

GENDER ISSUES CAN INFLUENCE LIQUIDITY AND RISK OF COMPANIES?

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Abstract

This paper seeks to identify how gender issues can impact companies, verifying the influence of female directors and executives on the accounting liquidity and the risk of publicly traded Brazilian companies. Results show that the number of women working in Brazilian companies is small, and the proportion of female directors is negatively linked to liquidity and positively linked to risk, contradicting many studies in the area. For female executives, the relation to liquidity was significative and positive. It can be inferred that female directors end up assuming a more confident position, once they are embedded in a predominantly masculine environment, what may lead to a reduction on liquidity and an increase on risk.

Keywords: Gender diversity. Accounting liquidity. Risk.

1. Introduction

Corporate Governance is a set of practices created by suppliers of funds to corporations to ensure they will get a return on their investments (Shleifer & Vishny, 1997). This issue rises from the agency problem, caused by the separation of ownership and control. According to Ross (1973) and Jensen and Meckling (1976), the individuals in control of the firm (executives, CEOs, board of directors) frequently are not the same individuals that own the company (shareholders, debtholders), which may lead to a manager's undesirable behavior that would not attend the interests of owners. Jensen and Meckling (1976) explained that the agency problem causes agency costs that affect the monitoring of manager's actions.

A strategy that can be used to mitigate the monitoring problem in firms is to increase the gender diversity in the board of directors and designate more females as CEOs and executives, what can be justified because a large amount of papers has confirmed that the presence of females can improve the firm's governance. For example, Adams and Ferreira (2009) examined a sample of US firms and showed that female directors have better attendance records

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and are more likely to join monitoring committees than male directors, what suggests that a boardroom with gender diversity tends to allocate more efforts in monitoring. However, their results indicated that firms with greater gender diversity on the board perform worse, because the excess of board monitoring can decrease shareholders value.

Abad *et al.* (2017) also studied the gender diversity on corporate boards, but related to information asymmetry in a Spanish sample. They showed that gender diversity boards are negatively associated with the level of information asymmetry in the stock market, what indicates that females in the boardrooms increases the quantity and quality of public disclosure by firms. Related to the firms' performance, Liu, Wei and Xie (2014) verified the effect of board gender diversity on company performance in China's listed firms between 1999 and 2011, founding a positive and significant relationship between these two variables. Besides, the authors detected that boards with three or more female directors have a stronger impact in the performance than boards with less than three females.

Also investigating the impact of gender-diverse boards, but from the point of view of stock liquidity in Australian firms, Ahmed and Ali (2017) expected that the diversity on boards and their efficient monitoring would lead to a higher stock liquidity. They used information of 944 Australian firms between 2008 and 2013, and found that gender diversity in the boardroom is significantly and positively associated with stock liquidity. Even though the number of studies with this focus is large, probably all of them face the same issue: the small quantity of women in the boardrooms around the world. According to the Corporate Women Directors International (CDWI) (2015), 19,2% of the board members in North America are women. Similar results were found in Europe (20%), in the Asia-Pacific region (9,4%) and in Latin America (6,4%). Globally, CDWI says that gender diversity in corporate boards is increasing, but not in Latin America.

Specifically in Brazil, whose companies sum nearly half the largest companies in Latin America, the average participation of women on the boards is 6.3%, and over 40% of the female directors have family ties to the company (CDWI, 2015). Based on this question, this paper seeks to identify how gender issues can impact companies, verifying the influence of the presence of female directors and executives on the accounting liquidity and the risk of publicly traded Brazilian companies. It is important to inform that was not identified Brazilian papers linking these concepts, and there are few studies related to gender in the country, being possible to emphasize the papers of Margem (2013), Segura *et al* (2016), Vaccari and Beuren (2017) and Silva Júnior and Martins (2017).

The data was collected from the Brazilian Securities Exchange Commission (CVM) to verify how many women were on the boardrooms of 234 companies between 2010 and 2016, once the CVM information disclosure started in 2010. The accounting liquidity, risk, and other performance variables were taken from the ECONOMATICA database. It was identified that women as directors have a negative impact on accounting liquidity, while female executives increases the firms' liquidity. For the risk, only one variable related to gender was significant, women as directors, and has a positive influence. This way, it can be inferred that female directors end up assuming a more

confident position because they are embedded in a predominantly masculine environment, what may lead to a reduction on liquidity and an increase on risk.

