Do female CEOs make a difference in firm operations? Evidence from Vietnam

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Abstract

This paper examines the effect of gender in corporate leadership on the performance and risk of Vietnamese listed firms. We find that firms with female CEOs generate higher profitability than those with male CEOs. In addition, firms led by female CEOs experience less systematic and idiosyncratic risks as well as lower volatility in their returns on assets. These results are robust under different regression specifications. Our results support the hypothesis that women offer unique perspectives, experiences and work styles that benefit firms and that provide evidence for continuing government efforts to improve gender equality in Vietnam.

Key words: CEO; Female; Gender; Leadership; Performance; Risk

JEL classification: O15, J71, G32, M51, D22

doi: 10.1111/acfi.12634

1. Introduction

Although women have increasingly participated in top corporate leadership, disparity between genders is still remarkable. In 1998, only one female CEO led a Fortune 500 company. This figure has substantially increased over the last two decades and reached 4.8 percent in 2018. However, with the headcount of only 24 out of the 500, female CEOs remain a minority in the largest US corporations.[1] This situation is also prevalent in other parts of the world. For example, in 2014, only 3 percent of the 145 largest Scandinavian companies

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[1]https://www.cnbc.com/2018/05/21/2018s-fortune-500-companies-have-just-24-female-ceos.html

were led by female CEOs.[2] Similarly, only 3.2 percent of large firms in Europe had female CEOs in 2012, and there were no large firms led by a female CEO in 15 of the 27 European members in 2011 (Ho *et al.*, 2015). In developing countries, the proportion of females in corporate leadership positions is even smaller (Pande and Ford, 2011). This small proportion has raised questions about their roles in operations.

In developed countries, research shows that most firms with female CEOs perform better than their counterparts (e.g., Erhardt *et al.*, 2003; Khan and Vieito, 2013) and face less risk (e.g., Martin *et al.*, 2009; Niessen and Ruenzi, 2017). In contrast, the empirical evidence in developing countries is still mixed. On the one hand, female entrepreneurs in Eastern and Central Europe are few and less efficient in terms of total factor productivity (Sabarwal and Terrell, 2008). Similarly, most female-led enterprises have low returns to capital (de Mel *et al.*, 2008). On the other hand, many firms in China with female CEOs perform better than their counterparts (Lam *et al.*, 2013).

This paper adds to the current literature by examining the role of female CEOs on the performance and risk of Vietnamese firms. Different from almost all other developing countries in the world, Vietnam has changed its economy in 1986 from centrally planned to a market-oriented one. To promote the development of non-state-owned sectors, the Assembly of Vietnam issued the Company Act of 1990 and the Private Enterprise Act of 1990 and pushed the privatisation of state-owned enterprises that had dominated the whole economy. The Ho Chi Minh Stock Exchange became the first stock market in Vietnam in 2000 and initially had only two listed stocks. In 2005, Vietnam opened the Hanoi Stock Exchange. The number of Vietnamese listed firms has increased significantly over the last decade and reached 731 firms in 2017 with a total market capitalisation of $US148.17 billion that accounted for 74.6 percent of the country's gross domestic product (GDP).[3] Together with the fast economic development, gender equality in Vietnam has also improved. In 2006, the Assembly of Vietnam inaugurated the Gender Equality Law that aimed to ensure equal rights for women in all aspects of economic and political life. This legislation paved the way for a drop in the score of gender inequality from 0.330 in 2010 to 0.304 in 2017 that brought Vietnam up to 67th position (among 189 countries).[4] The effort has led to significant progress in gender equality in education and employment. From 2007 to 2016, the ratio of women to men with a primary or secondary education increased from 0.89 to 0.98 (World Economic Forum, 2007, 2016). Waged employment for women also increased from 32 percent to 39 percent (Newman, 2017). In fact, Vietnam has

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[2]'Even Scandinavia Has a CEO Gender Gap', *Wall Street Journal*, 21 May, 2014.

[3]https://english.vietnamnet.vn/fms/business/192879/market-capitalisation-hits-74-6-percent-of-vietnam-s-gdp.html

[4]More information can be found at: http://hdr.undp.org/en/composite/GII

one of the highest rates of female work participation in Southeast Asia (Oxfam, 2017). Further, women have increasingly taken part in political decisions, with the number of female ministers at 20, and the number of female department directors at 89 out of 1,048 (Oxfam, 2017). However, the discrimination against women in business and politics still exists due to the strong presence of men in vital decision-making roles. Many female-led businesses contribute to economic development without public recognition (Oxfam, 2017).

Both the significant change in Vietnam's economic structure and the improvement in gender equality provide us with an interesting setting to investigate the effect of gender on the performance and risk of firms. We use data on the listed firms on the Vietnamese stock markets for the period from 2007 to 2015 and find that 6.4 percent of the firms are run by female CEOs. This number is higher than that in many countries such as the European Union (around 3.2 percent), China (around 4.4 percent), and the US (around 4.8 percent).

Some studies (e.g., Amin and Islam, 2014) show that women and men have different job preferences: women prefer to work in the retail sector or the service industry while men dominate manufacturing. Consistent with this observation, we find that firms with female CEOs are mainly in agriculture and the service industry. For example, women account for 28.6 percent of the CEOs in inland transportation services, 25 percent in agriculture, and 22.2 percent in financial services. In our sample, the industries with no female CEOs are computer services and oil and gas.

Our paper demonstrates that, unlike in the US (Khan and Vieito, 2013), on average, female-led firms are larger. However, these firms have less debt, hold fewer tangible assets, and are older. Female-led firms also have more cash and a higher equity ratio, which is consistent with Zeng and Wang (2015) and Adhikari (2018).

To examine the role of female CEOs in firms, we run regressions of different measures of the performance and risk of firms on CEO gender and other firm characteristics. The results show that firms with female CEOs perform better in the future and face less risk. Specifically, female-led firms earn a 1.1 percentage point higher return on assets, 1.7 percentage point higher return on equity, and enjoy a 0.155 higher Tobin's Q.[5] In contrast, systematic risk drops by 0.102, idiosyncratic risk lowers by 0.10 percent, and the volatility of the quarterly return on assets drops by 0.30 percent if firms have female CEOs. All of these estimates are statistically significant at the conventional confidence levels and are economically meaningful.

Why do firms with female CEOs have higher profits and face lower risk? The studies on leadership theory highlight that women offer unique perspectives,

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[5]Pham and Talavera (2018) use survey data on private Vietnamese SMEs and also report that Vietnamese male-led firms, on average, have lower return on assets compared to female-led firms.

experiences and work styles compared to their male counterparts that lead to different levels of effectiveness in the leadership of women and men (Hillman et al., 2002). Female leaders are more democratic (Johnson and Eagly, 1990), more collaborative (Eagly and Carli, 2003) and better at creating good practices in workplace management (Melero, 2011). As a result, they receive more valuable advice from the board of directors as well as other stakeholders. In addition, the studies on psychology and sociology demonstrate that men are more overconfident than women and that women are more risk averse than men (Croson & Gneezy, 2009). More overconfidence leads male CEOs to invest in negative net present value (NPV) projects that cause the firm's profits to drop and its risk to increase (Huang and Kisgen, 2013).

Because the proportion of female CEOs is smaller than that of male CEOs, we robustly test our results by matching female-led firms with their counterparts based on firm characteristics. We use propensity score matching to choose one firm with a male CEO for each female-led firm in the same industry and year that has the nearest propensity score. Using this matching sample, we run regressions of the performance and risk measures on CEO gender and other control variables. Consistent with our previous results, we find that firms with female CEOs perform better and have less risk.

We also try to address the endogeneity that may exist due to the possible omission of unobservable factors that affect both the firm's performance or risk and CEO gender. We follow Huang and Kisgen (2013) and use the two-stage least squares approach with instrumental variables. For each year, we use the ratio of the number of female CEOs in a certain industry to the total number of CEOs as the external instrument for a firm's female CEO dummy. This ratio can be an instrument because it is significantly related to a firm's choice of a female CEO and it is unlikely to have a direct effect on firm performance or risk. Our results are robust under this IV approach.

