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DO MALE CEOS REALLY RUN FIRMS BETTER THAN FEMALE COUNTERPARTS? NEW EVIDENCE FROM VIETNAM*

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Abstract

Using firm fixed-effects regression and data from Vietnam's Enterprise Censuses, this study aims to test the female underperformance hypothesis. Our findings decisively undermine these hypotheses. Female-managed firms are smaller than male-managed ones. However, once observed variables and firm fixed-effects are controlled for, female-managed firms have higher revenues and return on assets and capital than male-managed firms. Female-managed firms are more likely to employ female workers and provide more jobs with social insurance. Compared with male-managed firms, moreover, female-managed firms have a higher tax payment rate as well as a higher tax payment amounts.

Keywords: CEO gender, firm performance, gender gap, labor, Vietnam

JEL Classification Codes: J16, J54, L25

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I. *Introduction*

Gender equality is one of the important millennium development goals and sustainable development goals that countries throughout the world aim to achieve. Gender differences are often analyzed in education, health and employment (e.g., Grown, Gupta, & Kes, 2005). Recently, increasing attention has been paid to gender differences in entrepreneurial activities. Although the number of female directors has increased over time, it is still far below the number of male directors throughout the world (Klapper & Parker, 2010). Moreover, female-managed firms are smaller on average than male-managed firms. A controversial hypothesis asserts that female-managed (or female-owned) firms underperform male-managed (or male-owned) ones (e.g., Klapper & Parker).

According to the upper echelon theory, firm performance depends on managerial background characteristics, such as age, gender, education, and experience (Hambrick & Mason, 1984; Hambrick, 2007). Gender is a key characteristic, and there are several reasons why the gender of directors is correlated with firm performance. First, male and female CEOs differ in observed characteristics, such as age and education, which in turn affect firm performance. Most studies find that female directors are younger and somewhat less educated than male ones (e.g., see the review by Terjesen et al., 2009; Klapper & Parker, 2010).

Secondly, not only observed but also unobserved traits differ between male and female CEOs. For example, women are said to be more risk-averse than men, and they are more careful in financial decisions (e.g., Vandergrift & Yavas, 2009; Jianakoplos & Bernasek, 2007; Wei, 2007; Faccio, 2016). Psychological studies find that men perform better than women in negotiation and bargaining (Kray & Thompson, 2004; Eckel et al., 2008; Vandegrift & Yavas, 2009). Women are more concerned about others and less competitive than men (Babcock & Laschever, 2003; Van der Meer, 2014). There can be gender differences in business motivation and skills. For example, some studies suggest that women are less motivated than men by growth and profits (e.g., Anna et al., 1999; and Morris et al., 2006). All these gender differences may affect firm performance.

Thirdly, the gender effect on firm performance may be manifested through so-called institutional channels, such as gender differences in cultural matters, and discrimination (Aidis et al., 2007; Terjesen et al., 2009). Men are often believed to run a business better than women. Lee and James (2003) find that shareholders respond more negatively to the appointment of female than to male CEOs. Discrimination in accessing credit is the result when lenders view male and female CEOs differently (Muravyev et al., 2009).

A priori, the effect of the gender of directors on firm performance is unknown. Empirical studies on this issue also yield mixed results. Supporting evidence for the female underperformance hypothesis can be seen in several studies, such as those of Fischer (1992), Rosa et al. (1996), Fairlie and Robb (2009), and De Mel et al. (2009). Other studies, however, such as those of Du Rietz and Henrekson (2000), Atkinson et al. (2003), Campbell and Mínguez-Vera (2008), Ahern and Dittmar (2011), Robb and Watson (2012), and Zolin et al. (2013), indicate that the gender of CEOs or directors does not have a significant effect on firm performance.

A number of studies find that gender diversity on the board of directors can improve the monitoring process as well as firm performance (e.g., Erhardt et al., 2003; Dwyera et al. 2003; Krishnan & Parsons, 2008; Adams & Ferreira, 2009; Dezsö & Ross, 2012). Krishnan and

Parsons find that firms which have higher gender diversity on the management board are more likely to achieve higher earnings. Recently, Huang and Kisgen (2013) find that female directors have a lower number of acquisitions and level of debt than do male directors. Firms with a female CEO are less likely to be exposed to idiosyncratic financial risk than firms with a male CEO (Martin et al., 2009; Faccio, 2016).

Thus, existing studies show a wide diversity of empirical results, a situation which calls for further empirical studies to better understand the relationship between CEO gender and firm performance. The main objective of this study is to examine the effect of CEO gender on firm performance in Vietnam, using the large-scale enterprise censuses of 2011 and 2013.

Compared with previous studies, our study differs in several respects. First, empirical findings concerning the gender of top executives and owners of firms remain limited in low- and middle-income countries, and Vietnam is an interesting case to consider. Vietnam has achieved significant success in promoting gender equality and empowering women (e.g. Nguyen, 2012). However, female-managed firms account for only around 25% of the total number of firms. Although there are many studies on the gender gap in the labor market, little is known about the role of gender in firm performance at firm level in Vietnam. An exceptional study on 120 firms by Nguyen et al. (2015) finds a positive effect on Tobin's Q of the number of female directors in the boardroom.¹ In contrast with this study by Nguyen et al. (2015), we use data from full enterprise censuses.

Secondly, we investigate the effect of CEO gender on a wide range of firm outcomes, including revenue, profit, return on equity and assets, employment structure, and tax payments. Thirdly, we use the Oaxaca-Blinder decomposition technique to understand factors associated with the gap in performance between firms led by men and those led by women. The decomposition allows us to understand possible reasons for the gender gap in firm performance and examine potential gender discrimination in business activities. By looking at a series of firm outcomes and decomposing gender differences in these outcomes, our study is expected to provide new evidence on how the gender of CEOs affects firm performance.

This paper is structured into six sections. The second section describes the data set used in this study. The third section presents a descriptive analysis of firm performance along gender lines. The four and fifth sections discuss the estimation method and empirical results, respectively, of the effect of CEO gender on firm performance. Finally, the sixth section provides the conclusion.