The paper structure is divided in five sections, being this introduction the first of them. The literature related to gender diversity, liquidity and risk are shown in the section two. Section three shows the methodology and the variables used, section four shows the research results and section five closes the paper, with the final considerations, contributions and limitations of the study.

2. Corporate Governance, Gender and Performance: Concepts and Hypothesis

This section is divided into two parts to better explain the state of the art of the proposed theme, as follows: (i) Gender diversity and Liquidity; and, (ii) Gender diversity and risk.

2.1 Gender Diversity and Liquidity

Liquidity, in accounting and finance, is a measure of the ability of a borrower to pay their debts at the due date, or the ability to pay short-term debt (Tirole, 2006). Few studies in financial literature have tried to clarify if there is a relation between gender diversity and liquidity on firms, and one of the ways to explain this possible effect is through the overconfidence concept, already consolidated in the literature.

In psychology, Niederle and Vesterlund (2007) examined if men and women, with the same ability, differ in their selection into a competitive environment, considering that a series of psychology studies suggested that men are more competitive than women, and boys usually spend more of their time playing competitive games while girls prefer activities where there is no winner. The authors performed a laboratory experiment, first challenging the participants to solve a real task in a noncompetitive environment, then in a competitive tournament with incentives. There were no gender differences in performance, but 73 percent of males selected the tournament and only 35 percent of females made this choice, which shows that women refuse competition while men embrace it.

Huang and Kisgen (2013) brought the gender differences related to overconfidence to the corporate finance. Using a sample of US listed firms in the period from 1993 to 2005, they studied the impact of the CEO's and CFO's gender on the financial and investment decisions of firms. The authors found that male executives perform more acquisitions and issue debt in a higher frequency than female executives, what suggest that, even in the corporate decisions, men exhibit more overconfidence when compared to women.

The point connecting overconfidence and liquidity raises from the study of Huang, Tan and Faff (2016), which examined whether and at what extent the CEO's overconfidence affect the firm's debt maturity decisions, e.g., if they prefer short-term debt or long-term debt. They used a sample of 944 different US firms, in the period from 2006 to

2012, and found that overconfident CEOs change the debt maturity structure using a higher proportion of very short-term debt. Besides, authors showed that this action is not threatened by the existing liquidity risk of firms that take a large amount of short-term debt, that is, overconfident CEOs are not afraid of suffering from illiquidity, the inability of paying their debts.

Examining the influence of gender on financial decisions of micro and small start-ups firms in Spain, Hernandez-Nicolas, Martín-Ugedo and Mínguez-Vera (2015) argued that these companies have larger problems in security funding and the owner's and manager's characteristics play a crucial role in obtaining financing. They verified the level, the cost and the maturity of debt, and identified that the presence of females, as CEOs or as board members, leads to lower debt financing, reduces the cost of debt and increases the debt maturity. This paper shows that women can improve the financial situation of the firm in a crisis context, and also increase the firm's liquidity, once they prefer long-term debt.

Zeng and Wang (2015) related the CEO gender of Chinese listed firms with the corporate cash holdings, what can also be connected to a firm's liquidity. Considering a sample of 468 from 2007 to 2011, they discovered that female CEOs are associated with a higher level of cash holdings and are more concerned with the precautionary motive of cash than their male counterparts. Loukil and Yousfi (2016) studied the gender diversity on firms' boardrooms and its impact on the risk-taking of 30 Tunisian-listed firms, in the period from 1997 to 2010. The author linked the risk perception with the firm's liquidity, and found that the presence of women in the boardrooms, even if there is only one female director, is positively associated with cash ratio, what ensure a certain liquidity level and reduces the risk behavior.

Connecting these studies, was presumed that, if overconfident individuals tend to be liquidity averse, men usually are more overconfident than women, and females increase the firm's liquidity, was presented the first group of hypotheses:

H1: The greater the proportion of females as board members, the greater the liquidity of the Brazilian public traded firms.

H2: The greater the proportion of females as executives, the greater the liquidity of the Brazilian public traded firms.