We make several contributions to the current literature on the effect of CEO gender. First, our paper is the first to investigate the role of female CEOs in the operations of Vietnamese firms. We show that these firms perform better and face less risk than their counterparts. Second, we contribute to the debate on the role of female leadership in the firms of developing countries where the empirical evidence is still lacking and controversial. Finally, our results support the hypothesis that gender diversity affects firms. All of our findings and contributions have important policy implications.

The remainder of the paper is organised as follows: We discuss the relevant literature and develop the hypotheses in Section 2. We describe the data selection, variable measurements, and sample statistics in Section 3. Section 4 presents the univariate analyses while we perform the multivariate analyses in Section 5. Section 6 concludes.

2. Literature review, institutional background and hypothesis development

2.1. CEO gender and firm performance

Currently there are several theories on the difference in leadership style between female and male CEOs. On the one hand, leadership theory argues for the importance of nurturing communication, being more inclusive and creating alliances in firms (Stogdill, 1974). In support of this theory, Hillman *et al.* (2002) point out that women offer unique characteristics compared to their male counterparts. Thus, gender emerges as an important trait that affects leadership. Ford and Richardson (1994) find that female managers normally extract fewer personal benefits from the company and thus make more ethical decisions in the workplace than men. Similarly, Johnson and Eagly (1990) find that female leaders are more democratic, participative and less autocratic than male leaders. Eagly and Carli (2003) extend this theme to show that female leaders are less hierarchical and more cooperative and collaborative. Female leaders also create good workplace management practices through more interpersonal channels of communication and more employee participation in decisions (Melero, 2011). Tate and Yang (2015) find that female CEOs cultivate a more female-friendly workplace and pay more equal wages to newly hired workers. Overall, this literature finds that female leaders foster a corporate environment that is conducive to increasing a firm's value through its performance.

On the other hand, the resource dependency approach considers firms as entities in an open system and argues that female CEOs may add less value to firms. First, women interact less with managers in other companies (Zelechowski and Bilimoria, 2004). Second, women are less likely to be actively engaged in business activities (Kesner, 1988). More recently, Inci *et al.*, (2017) show that women have a disadvantage relative to males in accessing inside information probably due to their smaller informal networks.

In contrast to the above theories, Adams and Ferreira (2009) point to the possibility that women in top management positions do not have a different influence on a firm's performance compared to men. They argue that female managers reject feminine stereotypes and values and, as a result, behave like male managers do.

Empirically, Erhardt *et al.* (2003), based on Fortune 500 firms in the US, find that firms with a higher number of female executives have higher profits relative to the average profits in their industry sector. Firms that operate in complex environments generate positive and significant abnormal returns when they have a high proportion of females in top management (Francoeur *et al.*, 2008). Krishnan and Parsons (2008) show that firms with gender diversity in senior management have higher earnings quality. They also find that, after the initial public offering (IPO) process, firms with a higher number of women in senior management are more profitable and have higher stock returns than firms with

fewer women in management. Firms with a higher percentage of female officers also have smaller agency costs (Jurkus *et al.*, 2011) and better performance (Khan and Vieito, 2013). The positive relation between gender diversity and firm performance is also found in other developed countries, such as Denmark (Smith *et al.*, 2006), Finland (Kotiranta *et al.*, 2007) and Spain (Martín-Ugedo *et al.*, 2018).

In developing countries, research on female CEOs is largely unexplored and, of the few studies on the topic, the results are mixed. On the one hand, Lam *et al.* (2013) report that female-led firms outperform male-led firms in China. On the other hand, Sabarwal and Terrell (2008) use firm-level data from 26 post-socialist economies in Eastern and Central Europe and find that female entrepreneurs have a significantly smaller scale of operations and are less efficient in terms of total factor productivity. Similarly, using data from Sri Lanka, de Mel *et al.* (2008) show that female-led enterprises have lower returns to capital than their male counterparts.

2.2. CEO gender and firm risk

There is considerable evidence that women are more risk averse than men (see, e.g., Croson and Gneezy, 2009). Olsen and Cox (2001) investigate gender differences in attitudes towards risk for investors with a professional background and find that female investors give more weight to risk attributes such as the possibility of loss and ambiguity than their male counterparts do. Sunden and Surette (1998) show that women allocate retirement plans in a more conservative way. Considering risky assets, women hold approximately equal proportions of stocks and bonds, while men invest twice as much of their wealth in stocks. Similarly, Barber and Odean (2001) examine the accounting data for 35,000 US households during 1991–1997 and find that men invest in risky assets more often. Women also spend more time on research before making an investment decision and are more willing to ask for advice once they are in trouble. The difference in risk tolerance is also reflected in mutual fund investing, where female fund managers seem to take less unsystematic risk and opt for more stable investments (Niessen and Ruenzi, 2017).

While women are less risk tolerant than men in general, it may not necessarily be the case among top executives given the specific and rare combination of skills needed to ascend to that level. Consistent with this argument, Adams and Funk (2012) show that in contrast to the findings for the population, female directors are more open to change, are less conservative, and love risk more than male directors. Also, banks with more female directors did not have lower risk than other banks during the financial crisis (Adams and Ragunathan, 2015).

The differences in the structures of compensation and incentives may also explain the documented association between gender and risk taking. Specifically, low-risk firms may be more likely to offer fixed pay contracts and may be

more likely to attract female executives. Consistent with this argument, Bandiera *et al.* (2015) use a sample of Italian firms and show that more risk-averse and less talented managers tend to match with firms that only offer low-powered incentives. Similarly, Carter *et al.* (2017) find that risk-taking incentives, as measured by the portfolio beta, option delta and option vega, are significantly lower for women, which could be interpreted as women's acceptance of pay packages with less incentives.

In international settings, female CEOs are associated with a higher level of corporate cash in Chinese listed firms (Zeng and Wang, 2015), which indicates they are more conservative through the precautionary motive of cash. Female CFOs also engage in less earnings management than male CFOs (Liu *et al.*, 2016). Faccio *et al.* (2016) use a large sample of privately held and publicly traded European companies to show that firms run by female CEOs have lower leverage, less volatile earnings and a higher chance of survival.

2.3. Institutional background in Vietnam

Since the introduction of the comprehensive economic reform in 1986, Vietnam has gradually transformed its economy from a centrally planned one to a market-oriented one. This reform results in a more competitive business environment with equal opportunities for private, foreign-owned, state-owned and privatised firms to get funds from the financial markets. In an effort to create a new channel to raise funds and to promote economic development, the Vietnamese government established the first stock exchange in 2000 (Ho Chi Minh Stock Exchange, HOSE). The second stock exchange (Hanoi Stock Exchange, HNX) was established in 2005 for medium-sized companies.

Over the period from 2000 to 2005, the number of listed firms increased from 2 to 32. By the end of 2005, the Vietnamese stock markets were still very small and illiquid, with a market capitalisation of about $US390 million. However, when Vietnam became a member of the World Trade Organization at the beginning of 2007, the number of listed firms increased remarkably over time from 240 in 2007 to 679 in 2015. By the end of 2015, the market capitalisation consisted of about 34.5 percent of Vietnam's GDP.

The role of women in society has a long history in Vietnam. In 1930, the Vietnam Women's Union was established to encourage women to participate in all social activities. Vietnamese women had voting rights and have participated in the government since 1945. Together with its economic development, Vietnam has demonstrated its efforts to promote gender equality. It passed the Law on Gender Equality in 2006 and the Law on Domestic Violence Prevention and Control in 2007. The Laws were important steps in setting up a legal framework to maintain equality and to encourage both women and men to participate in all areas of the economy. Despite these efforts, challenges still remain to women's equal participation in decision-making in the public sphere. For example, Vietnamese women continue to face obstacles in

participating on an equal footing in leadership positions. According to the Vietnam Business Annual Report (2007), women ran only 24 percent of the country's total registered enterprises. This statistic paints a gloomy picture of female leadership in Vietnam that allows for much room for improvement in terms of gender equality.