II. *Data Set*

The main data set used in this study is derived from the Vietnam Enterprise Censuses (VEC) in 2011 to 2013. These two data sets were assembled by the General Statistics Office in early 2012 and 2014 to gather information on firm performance in 2011 and 2013, respectively. The main reason why these two data sets are used is that they contain demographic data about firm CEOs, including age, gender, ethnicity and education. Other data sets do not contain this information. The number of observations in VEC 2011 and VEC 2013 is 339,168 and 380,476

¹ In Nguyen et al. (2015), Tobin's Q is defined as "the sum of the market value of a firm's stock and the book value of debt divided by the book value of its total assets."

respectively. The number of firms totals 267,299 and these are included in both VEC 2011 and VEC 2013 (panel data).

The VECs contain detailed information on firms' business activities. These data include types of firm ownership, businesses' main industries, the number of workers, the number of male and female workers, the number of workers with social insurance, labor costs, assets, tax costs, production costs, turnover, and firm profits. Notably, the VECs contain data on the age, gender, education and ethnicity of firm managers, as well as loans that firms have obtained during the past 12 months.

III. *Gender of Firm CEOs in Vietnam*

1. **The Prevalence of Female-Managed Firms**

Although gender equality has improved, there is still considerable gender inequality in Vietnam (Nguyen, 2012). Parents prefer boys to girls. Nguyen and Tran (2017) find that families tend to continue to have children until they get a boy. Wages for women are around 17% lower than for men with similar education and experience (Nguyen, 2012). The percentage of female-managed firms was 24.7% and 24.8% in 2011 and 2013, respectively, and is higher in urban than in rural areas. In 2013, the percentage of female-managed firms was 18.4% and 26.4% in rural and urban areas, respectively.

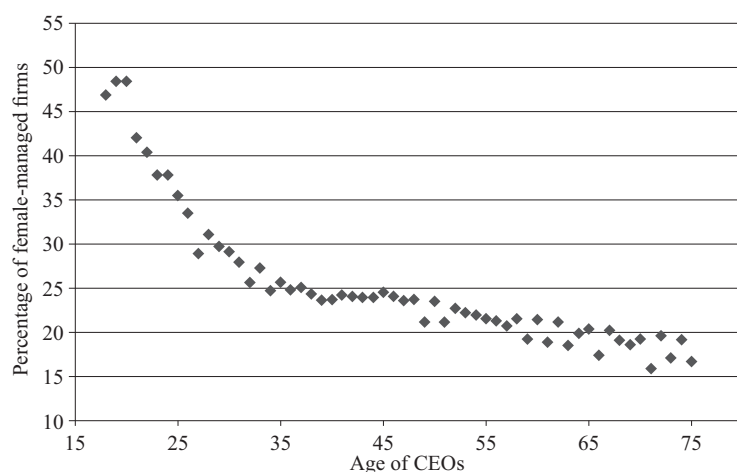
Most previous studies find that female directors are younger and less educated than their male peers (e.g., see the review by Tergesen et al., 2009). In Vietnam, female CEOs also have less education and are younger than male CEOs. In 2013, the percentage completing college or university was 62.7% for male CEOs and 58.4% for female CEOs. The average age was 42.0 for male CEOs and 40.5 for female CEOs.

Figure 1 presents the percentage of female-managed firms by CEO age. Since there is one CEO in each firm, this figure also indicates the percentage of female CEOs by age. It shows a strong negative correlation between age and the number of female CEOs. At the age of 20, 48.4% of CEOs are female. The proportion of female CEOs decreased to 24.5% by the age of 45 and to 16.7% at the age of 75 and above. The decreasing trend in the number of female CEOs according to age might be explained in several possible ways, such as a recent increase in the number of female CEOs, the lower retirement age of women, or the difference in survival rates between male- and female-managed firms at different ages.

Figure 2 shows a large variation in the percentage of female-managed firms by industry. The fact that female-managed firms are more concentrated in low-capital intensive industries has been well documented (e.g., Klapper & Parker, 2010). The same trend occurs in Vietnam. The percentage of firms with a female CEO is lower in sectors requiring large amounts of capital, such as agriculture (including fisheries and forestry), mining, manufacture and construction. By contrast, the percentage of female-managed firms is largest in textiles and trade, which are labor-intensive industries. It should be noted that the whole agricultural sector (mainly informal) is made up of labor-intensive industries. However, firms that operate in this sector are large and command substantial capital.

Consistent with findings from other countries (e.g., Coleman, 2007; Klapper & Parker, 2010; and Minniti & Naude, 2010), there is a strongly negative correlation between firm size

FIGURE 1. PERCENTAGE OF FEMALE-MANAGED FIRMS BY CEO AGE



Sources: Authors' estimation, using data from the 2011 and 2013 VECs.

and the percentage of female-managed firms in Vietnam (Figure 3). In 2013, 27.4% of firms with less than 6 workers had a female CEO, while only 12.3% of firms with more than 200 workers had a female CEO. Whereas women are less likely to manage state-owned firms and foreign direction investment (FDI) firms, which are large and capital-intensive,² private firms or enterprises have the highest proportion of female CEOs.

2. Firm Performance by CEO Gender

In this study, we analyze the effect of CEO gender on firm performance. Firm performance outcomes are analyzed along gender lines in Table 1. Female-managed firms have lower revenue and profit than male-managed firms. In 2013, the average revenue of male-managed firms and female-managed ones was 38,469 and 18,746 million VND, respectively.³ Around 51% of male-managed firms and 49% of female-managed firms reported positive net profit. The net profit per firm was 1,288 million VND for male-managed firms, and 276 million VND for female-managed firms. The profit margin (the percentage of net profit in total revenue) was also higher for male-managed firms than female-managed ones.⁴ The difference in revenue and profit may result from the difference in sector type and firm size between male- and female-managed firms.