2.2 Gender Diversity and Risk

Many studies in psychology, like Weber, Blais and Betz (2002), Harris, Jenkins and Glaser (2006), Charness and Gneezy (2012) and Sarin and Wieland (2016), have tried to explain the relation between gender and the risk propensity, where prevail the idea that women are more risk averse than men. At first, Byrnes, Miller and Schafer (1999) defined that risk taking involves the implementation of choices that could lead to negative consequences. Then,

they conducted a meta-analysis of 150 studies where were compared the risk-taking tendencies of male and female participants, which showed that, in general, male participants are more likely to assume risks than female participants, notably when it refers to gambling (where the likelihood of success does not depend on the person's skill level), risky experiments (experiments that can cause physical or psychological harm) and taking intellectual risks (that require mathematical skills).

In the corporate finance, there is no consensus about the relation between gender and risk propensity. Berger, Kick and Schaeck (2014) verified how gender composition of executive teams, among other variables, affects the portfolio risk of German banking industry between 1994 and 2010. Results suggested that board changes, which increase the representation of female executives, do not lead to a reduction in the portfolio risk. Instead, a higher proportion of female executives increased the portfolio risk measurements, even though the coefficients were only marginally significant. These findings do not coincide with psychological studies, concluding that women tend to be more risk averse than men, such as Byrnes *et al* (1999).

From another point of view, Sila, Gozalez and Hagendorff (2015) examined the risk implications of gender diversity on the boards of 1.960 non-financial US firms between 1996 and 2010 using, as dependent variables, three measures of equity risk: total risk, systematic risk and idiosyncratic risk. They found no evidence that female board representation influences equity risk. Furthermore, they suggest that the lack of solid empirical evidence on the relationship between gender diversity on boards and risk does not make this diversity more or less desirable, because this issue is much more a case of fairness than pure economic considerations.

On the other hand, Gulamhussen and Santa (2015) investigated the role of women in bank boards, considering a sample of 461 large banks from the OECD countries. First, they found that the presence and proportion of women directors in the boards have a positive effect on the bank's performance, and detected that exists a negative relation between females in the board and risk-taking. A similar influence of the female presence was found in Baixauli-Soler, Belda-Ruiz and Sanchez-Marin (2015), where companies with women in the top management team exhibit more conservative behavior and take less risk than firms without gender diversity in the top management team. As in Perryman, Fernando and Tripathy (2016), and in Faccio, Marchica and Mura (2016), who found that transitions from male to female CEOs are linked with significant reductions in corporate risk-taking. Given the fact that there is no consensus in the literature about this issue, the second group of hypotheses are:

H3: The greater the proportion of females as board members, the grater the risk propensity of the Brazilian public traded firms.

H3A: The greater the proportion of females as board members, the lower the risk propensity of the Brazilian public traded firms.

H4: The greater the proportion of females as executives, the greater the risk propensity of the Brazilian public traded firms.

H4A: The greater the proportion of females as executives, the lower the risk propensity of the Brazilian public traded firms.

3. Research Methodology

This paper is labeled as a descriptive research, according to Triviños (1987), because aims to describe facts and events of a given situation. The descriptive research implies the use of hypothesis that was already described in the previous section. Is also a quantitative research, because uses a big sample and the results can be quantified through mathematical and statistical methods (Fonseca, 2002). Was used secondary data from the Brazilian publicly listed firms in the period from 2010 to 2016, the data related to board composition were obtained in the site of Brazilian Securities Exchange Commission (CVM) and the data regarding to the performance measures of the firms were taken from ECONOMATICA. The final sample includes 234 firms, considering all the companies (listed and delisted), to avoid the survivorship bias. Were excluded non-industrial firms, those with Tobin's Q negative or above 10. The period between 2010 and 2016 was chosen because the CVM information disclosure has starting in 2010.

Regarding statistical analysis, was first performed a correlation test among the variables used, and proceeded the descriptive statistics. Later, to verify the influence of women in the board and as executives on the liquidity and risk of Brazilian firms, it was used an unbalanced panel data by Generalized Method of Moments (GMM), attributed to Hansen (1982). Specifically, was applied a variation of this test, the GMM-Sys model, as proposed by Blundell e Bond (1998), which consists in a dynamic model and in differences, which consider the lagged dependent variable as instruments, to relax the homoscedasticity conditions. To perform the analysis, was used the following tests: (i) correlation test; (ii) Arellano and Bond (1991) test, that verify the existence of serial autocorrelation in the sample; (iii) qui-square test (X^2); and, (iv) the Hansen J (1982) over-identification test. The following equations (1) and (2) show the regression models that attend the hypothesis previously described.

