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Abstract

This paper proposes female CEOs' overconfidence and risky behavior stem from gender stereotype threats. With two subsamples in Vietnam—firms in the Northern and Southern regions–we empirically show that female CEOs in the North, where there is less gender stereotype, tend to overinvest relative to male CEOs. However, in the South, they are indifferent. Additional analysis reinforces the main finding that female CEOs from the North tend to take more risks even when dealing with market volatility and uncertainty (e.g., the COVID-19 pandemic). Such risky behaviors of female CEOs in the North do not deteriorate firm value but instead, possibly improve firm performance.

JEL classification: G30, G32, J16

Keywords: female CEOs, Vietnam, gender, stereotype

1. Introduction

Women in leadership tend to exhibit lower levels of overconfidence and less willingness to take excessive risks or exploit opportunities for personal gain (Bernasek and Shwiff, 2001; Abou-el-sood, 2018; Adhikari et al., 2019). Therefore, female CEOs are likely to be risk-averse and make conservative decisions (Khan & Vieito, 2013; Palvia et al., 2015; Faccio et al., 2016; Zeng & Wang, 2015; Skala & Weill, 2018). However, many previous studies do not consider environmental factors that can drive female CEOs' risk aversion. For example, Berger et al. (2014) find that women tend to trade excessively and engage in more risk-taking activities than men in the financial sector, one of the most male-dominant industries (Ryan et al., 2016; Fender et al., 2016).

The mixed findings on women's risk-taking behavior imply that men and women could be biologically indifferent regarding risk aversion. However, their difference might stem from external factors such as education and culture. Booth and Nolen (2012) find that boys and girls from co-education schools do not show significantly different investment behavior, while Carr and Steele (2010) empirically show that 'stereotype' influences investment behavior for males and females. Based on this finding, female CEOs may respond differently depending on the cultural gender expectations or stereotypes.

Vietnam provides an ideal setting to check the influence of culture on female CEOs' risk-taking behavior due to its cultural separation of North and South[1] while their education system is the same (UNDP, 2015). The gender stereotypes of North and South Vietnam differ because of the country's division into two regions by political systems before the Vietnam War ended in 1975: communism/socialism in the North and capitalism in the South. Different political ideology leads to other gender stereotypes in society, and the effect is long-lasting

[1] According to Do et al. (2023), "it is commonly believed that there is a regional difference in gender role attitudes between people of Northern and Southern Vietnam."

(e.g., Alesina & Fuchs–Schündeln, 2007; Bauernschuster & Rainer, 2012; Lippmann et al., 2020). According to Anderson (2010), the communist North challenged traditional gender roles, and women participated in the war and other professions. However, the capitalist South's markers of freedom include focusing on Western gender norms like 'miniskirts' and '[driving] Honda motorcycles' (Eisen, 1984).

Since unification, Vietnam committed to promoting gender equality (UN Women, 2016). Vietnam currently ranks first worldwide regarding female work and women's political participation. However, regional differences between the North and South persist (Goodkind, 1996; Truong et al., 1997; Belanger, 2000; Ghuman et al., 2006), with a smaller gender gap in the North (General Statistics Office, 2015). Stereotype threat is a fear of being seen and judged according to a negative group stereotype. Thus, in a severely unequal gender environment, women may feel pressured to hold back and be less confident.

In addition, managers in North and South Vietnam exhibit different management styles due to their geographical separation. According to Ralston et al. (1999), managers in the North show a Western orientation of individualism and competitiveness (Hui and Triandis, 1975), while the South display a more collectivist aspect by prioritizing group goals over personal ones (Triandis et al., 1988). Thus, this paper explores whether female CEOs in the North and South exhibit different risk-taking behaviors due to variations in gender stereotypes and managerial individualism between the regions.

To test this question, we split the sample into North and South firms to examine risk-taking differences between female and male CEOs. Our findings empirically show that female CEOs in the North and South over-invest relative to male CEOs. However, the degree of coefficient differs by 3.5 times, and the statistical significance disappears for the South with different measurements of investment efficiency, while the results with alternative measures in the North are statistically significant and consistent with the main findings.