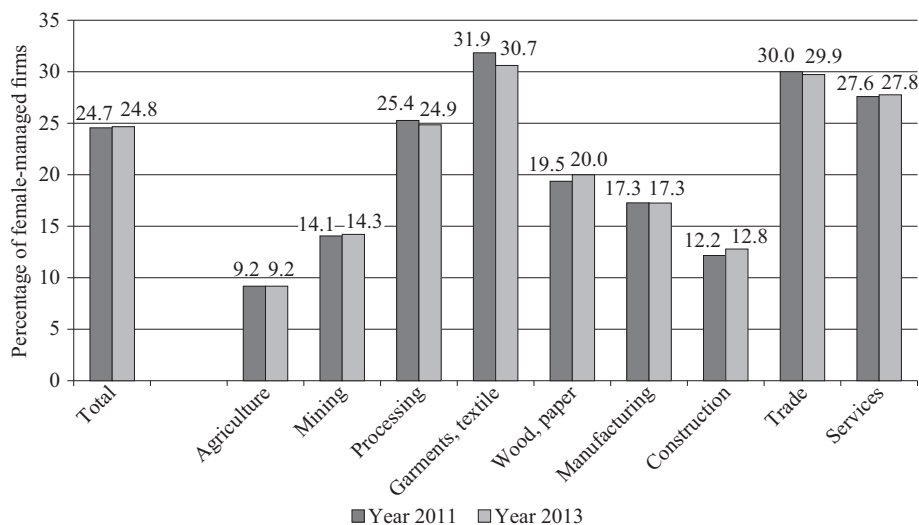
Although there is a large difference in profit between male- and female-managed firms, the

² According to Vietnam's enterprise law, private firms or enterprises are the simplest form of business entity. A private enterprise is owned by an individual who is fully liable for all its operations, backed by his/her entire property. For other firm types, owners of firms are responsible for firm debts and other property liabilities to the extent of the capital they have contributed to the firms.

³ In 2013, 1 USD was equivalent to approximately 21,000 VND.

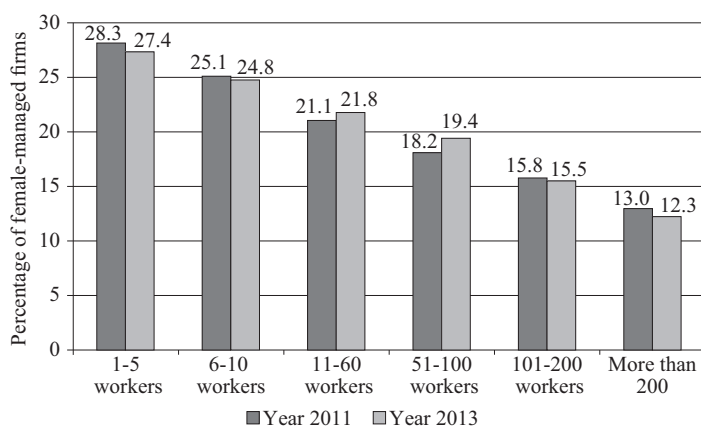
⁴ The profit margin is the ratio of net profit to total revenue. For firms with no profit or with negative profit, the profit margin is set as equal to zero.

FIGURE 2. PERCENTAGE OF FEMALE-MANAGED FIRMS



Source: Authors' estimation, using data from the 2011 and 2013 VECs.

FIGURE 3. PERCENTAGE OF FEMALE-MANAGED FIRMS BY FIRM SIZE AND OWNERSHIP TYPE



Source: Authors' estimation, using data from the 2011 and 2013 VECs.

difference in efficiency is small. Table 1 shows that male-managed firms have slightly better performance in terms of return on equity (ROE) and return on assets (ROA).⁵ Female-managed

⁵ Return on equity (ROE) and return on assets (ROA) are two important measures for gauging the effectiveness of

TABLE 1. FIRM PERFORMANCE BY CEO GENDER

Outcome variables	2011			2013		
	Female	Male	All	Female	Male	All
Average revenue (million VND)	18053.2 (615.9)	34087.0 (1482.0)	30111.0 (1124.9)	18745.9 (606.9)	38468.8 (2370.6)	33578.4 (1789.2)
Percentage of profit-making firms	51.87 (0.17)	55.06 (0.10)	54.28 (0.09)	49.10 (0.16)	51.38 (0.09)	50.81 (0.08)
Average profit (million VND)	143.00 (65.44)	861.85 (125.70)	683.17 (95.84)	275.54 (137.23)	1288.25 (250.44)	1036.89 (191.34)
Percentage of profit in revenue	2.02 (0.02)	2.30 (0.01)	2.23 (0.01)	2.56 (0.03)	2.80 (0.02)	2.74 (0.02)
Return on equity (ROE) (percent)	5.88 (0.06)	5.56 (0.03)	5.64 (0.03)	4.17 (0.04)	4.29 (0.03)	4.26 (0.02)
Return on assets (ROA) (percent)	2.23 (0.02)	2.31 (0.01)	2.29 (0.01)	1.83 (0.02)	1.96 (0.01)	1.93 (0.01)
Number of workers	18.36 (0.42)	35.25 (0.61)	31.08 (0.47)	17.42 (0.39)	33.78 (0.61)	29.73 (0.47)
Yearly wages per worker (million VND)	37.74 (0.31)	42.58 (0.28)	51.32 (0.14)	53.12 (0.09)	47.38 (0.11)	37.74 (0.31)
Percentage of female workers	50.73 (0.09)	30.30 (0.04)	35.34 (0.04)	39.94 (0.08)	31.94 (0.04)	33.92 (0.03)
Percentage of workers with social insurance	18.66 (0.12)	20.55 (0.07)	20.09 (0.06)	30.58 (0.10)	30.22 (0.06)	30.31 (0.05)
Percentage of firms paying tax	93.60 (0.08)	92.52 (0.05)	92.79 (0.04)	94.57 (0.07)	90.98 (0.05)	91.87 (0.04)
Amount of tax (million VND)	540.75 (50.36)	1720.27 (233.12)	1429.23 (176.04)	638.21 (67.71)	1892.74 (216.23)	1582.07 (163.55)
Percentage of tax amount to total revenue	5.04 (0.04)	4.86 (0.02)	4.90 (0.02)	3.73 (0.03)	3.60 (0.02)	3.64 (0.02)

Note: Standard errors in parentheses.

Source: Authors' estimation, using data from the 2011 and 2013 VECs.

firms have lower capital than male-managed firms.

Firms with a female CEO have a smaller number of workers than firms with a male CEO. However, the proportion of female workers is higher in female-managed firms than in male-managed firms, possibly because of the high concentration of female-managed firms in the textile and garment sector, which recruits a large number of female workers. During the 2011-2012 period, there was significant improvement in wages and social insurance enrolment in female-managed firms. As a result, in 2013 female-managed firms had a higher share of workers with social insurance as well as higher average wages than male-managed firms.

