grounds of female directors' risk aversion because internal dealings provide them with the necessary flexibility to cope with future contingencies or to take advantage of future growth opportunities without the need to retain cash for precautionary reasons. Our research thus provides a natural laboratory to study the impact of female directors on corporate cash holdings from a different perspective and so help to shed light on the competing forces that might drive the relation between female directors and corporate cash holdings.

In this sense, according to Myers and Rajan (1998), cash is the most valuable asset firms can expropriate. In the presence of internal dealings, insiders can easily transfer cash from one related party to another at lower costs, thereby increasing the agency problems associated to

free cash flows. In this sense, Jensen (1986) posits that agency problems are particularly severe in firms that have substantial free cash flows. This occurs because insiders might not use these cash flows to support the firm value creation process but to maximize their own utility function at the expense of outsiders' interests.

3. Literature review

The low investor protection and litigation risk that characterize the Spanish setting (Djankov *et al.*, 2008; La Porta *et al.*, 1998) decrease the likelihood that insiders will be sued when they opportunistically divert corporate cash for private gains, which exacerbates agency conflicts associated to free cash flows. Grounded in agency theory, previous literature is generally consistent with the idea that the monitoring function of corporate boards plays a critical role in mitigating the agency problems associated to free cash flows. However, the role of gender diversity in affecting this monitoring role is not sufficiently clear. Some studies provide evidence that greater board heterogeneity –due to female inclusion– might trigger conflicts among board members, restrict coordination and communication among them and so result in less effective board monitoring of managerial actions (Anderson *et al.*, 2011; Ferreira, 2010). However, much of the previous literature documents how women's skills can improve the monitoring and decision-making function of the board because female directors bring diverse and independent thinking to the board and are considered tougher monitors (Chen *et al.*, 2017). Adams and Ferreira (2009) show that gender-diverse boards are better at monitoring due to women's better communication skills and increased board attendance. Female directors are superior monitors of corporate decision-making and their presence on the board helps to reduce agency conflicts due to their democratic and people-oriented leadership style. Gul *et al.*, (2008) evidence that boards with female directors are more likely to demand greater monitoring in the form of more audit. Srinidhi *et al.* (2011) show that firms with female directors –specifically in the audit committee– exhibit better reporting discipline by managers. Ben-Amar *et al.* (2017)

find that the greater the percentage of women on the board the greater the likelihood of voluntary climate change disclosure. More recently, Ongsakul *et al.* (2021) conclude that board gender diversity plays an effective governance role, even more effective than board independence, at mitigating the opportunistic timing of option grants. As regards corporate financial policies, Cambrea *et al.* (2019) show that women who hold monitoring roles reduce corporate cash holdings due to their tendency to instigate more robust controls. Finally, Atif *et al.* (2019) document a negative relationship between board gender diversity and corporate cash holdings in the US. Consistent with the monitoring function, they also find a strong negative effect of female independent directors on corporate cash holdings. Wan Ismail *et al.* (2022) show a low level of cash holdings when firms have high levels of female representation on boards and are domiciled in high-level investor protection countries. Furthermore, they find that the negative effect of gender-diverse boards on corporate cash holdings is less pronounced in countries with relatively lower investor protection.

In line with the above, previous studies are generally consistent with the appointment of female directors proving critical vis-à-vis mitigating agency problems. In a context where internal dealings isolate insiders from market scrutiny (including institutional investors, the press, and financial analysts) and where insiders can divert corporate cash holdings for private gain with relatively immunity, appointing female directors might reduce corporate cash holdings, and these lower cash holdings might constitute an effective corporate governance mechanism (monitoring argument).

Cambrea *et al.* (2022) evidence that the effects of board of director characteristics are contingent on the firm's external environment. In times of crisis, board members abandon their monitoring duties and help the firm to survive. Thus, from a different perspective, the resource dependence theory emphasizes the role of the board as a mechanism to cope with uncertainty by providing links between the company and its external environment. Directors connect the

firm with the external factors that generate uncertainty and external dependencies, with this link proving critical to overcome such uncertainties (Pfeffer and Salancik, 1978). Following on from this view, Hillman *et al.* (2007) posit that by virtue of their different experience sets, beliefs, and perspectives, women have the potential to link organizations to constituencies that are different to those provided by men. Some previous studies have therefore emphasized that the appointment of female directors can reduce dependency and provide valuable resources to the firm such as advice and counsel, legitimacy, and channels for communicating information and for gaining preferential access to resources (Milliken and Martins, 1996; Yermack, 1996; Hillman *et al.*, 2007). With these valuable resources, firms are afforded easy access to external financing. In the presence of internal dealings, female directors thus reduce the firm's need to hold cash in order to cope with uncertainties and external dependencies (resource-based argument).