$$L_{it} = \alpha_i + WDir_{it}\gamma + WExec_{it}\mu + C_{it}\theta + \varepsilon_{it} \quad (1)$$

$$R_{it} = \alpha_i + WDir_{it}\gamma + WExec_{it}\mu + C_{it}\theta + \varepsilon_{it} \quad (2)$$

In equation (1), L represents the firm's Liquidity, and in (2) R is the firm's Risk. For both equations, α is the intercept, γ , δ , μ and θ are the variables' coefficients, $WDir$ is the first independent variable, related to the participation of Women in the board, $WExec$ is the second dependent variable, the proportion of females executives on the firm. C is related to the control variables and ε is the error term, i represents the firms and t represents the time. The data was corrected by the IGP-DI index and the outliers were winsorized by 1%. All the variables used in the regressions are presented in Appendix 1, including their descriptions, main authors and expected signals.

4. Analysis of Results

Before performing the main analysis, was tested the correlation among the variables. Was found a high correlation (above 0,7) between Total Assets (LTA), Net Revenue (Rev) and Equity (Eq). Avoiding multicollinearity problems, the variables with strong correlation, Revenue and Equity, were not used in the regression tests. Next, after winsorizing the variables at 1%, was proceeded to the descriptive statistics whose results can be found in Appendix 2. The first dependent variable, Liquidity, has a positive mean (8,8%) and a small standard deviation, which shows that, on average, the firms had a cash increase during the period. Risk, the second dependent variable, has a positive mean (7,3%) and also a small standard deviation. The mean and the median (p50) have close values.

Observing the independent variables, women directors (WDir) shows that, on average, only 7,9% of the directors in the companies are females. For women executives (WExec), 7,1% of the executives in the sample are females, on average. The last variable considering gender is women as independent directors (WIn), which indicates that barely 4,3% of the independent directors are women. For the three gender variables, was found that the mean and the median are quite similar, because a small number of companies have a woman in its boardroom or as an executive, indicating the weak gender diversity in Brazilian firms.

The average number of members in the board of directors (BoardSize) is around 6,55 members, and the biggest boardroom has 19 members. Regarding the number of executives in the firms, the average is of 4,48 executives and the firm with the greatest amount has 33 members. On average, the number of independent directors (InDir) in a boardroom is only 1,43, and the firm with the greatest number has 13 independent members. The mean and median values are quite close for these variables.

Concerning the performance variables, the studied firms have, on average, a market value that exceeds the total assets on 55% (Tobin's Q) while their market value is 64,7% of its equity value (MB). Mean values for ROA and ROE are positive (0,9% and 7,2%), showing that the firms may be reaching positive net profits. The companies have around 24,9% of tangible assets in relation to the total assets. Regarding Leverage, for each R\$ 1,00 of equity, the studied firms are indebted in short and long term by R\$ 1,79. The average net revenue of the firms is, on average, R\$ 1.731 million which differ largely from the median of R\$ 445 thousand. The mean of total assets is R\$ 3.063 million, their equity is

around R\$ 1.142 million, and differ from its median of R\$ 407 thousand. For Revenue, LTA and Equity, the values for standard deviation and variance are very high, suggesting the use of logarithm. To verify the relationship between liquidity and gender and between risk and gender, was applied the unbalanced panel data method by GMM-sys, as shown in Table 1.