We observe that female-managed firms are more likely to pay tax to the government. In 2013, around 95% of female-managed firms paid taxes to the government, while the corresponding figure for male-managed firms was 91%. The amount of taxes paid by male-managed firms was higher because of their larger size and higher revenue. However, the proportion of tax paid out of total revenue was higher in female-managed firms than male-managed ones.

firm management. ROA shows how efficiently the cost and capital are managed. It is equal to net profit divided by average total assets. The return on equity (ROE) is equal to net profit divided by average stockholder equity.

IV. *Estimation Method*

1. **The Effect of CEO Gender on Firm Performance**

To examine whether the gender of CEOs affects firm performance, we propose the following econometric model:

$$\log(Y_{it}) = \alpha + Female_{it}\beta + X_{it}\gamma + rYear_t\theta + u_i + v_{it}, \quad (1)$$

where $\log(Y_{it})$ is the log of a firm performance indicator (for example, labor, revenue and profit) of firm i in the year t . $Female_{it}$ is the gender variable of a firm's CEO or managing director (female = 1, male = 0). The control variables, X , include characteristics of CEOs, business industry and ownership type of firms, and the urban dummy. $Year_t$ is a year dummy, which is equal to 1 for 2013 and 0 for 2011; u_i and v_{it} are time-invariant and time-variant unobserved variables, respectively.

It should be noted that Model (1) does not include the macroeconomic variables as the explanatory variables. Model (1) assumes that the macroeconomic variables have a similar effect on male- and female-managed firms. If this assumption does not hold, the estimates can be biased. However, since we already control for the time trend effect ($Year_t$) and all time-invariant variables (u_i), we expect this bias is negligible.

We will examine the gender effect on a large number of indicators of firm performance, including revenue, profit, return on equity (ROE), return on assets (ROA), labor, wages, and tax payment. We run the same regression model for different indicators of firm performance.

The CEO gender effect is measured by the coefficient of $Female_{it}$. CEO gender is not exogenous. When contrasted with firms with a male CEO, firms with a female CEO may differ not only in observed characteristics, such as industry and capital, but also in unobserved characteristics, such as network. There may be prejudices against women. There is also a problem of reverse causality. Well-performed firms can get rid of the gender discrimination, and at the same time they are more likely to appoint a female CEO. Thus, the estimate of the effect of CEO gender can be biased. To reduce the selection bias, we estimate model (1) using firm fixed-effects regression, which has the advantage that it eliminates the time-invariant unobserved variables u_i , such as geographic variables (Wooldridge, 2010), and in this way reduces the selection bias in estimating the model.

The fixed-effects estimator assumes that the change in the gender of CEOs is more likely to be exogenous. To test this hypothesis, we start with the sample of male-managed firms in 2011 including 202,131, of which there are 7,114 firms having a female CEO in 2013. We test whether the change in the gender of CEOs is exogenous by comparing the baseline outcomes between firms with- and firms without changing the gender of CEOs between 2011 and 2013. In the second column of Table 2, we use the sample of all male-managed firms in 2011, and regress the firm outcomes on the dummy variable indicating firms which changed their CEOs from male CEOs to female CEOs. Other explanatory variables in these regressions include age, ethnicity, education of CEOs, urban, firm ownership and industries. The results show that firms which changed the CEO gender do not differ statistically significantly from firms without changing the CEO gender in terms of revenue, profit and labor size. Only the variables on tax

TABLE 2. REGRESSION OF FIRM PERFORMANCE ON THE CHANGE OF CEO GENDER

Dependent variables	Coefficient of female CEOs in 2013 in the sample of firms with male CEOs in 2011	Coefficient of male CEOs in 2013 in the sample of firms with female CEOs in 2011
Log of revenue	-0.0045 (0.028)	-0.0824 (0.059)
Firms having profit (yes=1, no=0)	-0.0143 (0.016)	-0.0128* (0.007)
Log of profit (for firms with positive profit)	0.0858 (0.068)	0.0840 (0.051)
Profit margin	0.0006 (0.001)	0.0008 (0.001)
Return on equity (ROE)	0.0027 (0.002)	0.0048* (0.003)
Return on assets (ROA)	0.0005 (0.001)	0.0008 (0.001)
Log of number of workers	-0.0108 (0.013)	-0.0047 (0.015)
Log of yearly wages	0.0142 (0.011)	0.0195* (0.011)
Proportion of female workers	0.0325 (0.023)	-0.0216 (0.023)
Proportion of workers with social insurance	0.0073 (0.005)	0.0123*** (0.004)
Firms paying tax (yes=1, no=0)	-0.0319 (0.024)	-0.0060 (0.004)
Log of amount of tax	0.0454* (0.027)	0.0003 (0.027)
Proportion of tax amount in revenue	-0.0028** (0.001)	0.0004 (0.002)
Number of observations	202,131	65,099

Note: Standard errors in parentheses.

Source: Authors' estimation, using data from the 2011 and 2013 VECs.

payment are different between the two groups of firms.

Similarly, in the third column of Table 2 we use the sample of female-managed firms in 2011 (65,099 firms), and regress the firm performance variables on the dummy indicating that firms which changed their CEOs from female CEOs to male ones (7,097 firms). It shows only a few regressions in which the changing of CEO gender is statistically significant.

It should be noted that the above approach is similar to regression of the change in the CEO genders on baseline outcomes. However, if we run one regression on all the outcomes as explanatory variables, a lot of observations are not used. This is because some outcomes, e.g., log of tax payment and log of profit, are not observed for the whole sample. Moreover, most outcomes are strongly correlated and putting them into one regression can result in a multi-collinearity problem which increases the standard error. Running regression of each outcome on the change in the CEO gender provides a test statistic of the difference in baseline outcome between the treatment and control.

The test results indicate that the differences in outcomes between firms with and firms

without changing the CEO gender are small. Thus, we expect a small bias if the assumption underlying the firm fixed-effects estimator does not hold. When a randomized design of an intervention is not available, estimates of the effect of the intervention should be always interpreted with caution.