Thus, we state our hypothesis as follows:

H1: In the presence of internal dealings, female directors reduce corporate cash holdings.

4. Research design

4.1 Data

The sample includes all non-financial Spanish listed companies from 2005 to 2019. Financial data were obtained from Osiris, a database from Bureau Van Dijk that includes financial information on listed companies across the globe (<https://www.bvdinfo.com/en-gb/our-products/data/international/osiris>). Corporate governance information was taken from the annual corporate governance report. To avoid any influence of outliers, variables were winsorized at the 1% and 99% level. The initial sample consists of 1,195 firm-year observations, corresponding to 90 non-financial Spanish firms listed on the electronic market at the end of 2019. To shape our experimental setting, we only consider observations for firms

engaged in internal dealings through related party transactions (RPTs). These transactions take place between the firm and significant shareholders, directors and officers or affiliates, creating internal markets that reduce financial constraints. We obtain the information about these transactions from the annual financial statements, available on the National Securities Market Commission (CNMV). More specifically, we hand-collect these data from the notes to financial statements of listed firms. The final sample thus includes 772 firm-year observations (75 firms).

4.2 Variables and estimation model

In line with previous literature (Ozkan and Ozkan, 2004; Bates *et al.*, 2009; Denis and Silbikov, 2010; Atif *et al.*, 2019), we consider two alternative measures for our dependent variable, the level of cash holdings. The first measure is the ratio of cash and marketable securities to total assets (*Cash Holding*), and the second is the ratio of cash and marketable securities to net assets (*Cash Holdingbis*), where net assets are defined as the book value of total assets minus cash and marketable securities.

Specifically, we consider different variables in order to analyse the effect of female directors on corporate cash holdings. First, we define the variable *%FemDir*, measured as the percentage of female directors out of the total number of directors. In addition, we consider a set of control variables commonly used in studies analysing the effect of corporate features on corporate cash holdings (Anderson and Hamadi, 2016; Atif *et al.*, 2019). We include board size (*BoardSize*), largest shareholder (*LargestShare*), firm age (*Age*), firm size (*Size*), total debt (*Debt*), capital expenditures (*Cap*), working capital excluding cash and marketable securities (*Wc*), cash flow (*Cf*), and research and development expenses (*R&D*). All variables are defined in Appendix.

We test our hypothesis using the following regression (Eq.1):

$$\mathbf{Cash\ Holding}_{it} = \alpha_0 + \alpha_1 \%FemDir_{it} + \mathbf{Z}_{it} + \mathbf{Industry}_i + \mathbf{Year}_t + \varepsilon_{it} \quad \mathbf{Eq.1}$$

where Z is the vector of control variables, while *Industry* and *Year* represent the industry and year fixed effects, respectively. \mathcal{E}_{it} is the residual term.

In Eq.1, the coefficient α_1 captures the effect of female directors on cash holdings. In line with our hypothesis, we expect the coefficient α_1 to be negative.

5. Empirical results

Table I shows the descriptive statistics for the variables. Average cash holdings (*Cash Holding* and *Cash Holdingbis*) amount to 0.074 and 0.088, respectively. The average percentage of female directors is 12.602%, which corresponds to an average number of female directors of 1.411. Table II includes the correlation matrix. If we focus on the variables that are not included in the same regression, we notice a correlation of over 0.4 (between *Size* and *Board Size*). We use the Variance Inflation Factor (VIF) to test whether the multicollinearity problem is present in our analysis. The highest VIF value is 2.02, which is well below 5, indicating that multicollinearity is not a concern in our study (Studenmund, 2014).

[Table I near here]

[Table II near here]

Figure 1 shows the evolution of female directors from 2005 (y05) to 2019 (y19). The average percentage of female directors increases from 4.00% in 2005 to 20.89% in 2019.

[Figure 1 near here]

Table III reports the simple comparisons of means of variables considering firms with and without female directors. Results show statistically significant differences in cash holdings (*Cash holding* and *Cash holdingbis*). Moreover, average cash holdings in firms with female directors are lower than average cash holdings in firms without female directors. Additionally, Table III also shows statistically significant differences in the variables *BoardSize*, *LargestShare*, *Size* and *R&D*. This means that firms with female directors have, on average, a

larger board size, fewer shares in the hands of the largest shareholder, a greater size and fewer research and development expenses.