To further check if the female CEOs in the North take more risks than male CEOs, we examine two risky environments for firms: high volatility in the market and COVID-19. Firms with female CEOs and high volatility seem to over-invest, indicating overconfidence in their decision-making abilities. Furthermore, during COVID-19, female CEOs still over-invest relative to male CEOs in the Northern region. Overall results suggest that Vietnamese female CEOs tend to take more risks, driven by less stereotype threat, allowing them to act freely.

This paper concludes with an analysis showing that Northern female CEOs indirectly influence firm performance through investment efficiency. The non-direct impact of female CEOs on firm performance is due to Vietnam's already gender-diverse environment that regards women positively in the workforce (Low et al., 2015). Thus, adding more gender diversity has a negligible impact on firm performance in that setting. Overall, the results suggest that while increasing gender diversity in management may not influence the firm performance in an already women-friendly environment, it could encourage female leaders to act to improve firm performance.

This study contributes to the literature in two ways. First, the empirical evidence enriches the extant literature on female CEO's risk-taking (e.g., Powell and Ansic, 1997; Bajtelsmit and Bernasek, 1996; Barber and Odean, 2001; Berger et al., 2014; Palvia et al., 2015; Faccio et al., 2016) by showing that female CEOs may not be biologically risk-averse relative to male CEOs. Second, the main findings propose that the stereotype threat is a possible factor that pressures female CEOs to be risk-averse (e.g., Alesina and Fuchs–Schündeln, 2007; Anderson, 2010; Bauernschuster and Rainer, 2012; Low et al., 2015; Lippmann et al., 2020). Thus, this research suggests studying environmental factors, such as gender stereotypes, alongside the correlation between female leadership and firm outcomes to analyze female leaders' effectiveness or behaviors.

The remainder of this paper is as follows. Section 2 discusses the data and sample, Section 3 presents the main findings, and Section 4 discusses additional tests. Finally, Section 5 provides a conclusion.

2. Data and Sample

2.1 Sample

Our initial sample comprises all Vietnamese firms available in the Thomson–Reuters Worldscope Database from 2015 to 2021. Using the database, we hand collect the CEO information and create a dummy variable that equals "1" if the CEO is female and "0" otherwise. All firm-level accounting data are from Thomson-Reuters Worldscope and Datastream and require firms not to have missing information for firm-level control variables. Finally, by removing financial firms (SIC Code 6000-6999), we have a final sample of 5,420 firm-year observations and 1,270 firms from 2015 to 2021.

2.2 Variable Construction

2.2.1. Investment Efficiency

While we test three different measures for investment efficiency, the main investment efficiency variable is per Chen et al. (2011) because the measurement incorporates McNichols and Stubben's (2008) argument that the relationship between investment and revenue growth can differ between revenue increases and decreases. The study uses the following model to capture the investment efficiency:

$$Investment_{i,t} = \alpha + \beta_1 Neg_{i,t-1} + \beta_2 Revenue\ Growth_{i,t-1} + \beta_3 Neg_{i,t-1} * Revenue\ Growth_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where $Investment_{i,t}$ is the growth in total assets and $Neg_{i,t-1}$ equals "1" if the previous year's revenue growth rate is negative and "0" otherwise. $Revenue\ Growth_{i,t-1}$ indicates the annual rate of revenue growth in the previous year. The interaction term of $Neg_{i,t-1}$ and

$Revenue\ Growth_{i,t-1}$ follows Chen et al. (2011) and the residual, $\varepsilon_{i,t}$, reflects the deviation from the expected level of investment at the industry level. The model's estimate is cross-sectional for each industry (three-digit SIC code). A positive (negative) residual means over (under) investment relative to the revenue growth as the investment is higher (lower) than the expected level.