However, compared to other developing countries, gender equality in Vietnam has shown an improvement. According to the *Global Gender Gap Report 2017* (World Economic Forum, 2017), the involvement of Vietnamese women in economic activities is relatively high (ranked 33 out of 144 countries). Vietnamese women also play an important role in political issues. In addition, the World Bank reports that Vietnam has experienced the elimination of the gender gap in primary schooling and Vietnamese 'women have caught up and even surpassed men in terms of attaining college degrees' (World Bank, 2011).

In terms of social norms as well as leadership style, Vu *et al.* (2017) find that the media reflects and reinforces strong gender stereotyping about male and female leaders in Vietnamese society. Female leaders are believed to be more communal (e.g., friendly, flexible, delicate, considerate and sympathetic) than male leaders. These differences may lead to a difference in making business decisions.

Conducting research on female leadership for small business enterprises, Vo and Harvie (2009) show that female Vietnamese entrepreneurs have difficulty in accessing financing, technology and market and government support as well as understanding the legal framework and business laws and using IT. In contrast, Pham and Talavera (2018) do not observe the presence of discrimination against female entrepreneurs by Vietnamese financial institutions. They show that the likelihood of female-led firms obtaining a bank loan is even higher than for male-led ones. Moreover, female-led firms have better access to business networks than their counterparts.

2.4. Hypothesis development

The evidence from the literature mentioned above indicates that gender representation in top executive positions has an effect on the decisions and risks of firms. As Perryman *et al.* (2016) argue, the influence of female managers may indirectly result in firms having smaller returns (i.e., taking less risk) while simultaneously having fewer huge losses (i.e., having more stable performance increases). This risk-return paradox may be the result of differences in management capabilities that occur because of different gender characteristics.

Therefore, we posit that the gender of CEOs reflects capabilities that influence both the performance and risk of firms, especially for those in a country with high economic growth and improved gender equality like Vietnam. We hypothesise that:

H1: Firms led by female CEOs in Vietnam, on average, perform better than firms led by male CEOs.

H2: Firms led by female CEOs in Vietnam, on average, have a lower risk level than their counterparts.

3. Sample selection, variable measurement and descriptive statistics

3.1. Sample selection and variable measurement

Our sample includes the publicly traded firms on the two stock exchanges in Vietnam from 2007 to 2015. We start our sample in 2007 because that was the year Vietnam's Law of Securities took effect, which brought in more fair and transparent trading along with more firms on the exchanges. In addition, the Law on Gender Equality was implemented in 2006. Our sample ends in 2015 because it is last year that the data are available to us.

We collect financial data of the firms from the Center for Economics and Finance Research at Ton Duc Thang University in Vietnam. We use this database to compute the return on assets, return on equity, Tobin's Q, logarithm of total assets, book-to-market, tangible assets, cash holdings, total debt, total equity, managerial ownership and the dividend ratios. Tobin's Q is defined as the ratio of the market value of equity plus total debt and the book value of total assets. Managerial ownership is the ratio of stocks held by firm's managers to total shares outstanding. The Appendix describes all other variables used in our analyses.

We use the stock trading database from Ton Duc Thang University to calculate the systematic and idiosyncratic risks. Systematic risk is the beta coefficient from the estimation of the capital asset pricing model (CAPM) using the daily stock returns over a year, while idiosyncratic risk is the standard deviation of the residuals of stock returns from the CAPM model. We use stock returns to measure the firm's risk for two reasons. First, as the literature shows, stock returns reflect all information about performance, which includes the firm's profits, value of both assets in place and growth opportunities, and expectations about its future. Second, due to the short data timeframe, these risk measures are more preferable than the firms' accounting information. For robustness, we use the volatility in the quarterly return on assets over the last two years as another proxy for risk.

Our main independent variable is CEO gender. We define the female CEO dummy variable as equal to one if a firm's CEO is female and zero otherwise.

To avoid effects from outliers, we winsorise all variables at the 1st and 99th percentiles. Our final sample consists of 3,712 observations from 591 firms from 2007 to 2015.

3.2. Descriptive statistics

Panel A of Table 1 reports the descriptive statistics for the variables used in our paper. In our sample, the proportion of firms with female CEOs is 6.4 percent. The ratio of female CEOs varies slightly over the sample period as it ranges from a low of 5.5 percent (year 2013) to a high of 10.2 percent (year 2007), as shown in Panel B. These proportions of female CEOs are higher than those in many developed countries, such as in the US or northern European countries (Huang and Kisgen, 2013; Faccio *et al.*, 2016). They indicate that the Vietnamese government may have reduced the gender disparity in corporate leadership. However, despite many efforts from the Vietnamese government, the proportion of women that take top leadership positions in businesses has not increased notably over this period.

Regarding profitability, firms in our sample have an average return on assets of 6.4 percent, return on equity of 12.8 percent and Tobin's Q of 1.47. The return on assets ranges from -14.4 percent to 32 percent, while the return on equity ranges from -37 percent to 50.8 percent. The Tobin's Q of firms in our sample ranges from 0.564 to 3.912.

Table 1 also shows that the mean of systematic risk is 0.737, while that of idiosyncratic risk is 3.2 percent; and the standard deviation in the quarterly returns on assets is 1.4 percent. The 25th percentile and 75th percentile values of systematic risk are 0.32 and 1.073, respectively, while those of idiosyncratic risk are respectively 2.6 percent and 3.8 percent. The standard deviations in the quarterly returns on assets are 0.5 percent and 1.7 percent in those percentiles respectively. The logarithms of total assets range from 9.9 to 16.9 with a standard deviation of 1.443 and an average of 13.1, which is equivalent to about 1.6 billion VND (approximately \$US70 million). The numbers indicate that Vietnamese listed firms are smaller than those in more developed countries.

The mean of tangible assets ratios is 0.19, which means on average the tangible assets of firms in our sample are 19 percent of their total assets. The total debt ratio ranges from 0.050 to 0.902 with a mean of 50.20 percent of total assets. On average, Vietnamese firms use more debt than firms in other developing countries such as Argentina, India and Korea (de Jong *et al.*, 2008). These results are reasonable because Vietnamese stock markets are relatively new.

CEO gender and performance may depend on the industry in which firms operate. In our sample, service, food, pharmacy and farming are industries with the highest female representation. Female CEOs are also common in agriculture, financial services and repair and guarantee services. One fourth of firms in agriculture have female CEOs, while this figure for firms in financial services is 22.2 percent. In contrast, there are no female CEOs in several industries such as computer services and oil and gas.

Table 1
Sample statistics

Panel A: Descriptive statistics

Variable	Average	Std.	Min.	25th Pctl	Med.	75th Pctl	Max.	N
Female CEO								
FCEO	0.064	0.245	0.000	0.000	0.000	0.000	1.000	3,712
Firm performance								
ROA	0.064	0.071	−0.144	0.019	0.050	0.096	0.320	3,712
ROE	0.128	0.127	−0.370	0.050	0.123	0.195	0.508	3,712
Q	1.471	0.525	0.564	1.159	1.416	1.653	3.912	3,712
Firm risk								
BETA	0.737	0.485	0.014	0.320	0.699	1.073	2.000	3,712
IDVOL	0.032	0.009	0.014	0.026	0.031	0.038	0.055	3,712
ROAVOL	0.014	0.013	0.000	0.005	0.010	0.017	0.076	3,712
Firm characteristics								
LAT	13.090	1.443	9.948	12.143	12.992	14.025	16.936	3,712
TANG	0.190	0.184	0.000	0.051	0.132	0.269	0.798	3,712
TDEBT	0.502	0.215	0.050	0.331	0.527	0.672	0.902	3,712
BEA	0.490	0.217	0.029	0.317	0.464	0.660	0.998	3,712
DIV	0.030	0.039	0.000	0.000	0.019	0.043	0.554	3,712
CASH	0.101	0.109	0.001	0.023	0.062	0.142	0.518	3,712
OWN	0.051	0.092	0.000	0.001	0.012	0.055	0.497	3,712
LAGE	3.155	0.518	2.197	2.708	3.135	3.584	4.111	3,712

Panel B: Female CEOs through time

Year	No. FCEO	No. of firms	FCEO ratio, %
2007	16	157	10.19
2008	19	220	8.64
2009	23	323	7.12
2010	22	342	6.43
2011	28	494	5.67
2012	30	515	5.83
2013	29	527	5.50
2014	32	546	5.86
2015	38	588	6.46
Total	237	3,712	6.38

This table presents the descriptive statistics of the main variables for firms in our sample. All variables are defined in the Appendix. The sample includes Vietnamese listed firms from 2007 to 2015 and excludes firms with total assets or sales volume of <1 billion VND. All variables are winsorised at 1st and 99th percentiles.