[Table III near here]

5.1 Multivariate test

One source of endogeneity arises due to the possibility that some firm specific features, such as corporate strategy or firm culture, might affect the relation between female directors and corporate cash holdings. By way of an example, a firm –depending on its particular culture or strategy– might prefer to obtain financial resources from related parties rather than by resorting to financial markets. The other source of endogeneity occurs when female directors might be a function of our dependent variable (cash holdings). Female directors might therefore prefer to sit on boards where firms maintain lower cash holdings. To address these potential endogeneity concerns, we test our hypothesis by using the two-step system GMM estimator.

Table IV reports the effect of female directors on corporate cash holdings, considering the two different measures for cash holdings. Both models in Table IV show a negative and statistically significant effect of the percentage of female directors on corporate cash holdings ($\alpha_1 = -0.094$ in model 1 and $\alpha_1 = -0.065$ in model 2). Our results might be explained by the increasing monitoring incentives of female directors in the presence of internal dealings. The presence of these dealings exacerbates the free cash flow problem, and in such a setting women directors might prove to be an effective corporate governance mechanism that helps to reduce the agency problems associated with free cash flows. By decreasing the level of corporate cash holdings, female directors thus promote effective monitoring of financial policies.

To test the consistency of the coefficients obtained in the GMM estimator, we first test the validity of the instruments by using the Hansen test, with the null hypothesis being the validity of the instruments. Second, we test for the absence of second-order autocorrelation, with the

null hypothesis being the non-existence of autocorrelation. Since we cannot reject the null hypothesis in the two tests, we conclude that the coefficients reported by the GMM estimator are robust. The models also include Wald tests for the joint significance of the reported coefficients (z1), the joint significance of the variables related to years (z2), and the joint significance of the variables related to industries (z3).

[Table IV near here]

As regards the control variables, we find a positive and statistically significant effect of debt (*Debt*), working capital (*Wc*), and cash flow (*Cf*) on corporate cash holdings, and a negative and statistically significant effect of shares in the hands of the largest shareholder (*LargestShare*), and capital expenditures (*Cap*) on corporate cash holdings.

5.2 Critical mass

Kristie (2011) summarizes the critical mass theory by stating that “one is a token, two is a presence, and three is a voice”. The literature suggests that women on boards may influence board decision-making to a greater degree when there is more than one woman on any given board (Kramer *et al.*, 2006; Amin *et al.*, 2022). In this sense, some previous studies suggest that a critical mass of three female directors is needed to make a difference (Kramer *et al.*, 2006; Konrad *et al.*, 2008; Torchia *et al.*, 2011). In this subsection, we therefore analyse whether the effect of female directors on corporate cash holdings is conditional on the number of women on corporate boards. We follow Buertey (2021), Atif *et al.* (2019) and Liu *et al.* (2014) and consider four variables: *NFemDir*, defined as the number of female directors divided by the total number of directors; *FemDir1*, a dummy variable that takes the value 1 if the firm has one female director, and 0 otherwise; *FemDir2*, a dummy variable that takes the value 1 if the firm has two female directors, and 0 otherwise; and *FemDir3*, a dummy variable that takes the value 1 if the firm has three or more female directors, and 0 otherwise.

In Figures 2 and 3, we report the evolution of the different variables used in this analysis. Figure 2 shows that the average number of women on boards rose from 0.48 in 2005 to 2.40 in 2019. Figure 3 shows that the percentage of observations with one woman on the board (*FemDir1*) decreases from 21.74% to 20.00%. The percentage of observations with two women on the board (*FemDir2*) increases from 4.35% to 20.00%. Finally, the percentage of firms with three or more women on the board (*FemDir3*) increases from 4.35% to 52.94%.

[Figure 2 near here]

[Figure 3 near here]

The effect of the critical mass of female directors on corporate cash holdings is shown in Table V. Models 3 to 6 report the results, considering the number of female directors (*NFemDir*) and the three dummy variables, respectively.

Model 3 shows a negative and statistically significant effect of the number of female directors on corporate cash holdings, with this result being in line with the one previously obtained in models 1 and 2. Model 4 shows a non-significant effect of the presence of one female director on corporate cash holdings. Nevertheless, model 5 shows a negative and significant effect of the presence of two female directors on corporate cash holdings, while model 6 shows a negative and significant effect of the presence of three or more female directors on cash holdings. Models 7 to 10 –built by considering our second measure of corporate cash holdings– lead to the same conclusions as those reached in models 3 to 6. In line with the critical mass theory, our results therefore also evidence that the negative effect of female directors on corporate cash holdings is conditional on the presence of two or more women on the board. Our results are in line with studies which posit that boards with one female director exert only a limited influence (Kanter, 1997; Crocker and McGraw, 1984; Kramer *et al.*, 2006; Konrad *et al.*, 2008; Torchia *et al.*, 2011). In the context analysed, just one female director is therefore a

token and is expected to adapt to existing board behaviour regarding corporate financial policies. However, contrary to studies which consider that the presence of two women on the board has no impact on board strategic tasks –because the number is insufficient to eliminate tokenism (Kramer *et al.*, 2006; Erkurt *et al.*, 2008; Torchia *et al.*, 2011; Schwartz-Ziv, 2017)– our results evidence that two (or more) female directors does have a significant impact on corporate cash holdings.