The other two alternative investment efficiency proxy measures are from Biddle et al. (2009), based on sales growth, and Chen et al. (2013), based on Tobin's Q and sales growth. The Biddle et al. (2009) model is:

$$Investment_{i,t} = \alpha + \beta_1\ Revenue\ Growth_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

where $Investment_{i,t}$ is the growth in total assets and $Revenue\ Growth_{i,t-1}$ indicates the previous year's annual rate of revenue growth. The Chen et al. (2013) model is:

$$Investment_{i,t} = \alpha + \beta_1\ Q_{i,t-1} + \beta_2\ Revenue\ Growth_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where $Investment_{i,t}$ is the growth in total assets and $Q_{i,t-1}$ is the firm performance measure Tobin's Q (calculated as (market capitalization + total liabilities) / (common equity + total liabilities)). $Revenue\ Growth_{i,t-1}$ indicates the previous year's annual rate of revenue growth. Consistent with our main model, residuals capture CEOs' over and under-investments.

2.2.2 Female CEOs

Due to limited data availability on Vietnamese firm leaders, we hand-collect information on CEOs by visiting each firm's website. For our sample period of 2015–2021, we assume the CEO is male if CEO information was unavailable for the firm. A dummy variable, *Female_CEO*, equals "1" if the CEO is female for the year and "0" otherwise.

2.2.3. Controls

Firm-specific financial information on international firms is from WorldScope and Datastream. Following previous literature such as Biddle and Hilary (2006) and Biddle et al.

(2009), we control for firm-specific characteristic variables such as the natural logarithm value of a firm's market capitalization (*Size*), book-to-market value (*BTM*), return on equity (*ROE*), the ratio of total debt (*Leverage*), the ratio of the amount of cash held to book value of assets (*CASH*), annual growth of sales (*Investment_Opportunity*), the annual standard deviation of monthly stock returns (*Volatility*), and the proportion of closely held shares (*CLOSE*). Table 1 presents summary statistics of the dependent and independent variables.

Table 1: Summary Statistics

	Observations	Mean	Std	P1	P25	Median	P75	P99
Inv_Eff	5,240	−0.055	0.942	−2.908	−0.146	−0.040	0.084	1.750
Female_CEO	5,240	0.035	0.185	0.000	0.000	0.000	0.000	1.000
Size	5,240	16.368	1.855	12.708	15.093	16.223	17.451	21.877
BTM	5,240	1.427	2.710	0.135	0.612	1.000	1.603	7.378
ROE	5,240	0.060	0.923	−0.811	0.026	0.089	0.162	0.533
Leverage	5,240	0.218	0.189	0.000	0.034	0.190	0.358	0.669
Cash	5,240	0.148	0.162	0.001	0.030	0.089	0.210	0.717
Invop	5,240	0.286	4.509	−0.866	−0.129	0.034	0.186	3.731
Volatility	5,240	0.128	0.088	0.028	0.071	0.108	0.161	0.441
Close	5,240	0.390	0.318	0.000	0.000	0.422	0.658	0.981

3. Main Results

3.1 Baseline Findings

To investigate whether a firm's emission strategy reacts to air pollution, we use the following equation:

$$Inv\_Eff_{i,t} = \alpha + \beta_1 Female\_CEO_{i,t} + \beta_2 X_{i,t} + \Phi_{industry} + \theta_t + \varepsilon_{i,t} \quad (4)$$

where the indices *i* and *t* correspond to firm and year, respectively. $Inv\_Eff_{i,t}$ represents the investment efficiency of firms. $Female\_CEO_{i,t}$ equals "1" if the CEO is female and "0" otherwise. $X_{i,t}$ represents control variables, including *Size, BTM, ROE, Leverage, Cash, Invop, Volatility,* and *Close* while $\Phi_{industry}$ and θ_t represent industry and year fixed-effects. Finally, $\varepsilon_{i,t}$ represents the firm time-specific error term clustered at the firm level.

The regression results are in Table 2; Model (1) shows results before splitting the sample into North and South. The coefficient of *Female_CEO* is positive and statistically significant, indicating that female Vietnamese CEOs over-invest across the country. When splitting the sample into North and South in Models (2) and (3), respectively, the *Female_CEO* has a positive and statistically significant coefficient in both columns. However, the size and statistical significance are much more noticeable in Model (2) for the Northern region. Overall results imply that female CEOs in Northern regions—where gender stereotypes against women are less prevalent—exhibit greater confidence and tend to over-invest their resources.