Table 1
Regression analysis using GMM-sys: impact on liquidity and risk

	Liquidity				Risk			
	Coef.	Rob. Std. Err.	z	P>z	Coef.	Rob. Std. Err.	z	P>z
L1.	0,909***	0,057	15,820	0,000	0,305*	0,165	1,850	0,064
WDir	-0,010**	0,005	-2,150	0,031	0,010**	0,005	2,090	0,037
WExec	0,006*	0,003	1,650	0,098	-0,001	0,003	-0,400	0,690
WIn	0,003	0,006	0,410	0,682	-0,002	0,008	-0,210	0,830
Wchair	-0,009	0,053	-0,160	0,869	-0,018	0,051	-0,340	0,731
BoardSize	0,010*	0,005	1,930	0,053	-0,013**	0,006	-2,170	0,030
TotalExec	0,003	0,005	0,620	0,537	0,004	0,005	0,870	0,383
InDir	0,002	0,007	0,280	0,777	0,009	0,009	1,050	0,292
Dual	-0,009	0,037	-0,250	0,801	-0,037	0,025	-1,470	0,142
Q	0,020**	0,009	2,310	0,021	0,019**	0,009	2,050	0,041
ROA	0,084	0,135	0,620	0,533	-0,638***	0,117	-5,460	0,000
Tang	0,066	0,074	0,900	0,369	0,025	0,062	0,400	0,688
Lev	-0,005	0,004	-1,190	0,234	-0,002	0,005	-0,380	0,702
LTA	0,000	0,013	0,020	0,986	0,009	0,011	0,790	0,432
_cons	-0,138	0,127	-1,080	0,279	-0,005	0,120	-0,040	0,968
Chi2	1657,428	-	-	0,000	204,443	-	-	0,000
Hansen	66,518	-	-	0,720	44,170	-	-	0,772
Ar1	-1,886	-	-	0,059	-1,649	-	-	0,099
Ar2	1,495	-	-	0,135	-1,010	-	-	0,313

Legend: WDir = women as directors, WExec = executive women, WIn = women as independent directors, Wchair = woman as chairman, BoardSize = total number of members on the board, TotalExec = total number of executives, InDir = total number of independent directors on the board, Dual = duality CEOxChairman, Q = Tobin's Q, ROA = return on assets, Tang = tangibility, Lev = leverage, LTA = logarithm of total assets, * = significant at 10%, ** = significant at 5%, *** = significant at 1%

Source: Prepared by the authors (2018).

The Arellano and Bond (1991) test (Ar1 and Ar2) for liquidity and risk indicates that the models do not reject the null hypothesis of no serial correlation in the first order residuals, and this serial correlation in first order justifies the use of a dynamic model such as GMM-sys. The Hansen test (1982) does not reject the null hypothesis for both cases, which shows that there are no specification problems in the instrumental variables. As suggested by Almeida, Campello and Galvão (2010), were used the lagged independent variables as instruments. Lastly, was applied the Chi-square test (Chi2), which rejected the null hypothesis and indicates that there is an association within the group of variables for both cases.

Analyzing the results for the liquidity regression, only two variables of gender are significant. Women directors (WDir) has a significance level of 5% and a negative impact on the firm's liquidity, where the increase of 1% in the quantity of females on the boardroom reduces in 0,01% the liquidity, which was not expected. Otherwise, the women executives variable (WExec), significant at 10%, has a positive impact on liquidity, and a growth of 1% in the number of female executives increases the liquidity of the firm in 0,006%. For women as independent directors (WIn),

an increase of 1% in the number of female independent directors would raise the liquidity in 0,003%, but the variable did not reach the significance level.

Another significant variables at 10% are board size, where the increase of 1% in the size of boards causes an increase of 0,01% in liquidity. The board size variable results contradict the findings in literature, once is expected that smaller boards take low leverage, what reduces the cash commitment and increase the liquidity, so the greater the board size, the smaller is the liquidity, as suggested by Wang (2013) and Loukil and Yousfi (2015). Tobin's Q was also significant, but at the level of 5%, and its increase of 1% raises the liquidity in 0,02%, an expected result.

Finally, was performed the regression for risk and only one variable regarding gender diversity was significant. Women directors has a significance level of 5% and a positive impact on risk, an unexpected result, and an increase of 1% in the number of female directors increases the firm's risk in 0,01%. Board Size is significant at the level of 5%, and an increase on its value reduces the risk in 0,013%. Again, Tobin's Q is significant at the level of 5% and impacts the risk positively, which increase in 0,019% the risk. This result goes against Shin and Stulz (2000) and Sila et al. (2015), who found a negative relationship between risk and Tobin's Q. Lastly, Return on assets (ROA) is also significant, but at 1%, and has a negative impact, where a growth of 1% on the returns reduces the risk in 0,638%.