[Table V near here]

5.3 Further analysis

Our results evidence a negative relation between female directors and corporate cash holdings. In the presence of internal dealings, both agency theory and the resource-based theory might provide a sound rationale to our findings. However, in an effort to provide further robustness, we carry out an additional analysis. In this sense, certain previous studies emphasize the importance of further exploring the associated roles performed by women on corporate boards to better understand their impact on various management decisions (Cambrea *et al.*, 2019). In this regard, the role of women on corporate boards might be affected by their functions. In this sense, female directors might be executive or independent directors. Executive female directors invest their human capital in the firm and consequently have a strong incentive to increase firm value. Furthermore, due to their positions, executive female directors cannot perform the independent monitoring and advisory functions attributed to the board of directors. However, unlike their executive counterparts, independent female directors do not invest their human capital in the firm but do, on the other hand, have an incentive to monitor managers effectively. In line with this view, Cambrea *et al.* (2019) predict that females in executive positions might be more willing to store cash reserves so as to safeguard the company in the event of unforeseen contingencies, while women who perform a monitoring function might mitigate agency conflicts related to cash reserves by reducing the level of cash holdings. Furthermore, according

to the resource-based view, compared with executive female directors, independent female directors are better placed to link the company to its external environment. Following on from the above, we explore the relation between female directors and corporate cash holdings dependent on female directors' role (executive versus independent).

In Table VI, our results show a negative effect of independent female directors on corporate cash holdings (models 11 and 12) but a non-significant effect of executive female directors on corporate cash holdings (models 13 and 14). In the presence of internal dealings, our results thus provide further support to our hypothesis regarding the monitoring and resource providing role of female directors vis-à-vis corporate cash holdings.

Unlike Zeng and Wang (2015), Adhikari (2018) and Cambrea *et al.* (2019), we find no positive relation between females in executive roles and corporate cash holdings. In contrast, we obtain a non-significant relation between executive female directors and corporate cash holdings. However, unlike previous works, we carry out our study in a context in which female directors show no incentives to hold cash for transaction and/or precautionary motives due to the potential of internal dealings. Our findings thus further current knowledge concerning the monitoring and resource-providing role of female directors. We also add to the existing literature exploring what role female directors play in improving corporate governance through reducing agency conflicts (García Lara *et al.*, 2017, Usman *et al.*, 2018; Cambrea *et al.*, 2019) by showing that independent female directors fulfil an effective monitoring role regarding corporate cash holdings in the presence of internal dealings. Moreover, our findings complement previous literature by exploring what role female directors play in providing valuable resources and external linkages to cope with uncertainty (Milliken and Martins, 1996; Yermack, 1996; Hillman *et al.*, 2007).

[Table VI near here]

6. Concluding remarks

Previous literature points to the need for more research on gender diversity in order to realize the potential benefits that may result from appointing women to boards (Adams, 2016). To the best of our knowledge, this is the first study to examine the influence of female directors on corporate cash holdings, conditional upon the existence of internal dealings. This setting provides an ideal context in which to better disentangle the contrasting forces that previous literature has considered may be potential drivers of the relation between female directors and corporate cash holdings. Thus, in the considered setting, the relation between female directors and corporate cash holdings can hardly be explained by female directors' incentives to hold cash for transaction and/or precautionary motives due to the financial cushion these internal markets provide for the firm. On the contrary, these internal dealings isolate firms from market scrutiny, exacerbating the free cash flow problem (Jensen, 1986). Our research design therefore offers a significant variation with regard to previous studies that explore the impact of women directors on corporate cash holdings.

Overall, our results show that –in the presence of internal dealings– female directors reduce corporate cash holdings. These findings are consistent with both the monitoring and the resource-providing role of female directors. In the presence of internal dealings, boards with female directors are likely to reduce corporate cash holdings –with this lower cash holding possibly being used as an effective monitoring device aimed at reducing agency problems associated to free cash flows. Alternatively, boards with female directors might provide valuable resources and external linkages to the firm that enable easy access to external financing. Together with the potential of internal dealings, this benefit might help reduce the firm's need to hold cash in order to cope with external uncertainties. Furthermore, and in line with the critical mass theory, our results show that the observed impact is critically dependent upon the presence of two or more female directors on the board. Finally, our results also show

that the negative relation between female directors and corporate cash holdings is driven by independent rather than by executive female directors.