Table 2: Baseline Findings

This table presents the regressions of the *Female_CEO* variable on the investment efficiency variable, *Inv_Eff*. The firm level controls *Size, BTM, ROE, Leverage, Cash, Invop, Volatility,* and *Close*. The results are from regressions with industry and year-fixed effects. The values of the t-statistics in parentheses use robust standard errors clustered at the firm level. Model (1) includes all samples of Vietnamese firms, while Models (2) and (3) report results for the North and South sample, respectively.

	(1)	(2)	(3)
VARIABLES	***Inv_Eff***	***Inv_Eff***	***Inv_Eff***

VARIABLES	(1) *Inv_Eff*	(2) *Inv_Eff*	(3) *Inv_Eff*
Female_CEO	**0.114****	**0.286*****	**0.089***
	(2.33)	**(2.85)**	**(1.84)**
Size	0.027***	0.039***	0.022**
	(3.70)	(3.88)	(2.05)
BTM	−0.013***	−0.008	−0.014***
	(−6.00)	(−1.16)	(−11.13)
ROE	0.013	0.007	0.018
	(1.59)	(0.98)	(1.18)
Leverage	0.045	0.066	−0.013
	(0.54)	(0.64)	(−0.09)
Cash	0.071	−0.007	0.109
	(0.78)	(−0.06)	(0.97)
Invop	0.026	0.003	0.078***
	(1.32)	(1.13)	(3.70)
Volatility	0.319**	0.332	0.070
	(2.14)	(1.42)	(0.35)
Close	−0.011	−0.024	−0.032
	(−0.28)	(−0.47)	(−0.64)
Industry-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	5,240	2,317	2,350
R-squared	0.039	0.033	0.114

3.2 Alternative Investment Efficiency Variables

Using Biddle et al.'s (2009) model, we extract an alternative investment efficiency measure, *Inv_Eff_A*, and regress it with *Female_CEO* as our baseline finding. Table 3 Models (1)–(3) show that the variable *Inv_Eff_A* produces insignificant coefficients for *Female_CEO* in the full and South firm samples. *Female_CEO* has a positive and statistically significant coefficient only in the North sample, supporting our main finding that female CEOs in the North are overconfident and over-invest due to less prevalent gender stereotypes.

Furthermore, applying Chen et al.'s (2013) model and an alternative investment efficiency variable, *Inv_Eff_B*, we obtained identical findings to those of *Inv_Eff_A*. Overall results indicate that the threat of gender stereotypes influences female CEOs' risk-taking actions.

Table 3: Alternative Measures of Investment Efficiency

This table presents the regressions of the *Female_CEO* variable on the alternative investment efficiency variables, *Inv_Eff_A* and *Inv_Eff_B*. The firm level controls *Size, BTM, ROE, Leverage, Cash, Invop, Volatility,* and *Close.* The results are from regressions with industry and year-fixed effects. The values of the t-statistics in parentheses are from robust standard errors clustered at the firm level. Models (1) to (3) report results for the North sample, while Models (4) to (6) show results for the South sample.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
VARIABLES	***Inv_Eff_A***	***Inv_Eff_A***	***Inv_Eff_A***	***Inv_Eff_B***	***Inv_Eff_B***	***Inv_Eff_B***
Female_CEO	**0.042**	**0.154****	**0.013**	**0.028**	**0.136****	**−0.005**
	(1.29)	**(2.24)**	**(0.34)**	**(1.02)**	**(2.07)**	**(−0.20)**
Size	0.028***	0.036***	0.019***	0.026***	0.033***	0.019***
	(6.31)	(5.03)	(3.45)	(6.70)	(5.21)	(3.82)
BTM	−0.005***	−0.007	−0.004***	−0.005***	−0.002	−0.005***
	(−3.46)	(−1.40)	(−4.76)	(−5.30)	(−0.63)	(−6.19)
ROE	0.015*	0.010	0.017	0.015*	0.009	0.019
	(1.87)	(1.33)	(1.28)	(1.90)	(1.14)	(1.57)
Leverage	0.147***	0.081	0.188***	0.149***	0.096	0.186***
	(3.28)	(1.16)	(3.54)	(3.82)	(1.51)	(4.12)
Cash	0.111**	0.123	0.118**	0.042	0.073	0.028
	(2.16)	(1.51)	(2.19)	(0.96)	(1.13)	(0.55)
Invop	0.033	0.003	0.104***	0.033	0.004	0.111***
	(1.20)	(0.79)	(2.98)	(1.19)	(1.06)	(3.20)
Volatility	0.401***	0.405**	0.192	0.381***	0.446**	0.114
	(3.44)	(2.01)	(1.18)	(3.38)	(2.25)	(0.74)
Close	0.001	0.027	−0.021	−0.017	0.012	−0.026
	(0.07)	(0.82)	(−0.82)	(−1.00)	(0.49)	(−1.18)
Industry-Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,240	2,317	2,350	5,102	2,248	2,301
R-squared	0.137	0.083	0.433	0.177	0.105	0.518