We also report in Table 2 the correlation matrix of the female CEO dummy variable and measures of the performance and risk of firms. The results in Panel A show that female CEOs are positively and significantly correlated with the return on assets, return on equity and Tobin's Q. These correlations

Table 2
Variable correlations

Panel A: Correlations between CEO gender and firm performance and risk

	FCEO	ROA	ROE	Q	BETA	IDVOL
ROA	0.074***					
	(0.00)					
ROE	0.038**	0.845***				
	(0.02)	(0.00)				
Q	0.084***	0.381***	0.423***			
	(0.00)	(0.00)	(0.00)			
BETA	−0.057***	−0.101***	−0.033**	−0.003		
	(0.00)	(0.00)	(0.04)	(0.87)		
IDVOL	−0.111***	−0.172***	−0.083***	−0.030*	0.237***	
	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)	
ROAVOL	−0.025	0.201***	0.061***	0.042**	0.009	0.039**
	(0.13)	(0.00)	(0.00)	(0.01)	(0.56)	(0.02)

Panel B: Correlations between CEO gender and firm characteristics

	FCEO	LAT	TANG	TDEBT	BEA	DIV	CASH	OWN
LAT	0.071***							
	(0.00)							
TANG	−0.062***	0.013						
	(0.00)	(0.43)						
TDEBT	−0.074***	0.313***	−0.020					
	(0.00)	(0.00)	(0.23)					
BEA	0.072***	−0.338***	0.026	−0.992***				
	(0.00)	(0.00)	(0.11)	(0.00)				

(continued)

Table 2 (continued)

Panel B: Correlations between CEO gender and firm characteristics

	FCEO	LAT	TANG	TDEBT	BEA	DIV	CASH	OWN
DIV	0.048***	−0.154***	0.047***	−0.397***	0.403***			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
CASH	0.032*	−0.090***	−0.141***	−0.288***	0.284***	0.340***		
	(0.05)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
OWN	0.075***	0.006	−0.078***	0.048***	−0.052***	−0.094***	−0.124***	
	(0.00)	(0.72)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
LAGE	0.025	0.006	0.093***	0.067***	−0.064***	0.070***	0.027***	−0.072***
	(0.13)	(0.70)	(0.00)	(0.00)	(0.00)	(0.00)	(0.11)	(0.00)

This table presents the paired correlations between the main variables used in our paper. The sample includes all Vietnamese listed firms from 2007 to 2015 and excludes firms with total assets or sales volume <1 billion VND. All variables are winsorised at 1st and 99th percentiles. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively; p-values are reported in parentheses.

indicate that firms with female CEOs perform better than firms with male CEOs.

In contrast, the correlations between the female CEO dummy variable and the systematic and idiosyncratic risks are significantly negative. These results mean that firms with female CEOs have less risk than firms with male CEOs, which is consistent with the results in previous studies (e.g., Faccio *et al.*, 2016). These correlations preliminarily support our hypotheses on the relation between CEO gender and the performance and risk of firms.

Panel B of Table 2 presents the paired correlations between CEO gender and firm characteristics. The results in this table show that the correlations between the female CEO and total assets, equity ratio, cash ratio, dividend yield and managerial ownership are significantly positive. In contrast, firms with female CEOs use less debt and have a lower tangible assets ratio. The correlations between the female CEO dummy and total debt and the tangible assets ratios are −7.40 percent and −6.20 percent, respectively, and statistically significant at the 1 percent level.

4. Univariate analysis

In this section, we extend our analysis by comparing firms with female CEOs to those with male counterparts.

Because both CEO gender and firm performance may be different for different industries, we only keep industries that have female CEOs in this section. Although this approach reduces the total number of observations, it provides a clearer picture of the effect of gender on firm performance. We then group firms by their CEO genders and calculate each group's annual average performance. The results are shown in Table 3.

Table 3 shows that firms with female CEOs have higher profitability. For example, firms with female CEOs have an average 8.4 percent return on assets (ROA), while this figure for firms with male CEOs is 5.9 percent, which is an outperformance of 2.5 percentage points for the firms with female CEOs. The difference is statistically significant at the 1 percent level and economically meaningful. Similarly, the return on equity (ROE) and Tobin's Q of firms with female CEOs are both higher compared to firms with male CEOs.

The results in Table 3 also show that firms with female CEOs have lower risk. The systematic risk (beta) and idiosyncratic risk of these firms are 0.632 and 2.80 percent, while these figures for firms with male CEOs are 0.719 and 3.20 percent, respectively. Both differences are statistically significant at the 1 percent level.

Firms led by female CEOs also have different characteristics. They are slightly larger and have higher equity to assets ratios, more cash, and more managerial ownership as well as paying higher dividends than firms with male CEOs. However, they borrow less debt. This evidence means that firms with

Table 3
CEO gender and firm characteristics

Variable	FCEO	MCEO	Mean difference
Firm performance			
ROA	0.084	0.059	0.025***
ROE	0.146	0.120	0.026***
Q	1.641	1.462	0.179***
Firm risk			
BETA	0.632	0.719	−0.087***
IDVOL	0.028	0.032	−0.004***
ROAVOL	0.012	0.013	−0.001
Firm characteristics			
LAT	13.482	13.120	0.362***
TANG	0.147	0.154	−0.008
TDEBT	0.441	0.514	−0.073***
BEA	0.550	0.477	0.072***
DIV	0.037	0.027	0.009***
CASH	0.115	0.101	0.014*
OWN	0.078	0.056	0.022***
LAGE	3.204	3.178	0.027
N	237	2,349	

This table shows the statistics for firms with female (FCEO) and male CEOs (MCEO). The sample includes Vietnamese listed firms in industries having female CEOs and with total assets or sales of at least 1 billion VND. Industries with no female CEOs are excluded. All variables are winsorised at 1st and 99th percentiles. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

female CEOs perform better and take less risk than their counterparts, which is consistent with the predictions in our hypotheses.

5. Multivariate analysis

In this section, we investigate the effects of CEO gender on the performance and risk of firms by using three different approaches. First, following Huang and Kisgen (2013), we use an ordinary least squares (OLS) model for the whole sample. The benefit of this approach is that all firms can be considered, including firms with female-to-female or male-to-female transitions. Further, we use propensity score matching that matches female-led firms with male-led firms. This alternative method allows us to deal with the imbalance in the number of firms with female CEOs as compared to those with male CEOs in our sample. Lastly, we address the endogeneity issue with the choice of CEO gender and performance and risk by using the 2SLS method with an instrumental variable.

5.1. Baseline regression model

To investigate the effect of CEO gender on performance and risk, we run the following multivariate regression model:

$$
\begin{aligned}
PERFORM_{i,t+1} =& \beta_0 + \beta_1 FCEO_{i,t} + \beta_2 FIRM - CHAR_{i,t} \\
& + \beta_3 INDUSTRY - DUMMY_{j,t} + \beta_4 YEAR \\
& - DUMMY_t + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where *PERFORM* is either the return on assets, return on equity, or Tobin's *Q*; *FCEO* is the dummy variable for a female CEO; *FIRM-CHAR* is a set of firm characteristics; *INDUSTRY-DUMMY* is industry dummy variables; and *YEAR-DUMMY* is year dummy variables. In our analyses of risk, we replace *PERFORM* with one of three risk measures: systematic risk, idiosyncratic risk or standard deviations in the quarterly returns on assets.