2. Decomposition of Gender Gap in Firm Performance

On the firm-data level, we use an Oaxaca-Blinder decomposition technique to examine factors associated with the gender gap in firm performance between male- and female-managed firms (Blinder, 1973; Oaxaca, 1973). We run separate regressions of an outcome variable (e.g., log of firm revenue or profit) on explanatory variables for male- and female-managed firms:

$$\log(Y_m) = \alpha_m + X_m\beta_m + \varepsilon_m, \quad (2)$$

$$\log(Y_f) = \alpha_f + X_f\beta_f + \varepsilon_f. \quad (3)$$

The subscript *it* is dropped for simplicity. Subscripts '*m*' and '*f*' denote male and female, respectively.

The Oaxaca-Blinder decomposition technique is widely used to decompose a dependent variable gap between two groups into a gap due to differences in explanatory variables and a gap due to differences in the coefficients of the explanatory variables. There are several ways to decompose the gap between two groups (see e.g., Jann & Zurich, 2008). A concern with the Oaxaca-Blinder decomposition method is the index problem: the choice of the reference group (male and female CEOs) affect the results of decomposition analysis. In this study, to avoid this problem we use the neutral coefficients in decomposition analysis. Specifically, we use the following decomposition method:

$$\begin{aligned} (\Delta \hat{E}[\log(Y)] &= \hat{E}[\log(Y_f)] - \hat{E}[\log(Y_m)] \\ &= (\hat{\alpha}_f + \bar{X}_f \hat{\beta}_f) - (\hat{\alpha}_m + \bar{X}_m \hat{\beta}_m) \\ &= [(\bar{X}_f - \bar{X}_m) \hat{\beta}^*] + [\bar{X}_f (\hat{\beta}_f - \hat{\beta}^*) + \bar{X}_m (\hat{\beta}^* - \hat{\beta}_m) + (\hat{\alpha}_f - \hat{\alpha}_m)], \end{aligned} \quad (4)$$

where $\hat{\alpha}$ and $\hat{\beta}$ are estimates of the parameters in regressions (2) and (3). \bar{X}_m and \bar{X}_f are the average of explanatory variables of male- and female-managed firms, respectively. $\hat{\beta}^*$ is a vector of the estimated coefficients of the X variables from the regression, using pooled data.

The first term on the right-hand side of equation (4), $(\bar{X}_f - \bar{X}_m) \hat{\beta}^*$, is the gender gap in firm outcome between female- and male-managed firms, resulting from the difference in the observed characteristics of firms. This is described as the endowment effect or explained component. It should be noted that several decomposition methods use β_m or β_f instead of β^* is estimating the explained component. It depends on the choice of the reference group, and it raises the index problem. Thus, using estimates of β^* , which is estimated from the pooled sample of male and female CEOs, in the decomposition can avoid this problem.

The second term is the gender difference caused by factors other than the observed characteristics of the firms. This component includes both differences in return due to observed

characteristics (i.e., differences in coefficients of explanatory variables in regression), and also differences in unobserved characteristics between female- and male-managed firms. Hence this component is called the “unexplained component” and is often attributed to gender discrimination.

V. *Empirical Results*

1. Effect of CEO Gender on Firm Performance

To estimate the effect of CEO gender on firm performance, we run a regression of firm performance variables on CEO gender and other control variables. For each dependent variable, there are five models, which differ in their specification of explanatory variables. Models 1 to 3 are OLS regression, while Models 4 and 5 are a firm fixed-effects regression. Model 1 includes CEO gender and a year dummy. It simply compares outcomes between female- and male-managed firms without control variables. Model 2 controls for variables, including CEO demographic characteristics, including gender, age, age squared, ethnicity, education and urban variables. This model aims to explore the upper echelons hypothesis (Hambrick & Mason, 1987; 2007). In addition to CEO demographic characteristics, Model 3 includes variables measuring ownership types and the industries of firms. It should be noted that the control variables should be predetermined and not firm performance outcomes. For example, firm size is affected by the CEO gender and is treated as a dependent rather than independent variable.

Model 4 has the same control variables as Model 3, with the addition of firm fixed effects. In Model 5, we control for firm size, which is measured by the log of the number of workers. The firm size can be affected by the CEO gender; thus, it should not be controlled in the regressions (Angrist and Pischke, 2008; Heckman et al., 1999). However, we tried to control for the firm size to examine the sensitivity of the estimation results to the control variables and examine whether the effect of the CEO gender on firm performance is through the firm size.

In Tables 3 and 4, we report only estimates of CEO gender (equal to 1 for female, and 0 for male) in regressions. The full regressions are presented in tables A.2 to A.6 in the Appendix.⁶ Table 3 reports the effects of female CEOs on firm performance variables. Model 1 shows that female-managed firms have lower performance than male-managed ones. However, once control variables are added, the picture changes. Having a female CEO improves a firm's performance. For example, Model 1 shows that the revenue of female-managed firms is around 8% lower than that earned by male-managed firms, although the difference is not statistically significant at the conventional level. Once the demographic variables of CEOs are controlled for, the “female CEO” factor becomes positive. Adding ownership and industry variables improves the efficiency of the estimate. The effect of female CEOs is statistically significant at the 5% level. The results of OLS and firm fixed-effects are quite similar and indicate that CEO gender is not strongly correlated with time-invariant unobserved variables in the equation of firm performance. According to Model 4, the revenue of female-managed firms is around 3.85% higher than that of male-managed firms. When the firm size is controlled for (model 5),

⁶ Appendix can be downloaded at the website of the Hitotsubashi Journal of Economics (<http://hdl.handle.net/10086/30786>)