3.3. Subsequent effect of female CEOs

In this section, we lag all the independent variables to check for any subsequent effect of female CEOs on investment efficiency. Table 4 shows that the lag of *Female_CEO* is only statistically significant in Model (2), the Northern regions sample. This result strengthens our main finding that female CEOs tend to exhibit overconfidence, especially in societies that define gender roles less rigidly.

Table 4: Subsequent Effect

This table presents the regressions of a one-year lag of the *Female_CEO* variable on the investment efficiency variable, *Inv_Eff.* The firm level controls *Size, BTM, ROE, Leverage, Cash, Invop, Volatility,* and *Close.* The results are from regressions with industry and year fixed effects. The values of the t-statistics in parentheses are from robust standard errors clustered at the firm level. Model (1) includes

all samples of Vietnamese firms, while Models (2) and (3) report results for the North and South sample, respectively.

VARIABLES	(1) *Inv_Eff*	(2) *Inv_Eff*	(3) *Inv_Eff*
L.Female_CEO	**−0.009**	**0.317*** **	**0.089**
	(−0.07)	**(2.60)**	**(1.44)**
L.Size	−0.055	0.029**	0.008
	(−0.81)	(2.53)	(0.60)
L.BTM	−0.053	−0.012	−0.031
	(−1.35)	(−1.24)	(−1.55)
L.ROE	−0.074	0.002	−0.174***
	(−1.40)	(0.38)	(−10.07)
L.Leverage	−0.554	−0.156	−0.226
	(−1.41)	(−1.55)	(−1.29)
L.Cash	−0.202	−0.176	−0.029
	(−1.06)	(−1.03)	(−0.20)
L.Invop	−0.001	−0.001	0.002
	(−0.56)	(−0.48)	(0.62)
L.Volatility	−0.512	0.211	−0.309
	(−0.97)	(1.06)	(−1.35)
L.Close	−0.175	−0.025	−0.028
	(−0.87)	(−0.45)	(−0.49)
Industry-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	4,476	1,977	2,011
R-squared	0.002	0.009	0.026

4. Additional Analysis

4.1. Risky Firms

An interaction term between the *Female_CEO* variable and one of our control variables, *Volatility*, which is the annual standard deviation of monthly stock returns, serves to investigate whether Northern Vietnamese female CEOs exhibit risk propensity due to lower gender stereotypes. The interaction term only has a positive and statistically significant coefficient for the North sample in Model (2) of Table 5. It supports our main finding that gender stereotype threat influences female CEOs' risky behaviors and their overinvestment when the gender stereotype threat is weak.

Table 4: Subsequent Effect

This table presents the regressions of a one-year lag of the *Female_CEO* variable on the investment efficiency variable, *Inv_Eff*. The firm level controls *Size*, *BTM*, *ROE*, *Leverage*, *Cash*, *Invop*, *Volatility*, and *Close*. The results are from regressions with industry and year fixed effects. The values of the t-

statistics in parentheses are from robust standard errors clustered at the firm level. Model (1) includes all samples of Vietnamese firms, while Models (2) and (3) report results for the North and South sample, respectively.