Our findings are consistent with the empirical studies of García Lara *et al.* (2017) and Usman *et al.* (2018) addressing different management actions (i.e., earnings management and CEO compensation), and lead to the conclusion that the presence of independent female directors appears to improve firm-level governance by reducing agency problems. Moreover, our results are also in line with the findings in Milliken and Martins (1996) and Hillman *et al.*, (2007) who emphasize the important role female directors play in providing valuable resources to cope with external uncertainties.

Our study provides different contributions to the current literature. In the presence of internal dealings –and building on the agency theory– our work adds to studies on the monitoring role of independent female directors with regard to corporate financial policies. Our paper also makes a relevant contribution to the growing research linking gender diversity to monitoring intensity (Adams and Ferreira, 2009; Gul *et al.*, 2011) and to studies focused on investigating whether women behave differently in a variety of settings (*e.g.*, Zeng and Wang, 2015; Ben-Amar *et al.*, 2017; Ongsakul *et al.*, 2021). Building on the resource-based theory, our work also adds to studies examining the role of female directors in providing critical resources and valuable linkages with the external environment (*e.g.*, Milliken and Martins, 1996; Yermack, 1996; Hillman *et al.*, 2007). Finally, our results contrast to those which consider that the presence of two women on the board of directors has no impact on board strategic tasks, because they are not enough to eliminate tokenism (Kramer *et al.*, 2006; Erkurt *et al.*, 2008; Torchia *et al.*, 2011; Schwartz-Ziv, 2017). Our findings suggest that the presence of two or more female directors does have a major impact on corporate cash holdings.

In a context in which dominant owners can take private advantage of corporate cash holdings with relative immunity –due to internal dealings isolating the firm from market discipline, and

where the legal system provides weak protection to external shareholders' interest (Cuervo, 2002)– our results should be taken into consideration by regulators and policy-makers concerned with effective corporate governance. Our results provide some practical implications by suggesting that, in the presence of internal dealings, more attention should be given to board gender diversity if the aim is to improve corporate governance by decreasing agency conflicts associated to free cash flows. We contribute to prior academic debate regarding the importance of considering not only the presence of women on the board but also their number and specific roles (Cambrea *et al.*, 2019) vis-à-vis understanding their real impact on firm behaviour. Moreover, firms, boards, policymakers and regulators need to understand that appointing two or more female directors is the required threshold for observing a significant impact of female directors on the level of corporate cash holdings.

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Table I. Descriptive statistics

	Mean	Median	S.D.	1st Q	3rd Q
<i>CashHolding</i>	0.074	0.056	0.073	0.023	0.095
<i>CashHoldingbis</i>	0.088	0.059	0.104	0.023	0.106
<i>%FemDir</i>	12.602	11.111	11.508	0.000	20.000
<i>BoardSize</i>	11.148	11.000	3.370	9.000	13.000
<i>LargestShare</i>	33.230	26.502	19.786	18.323	50.110
<i>Age</i>	3.599	3.689	0.703	3.135	4.205
<i>Size</i>	13.731	13.808	2.057	12.142	15.124
<i>Debt</i>	0.673	0.677	0.204	0.546	0.803
<i>Cap</i>	0.004	0.000	0.069	-0.009	0.021
<i>Wc</i>	-0.005	-0.023	0.188	-0.103	0.079
<i>Cf</i>	0.053	0.047	0.099	0.016	0.083
<i>R&D</i>	0.002	0.000	0.009	0.000	0.000

Table II. Correlation matrix

	Cash Holding	Cash Holdingbis	%FemDir	BoardSize	LargestShare	Age	Size	Debt	Cap	Wc	Cf
Cash Holdingbis	0.988***										
%FemDir	-0.027	-0.052									
BoardSize	-0.089*	-0.089*	0.006								
LargestShare	0.121**	0.110**	0.059	-0.174***							
Age	0.108**	0.116**	0.012	0.255***	-0.077						
Size	-0.026	-0.046	0.103*	0.462***	-0.133**	0.302***					
Debt	0.112**	0.094*	-0.111**	0.143***	-0.007	0.275***	0.229***				
Cap	-0.070	-0.063	-0.034	0.077	-0.023	0.019	0.071	-0.029			
Wc	-0.196***	-0.186***	0.009	-0.079	-0.049	-0.017	-0.195***	-0.206***	0.057		
Cf	0.162***	0.190***	0.008	0.062	0.110**	-0.086*	0.046	-0.327***	0.095*	0.132**	
R&D	0.011	-0.002	-0.052	0.003	-0.074	0.033	0.067	0.012	0.000	0.077	0.035

