

OAXACA - BLINDER DECOMPOSITION EXTENDED FOR THE NON-LINEAR MODEL TO IDENTIFY THE OWNERSHIP GAP IN THE EXIT RATE

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ABSTRACTS

The purpose of this research is to identify factors to explain the gap in exit rate between state and non-state firms in Vietnam. With a sample of 7,962 Vietnamese firms and using the Oaxaca-Blinder decomposition extended for non-linear models, the research finds out that a very large part of the ownership gap in exit rate between state and non-state firms cannot be explained by the included covariates, but it is almost explained by the effects of differences in the coefficients of covariates. In particular, the differences in coefficients of covariates of initial assets, the industrial sector (mining, construction and manufacturing industries), and the service sector considerably increase the ownership gap in exit rate, but the difference in the coefficient of initial employment reduces the ownership gap in the exit rate. Moreover, differences in explanatory variables between state and non-state firms explain a very small part of the ownership gap in exit rate. This means that an estimate of the reduction in state and non-state firms' exit rates (resulting from giving non-state firms the same characteristics as state firms) is very small. The differences in coefficients have a much greater impact on differences in exit rates than characteristics that may be due to existing discrimination between state and non-state firms.

Keywords: Exit, Firms, Gap, Oaxaca-Blinder, Non-state, State

1. Introduction

In Vietnam, private firms are almost to medium and small enterprises until 2005 because they have the short time to accumulate the resource (i.e. they were established and developed from the Doi Moi policy). Meanwhile, state enterprises dominate in the economy and receive more preference. While in other countries, this is not the case, as the private sector is typically made up of private small, medium, and large enterprises. Thus, the majority of domestic private firms were small and medium sized new start-ups. Similarly, foreign firms were also newly set-up. Hence, due to various characteristics of state, and non-state ownerships, these two

ownerships types may experience various probabilities of survival and exit. This research will engage in further study of the survival/exit rate of each firm ownership type and provide a comparison of survival/exit rates between state and non-state firms. In so doing, answering to the following study questions:

Which factors can explain for the differences in exit rate between state and non-state firms?

And which factors are important to these differences?

Data for this research is the sample of 7,962 Vietnamese firms established prior to 2005. All firms are monitored until 2005,

and the study period is from 2000 to 2005. Firms in the sample can be also classified by ownership type. This study has applied the Oaxaca-Blinder decomposition extended for non-linear models for the analysis of identifying factors to explain for the exit rate gap between state and non-state firms in Vietnam.

The Oaxaca-Blinder decomposition has popularly been used in finding the discrimination in wage discrimination (Nielsen, 2000; Dorothe and Michael, 2001; Melly, 2005; Luiz; Elaine, 2007), in racial discrimination in health (Fournier, 2006; Darrell, 2006; Kirby, 2006; Samuel, 2003), in earnings differential between urban residents and rural migrants (Deng, 2007), in households income (François, 2008) and etc.

The remainder of this study is organized as follows: Section 2 briefly reviews literature of Oaxaca-Blinder decomposition extended for the nonlinear. Next provides the Oaxaca-Blinder decomposition extended for the nonlinear version to identify factors which explain the differences in exit rate between state and non-state firms. Finally, conclusions and some policy implications are drawn from this analysis.

2. The Literature of the Oaxaca-Blinder decomposition extended for the non-linear model to identify the ownership gap in the exit rate

In order to identify factors that create differences in the survival/exit rates between state firms and non-state firms or other firms (foreign and domestic private firms), the Oaxaca-Blinder decomposition extended to the case of the binary logit and probit model is applied.

For a linear regression, according to the Oaxaca-Blinder decomposition model (1973), the dependent variable (Y) takes the form of

$$Y = X\beta + \varepsilon$$

where X represents vectors of observable characteristics, β is vectors of coefficients, and ε is the residual terms.

The group of state firms (s) is $Y^s = X^s\beta^s + \varepsilon^s$

and the group of non-state firms or other firms (o) has $Y^o = X^o\beta^o + \varepsilon^o$

where X^s and X^o refer to firm characteristics of the sample of state and non-state owned firms, respectively. β^s and β^o are the parameters of estimations for the sample of state and non-state owned firms, respectively.