VARIABLES	(1) *Inv_Eff*	(2) *Inv_Eff*	(3) *Inv_Eff*
*Female_CEO * Volatility*	**0.951**	**2.902*** **	**−0.331**
	(1.40)	**(4.14)**	**(−0.73)**
Female_CEO	−0.004	−0.091	0.129
	(−0.05)	(−1.21)	(1.61)
Size	0.027***	0.040***	0.022**
	(3.73)	(4.00)	(2.05)
BTM	−0.013***	−0.008	−0.014***
	(−6.06)	(−1.19)	(−11.05)
ROE	0.013	0.007	0.018
	(1.59)	(0.97)	(1.18)
Leverage	0.045	0.061	−0.014
	(0.53)	(0.60)	(−0.10)
Cash	0.072	−0.013	0.107
	(0.79)	(−0.11)	(0.96)
Invop	0.026	0.003	0.078***
	(1.32)	(1.13)	(3.70)
Volatility	0.290*	0.271	0.084
	(1.92)	(1.16)	(0.41)
Close	−0.011	−0.023	−0.032
	(−0.28)	(−0.44)	(−0.64)
Industry-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	5,240	2,317	2,350
R-squared	0.039	0.035	0.115

4.2 During COVID-19

A further check is to see if Northern Vietnamese female CEOs engage in riskier behaviors than male CEOs during unstable times like the COVID-19 pandemic. The *Covid* variable is a dummy variable that equals "1" if the year is 2020 and/or 2021 and "0" otherwise. Again, the interaction term of *Covid* and *Female_CEO* is statistically significant only for the North sample in Model (2) of Table 6, indicating that Vietnamese CEOs take riskier actions than male CEOs even during unstable times. This result further supports our baseline findings.

Table 6: Risky Times

This table presents the regressions of the *Female_CEO* variable and interaction term of *Female_CEO* and *Covid* on the investment efficiency variable, *Inv_Eff*. *Covid* equals "1" for 2020 and 2021 and "0"

otherwise. The firm level controls *Size*, *BTM*, *ROE*, *Leverage*, *Cash*, *Invop*, *Volatility*, and *Close*. Results are from regressions with industry and year fixed effects. The values of the t-statistics in parentheses are from robust standard errors clustered at the firm level. Model (1) includes all samples of Vietnamese firms, while Models (2) and (3) report results for the North and South sample, respectively.

VARIABLES	**(1)** ***Inv_Eff***	**(2)** ***Inv_Eff***	**(3)** ***Inv_Eff***
*Female_CEO * Covid*	**0.258***	**0.708****	**0.159**
	(1.90)	**(2.50)**	**(1.19)**
Female_CEO	0.023	0.045	0.028
	(0.92)	(1.17)	(0.83)
Size	0.027***	0.040***	0.022**
	(3.73)	(4.01)	(2.06)
BTM	−0.013***	−0.007	−0.014***
	(−5.95)	(−1.10)	(−11.08)
ROE	0.013	0.007	0.017
	(1.57)	(0.96)	(1.16)
Leverage	0.042	0.054	−0.015
	(0.50)	(0.53)	(−0.11)
Cash	0.071	−0.010	0.110
	(0.78)	(−0.08)	(0.98)
Invop	0.026	0.003	0.078***
	(1.32)	(1.12)	(3.70)
Volatility	0.322**	0.320	0.077
	(2.16)	(1.38)	(0.39)
Close	−0.010	−0.019	−0.032
	(−0.25)	(−0.36)	(−0.63)
Industry-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	5,240	2,317	2,350
R-squared	0.040	0.037	0.115

4.2 Firm Performance

Previous literature vastly covered the impact of female leaders on firm performance, with mixed evidence. Among the scant research in Asia, Julizaerma and Sora (2012) show a positive relationship between women board members and firm performance with Malaysian data. Darmadi's (2011) study of Indonesian firms shows that women on boards negatively impact firm performance. Low et al. (2015) explain the differing Asia results with differences in the degree of tokenism and level of female labor participation (Yi, 2011). According to Low et al. (2015), women board members in South Korea have a stronger positive impact on firm performance than in Hong Kong and Singapore, where there is weaker corporate

governance plus lower female labor participation. In such an environment, firms will not appoint female directors who lack the skills solely to reflect societal expectations; therefore, tokenism is unlikely to happen.