5. Conclusions and Contributions

This paper seeks to verify the impact of the females as directors and as executives on the accounting liquidity and on the risk of 234 Brazilian listed firms. Results show that the gender diversity on companies really has an impact on its performance, once they affect their liquidity and risk. At first, the H1 hypothesis was rejected, once was found a significant result, but contrary to Hernandez-Nicolas *et al.* (2015) and Loukil and Yousfi (2016), who proposed that female directors increases liquidity. The results show that a greater participation of women directors lead to a reduction on liquidity, doubting the idea that women are less overconfident than men, what could lead to a higher liquidity.

As an argument for this outcome is the fact that most of these studies investigated the behavior differences between genders considering the general population, while specific studies do not find that women are less overconfident than men (Deaves, Luders & Luo, 2009; Sila *et al.*, 2016). These authors suggest that females who are attracted to "male" activities tend to have a different behavior from the general population, which is the case of female executives that work in a predominantly male environment. Meanwhile, the hypothesis H2 was not rejected, corroborating the findings of Huang and Kisgen (2013), Hernandez-Nicolas *et al.* (2015) and Zeng and Wang (2015), in which the presence of female executives leads to an increase on liquidity.

In sequence, the H3 hypothesis was not rejected, confirming the results of Berger *et al.* (2014). Considering that there was no consensus on the literature about this subject, was found that female directors lead to an increase on the risk of firms, what can also be explained by Deaves *et al.* (2009) and Sila *et al.* (2016). Finally, the H4 hypothesis,

which assumes that female executives leads to a smaller risk and is based on Baixauli-Soler *et al.* (2015), Perryman *et al.* (2016) and in Faccio *et al.* (2016) inferences, was rejected, once its significance coefficient was not significant, even at the 10% level.

As contributions, this paper brings the theoretical entanglement of financial terms, as liquidity and risk, with psychology terms, such as gender differences, overconfidence and risk-taking to the Brazilian perspective, a country where this kind of research still poorly explored. Specifically, approaching the gender diversity raises the issue that, even nowadays, women have a small participation on high roles inside the firms, even though it is known that they can contribute to a better performance. In practical terms, the research contributes with the usage of unbalanced panel data through GMM-Sys to study Brazilian companies, what helps to clarify particular issues of these firms.

As limitations, was considered the difficulty of comparing our results with other papers performed in Brazil, once the researches about this subject are sparse. Actually, it was difficult to find works approaching the specific issue between liquidity, risk and gender in other countries, because many studies try to link the gender diversity with performance, in general. Another limitation is the fact that the relationship between gender and the dependent variables may be endogenous.

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APPENDIX 1

Variables definition

Variable Name	Description	Measurement	Main Authors		Expected Signal	
Dependent Variables						
Liquidity	Cash holding to total assets ratio, a commonly used measure in corporate finance studies of liquidity management. A higher ratio indicates a greater liquidity.	$\Delta Cash/Total Assets$	John (1993); Feng, Lu and Wang (in press)		NA	NA
Risk	Standard deviation of the asset turnover ratio, is a volatility measure. The greater the volatility, the greater the risk.	$\sigma(Operating Revenue/Total Assets)$	Rajan and Zingales (1995)		NA	NA
Independent Variables						
Variable Name	Description	Measurement	L	R	L	R
Women in the Board (Main)	Ratio of the number of female directors to the total number of directors on the board. We expect that an increase in the proportion of females board members raises the liquidity and increases or decreases the risk.	$Log\left(\frac{0.01+Number\ of\ women\ in\ the\ board}{Total\ number\ of\ members\ in\ the\ board}\right)$	Loukil and Yousfi (2016), Hernandez-Nicolas <i>et al.</i> (2015)	Gulamhussen and Santa (2015), Sila <i>et al.</i> (2015)	(+)	(+) or (-)
Women as Executives (Main)	Ratio of the number of female executives to the total number of executives in the firm. We expect that an increase in the proportion of female executives raises the liquidity and increases or decreases the risk.	$Log\left(\frac{0.01 + Number\ of\ women\ executives}{Total\ number\ of\ executives}\right)$	Huang and Kisgen (2013), Hernandez-Nicolas <i>et al.</i> (2015), Zen and Wang (2015)	Baixauli-soler <i>et al.</i> (2014), Berger <i>et al.</i> (2014)	(+)	(+) or (-)
Women as Independent Directors	Ratio of the number of female independent directors to the total number of independent directors on the board. We expect that an increase in the proportion of female independent directors raises the liquidity and increases or decreases the risk.	$Log\left(\frac{0.01 + Number\ of\ women\ in.\ dir.}{Total\ number\ of\ ind.\ directors}\right)$	Liu <i>et al.</i> (2014)	Liu <i>et al.</i> (2014)	(+)	(-)
Woman as the Chairman	Dummy variable. It is expected that a female chairman will assume less risk, use less leverage and guarantee less volatile earnings than a male chairman.	Score 1 if the Chairman is a woman 0 otherwise	Faccio <i>et al.</i> (2016)	Faccio <i>et al.</i> (2016)	(+)	(-)
Independent Directors	Ratio of the number of independent directors to the total number of directors on the board. From an agency perspective, independent directors have a commitment to undertake low risk investment/decisions. The greater the number of independent directors on the board, the greater the liquidity and the smaller the risk.	$Log\left(\frac{0.01 + number\ of\ ind.\ directors}{Number\ of\ directors}\right)$	Loukil and Yousfi (2015), Khaw (2016)	Loukil and Yousfi (2015), Khaw (2016)	(+)	(-)
Board Size	Smaller boards take low leverage, what reduces the cash commitment and increase the liquidity, so, the greater the board size, the smaller is the liquidity. Smaller boards tend to encourage risk-taking, so, the greater the number of directors on the board, the smaller is the risk.	Total number of directors on the board	Wang (2013), Loukil and Yousfi (2015)	Hermalin and Weisbach (2001), Loukil and Yousfi (2015)	(-)	(-)
Total Executives	A small number of executives tend to increase the liquidity, for the	Total number of executives in a firm	NF	Berger <i>et al.</i>	(-)	(-)