The mean values of the variables and estimated parameters in each group as $\bar{Y}^s = \bar{X}^s \hat{\beta}^s$ and $\bar{Y}^o = \bar{X}^o \hat{\beta}^o$, respectively.

The state and non-state ownership gap in the average value of the dependent variable, Y , can be written as

$$\bar{Y}^s - \bar{Y}^o = \bar{X}^s \hat{\beta}^s - \bar{X}^o \hat{\beta}^o \quad (2.1)$$

After adding and subtracting $\bar{X}^o \hat{\beta}^s$, the gap becomes

$$\bar{Y}^s - \bar{Y}^o = (\bar{X}^s - \bar{X}^o) \hat{\beta}^s - \bar{X}^o (\hat{\beta}^s - \hat{\beta}^o) \quad (2.2)$$

The component $(\bar{X}^s - \bar{X}^o) \hat{\beta}^s$ is interpreted as the part of the gap in the value of dependent variables due to differences in observable (explained) average characteristics between state firms and non-state firms (foreign and domestic private firms). If the state firms and non-state firms have the same levels of X , then this term would be 0. Moreover, the

other component, $\bar{X}^o (\hat{\beta}^s - \hat{\beta}^o)$, is the part attributed to differences in coefficient estimates (discrimination or unexplained). If coefficients are the same for state

and non-state firms, then this term is 0 (the gap is due entirely to differences in characteristics).

An equally valid expression for equation (2.2) for the decomposition

occurs when adding and subtracting $\bar{X}^s \hat{\beta}^o$ in the equation (2.1); the gap is written as:

$$\bar{Y}^s - \bar{Y}^o = (\bar{X}^s - \bar{X}^o) \hat{\beta}^o - \bar{X}^s (\hat{\beta}^s - \hat{\beta}^o) \quad (2.3)$$

The decomposition of the outcome variable similar to the equation (2.2) is not

$$\bar{Y}^s - \bar{Y}^o = \left[\sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s} - \sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^s)}{N^o} \right] + \left[\sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^s)}{N^o} - \sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^o)}{N^o} \right] \quad (2.4)$$

Or $\bar{Y}^s - \bar{Y}^o = \text{characteristics effect} + \text{coefficient effect}$

$$\bar{Y}^s - \bar{Y}^o = \left[\bar{P}(X^s \beta^s) - \bar{P}(X^o \beta^s) \right] + \left[\bar{P}(X^o \beta^s) - \bar{P}(X^o \beta^o) \right] \quad (2.5)$$

Where the binary dependent variable, Y , takes the value 1 if the firm exits, and 0 otherwise. $\bar{Y}^s = \sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s}$

, is the predicted probability of failure of

state firms, and $\bar{Y}^o = \sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^o)}{N^o}$, is the

predicted probability of failure of non-state firms. N^s and N^o are the number of state and non-state firms in the sample, respectively. \bar{P} represents the average predicted probability of the binary outcome (exit or survival), and F is the cumulative distribution function from the logistic distribution.

The characteristic effect is due to the differences in predicted probabilities of

appropriate if the outcome is binary and the coefficients are from a logit or probit model. The coefficient estimates cannot be applied directly in the standard Oaxaca-Blinder decomposition equations.

Fairlie (1999, 2003, and 2005) and Yun (2000 and 2004) have extended the Oaxaca-Blinder decomposition for nonlinear models. The decomposition for

a nonlinear equation, $Y = F(X \hat{\beta})$, can be written as:

exit when the firm characteristics of both state and non-state owned firms are used and the parameter vector is held constant. In other words, it represents the gap due to group differences in distributions of X .

The coefficient effect measures the differences in predicted probabilities of exit that result when the characteristics of non-state owned firms are held constant but the coefficient vectors of both state and non-state owned firms are used. In other words, The coefficient effect represents the part due to differences in the group processes determining levels of Y , and it is the part of the gap that is due to group differences in unobserved endowments (discrimination).