TABLE 3. EFFECT OF FEMALE CEOs ON FIRM PERFORMANCE VARIABLES

Dependent variables	Model 1: OLS, no control variables	Model 2: OLS, control for CEOs' characteristics	Model 3: OLS, control for CEOs' characteristics, ownership type, industry	Model 4: firm fixed-effects, and control for CEOs' characteristics, ownership type, industry	Model 5: firm fixed-effects, and control for CEOs' characteristics, ownership type, industry, labor size
Log of revenue	-0.0803 (0.060)	0.0775 (0.057)	0.0932** (0.023)	0.0385* (0.023)	0.1164*** (0.011)
Firms having profit (yes=1, no=0)	-0.0271* (0.011)	-0.0155 (0.010)	-0.0119*** (0.002)	-0.0162*** (0.002)	-0.0110*** (0.001)
Log of profit (for firms with positive profit)	-0.1183** (0.027)	0.0401* (0.015)	0.1211*** (0.010)	0.0990*** (0.011)	0.1261*** (0.009)
Profit margin	-0.0026* (0.001)	-0.0013 (0.001)	-0.0008*** (0.000)	-0.0008*** (0.000)	-0.0009*** (0.000)
Return on equity (ROE)	0.0009 (0.002)	0.0052** (0.001)	0.0040*** (0.000)	0.0039*** (0.000)	0.0044*** (0.000)
Return on assets (ROA)	-0.0011 (0.001)	0.0005 (0.001)	0.0002** (0.000)	0.0002** (0.000)	0.0004*** (0.000)

Note: This table reports estimates of the CEO gender (female = 1, male = 0) in regressions of firm performance variables. There are six dependent variables and four models. It means that the number of regressions is 24. The full regressions are presented in Appendix.

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Sources: Authors' estimation using data from the 2011 and 2013 VECs.

the effect of CEO gender on revenue is higher. Female-managed firms has the revenue around 11.6% higher than male-managed firms.

Overall Models 4 and 5 produce similar results. In the following, we use the results from firm fixed-effects regression in Model 4 for interpretation, since it is better to measure the causal effect of CEO gender. Female-managed firms are less likely to show positive profit than male-managed firms. However, for firms with positive profit, having a female CEO increases profit by 9.9% but in female-managed firms, the profit margin is lower than in male-managed firms. It should be noted that the regression of log of profit uses only firms with positive profit, while the regression of profit margin uses all firms. For firms without profit, the profit margin is set equal to 0.⁷

Although female-managed firms show a slightly lower profit margin, they draw on less capital than male-managed firms. Hence, female CEOs tend to run their firms more efficiently than male CEOs, given the same level of capital. Table 2 shows that having a female CEO increases the ROE and ROA by 0.0039 and 0.0002. The average ROE and ROA in 2013 was 0.042 and 0.019, respectively. This means that the effect of having a female CEO is equivalent

⁷ Except for regression of log of profit, we use the full data set in regressions of other outcome variables. For firms without profit, taking log of negative or zero profit returns to missing. Thus for regression of log of profit, we use firms with positive profit. This is also similar to the two-part models, in which the first part is to model the probability of positive profit and the second part is to model the log of profit.

TABLE 4. EFFECTS OF FEMALE CEOS ON FIRM LABOR AND TAX PAYMENT VARIABLES

Dependent variables	Model 1: OLS, no control variables	Model 2: OLS, control for CEO characteristics	Model 3: OLS, control for CEO characteristics, ownership type, industry	Model 4: firm fixed-effects, and control for CEO characteristics, ownership type, industry	Model 5: firm fixed-effects, and control for CEOs' characteristics, ownership type, industry, labor size
Log of number of workers	-0.2542*** (0.052)	-0.1440* (0.055)	-0.0250** (0.008)	-0.0494*** (0.013)	n.a.
Log of yearly wages	-0.0222 (0.015)	-0.0119 (0.013)	0.0037** (0.001)	0.0058*** (0.001)	0.1121*** (0.006)
Proportion of female workers	0.1385*** (0.007)	0.1402*** (0.007)	0.1186*** (0.005)	0.1120*** (0.006)	0.0150*** (0.002)
Proportion of workers with social insurance	-0.0070 (0.009)	0.0084 (0.007)	0.0106*** (0.001)	0.0126*** (0.002)	0.0082*** (0.001)
Firms paying tax (yes=1, no=0)	0.0241*** (0.004)	0.0243*** (0.004)	0.0225*** (0.002)	0.0072*** (0.001)	0.0990*** (0.013)
Log of amount of tax	-0.1871* (0.071)	-0.0291 (0.067)	0.0464* (0.017)	0.0428* (0.025)	0.0010*** (0.000)
Proportion of tax amount in revenue	0.0015** (0.000)	0.0017** (0.000)	0.0021*** (0.000)	0.0013*** (0.000)	0.1121*** (0.006)

Note: This table reports estimates of the CEO gender (female = 1, male = 0) in regressions of firm performance variables. There are six dependent variables and four models. It means that the number of regressions is 24. The full regressions are presented in Appendix.

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Sources: Authors' estimation using data from the 2011 and 2013 VECs.

to around 9.2% and 1.1% of the average levels of ROE and ROA, respectively.

In Table 4, we look at the effect of CEO gender on firm labor. Female-managed firms are smaller than male-managed firms. The descriptive analysis in section 4 shows that the number of workers in female-managed firms was about half that in male-managed firms. Controlling for observed variables, the difference in firm size is much smaller. Specifically, the number of workers in female-managed firms is around 5% lower than in male-managed firms. Workers in female-managed firms have moderately higher wages than those in male-managed firms, possibly because female-managed firms employ a smaller number of workers. It should be noted that Model 5 controls for the labor size as an explanatory variable. When the labor size is used the dependent variable, there are no estimates from Model 5.

Interestingly, we find that CEO gender has a strong effect on the proportion of female workers. We observe that female-managed firms are more likely to operate in the textile and garment industries, which have a large proportion of female workers. After industry and other variables are controlled for, the presence of female CEOs still has a significant effect on the proportion of female workers. Specifically, having a female CEO increases the proportion of female workers in a firm by 11.2 percentage points. This finding provides evidence for the “revolving door” hypothesis, that having a woman in management may increase the opportunities for other women to find jobs (e.g., Kunze & Miller, 2017). Female CEOs can also have a positive spillover effect on other female workers (e.g., Kunze & Miller, 2017). As a

result, more women and fewer men may be willing to work in a female-managed firm.

Female-managed firms have a higher proportion of workers with social insurance than male-managed firms, implying that female CEOs are more likely to follow labor regulations than their male counterparts. This observation is confirmed by the positive effect of female CEOs on tax payments to the government. Compared to male-managed firms, a larger number of female-managed firms pay taxes, pay a larger amount of tax, as well as providing a higher proportion of tax payments from total revenue.