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table III. Firms with and without women on the board

	Firms committing to RPTs with women on the board (N=540)			Firms committing to RPTs without women on the board (N=232)			t-student
	Mean	Median	S.D.	Mean	Median	S.D.	
<i>Cash Holding</i>	0.074	0.061	0.064	0.087	0.051	0.093	2.203***
<i>Cash Holdingbis</i>	0.086	0.065	0.088	0.109	0.054	0.141	2.784***
<i>BoardSize</i>	11.656	12.000	3.215	9.966	10.000	3.434	1.841**
<i>LargestShare</i>	32.372	25.923	20.084	35.227	29.773	18.966	-6.56***
<i>Age</i>	3.609	3.664	0.676	3.575	3.749	0.764	-0.614
<i>Size</i>	13.941	14.286	2.085	13.243	12.888	1.906	-6.026***
<i>Debt</i>	0.671	0.681	0.202	0.681	0.667	0.198	0.632
<i>Cap</i>	0.006	0.001	0.068	0.005	0.001	0.073	-0.063
<i>Wc</i>	-0.019	-0.034	0.181	-0.009	-0.009	0.170	0.712
<i>Cf</i>	0.057	0.050	0.090	0.058	0.052	0.121	0.097
<i>R&D</i>	0.002	0.000	0.008	0.003	0.000	0.012	2.211***

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table IV. Female Directors and Cash Holding

	<i>Cash holding</i>	<i>Cash holdingbis</i>
	Model 1	Model 2
<i>%FemDir</i>	-0.094*** (-4.127)	-0.065*** (-6.34)
<i>BoardSize</i>	-0.012 (-1.162)	-0.023 (-1.511)
<i>LargestShare</i>	-0.004*** (-2.452)	-0.001*** (-2.672)
<i>Age</i>	-0.007 (-0.515)	-0.002 (-1.527)
<i>Size</i>	0.007*** (2.432)	0.008* (1.940)
<i>Debt</i>	0.060*** (3.211)	0.068*** (2.836)
<i>Cap</i>	-0.042*** (-2.909)	-0.056*** (-2.725)
<i>Wc</i>	-0.024*** (-2.888)	-0.017*** (-4.235)
<i>Cf</i>	0.225*** (4.982)	0.325*** (5.460)
<i>R&D</i>	-0.253 (-1.727)	-0.232 (-2.626)
<i>Constant</i>	-0.0631 (-1.901)	-0.076 (-1.350)
<i>Year effects</i>	Yes	Yes
<i>Industry effects</i>	Yes	Yes
<i>Hansen test</i>	51.32	39.50
<i>m2 test</i>	1.28	1.27
<i>z1 test</i>	19.55***	11.18***
<i>z2 test</i>	27.48***	23.89***
<i>z3 test</i>	10.61***	8.23***
<i>Observations</i>	772	772

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table V. Female Directors and Corporate Cash Holdings. Critical mass.