An equally valid expression to the equation (2.4) for the decomposition is:

$$\bar{Y}^s - \bar{Y}^o = \left[\sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^o)}{N^s} - \sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^o)}{N^o} \right] + \left[\sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s} - \sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^o)}{N^s} \right] \quad (2.6)$$

In this equation (2.6), the state firm coefficient estimates, $\bar{\beta}^o$, are used as weights for the characteristic effects in the decomposition, and the non-state owned firm distribution of the independent

variables, X^s , are used as weights for the coefficient effects.

Similarly, changing the reference group, an alternative expression for the decomposition is written as:

$$\bar{Y}^o - \bar{Y}^s = \left[\sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^o)}{N^o} - \sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^o)}{N^s} \right] + \left[\sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s} - \sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s} \right] \quad (2.7)$$

The first term on the right hand side is (again) differences in the probability of exit between state and non-state owned firms that is due to differences in the covariates X . The second term is the part of the differences in the probability of exit

that is due to differences in coefficients (β) of both state and non-state owned firms.

An equally valid expression for the decomposition of the equation (2.7) is expressed as:

$$\bar{Y}^o - \bar{Y}^s = \left[\sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^s)}{N^o} - \sum_{i=1}^{N^s} \frac{F(X_i^s \bar{\beta}^s)}{N^s} \right] + \left[\sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^o)}{N^o} - \sum_{i=1}^{N^o} \frac{F(X_i^o \bar{\beta}^s)}{N^o} \right] \quad (2.8)$$

The model in the equation (2.4) assumes that discrimination against non-state firms, and that the exit rate of state firms is a base for a comparison of the two groups. In other words, it decomposes the difference in exit rate by comparing the difference between the exit rate of non-state firms based on their own exit structure and the exit of non-state firms based on the state exit structure. The characteristics effect represents the extent to which the differences in exit rate between state and non-state firms are

accounted for by observed differences in firm characteristics. The residual effect measures the part due to differences in the regression coefficients and unobserved factors (due to discrimination).

The steps of the decomposition are given as follows:

First, a logit regression is estimated using the state and non-state samples¹. Then, results of these coefficient estimates are used to calculate predicted probabilities evaluated at means of the independent variables:

¹ According to Gujarati (1995), the logit model is follows:

$$P_i = E(Y = 1 | X_i) = \beta_0 + \sum_{i=1}^n \beta_i X_i$$

P_i : is probability of exit ($Y = 1$); $\beta_1, \beta_2, \dots, \beta_k$: are coefficients; X_i ($i = 1, \dots, k$): Independent variables

Denote: $z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$

We have:

$$P_i = \frac{e^z}{1 + e^z} = \frac{1}{1 + e^{-z}} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}$$

and: $L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$

$$\bar{P} = \frac{1}{1 + \exp(-\bar{X} \beta)} \quad (2.9)$$

Next, the ownership gap in exit between state and non-state firms is calculated by the difference between the predicted probabilities between the two groups, based on the equation (2.5).

Finally, the counterfactuals are calculated to identify the contribution of each covariate to the state and non-state gap in exit. The contribution of each

independent variable to the ownership gap is equal to the change in the mean predicted probability from replacing the non-state firm distribution with the state firm distribution of that variable while holding the distribution of the other independent variable constant². It follows that:

i) Characteristics effects: assuming that there are 3 variables (X_1 , X_2 , and X_3).

The independent variables of X_1 to the gap can be expressed as:

$$X_1: F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^s \beta_2^s + \bar{X}_3^s \beta_3^s) - F(\alpha^s + \bar{X}_1^s \beta_1^s + \bar{X}_2^s \beta_2^s + \bar{X}_3^s \beta_3^s)$$

Similarly, variables of X_2 and X_3 are written as:

$$X_2: F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^s \beta_3^s) - F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^s \beta_2^s + \bar{X}_3^s \beta_3^s)$$

$$X_3: F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^s) - F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^s \beta_3^s)$$

The sum of X_1 , X_2 , and X_3 , the characteristic effect, is written as:

$$F(\alpha^s + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^s) - F(\alpha^s + \bar{X}_1^s \beta_1^s + \bar{X}_2^s \beta_2^s + \bar{X}_3^s \beta_3^s) \quad (2.10)$$

ii) Coefficient effects: for 3 variables X_1 , X_2 , and X_3 ,

The independent variables of X_1 to the gap can be expressed as:

$$X_1: F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^o + \bar{X}_3^o \beta_3^o) - F(\alpha^o + \bar{X}_1^o \beta_1^o + \bar{X}_2^o \beta_2^o + \bar{X}_3^o \beta_3^o)$$