Some studies (e.g., Huang and Kisgen, 2013; Faccio *et al.*, 2016) show that the performance and risk of firms and CEO gender are all correlated with the firm's sales, leverage, and dividend. Therefore, we control for these variables in our model. Specifically, we control for the firm's size measured by the logarithm of total assets, tangible assets, total debt ratios and dividend yield. We also control for the equity to total assets ratio, cash holdings and the age of the firm. We further control for managerial ownership because it can be a proxy for managerial incentives that play an important role in operations and the choice of CEO gender.

We also control for industry fixed-effects because firm performance and CEO gender might be different for different industries. We control for time effects because firm performance is highly related to business cycles. Further, to mitigate the endogeneity in which both firm performance and CEO gender are driven by omitted variables, we add a current performance measure (*ROE*) and risk measure (*IDVOL*) to our regression models.

Consistent with H1, the first column of Table 4 shows that the coefficient for the female CEO variable is 0.011 ($p = 0.024$) and is positive and statistically significant at the 5 percent level. This result means that, after controlling for other characteristics, firms with female CEOs earn a 1.1 percentage point higher ROA than their male counterparts. As mentioned in Table 3, the average ROA of firms with male CEOs is 5.9 percent. Thus, an outperformance of 1.1 percentage points by female-led firms corresponds to around a 19 percent higher ROA than that of male-led firms. Similarly, firms with female CEOs have a 1.7 percentage point higher ROE ($p = 0.047$) and a 0.0155 higher Tobin's *Q* ($p = 0.014$) than firms with male CEOs. These outperformances are nontrivial.

The effects of other characteristics on the performance of firms are also presented in Table 4. Current performance measures are positively correlated

Table 4
CEO gender and firm performance

PERFORM$_{t+1}$	(1) ROA$_{t+1}$	(2) ROE$_{t+1}$	(3) Q$_{t+1}$
FCEO$_t$	0.011**	0.017**	0.155**
	(0.024)	(0.047)	(0.014)
ROE$_t$	0.192***	0.450***	0.868***
	(0.000)	(0.000)	(0.000)
IDVOL$_t$	−0.187	−0.287	−2.919**
	(0.182)	(0.296)	(0.013)
LAT$_t$	−0.001	−0.002	0.017
	(0.405)	(0.200)	(0.182)
TANG$_t$	0.018***	0.029**	−0.033
	(0.006)	(0.013)	(0.581)
TDEBT$_t$	−0.058*	−0.113	1.281***
	(0.066)	(0.111)	(0.001)
BEA$_t$	0.000	−0.179**	0.602
	(0.997)	(0.014)	(0.137)
DIV$_t$	0.557***	0.657***	2.731***
	(0.000)	(0.000)	(0.000)
CASH$_t$	0.055***	0.094***	0.302**
	(0.000)	(0.000)	(0.019)
OWN$_t$	−0.008	−0.009	0.072
	(0.487)	(0.698)	(0.539)
LAGE$_t$	0.005**	0.007*	0.000
	(0.017)	(0.063)	(0.986)
Intercept	0.033	0.186**	0.047
	(0.419)	(0.019)	(0.922)
Ind. FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
N	3,037	3,037	3,037
Adj. R^2	0.5425	0.4416	0.4087

This table presents the results from the regression of firm performance on female CEO:

$$PERFORM_{i,t+1} = \beta_0 + \beta_1 FCEO_{i,t} + \beta_2 FIRM - CHAR_{i,t} + \beta_3 INDUSTRY - DUMMY_{j,t} + \beta_4 YEAR - DUMMY_t + \varepsilon_{i,t}$$

where *PERFORM* is either the return on assets, return on equity ratios, or Tobin's Q, *FCEO* is the indicator for female CEO, and *FIRM-CHAR* is a set of firm characteristics. All variables are defined in the Appendix. The sample includes Vietnamese listed firms from 2007 to 2015 and excludes firms having total assets or sales volume <1 billion VND. All variables are winsorised at 1st and 99th percentiles. Standard errors are clustered by firm, and the *p*-values are reported in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

with the corresponding future performance measures, as expected. Similarly, firms with a high dividend yield or more cash perform better in the future. The ratio of equity to total assets is negatively correlated with the future return on

equity. Table 4 also shows that more established firms perform better than younger ones.

In addition to having a significant effect on performance, CEO gender also affects the risk of the firm. Therefore, we use model 1 to run a regression of risk measures on the CEO gender and other control variables. The results are reported in Table 5.[6]

Consistent with previous studies (e.g., Huang and Kisgen, 2013; Faccio *et al.*, 2016) and H2, Table 5 shows that firms with female CEOs take less risk than firms with male CEOs. Specifically, compared to male-led firms, female-led firms have systematic risk measured by a beta that is lower by 0.102 (or about 14 percent relative to the average beta of the male-led firms), idiosyncratic risk that is lower by a 0.1 percentage point, and volatility in the quarterly return on assets that is lower by a 0.3 percentage point next year. Because the average *IDVOL* of firms with a male CEO is 0.032, firms with a female CEO can reduce idiosyncratic risk by 3.13 percent compared to their male counterparts. Table 5 also shows that old firms or firms with more cash and a high dividend yield experience less risk, while large firms have low idiosyncratic risk but high systematic risk.

5.2. Matching sample

To further examine the effect of CEO gender on performance and risk, we use propensity score matching. This method begins with a probit regression model of the female CEO dummy on firm characteristics. Any industry without a female CEO is excluded. Following Huang and Kisgen (2013), we use the set of control variables from the baseline regression model (model 1) that includes industry and year dummies. The inclusion of these variables not only ensures that firms with female or male CEOs share the same firm characteristics but also ensures that the coefficient estimators are not driven by the differences in any industry and time.

Column 1 of Panel A of Table 6 presents the results from the probit regression. The results show that the model specification can explain the significant variability in the choices of female CEOs that is captured by the pseudo R^2 of 12.92 percent and the *p*-value from the test of the fitness of the overall model that is <1 percent. From this regression, we estimate the predicted probability, or propensity score, for each firm-year observation. We then match firms with female CEOs (treatment group) with firms with male CEOs (control group) with the nearest propensity score. We exclude any industry with only one firm with a female CEO or firms without at least two years of financial information. We end up with 186 paired firms or 372 firm-year observations.

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[6]The results are qualitatively the same when the Fama-French three factor model is used to estimate beta and idiosyncratic risk.

Table 5
CEO gender and firm risk taking

$RISK_{t+1}$	(1) $BETA_{,t+1}$	(2) $IDVOL_{t+1}$	(3) $ROAVOL_{t+1}$
$FCEO_t$	−0.102***	−0.001**	−0.003***
	(0.002)	(0.014)	(0.006)
ROE_t	−0.158**	−0.009***	−0.003
	(0.041)	(0.000)	(0.539)
$IDVOL_t$	15.547***	0.468***	0.056
	(0.000)	(0.000)	(0.207)
LAT_t	0.160***	−0.001***	−0.001*
	(0.000)	(0.000)	(0.079)
$TANG_t$	−0.122*	−0.000	0.000
	(0.070)	(0.607)	(0.991)
$TDEBT_t$	−0.801***	−0.001	−0.002
	(0.009)	(0.819)	(0.882)
BEA_t	−0.493	−0.004	0.009
	(0.108)	(0.194)	(0.391)
DIV_t	−0.542**	−0.014***	0.023**
	(0.049)	(0.001)	(0.037)
$CASH_t$	−0.296***	−0.001	0.004
	(0.002)	(0.514)	(0.284)
OWN_t	−0.353***	−0.000	−0.001
	(0.003)	(0.877)	(0.745)
$LAGE_t$	−0.088***	−0.001***	−0.001
	(0.000)	(0.001)	(0.190)
Intercept	−0.523	0.045***	0.023*
	(0.147)	(0.000)	(0.070)
Ind. FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
N	3,037	3,037	3,037
Adj. R^2	0.4689	0.5383	0.1659

This table presents the results from the regressions of firm risk on female CEO:

$$PERFORM_{i,t+1} = \beta_0 + \beta_1 FCEO_{i,t} + \beta_2 FIRM - CHAR_{i,t} + \beta_3 INDUSTRY - DUMMY_{j,t} + \beta_4 YEAR - DUMMY_t + \varepsilon_{i,t}$$

where *RISK* is either systematic risk (*BETA*), idiosyncratic risk (*IDVOL*) or standard deviations in the quarterly returns on assets (*ROAVOL*), and *FIRM-CHAR* is a set of firm characteristics. All variables are defined in the Appendix. The sample includes Vietnamese listed firms from 2007 to 2015 and excludes firms with total assets or sales volume <1 billion VND. All variables are winsorised at 1st and 99th percentiles. Standard errors are clustered by firm, and *p*-values are reported in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Because the propensity score matching is valid only when two groups of firms are not statistically different in predicting the CEO gender, we conduct a diagnostic test to verify this assumption. We rerun the regression of the

female CEO dummy on firm characteristics and report the results in column 2 of Panel A of Table 6. None of the independent variables are statistically significantly correlated with the female CEO variable, which means that none of the firm characteristics of the two groups makes a different prediction of the CEO gender. Moreover, the pseudo R^2 significantly drops to 1.64 percent and the Chi-square test for the model fitness shows that the null hypothesis for all coefficients of zero cannot be rejected because its *p*-value is 8.34 percent.