	reduction on cash commitment, and to assume more risky decisions. So, a greater number of executives reduces the liquidity and the firm's risk.			(2014)		
Duality	Agency theory predicts that CEO duality strengthens the CEO's power to further their self-interests rather than the interests of shareholders. This could lead to a reduction of the firm's liquidity and an increase on its risk.	Score 1 if the CEO is the chairman of the board Score 0 otherwise	Fama and Jensen (1983), Rutledge <i>et al.</i> (2016)	Fama and Jensen (1983), Rutledge <i>et al.</i> (2016)	(-)	(+)
Firm Size (LTA) (Control)	The firm size is measured as the logarithm of the firm's total assets. The greater the firm size, the greater the liquidity and the lower the risk.	Logarithm of firm's total assets	Hernandez-Nicolas <i>et al.</i> (2015), Zeng and Wang (2015)	Faccio <i>et al.</i> (2016)	(+)	(-)
Leverage (Control)	Firms with high leverage face higher default risk. This way, they should choose long-term debt to minimize suboptimal liquidation. The higher the firm's leverage ratio, the smaller is the liquidity. The higher the firm's leverage ratio, the higher is the default risk.	$\frac{\text{Current liabilities} + \text{long term liabilities}}{\text{Net equity}}$	Diamond (1991), Huang <i>et al.</i> (2016)	Diamond (1991), Huang <i>et al.</i> (2016)	(-)	(+)
Profitability (Control)	The Pecking Order Theory says that more profitable firms utilize less debt and have lower leverage, so, the higher the profitability, the higher the liquidity and the smaller the risk.	$ROA = \text{Net profit} / \text{Total assets}$	Myers and Majluf (1984), Huang <i>et al.</i> (2016), Hernandez-Nicolas <i>et al.</i> (2015)	Myers and Majluf (1984), Huang <i>et al.</i> (2016).	(+)	(-)
		$ROE = \text{Net profit} / \text{Net equity}$	Dezso and Ross (2008)	Dezso and Ross (2008)	(+)	(-)
Tangibility (Control)	The greater the quantity of tangible assets, the greater the expectation that the firms will take over their debts, so, the greater the liquidity and the lower the risk.	$\text{Assets tangibility} = \text{Fixed assets} / \text{Total assets}$	Hernandez-Nicolas <i>et al.</i> (2015)	Faccio <i>et al.</i> (2016);	(+)	(-)
Growth Opportunity (Control)	Tobin's Q is a measure for growth opportunity. An increase in Tobin's Q is linked to an increase in liquidity. A fall in Q's value is associated with an increase in the firm's total equity risk.	$\text{Tobin's } Q = \text{Market value} / \text{Total assets}$	John (1993); Feng <i>et al.</i> (2017)	Shin and Stulz (2000), Sila <i>et al.</i> (2015)	(+)	(-)
	Risky debt financing can lead to suboptimal investment, what could be mitigated by issuing short-term debt that matures before the exercise of growth options. Therefore, we expect a positive relation between the market-to-book ratio and short-term debt, what reduces the liquidity and increases the risk.	$\text{Market to book} = \frac{\text{Equity market value}}{\text{Equity book value}}$	Myers (1977); Huang <i>et al.</i> (2016).	Sila <i>et al.</i> (2015)	(-)	(+)
Revenue	Measured as the net revenue, we expect that the greater the net revenue, the greater the liquidity and the smaller the risk	Logarithm of the company's net revenue	NF	NF	(+)	(-)
Equity	We expect that the greater a firm's equity, the greater its liquidity and the smaller its risk.	Logarithm of the firm's equity.	NF	NF	(+)	(-)