2. The Decomposition Analysis

Male-managed firms achieve better firm performance than female-run firms, but once the explanatory variables are controlled for, female CEOs tend to run their firms better than do male CEOs. This means that the discrepancies in performance between female- and male-managed firms are explained by the differences in the explanatory variables as well as their effects on firm performance. In this section, we use decomposition techniques to gain insight into this issue. There are several outcomes, and the decomposition results of all the outcomes with explanatory variables are very lengthy. Thus, in the following tables, we include decomposition of the gender gap in the overall explained and unexplained components. The percentage of total differences of these components is presented in brackets. Detailed decomposition results for explanatory variables are presented in the Appendix.

Table 5 reports the decomposition of firm performance. The explained components, elucidated by differences in characteristics given non-discriminatory returns, are all negative. This means that the differences in endowments tend to increase the gap in performance between female- and male-managed firms. Regarding revenue, the difference in log of revenue between male- and female-managed firms is -0.0803, which implies that the revenue of female-managed firms is around 8.03% lower than that of male-managed firms. The difference due to endowments is -0.1738, which is equal to 215.6% of the gap in revenue between male- and female-managed firms. The unexplained component is 0.093, which helps to reduce the gap by around 115.6%.

The probability of profit for a female-managed firm is 0.0271 (or 2.71 percentage points) lower than that for male-managed firms. This gap is due to differences in both explained and unexplained components. Specifically, 56.1% of the gap in the profit probability is explained by differences in observed characteristics between female- and male-managed firms. The unexplained component accounts for 43.9% of the gap.

Among firms with positive profit, female-managed firms have 11.8% lower profit than male-managed firms. The difference due to the explained component is -0.239, which is equal to 202% of the total gap in profit between female- and male-managed firms. The difference due to the unexplained component is 0.121. This means that the unexplained component reduces the gap by around 103%. Differences in both explained and unexplained components contribute to the gap in profit margin between female- and male-managed firms.

Female-managed firms have higher ROE but lower ROA. The explained component tends to increase the gap in both ROE and ROA between female- and male-managed firms, while the unexplained component decreases this gap.

Table 6 gives the decomposition of the differences in labor and tax payments between female- and male-managed firms. The explained component accounts for 90.2% of the

TABLE 5. DECOMPOSITION OF DIFFERENCES IN FIRM PERFORMANCE BETWEEN MALE- AND FEMALE-CEO FIRMS

Explanatory variables	Log of revenue	Firms making a profit (yes=1, no=0)	Log of profit (for firms with positive profit)	Profit margin	Return on equity (ROE)	Return on assets (ROA)
Firms with female CEOs	6.6526***	0.5040***	3.7487***	0.0231***	0.0497***	0.0202***
Firms with male CEOs	6.7332***	0.5311***	3.8666***	0.0256***	0.0489***	0.0213***
Total differences	-0.0806***	-0.0271***	-0.1180***	-0.0026***	0.0009**	-0.0011***
Percent of contribution	[100]	[100]	[100]	[100]	[100]	[100]
Explained components	-0.1738***	-0.0152***	-0.2391***	-0.0017***	-0.0031***	-0.0013***
Percent of contribution	[215.6]	[56.1]	[202.6]	[65.4]	[-344.4]	[118.2]
Unexplained components	0.0932***	-0.0119***	0.1211***	-0.0008***	0.0040***	0.0002
Percent of contribution	[-115.6]	[43.9]	[-102.6]	[30.8]	[444.4]	[-18.2]
Observations	719,644	719,644	377,410	719,644	719,644	719,644

Note: This table reports the total difference due to explained and unexplained factors. The differences due to specific explanatory variables are reported in tables in the Appendix.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The percentage contributed by components to the total difference is presented in brackets and is equal to the percentage of the explained component or unexplained component in the total difference.

Source: Authors' estimation, using data from the 2011 and 2013 VECs.

discrepancy in employment numbers between female- and male-managed firms. Only 9.8% of the difference is accounted for by the unexplained component.

As mentioned, the proportion of female workers is notably higher in female- than in male-managed firms. Only 14.4% of this difference is explained by differences in observed characteristics, while 85.6% of the difference is explained by other factors. This means that the reason why female-managed firms are more likely to recruit female workers is not because of differences in observed variables, such as firm size, industries and ownership types. This finding again indicates evidence of the "revolving door" hypothesis, that having a woman in management may increase the probability of a firm's providing jobs for women.

The amount of taxes paid is strongly correlated with firm size. Female-managed firms pay a lower amount of taxes than do their male counterparts, since their firm size is smaller. As is the case with employment size, the difference in the amount of taxes paid between female- and male-managed firms is mainly explained by observed characteristics. The number of firms paying taxes as well as the proportion of tax payments from total revenue (tax paid as the proportion of revenue) are higher in female-managed firms than in male-managed ones. The discrepancy in these variables is mainly accounted for by the unexplained components.

The gap in firm performance between female- and male-managed firms is mainly caused by the differences in explained components. In Figures 4 and 5, we present the contribution of specific observed characteristics in the explained components. The contribution of explanatory variables is equal to the percentage of the explained part of explanatory variables in the total explained component. For example, the difference in log of revenue between male- and female-managed firms is -0.0803. The total explained component is estimated at -0.1738. The parts explained by the differences in age and squared age between female and male CEOs are -0.2534 and 0.1773 (decomposition of log of revenue in Table A.9 in the Appendix). The sum

TABLE 6. DECOMPOSITION OF DIFFERENCES IN LABOR AND TAX PAYMENTS BETWEEN MALE- AND FEMALE-CEO FIRMS

Explanatory variables	Log of number of workers	Log of yearly wages	Proportion of female workers	Proportion of workers with social insurance	Firms paying tax (yes=1, no=0)	Log of amount of tax	Proportion of tax amount in revenue
Firms with female CEOs	1.8378***	3.5434***	0.4501***	0.2498***	0.9412***	2.6713***	0.0435***
Firms with male CEOs	2.0921***	3.5647***	0.3117***	0.2566***	0.9171***	2.8610***	0.0419***
Total differences	-0.2543***	-0.0212***	0.1385***	-0.0068***	0.0241***	-0.1897***	0.0015***
Percent of contribution	[100]	[100]	[100]	[100]	[100]	[100]	[100]
Explained components	-0.2293***	-0.0250***	0.0199***	-0.0175***	0.0016***	-0.2362***	-0.0006***
Percent of contribution	[90.2]	[117.9]	[14.4]	[257.4]	[6.6]	[124.5]	[-40.0]
Unexplained components	-0.0250***	0.0037*	0.1186***	0.0106***	0.0225***	0.0464***	0.0021***
Percent of contribution	[9.8]	[-17.5]	[85.6]	[-155.9]	[93.4]	[-24.5]	[140.0]
Observations	718,525	702,991	719,644	719,644	719,644	664,247	719,644