In Vietnam, especially in the North, the workplace has greater gender diversity than in other Asian countries such as South Korea and Singapore[2]. In these settings, previous literature, such as Adams and Ferreira (2009) and Low et al. (2015), shows that simply adding females to the board or management would not impact or could negatively impact firm performance without gender diversity improvement. Table 7 demonstrates this finding when regressing *Female_CEO* with the firm performance measure, *Tobin's Q*.

However, previous literature does not show how female leaders behave in an already gender-diverse environment. Table 7 shows that the investment efficiency variable only positively relates to *Tobin's Q* for the North sample in Model (2), suggesting that female CEOs take action to improve firm performance when there is a decreased gender stereotype threat, even if it is over-investing because it enhances firm performance.

Table 7: Firm Performance

This table presents the *Female_CEO* and *Investment Efficiency* regressions on firm performance, *Q*. *Covid* equals "1" for 2020 and 2021 and "0" otherwise. The firm level controls *Size, BTM, ROE, Leverage, Cash, Invop, Volatility,* and *Close.* Results are from regressions with industry and year fixed effects. The values of the t-statistics in parentheses are from robust standard errors clustered at the firm level. Model (1) includes all samples of Vietnamese firms, while Models (2) and (3) report results for the North and South sample, respectively.

	(1)	(2)	(3)
VARIABLES	**Q**	**Q**	**Q**
Inv_Eff	**0.003**	**0.019****	**−0.008***
	(0.64)	**(2.31)**	**(−1.66)**
Female_CEO	0.057	−0.047	0.084
	(0.99)	(−1.23)	(1.01)
Size	0.103***	0.076***	0.116***
	(9.99)	(7.41)	(10.19)

[2] Economic Participation and Opportunity Index, from the 2021 Global Gender Gap Report published by the World Economic Forum, measures a country's attitude toward women at work. Vietnam ranks 26th, which is higher than Singapore (33rd) and South Korea (102th) out of 156 countries on the list.

	(1)	(2)	(3)
VARIABLES	**Q**	**Q**	**Q**
BTM	−0.042	−0.111***	−0.020
	(−1.57)	(−4.42)	(−1.49)
ROE	−0.013**	−0.000	−0.029*
	(−2.01)	(−0.10)	(−1.86)
Leverage	−0.026	0.092	−0.198**
	(−0.48)	(1.18)	(−2.39)
Cash	0.477***	0.285**	0.524***
	(5.35)	(2.41)	(5.17)
Invop	0.000	−0.000	0.002*
	(0.32)	(−0.68)	(1.77)
Volatility	0.374***	0.275***	0.522***
	(4.90)	(2.61)	(4.08)
Close	0.099***	0.129***	0.068**
	(3.84)	(3.09)	(1.99)
Industry-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	5,240	2,317	2,350
R-squared	0.406	0.528	0.404

5. Conclusion

This paper investigates the impact of gender stereotype threat on female CEO risk-taking behavior. Using samples of Vietnamese firms from Northern and Southern regions, we find that female CEOs from the North, where there is a weaker gender stereotype threat, overinvest. Such female CEO behavior in the North persists even when the firm's risk is high and during the COVID-19 pandemic. Thus, environmental factors play a significant role in female leaders' success, indicating that biological differences in risk-taking may not affect women's behaviors as much as gender stereotype threats and other environmental factors.

Lastly, the presence of female CEOs may not have a direct impact on the firm performance in an already gender-diverse environment. However, as the last section of this paper shows, female CEOs take actions that improve firm performance, including overinvestment, despite overinvestment's potential to deteriorate firm value (but not in the Vietnam case). Our study contributes to the literature on female CEOs and the importance of considering environmental factors when examining female leaders.

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