Legend: NF= we didn't find in the literature papers using these variables in relation to liquidity and risk.

Source: Prepared by the authors (2018).

APPENDIX 2

Descriptive statistics of the variables

stats	Liq	Risk	WDir	Wexec	Win	BoardSize	TotalExec	InDir	Q	MB	ROA	ROE	Tang	Lev	Revenue	TA	Eq
N	1072,0	1072,0	1352,0	1342,0	735,0	1360,0	1360,0	1360,0	983,0	1077,0	1072,0	983,0	1072,0	983,0	1077,0	1077,0	983,0
Mean	0,088	0,073	0,079	0,071	0,043	6,555	4,488	1,429	1,550	0,647	0,009	0,072	0,249	1,792	1731062,00	3063009,00	1142001,00
p50	0,002	0,051	0,002	0,003	0,005	6,000	4,000	1,000	1,138	0,412	0,024	0,093	0,241	1,370	445713,20	978075,30	407837,00
p10	0,000	0,007	0,001	0,001	0,003	3,000	2,000	0,000	0,086	0,084	-0,125	-0,189	0,002	0,013	7277,71	76348,54	1544,42
p25	0,000	0,019	0,001	0,003	0,003	5,000	3,000	0,000	0,567	0,203	-0,020	0,003	0,015	0,595	114022,70	277492,80	102247,90
p75	0,055	0,098	0,112	0,010	0,010	8,000	6,000	3,000	2,150	0,796	0,068	0,190	0,391	2,402	1576005,00	2763567,00	1021480,00
p90	0,367	0,163	0,287	0,253	0,010	10,000	8,000	4,000	3,892	1,668	0,120	0,329	0,574	4,805	3702306,00	7586328,00	2477245,00
Variance	0,034	0,005	0,022	0,021	0,023	7,853	7,449	2,935	1,971	0,419	0,011	0,052	0,047	5,080	1.68e+13	3.51e+13	6.11e+12
Min	0,000	0,003	0,001	0,000	0,001	0,000	0,000	0,000	-0,203	0,045	-0,284	-0,574	0,000	-1,847	0,00	694,60	-4177521,00
Max	0,681	0,293	1,010	1,005	1,010	19,000	33,000	13,000	5,125	2,468	0,172	0,494	0,677	8,286	4.54e+07	4.51e+07	2.31e+07
Sd	0,185	0,074	0,149	0,146	0,150	2,802	2,729	1,713	1,404	0,647	0,104	0,229	0,216	2,254	4099496,00	5922365,00	2472337,00
Skewness	2,342	1,596	2,851	2,837	4,866	0,509	2,439	1,307	1,119	1,568	-1,210	-0,944	0,423	1,272	5,585	3,720	4,545
Kurtosis	7,224	5,070	13,904	13,526	28,333	3,440	17,710	5,362	3,527	4,620	4,646	4,704	2,020	4,975	43,756	18,898	28,580

Legend: Liq = Liquidity, WDir = women as directors, WExec = executive women, Win = women as independent directors, BoardSize = total number of members on the board, TotalExec = total number of executives, InDir = total number of independent directors on the board, Q = Tobin's Q, MB = Market-to-book, ROA = return on assets, ROE = return on equity, Tang = tangibility, Lev = leverage, TA = total assets, Eq = Equity, Min = minimum, Max = maximum, Sd = standard deviation.

Source: Prepared by the authors (2018).