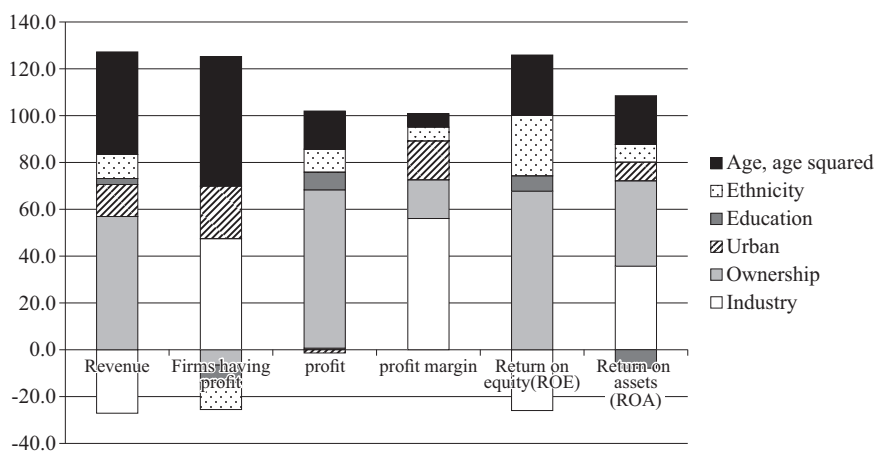
Note: This table reports the total difference due to explained and unexplained factors. The differences due to specific explanatory variables are reported in tables in the Appendix.

*** p<0.01, ** p<0.05, * p<0.1.

The percentage contributed by components to the total difference is presented in brackets and is equal to the percentage of the explained component or unexplained component in the total difference.

Source: Authors' estimation, using data from the 2011 and 2013 VECs.

FIGURE 4. CONTRIBUTIONS TO THE EXPLAINED COMPONENT OF FIRM PERFORMANCE

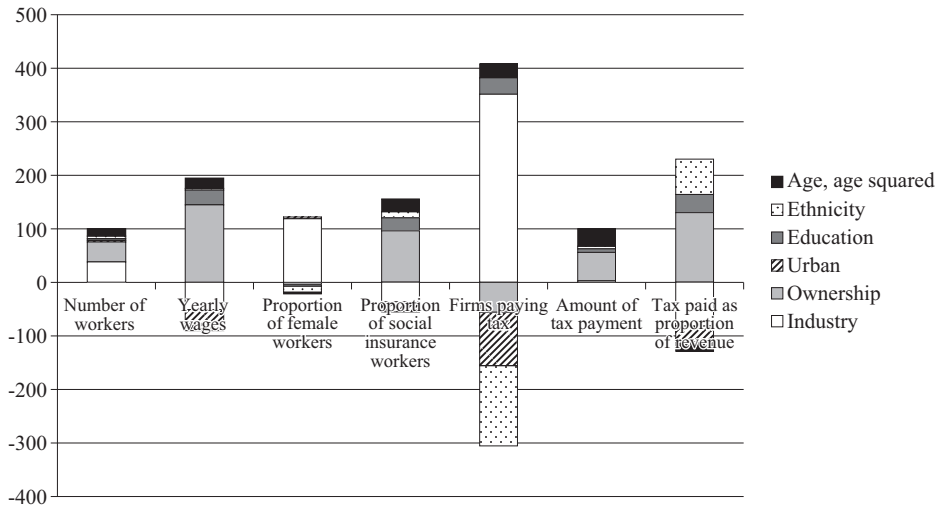


Sources: Authors' estimation, using data from the 2011 and 2013 VECs.

of these two parts is -0.0761, which is equal to 43.7% of the total explained component (-0.1738).

Explanatory variables are grouped by age, ethnicity, education, urban status, ownership, and industry and show that differences in ethnicity, education, and urban status between female and male CEOs play only a small role in explaining differences in performance outcomes between female- and male-managed firms. Among demographic characteristics, age is more

FIGURE 5. CONTRIBUTIONS TO THE EXPLAINED COMPONENT OF FIRM LABOR AND TAX PAYMENTS



Source: Authors' estimation, using data from the 2011 and 2013 VECs.

important in explaining differences in performance between such firms.

Differences in ownership and industry account for a large proportion of the discrepancies in firm performance between female- and male-managed firms. Similarly, differences in ownership and industry are also the main source of differences in employment and tax payments between female- and male-managed firms (Figure 5).

VI. Conclusions

In Vietnam, 25% of firms are managed by female CEOs. Female-managed firms are smaller than male-managed firms in many respects, including firm size, revenues and profits. In this study, we investigate whether the gender of CEOs makes a difference to firm performance in Vietnam. Our findings clearly undermine hypotheses of female underperformance. After the observed characteristics of CEOs and firm fixed-effects are controlled for, female-managed firms have higher revenues and return to asset and capital than male-managed firms. Female-managed firms are more likely than male-managed firms to employ female workers and have workers with social insurance. This finding highlights the important role of female-managed firms in empowering women. Increasing economic opportunities for women can assist in fighting against the trafficking of women and gender violation (Welter et al., 2004). Female CEOs are also found to comply with tax obligations. A higher proportion of female-managed firms pay taxes, pay a larger amount of tax, and also shoulder a higher proportion of the tax burden.

Using decomposition analysis, we find that the discrepancies in firm performance between female- and male-managed firms are mainly explained by differences in the observed

characteristics. We do not find evidence of gender discrimination against female-managed firms in Vietnam. Among the observed characteristics used in the regressions, differences in ownership and type of industry account for a large proportion of the differences in firm performance between female- and male-managed firms.

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