To further examine whether the firms in the two groups have similar characteristics, we report the means of all control variables used in our regression specification (model 1) for each group and compute the difference between them. The results are reported in Panel B of Table 6.

Overall, there are no statistically significant differences in characteristics of the two groups of firms. For example, the means of the ROE are virtually the same. The differences between the two means of the other characteristics are not significantly different from zero because the *p*-values for all *t*-tests of the null hypothesis that two groups have the same firm characteristics are >35 percent. These values mean that firms with female CEOs have the same characteristics as the firms with male CEOs. These results verify the validity of the assumption of the propensity score matching.

Table 7 provides the results from the regressions of performance and risk on CEO gender and other control variables for firms in the matching sample. Consistent with the results in Tables 4 and 5, they show that female CEOs are significantly and positively related to three measures of performance but negatively correlated with the three proxies for risk. Specifically, when a female CEO is hired, the ROA increases by a 1.6 percentage point, and the ROE goes up by 2.8 percentage points in the following year. Compared to the results in Table 3, these coefficients are nearly double in magnitude. In contrast, the coefficient of the female CEO dummy for Tobin's *Q* is 0.143, which is slightly lower than that coefficient in Table 4.

The effect of female CEOs on risk also remains significant in the matched sample. The coefficients of all risk variables are negative and statistically significant. For example, the coefficient of systematic risk (*BETA*) is −0.104 with *p*-value of 0.007. These estimates suggest that the firms with female CEOs take less risk than their male counterparts do.

5.3. 2SLS method with instrumental variable

An important issue when examining the effect of CEO gender on the performance and risk of firms is endogeneity in which some unobservable characteristics may influence both the choice of the CEO gender and the performance and risk. This omission may lead to incorrect statistical references between the choice and the operations of the firm. In our baseline regression specification, we partially address this issue by adding the current performance

Table 6
Matching sample

Panel A: Propensity score matching

	(1) Whole sample	(2) Matching sample
ROE_t	−0.089	0.395
	(0.838)	(0.581)
$IDVOL_t$	−28.388***	−2.800
	(0.000)	(0.808)
LAT_t	0.112***	0.013
	(0.005)	(0.841)
$TANG_t$	−1.100***	−0.348
	(0.004)	(0.641)
$TDEBT_t$	1.846	−1.871
	(0.287)	(0.585)
BEA_t	2.269	−1.821
	(0.191)	(0.593)
DIV_t	0.445	−0.837
	(0.778)	(0.749)
$CASH_t$	0.027	−0.825
	(0.951)	(0.247)
OWN_t	1.277***	−0.300
	(0.001)	(0.607)
$LAGE_t$	0.282***	0.056
	(0.004)	(0.751)
Intercept	−4.711**	1.389
	(0.021)	(0.724)
Ind. FE	Yes	Yes
Time FE	Yes	Yes
N	2,330	372
Pseudo R^2	0.1292	0.0164

Panel B: Firm characteristics of two groups

	FCEO	MCEO	Difference (*p*-value)
LAT	13.374	13.360	0.014 (0.934)
ROE	0.146	0.146	0.001 (0.967)
TANG	0.137	0.132	0.005 (0.730)
TDEBT	0.444	0.437	0.007 (0.754)
BEA	0.546	0.554	−0.008 (0.716)
DIV	0.037	0.039	−0.002 (0.605)
CASH	0.117	0.129	−0.012 (0.352)

(continued)

Table 6 (continued)

Panel B: Firm characteristics of two groups

	FCEO	MCEO	Difference (*p*-value)
OWN	0.077	0.079	−0.002 (0.866)
LAGE	3.238	3.229	0.009 (0.849)
IDVOL	0.028	0.028	0.000 (0.877)
N	186	186	

Panel A presents the diagnostics and the results from the probit regression of female CEO on firm characteristics: $P(FCEO_{i,t} = 1|X) = \Phi(X^\mathrm{T}\beta)$, where *FCEO* is a dummy variable that equals one if a firm's CEO is female and zero otherwise. *X* is a set of firm characteristics defined in the Appendix. All variables are winsorised at 1st and 99th percentiles. Industries without female CEO are excluded, and firms in the sample must have financial information in at least two years. Standard errors are clustered by firm, and *p*-values are reported in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively. Panel B shows the descriptive statistics for firms in both the treatment (female CEO) and control (male CEO) groups.

and risk measures to the model. However, the endogeneity issue may still exist. In this subsection, we deal with this issue by using a 2SLS with an instrumental variable.

We use the ratio of the number of female CEOs in an industry to the number of total CEOs as an external instrument for the firm's female CEO. To be used as an instrumental variable, the ratio of industry female CEOs to total CEOs must satisfy two conditions: it must be significantly related to the firm's female CEO, and it must not have a direct effect on performance or risk. Because the proportion of industry female CEOs to total CEOs mainly measures the position of industry female CEOs in the markets, it is unlikely that it has a direct effect on performance or risk, satisfying the second condition. For the first condition, the first column of Table 8 presents the first-stage regression results of female CEO on the ratio of industry female CEOs to total CEOs and the other control variables used in our baseline regression model (1). As expected, the ratio of industry female CEOs to total CEOs is significantly and positively correlated with the firm's choice of a female CEO. This coefficient is statistically significant at the 1 percent level. We then apply the Cragg-Donald Wald *F*-statistic and the Stock and Yogo tests for a weak instrument. The results (not reported) show that the null hypothesis for a weak instrument is rejected, suggesting that the ratio of industry female CEOs is a valid instrument for the choice of a female CEO.

The results from the second-stage regressions are reported in columns 2–7. Columns 2–4 show that female CEOs are positively correlated with the three measures of performance. Similarly, columns 5–7 demonstrate that firms with

Table 7
Firm performance and risk-taking in matched sample

	(1) ROA_{t+1}	(2) ROE_{t+1}	(3) Q_{t+1}	(4) $BETA_{t+1}$	(5) $IDVOL_{t+1}$	(6) $ROAVOL_{t+1}$
$FCEO_t$	0.016**	0.028**	0.143**	−0.104***	−0.001*	−0.003**
	(0.013)	(0.016)	(0.023)	(0.007)	(0.064)	(0.020)
ROE_t	0.206***	0.481***	1.415***	−0.369*	−0.008***	0.002
	(0.000)	(0.000)	(0.000)	(0.066)	(0.001)	(0.894)
$IDVOL_t$	0.274	0.185	0.427	17.506***	0.350***	0.124
	(0.483)	(0.782)	(0.894)	(0.000)	(0.000)	(0.184)
LAT_t	0.004	0.004	0.062	0.148***	−0.001***	0.000
	(0.262)	(0.542)	(0.168)	(0.000)	(0.000)	(0.554)
$TANG_t$	0.067**	0.128***	0.344	−0.409**	−0.003	0.000
	(0.017)	(0.002)	(0.239)	(0.027)	(0.245)	(0.968)
$TDEBT_t$	0.091	0.388	3.170***	−1.140	−0.005	0.006
	(0.501)	(0.366)	(0.003)	(0.198)	(0.732)	(0.849)
BEA_t	0.157	0.329	2.671**	−0.972	−0.009	0.013
	(0.267)	(0.442)	(0.023)	(0.272)	(0.552)	(0.673)
DIV_t	0.570***	0.664***	1.618	0.794	−0.001	0.037
	(0.000)	(0.001)	(0.104)	(0.205)	(0.939)	(0.190)
$CASH_t$	0.054**	0.076*	0.033	−0.284*	−0.003	0.009
	(0.044)	(0.090)	(0.889)	(0.098)	(0.320)	(0.198)
OWN_t	−0.010	−0.031	−0.029	−0.279	−0.000	0.005
	(0.746)	(0.628)	(0.926)	(0.133)	(0.949)	(0.449)
$LAGE_t$	0.015**	0.010	0.039	−0.089*	0.000	0.000
	(0.039)	(0.458)	(0.623)	(0.076)	(0.490)	(0.859)
Intercept	−0.238	−0.436	−2.834	−0.045	0.049***	−0.006
	(0.145)	(0.317)	(0.110)	(0.966)	(0.004)	(0.867)
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	372	372	372	372	372	372
Adj. R^2	0.6172	0.4603	0.3659	0.4721	0.4879	0.1490