	<i>Cash holding</i>	<i>Cash holding</i>	<i>Cash holding</i>	<i>Cash holding</i>	<i>Cash Holdingbis</i>	<i>Cash Holdingbis</i>	<i>Cash Holdingbis</i>	<i>Cash Holdingbis</i>
	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
<i>NFemDir</i>	-0.004*** (-2.977)				-0.008*** (-4.116)			
<i>FemDir1</i>		-0.001 (-0.324)				-0.001 (-1.115)		
<i>FemDir2</i>			-0.016** (-2.442)				-0.013*** (-2.934)	
<i>FemDir3</i>				-0.014*** (-3.225)				-0.057*** (-3.661)
<i>BoardSize</i>	-0.001 (-0.450)	-0.003* (-1.724)	-0.002 (-1.481)	-0.003* (-1.722)	-0.001 (-0.647)	-0.003 (-1.447)	0.002 (0.100)	-0.003 (-0.626)
<i>LargestShare</i>	-0.003 (-1.275)	-0.001 (-1.392)	-0.001 (-0.987)	-0.002*** (-3.060)	-0.001* (-1.962)	-0.003** (-2.538)	-0.001 (-0.551)	-0.002 (-0.960)
<i>Age</i>	-0.019*** (-3.659)	-0.019*** (-3.976)	-0.018*** (-3.601)	-0.030*** (-5.201)	-0.022*** (-3.554)	-0.010** (-2.222)	-0.021*** (-3.126)	-0.033*** (-4.807)
<i>Size</i>	0.013*** (3.944)	0.017*** (4.774)	0.016*** (7.027)	0.025*** (5.811)	0.020*** (4.379)	0.017*** (3.942)	0.011*** (2.748)	0.026*** (6.576)
<i>Debt</i>	0.128*** (6.913)	0.149*** (8.119)	0.140*** (8.634)	0.149*** (5.460)	0.170*** (6.917)	0.172*** (7.752)	0.166*** (8.008)	0.179*** (4.927)
<i>Cap</i>	-0.038** (-2.852)	-0.029 (-0.823)	-0.087*** (-2.763)	-0.055 (-1.558)	-0.091** (-2.565)	-0.166*** (-4.489)	-0.037 (-1.131)	-0.062* (-1.757)
<i>Wc</i>	-0.011 (-0.948)	-0.004 (-0.306)	-0.036** (-2.083)	-0.014 (-1.116)	-0.007 (-0.456)	-0.005 (-0.430)	-0.039** (-2.161)	-0.070*** (-3.110)
<i>Cf</i>	0.140*** (5.869)	0.136*** (6.075)	0.103*** (4.881)	0.204*** (5.358)	0.205*** (6.861)	0.277*** (8.243)	0.336*** (9.809)	0.482*** (8.168)
<i>R&D</i>	-0.381** (-2.053)	-0.473** (-2.472)	-0.484** (-2.425)	-0.384 (-1.420)	-0.550** (-2.071)	-0.404 (-1.252)	-1.845*** (-2.716)	-0.378 (-1.194)
<i>Constant</i>	-0.164*** (-3.053)	-0.210*** (-3.924)	-0.204*** (-4.881)	-0.288*** (-4.496)	-0.260*** (-3.799)	-0.257*** (-3.976)	-0.154*** (-2.724)	-0.334*** (-4.731)
<i>Year effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Hansen test</i>	38.10	35.58	47.22	48.21	37.21	49.94	44.05	49.28
<i>m2 test</i>	1.38	1.37	1.41	1.19	1.55	1.42	1.75	1.24
<i>z1 test</i>	11.30***	14.45***	23.49***	58.99***	15.72***	20.19***	36.01***	44.52***
<i>z2 test</i>	20.82***	16.27***	29.80***	31.36***	32.52***	37.00***	38.61***	104.62***

<i>z3 test</i>	18.99***	21.46***	21.59***	18.55***	17.34***	20.16***	22.34***	29.12***
<i>Observations</i>	772	772	772	772	772	772	772	772

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table VI. Independent Female Directors, Executive Female Directors and Cash Holding

	Cash Holding Model 11	Cash Holdingbis Model 12	Cash Holding Model 13	Cash Holdingbis Model 14
<i>%IndepFemDir</i>	-0.002*** (-6.092)	-0.002*** (-3.986)		
<i>%ExecFemDir</i>			0.001 (0.502)	0.001 (0.703)
<i>BoardSize</i>	0.001 (0.639)	-0.001 (-0.743)	-0.004* (-1.756)	-0.002 (-0.891)
<i>LargestShare</i>	-0.003* (-1.696)	-0.002** (-2.097)	-0.001 (-1.659)	-0.001** (-2.012)
<i>Age</i>	-0.011 (-1.342)	-0.017 (-1.400)	-0.010* (-1.761)	-0.015** (-2.062)
<i>Size</i>	0.014*** (3.094)	0.010* (1.787)	0.014** (2.626)	0.017** (2.433)
<i>Debt</i>	0.095*** (4.046)	0.096*** (3.559)	0.070*** (3.064)	0.088*** (2.947)
<i>Cap</i>	-0.179*** (-6.579)	-0.253*** (-6.509)	-0.014 (-0.247)	-0.046 (-0.521)
<i>Wc</i>	-0.005 (-0.249)	-0.051 (-1.527)	-0.010 (-0.642)	-0.022 (-1.022)
<i>Cf</i>	0.133*** (3.390)	0.218*** (4.528)	0.162*** (4.629)	0.263*** (5.448)
<i>R&D</i>	-0.276 (-1.234)	-0.444* (-1.734)	-0.812*** (-3.767)	-1.237*** (-4.139)
Constant	-0.152*** (-2.708)	-0.063 (-0.803)	-0.137* (-1.822)	-0.188* (-1.953)
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Hansen test	50.68	53.96	37.57	36.83
m2 test	1.15	1.47	1.35	1.55
z1 test	19.05***	52.60***	6.95***	9.24***
z2 test	11.50***	11.12***	11.08***	13.19***
z3 test	13.15***	8.58***	5.65***	7.44***
Observations	772	772	772	772