Similarly, variables of X_2 and X_3 are given by:

$$X_2: F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^o) - F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^o + \bar{X}_3^o \beta_3^o)$$

$$X_3: F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^s) - F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^o)$$

The sum of X_1 , X_2 , and X_3 , the coefficient effect, is given by:

$$F(\alpha^o + \bar{X}_1^o \beta_1^s + \bar{X}_2^o \beta_2^s + \bar{X}_3^o \beta_3^s) - F(\alpha^o + \bar{X}_1^o \beta_1^o + \bar{X}_2^o \beta_2^o + \bar{X}_3^o \beta_3^o) \quad (2.11)$$

The equation (3.15) subtracts the equation (3.16); the ownership gap in exit is

$$F(\alpha^s + \bar{X}_1^s \beta_1^s + \bar{X}_2^s \beta_2^s + \bar{X}_3^s \beta_3^s) - F(\alpha^o + \bar{X}_1^o \beta_1^o + \bar{X}_2^o \beta_2^o + \bar{X}_3^o \beta_3^o) \quad (2.12)$$

² The non-linear case is different from the linear case; that is, the independent contributions of X_1 , X_2 , and X_3 depend on the value of the other variable. This implies that the choice of a variable as X_1 , X_2 , or X_3 (or the order of switching the distributions) is potentially important in calculating its contribution to the ownership gap in exit rate.

3. Study Data

The main data for the study is from the firm-level database, which is the result of surveys conducted annually by the Vietnam General Statistical Office. The survey was first conducted in the year 2000, and the data in question is recorded at the end of each calendar year (31 December). Such data from Vietnamese firms is currently available from the years 2000 to 2005. Firms are drawn randomly from the total database, making the sample for this study a random one. The number of subjects for this research is 10,000 firms. After filtering unqualified firms according to the above criteria, the total number of subjects is 7,962 firms, which enter the sample from 2000–2005. All firms are monitored until 2005.

4. Results of the Oaxaca-Blinder decomposition extended for the non-linear model to identify the ownership gap in the exit rate Oaxaca-Blinder decomposition

4.1. Description of variables used the Oaxaca-Blinder decomposition

One dependent variable used in the logit regression is a status variable (Y) to distinguish failure or survival. It is the dummy variable capturing the occurrence of the hazard. $Y = 1$ if the firm exits; otherwise, $Y = 0$.

There are explanatory variables in the logit model as well as in the Oaxaca-Blinder decomposition, follows:

The economic sector of the firm in operation: Firms in the agricultural sector (rural, agricultural, and fishery industries) are denoted by the variable $\text{AgriSector} = 1$, 0 otherwise. Firms in the industrial sector (mining, construction, and manufacturing industries) are denoted by the variable $\text{InduSector} = 1$, 0 otherwise. Firms in the service sector (service industries) are denoted by $\text{ServSector} = 1$, 0 otherwise.

Firm size (Lnsize) is the logarithm of the number of employees in the firm at the start-up year. Similarly, the firm's assets (Lnassets) is the logarithm of the total asset of the firm at the start-up year. The firm's initial liability (Initialdebt) is the firm's debt at the start-up year. Capital-intensive (Capintensive) is the total capital per person employed by the firm at the start-up year.

The firm's productivity: Sales to employees in year $t-1$ (LagSaleslabor) is defined by the firm's gross sales over total employees in year $t-1$. Earnings before tax (EBT) to employees in year $t-1$ (LagEBTlabor) is identified by dividing the firm's EBT by the total employees in year $t-1$.

The previous growth in employment (LagGrowth): The firm's growth in employment is measured by the number of employees of the firm at year t minus (-) the number of employees at year $t-1$, and then divided by the number of employees at year $t-1$.

The previous growth in assets (LagAssetgrowth): This variable is included into the model to consider the effect of previous growth in assets on firm survival. The firm's growth in assets is measured by the total assets of the firm at year t minus (-) the total assets at year $t-1$, and then divided by the total assets at year $t-1$.