This table presents the results from the regressions of the performance and risk of firms on female CEO dummy using the matched sample:

$$PERFORM_{i,t+1} = \beta_0 + \beta_1 FCEO_{i,t} + \beta_2 FIRM - CHAR_{i,t} + \beta_3 INDUSTRY$$
$$- DUMMY_{j,t} + \beta_4 YEAR - DUMMY_t + \varepsilon_{i,t}$$

where *PERFORM* is either the return on assets, return on equity ratios, or Tobin's Q, *RISK* is either systematic risk, idiosyncratic risk or standard deviations in the quarterly returns on assets, and *FIRM-CHAR* is a set of firm characteristics. All variables are defined in the Appendix. All variables are winsorised at 1st and 99th percentiles. Standard errors are clustered by firm, and the *p*-values are reported in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Table 8
CEO gender and firm performance – IV approach

	(1) $FCEO_t$	(2) ROA_{t+1}	(3) ROE_{t+1}	(4) Q_{t+1}	(5) $BETA_{t+1}$	(6) $IDVOL_{t+1}$	(7) $ROAVOL_{t+1}$
IV	0.894***						
	(0.000)						
$FCEO_t$		0.035***	0.044*	0.204**	−0.523***	−0.004***	−0.002
		(0.008)	(0.085)	(0.029)	(0.000)	(0.009)	(0.544)
ROE_t	0.021	0.205***	0.479***	0.868***	−0.143**	−0.008***	−0.003
	(0.604)	(0.000)	(0.000)	(0.000)	(0.029)	(0.000)	(0.160)
$IDVOL_t$	−2.227***	−0.261*	−0.308	−3.093***	14.959***	0.477***	0.045
	(0.000)	(0.059)	(0.250)	(0.002)	(0.000)	(0.000)	(0.224)
LAT_t	0.010***	−0.001	−0.003*	0.014***	0.171***	−0.001***	−0.000**
	(0.007)	(0.220)	(0.076)	(0.009)	(0.000)	(0.000)	(0.016)
$TANG_t$	−0.057**	0.025***	0.037***	−0.123***	−0.169***	−0.001	−0.000
	(0.017)	(0.000)	(0.000)	(0.001)	(0.000)	(0.144)	(0.826)
$TDEBT_t$	0.112	−0.058*	−0.108*	1.284***	−0.793***	0.001	−0.007
	(0.448)	(0.064)	(0.079)	(0.000)	(0.001)	(0.800)	(0.414)
BEA_t	0.157	0.006	−0.163***	0.570**	−0.449*	−0.002	0.005
	(0.290)	(0.843)	(0.008)	(0.012)	(0.062)	(0.516)	(0.541)
DIV_t	0.080	0.549***	0.634***	2.908***	−0.556**	−0.015***	0.032***
	(0.601)	(0.000)	(0.000)	(0.000)	(0.024)	(0.000)	(0.000)
$CASH_t$	0.002	0.059***	0.093***	0.315***	−0.329***	−0.001	0.004
	(0.958)	(0.000)	(0.000)	(0.000)	(0.000)	(0.302)	(0.124)
OWN_t	0.165***	−0.016	−0.018	0.087	−0.262***	0.001	−0.002
	(0.000)	(0.114)	(0.354)	(0.230)	(0.001)	(0.581)	(0.559)
$LAGE_t$	0.018**	0.006***	0.009**	0.034***	−0.099***	−0.001***	−0.002***
	(0.029)	(0.002)	(0.013)	(0.007)	(0.000)	(0.001)	(0.001)
Intercept	−0.231	0.026	0.166**	−0.019	−0.584**	0.041***	0.028***
	(0.183)	(0.482)	(0.021)	(0.941)	(0.037)	(0.000)	(0.004)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,037	3,037	3,037	3,037	3,037	3,037	3,037
Adj. R^2	0.1136	0.5231	0.4333	0.3462	0.4129	0.5266	0.0848

This table presents the results from the first and second stages of the 2SLS regression of the performance and risk of firms on female CEO dummy and other control variables. The instrumental variable is the ratio of the number of industry female CEOs to total CEOs. All other variables are defined in the Appendix. The sample includes all Vietnamese listed firms from 2007 to 2015 and excludes firms with total assets or sales volume <1 million VND. All variables are winsorised at 1st and 99th percentiles. Standard errors are clustered by firm, and p-values are reported in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

female CEOs face less systematic and idiosyncratic risks in the future. These results are consistent with the results reported in previous sections and support our hypotheses that firms with female CEOs perform better and face less risk than firms with male CEOs.

6. Conclusion

We investigate the added value of female CEOs to firms in Vietnam. We use data on Vietnamese listed firms from 2007 to 2015 to show that those with female CEOs generate higher profitability and face less risk than those with male CEOs. This finding holds in our tests on the whole sample as well as on the matched sample, or when we use a 2SLS with an instrumental variable.

Our findings support the hypothesis that women offer unique perspectives, experiences and work styles compared to their male counterparts that lead to differences in the effectiveness of leadership for women and men. In addition, men are more overconfident, and women are more risk averse and collaborative, which allow firms with female CEOs to avoid negative NPV projects and receive valuable advice from the board of directors and other stakeholders.

Our findings are also consistent with the hypothesis that Vietnamese CEOs have some unique characteristics that stem from Vietnam's institutional background that help them to better manage firms. First, Vietnamese women are highly involved in economic activities (World Economic Forum, 2017), which suggests that they are hardworking. Second, they have a good educational background, 'even surpass[ing] men in terms of attaining college degrees' (World Bank, 2011). Further, female-led firms have better access to business networks than their counterparts (Pham and Talavera, 2018), which indicates that Vietnamese CEOs possess better soft skills than male CEOs do.

In the context of emerging markets and especially Vietnam, the results support the recent movement to increase the number of females that take leadership roles in businesses. Our results also highlight the importance of various policies and laws that promote gender equality in economic development. With a developing stock market and a high rate of female employment, our findings show that there are a lot more benefits to be reaped from increasing the number of women who take leadership roles in Vietnam.

References

Adams, R. B., and D. Ferreira, 2009, Women in the boardroom and their impact on governance and performance, *Journal of Financial Economics* 94, 291–309.
Adams, R. B., and P. Funk, 2012, Beyond the glass ceiling: does gender matter?, *Management Science* 58, 219–235.
Adams, R. B., and V. Ragunathan, 2015, Lehman sisters, Working paper (FIRN Research Paper).
Adhikari, B. K., 2018, Female executives and corporate cash holdings, *Applied Economics Letters* 25, 958–963.
Amin, M., and A. Islam, 2014, Are there more female managers in the retail sector? Evidence from survey data in developing countries, *Journal of Applied Economics* 17, 213–228.
Bandiera, O., L. Guiso, A. Prat, and R. Sadun, 2015, Matching firms, managers, and incentives, *Journal of Labor Economics* 33, 623–681.