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1. Percentage of Female Directors

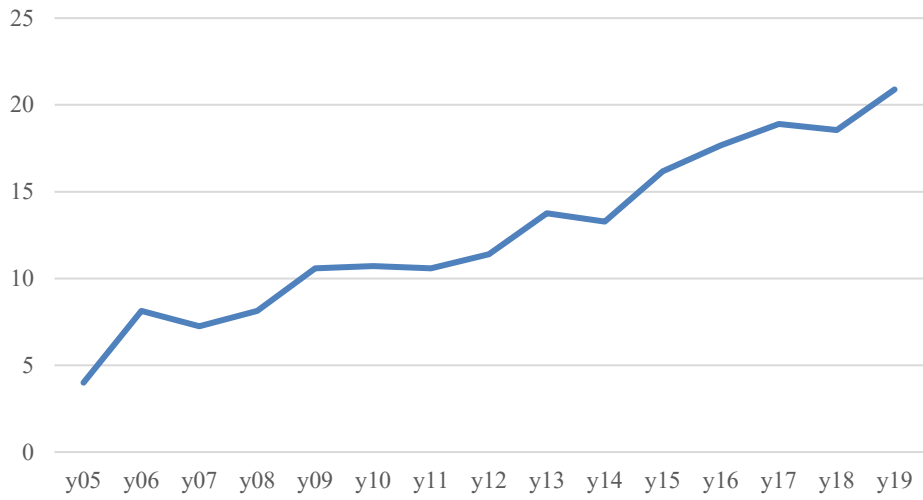
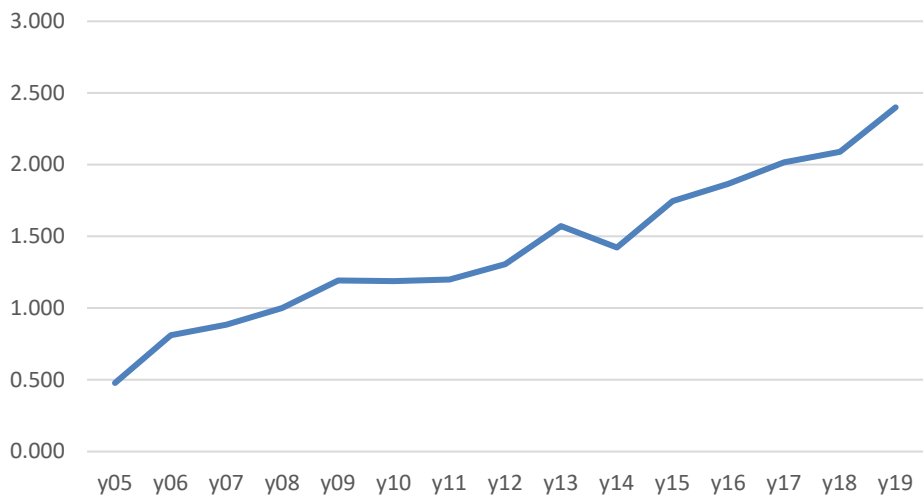


Figure 2. Number of Female Directors



Appendix

Table A I. Variable definitions

<i>CashHolding</i>	The ratio of cash and marketable securities to total assets.
<i>CashHoldingbis</i>	The ratio of cash and marketable securities to net assets (net assets are defined as the book value of total assets minus cash and marketable securities).
<i>%FemDir</i>	The percentage of female directors out of the total number of directors.
<i>%IndepFemDir</i>	The percentage of independent female directors out of the total number of directors.
<i>%ExecFemDir</i>	The percentage of executive female directors out of the total number of directors.
<i>NFemDir</i>	The number of female directors out of the total number of directors.
<i>FemDir1</i>	A dummy variable equal to 1 if the firm has one female director on the board.
<i>FemDir2</i>	A dummy variable equal to 1 if the firm has two female directors on the board.
<i>FemDir3</i>	A dummy variable equal to 1 if the firm has three or more female directors on the board.
<i>BoardSize</i>	The number of members on the board.
<i>LargestShare</i>	The percentage of the major shareholder's voting rights.
<i>Age</i>	The natural logarithm of firm age.
<i>Size</i>	The natural logarithm of the market value of equity.
<i>Debt</i>	The ratio of total debt to total assets.
<i>Cap</i>	The increase in tangible assets divided by total assets.
<i>Wc</i>	Working capital (excluding cash and marketable securities) divided by total assets.
<i>Cf</i>	Earnings before interest and taxes divided by total assets
<i>R&D</i>	Research & development expenses divided by total assets