Barber, B. M., and T. Odean, 2001, Boys will be boys: gender, overconfidence, and common stock investment, *The Quarterly Journal of Economics* 116, 261–292.

Carter, M. E., F. Franco, and M. Gine, 2017, Executive gender pay gaps: the roles of female risk aversion and board representation, *Contemporary Accounting Research* 34, 1232–1264.

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

de Jong, A., R. Kabir, and T. T. Nguyen, 2008, Capital structure around the world: the roles of firm- and country-specific determinants, *Journal of Banking and Finance* 32, 1954–1969.

de Mel, S., D. McKenzie, and C. Woodruff, 2008, Returns to capital in microenterprises: evidence from a field experiment, *The Quarterly Journal of Economics* 123, 1329–1372.

Eagly, A. H., and L. L. Carli, 2003, The female leadership advantage: an evaluation of the evidence, *The Leadership Quarterly* 14, 807–834.

Erhardt, N. L., J. D. Werbel, and C. B. Shrader, 2003, Board of director diversity and firm financial performance, *Corporate Governance: An International Review* 11, 102–111.

Faccio, M., M.-T. Marchica, and R. Mura, 2016, CEO gender, corporate risk-taking, and the efficiency of capital allocation, *Journal of Corporate Finance* 39, 193–209.

Ford, R. C., and W. D. Richardson, 1994, Ethical decision making: a review of the empirical literature, *Journal of Business Ethics* 13, 205–221.

Francoeur, C., R. Labelle, and B. Sinclair-Desgagné, 2008, Gender diversity in corporate governance and top management, *Journal of Business Ethics* 81, 83–95.

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

Ho, S. M., A. Y. Li, K. Tam, and F. Zhang, 2015, CEO gender, ethical leadership, and accounting conservatism, *Journal of Business Ethics* 127, 351–370.

Huang, J., and D. J. Kisgen, 2013, Gender and corporate finance: are male executives overconfident relative to female executives?, *Journal of Financial Economics* 108, 822–839.

Inci, A. C., M. P. Narayanan, and H. N. Seyhun, 2017, Gender differences in executives' access to information, *Journal of Financial and Quantitative Analysis* 52, 991–1016.

Johnson, B. T., and A. H. Eagly, 1990, Involvement and persuasion: types, traditions, and the evidence, *Psychological Bulletin* 107, 375–384.

Jurkus, A. F., J. C. Park, and L. S. Woodard, 2011, Women in top management and agency costs, *Journal of Business Research* 64, 180–186.

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

Khan, W. A., and J. P. Vieito, 2013, CEO gender and firm performance, *Journal of Economics and Business* 67, 55–66.

Kotiranta, A., A. Kovalainen, and P. Rouvinen, 2007, Female leadership and firm profitability, *EVA Analysis* 3, 1–11.

Krishnan, G. V., and L. M. Parsons, 2008, Getting to the bottom line: an exploration of gender and earnings quality, *Journal of Business Ethics* 78, 65–76.

Lam, K. C. K., P. B. McGuinness, and J. P. Vieito, 2013, CEO gender, executive compensation and firm performance in Chinese-listed enterprises, *Pacific-Basin Finance Journal* 21, 1136–1159.

Liu, Y., Z. Wei, and F. Xie, 2016, CFO gender and earnings management: evidence from China, *Review of Quantitative Finance and Accounting* 46, 881–905.

Martin, A. D., T. Nishikawa, and M. A. Williams, 2009, CEO gender: effects on valuation and risk, *Quarterly Journal of Finance and Accounting* 48, 23–40.

Martín-Ugedo, J. F., A. Mínguez-Vera, and L. Palma-Martos, 2018, Female CEOs, returns and risk in Spanish publishing firms, *European Management Review* 15, 111–120.

Melero, E., 2011, Are workplaces with many women in management run differently?, *Journal of Business Research* 64, 385–393.

Newman, C., 2017, Gender inequality and the empowerment of women, in: F. Tarp, ed., *Growth, Structural Transformation, and Rural Change in Viet Nam: A Rising Dragon on the Move* (Oxford University Press, Oxford), 222–236.

Niessen, A., and S. Ruenzi, 2017, Sex matters: Gender bias in the mutual fund industry, Working paper (University of Mannheim).

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

Oxfam, 2017, Even it up: how to tackle inequality in Vietnam. Retrieved from: https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-vietnam-inequality-120117-en.pdf

Pande, R., and D. Ford, 2011, Gender quotas and female leadership: a review, Working paper (The World Bank).

Perryman, A. A., G. D. Fernando, and A. Tripathy, 2016, Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation, *Journal of Business Research* 69, 579–586.

Pham, T., and O. Talavera, 2018, Discrimination, social capital, and financial constraints: the case of Viet Nam, *World Development* 102, 228–242.

Sabarwal, S., and K. Terrell, 2008, Does gender matter for firm performance? Evidence from Eastern Europe and Central Asia, Working paper (The World Bank).

Smith, N., V. Smith, and M. Verner, 2006, Do women in top management affect firm performance? A panel study of 2,500 Danish firms, *International Journal of Productivity and Performance Management* 55, 569–593.

Stogdill, R. M., 1974, *Handbook of Leadership: A Survey of Theory and Research* (Free Press, New York).

Sunden, A. E., and B. J. Surette, 1998, Gender differences in the allocation of assets in retirement savings plans, *The American Economic Review* 88, 207–211.

Tate, G., and L. Yang, 2015, Female leadership and gender equity: evidence from plant closure, *Journal of Financial Economics* 117, 77–97.

Vietnam Business Annual Report, 2007, Labor and human resource development. Retrieved from https://www.economica.vn/Portals/0/Documents/3cd5971e0395e412b461eb83f67cd43a.pdf

Vo, A., and C. Harvie, 2009, The changing face of women managers in small and medium sized enterprises in Vietnam, in: C. Rowley, Q. Truong, eds., *The Changing Face of Vietnamese Management* (Routledge, London), 158–182.

Vu, H. T., H. T. Duong, B. Barnett, and T. T. Lee, 2017, A role (in)congruity study on Vietnamese journalists' perception of female and male leadership, *Asian Journal of Communication* 27, 648–664.

World Bank, 2011, *Vietnam – Country Gender Assessment* (World Bank).

World Economic Forum, 2007, The global gender gap report. Retrieved from http://www3.weforum.org/docs/WEF_GenderGap_Report_2007.pdf

World Economic Forum, 2016, The global gender gap report. Retrieved from http://www3.weforum.org/docs/GGGR16/WEF_Global_Gender_Gap_Report_2016.pdf

World Economic Forum, 2017, The global gender gap report. Retrieved from http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

Zelechowski, D. D., and D. Bilimoria, 2004, Characteristics of women and men corporate inside directors in the US, *Corporate Governance: An International Review* 12, 337–342.

Zeng, S., and L. Wang, 2015, CEO gender and corporate cash holdings: are female CEOs more conservative?, *Asia-Pacific Journal of Accounting and Economics* 22, 449–474.

Appendix

Variable definitions

Variable	Definition
CEO variables	
FCEO	Dummy variable that equals one if a firm's CEO is female and zero otherwise
Firm performance	
ROA	Return on assets that equals the ratio of net income to total assets
ROE	Return on equity that equals the ratio of net income to total equity
Q	Tobin's Q that equals the market value of equity plus total debt to the book value of total assets
BETA	Systematic risk that is estimated in the CAPM model of firm's daily stock returns on market portfolio returns over a year
IDVOL	Idiosyncratic risk that equals the standard deviation of the residuals of stock returns from the CAPM model
ROAVOL	The standard deviation in the quarterly returns on assets over the last two years
Firm characteristics	
LAT	The natural logarithm of total assets
TANG	The ratio of tangible assets to total assets
TDEBT	The ratio of total debt to total assets
BEA	The ratio of book equity to total assets
DIV	The ratio of cash dividend to total assets
CASH	The ratio of cash flow from operations to total assets
OWN	The ratio of managerial ownership that equals the ratio of stocks held by firm's managers to total shares outstanding
LAGE	The natural logarithm of firm age until 2015

All variables are at the firm level for each current year (t) unless noted otherwise.