The firm's financial ratios and efficiency: Return to sales in year $t-1$ (LagROS) is calculated by dividing the earnings before tax by sales revenue in year $t-1$. Moreover, in this research, the return on assets in year $t-1$ (LagROA) ROA is calculated by dividing the EBT by the total assets of the firm in year $t-1$. Leverage in year $t-1$ (LagLeverage) is calculated by dividing debt (including short -, medium - and long term debts) over the total assets in year $t-1$.

4.2. Results of the Oaxaca-Blinder decomposition extended for the non-linear model

As mentioned the steps of the decomposition, a logit regression is firstly estimated using the state and non-state samples. The logistic results of exit by state firms and non-state firms in Vietnam are shown in Appendix 1. Then, results of these coefficient estimates are used to calculate predicted probabilities evaluated at means of the independent variables

Next, the ownership gap in exit between state and non-state firms is calculated by the difference between the predicted probabilities between the two groups, based on the equation (2.5). Table 1 reports the predicted probabilities of exit rate between state and non-state firms; In Table 1, the average predicted probability of the state exit rate is 0.0225, and the average predicted probability of the non-state exit rate is 0.0755. Hence, the difference between state and not-state firms' exit rate is -0.0531. This result illustrates that state firms experience a lower exit rate than non-state firms do. This is possibly explained by the fact that state firms are protected by the government and have more advantages and privileges than non-state firms have. The difference in exit rate between state and non-state firms are attributed to two effects: characteristic effects and coefficient effects.

Finally, the counterfactuals are calculated to identify the contribution of each covariate to the state and non-state gap in exit. The contribution of each independent variable to the ownership gap is equal to the change in the mean predicted probability from replacing the non-state firm distribution with the state firm distribution of that variable while holding the distribution of the other independent variable constant, based on the equations (2.10), (2.11) and (2.12).

Table 2 illustrates the contribution of each independent variable to the differences in exit rate between state and non-state firms in the characteristic effects and the coefficients effects (Table 2 is given by Appendixes 2 and 3).

In Table 2, The Chow test shows there is the difference in parameters of two groups, and the decomposition analysis demonstrates that the *characteristic effect* explains only 1.49% of ownership difference of exit rate between state and non-state firms. This means that an estimate of the reduction in state and non-state firms' exit rates resulting from giving non-state firms the same characteristics (the same distribution of all included variables) as state firms is 1.49%. The characteristics of the industrial sector (firms in mining, construction, and manufacturing industries), initial assets, asset growth, and the return on sales (ROS) actually decrease the ownership gap in the explained effect (characteristics effects), with 2.17%, 1.64%, 0.84%, and 2.05%, respectively. However, differences between two groups in the service sector (firms in industries related to services), initial employment size, initial debt, initial capital intensity, productivity, employment growth, return on assets (ROA), and leverage actually increase the state and non-state gap in exit rates.

Most of this ownership difference in exit rate cannot be explained by the included covariates. The coefficient effect can show how much non-state firms would exit/survive if they were treated like state firms in the market. In Table 2, *the coefficient effect* on the ownership gap in exit is very large (-0.0539). In particular, the effects of differences in coefficients of variables—such as initial assets, the industrial sector (firms in mining, construction and manufacturing industries), and the service sector (firms in industries related to services)—considerably increase the

ownership gap Specifically, the difference in the coefficients which contributes to increasing the ownership gap in exit rate is the highest for the covariate of initial assets, with 43.87%. The difference in two constants has the significant effect of widening the ownership gap in exit rate, with 41.72%. Next, the effects of differences in coefficients of the industrial and service sectors increase the ownership gap in exit rate, with 10.79% and 11.59%, respectively. However, the differences in coefficients of covariates to decrease the ownership gap are very small. The difference in the coefficient of initial employment to reduce the ownership gap is 4.57%.

Hence, the difference in the state and non-state exit gap comes from the differences in coefficients which may arise for a variety of reasons:

Two different groups with the same characteristics experience different chances of business or technology.

Two groups might differ in terms of the participation behaviour of their owners or entrepreneurs.

A part of this difference is due to discrimination that might stem from the government's discrimination against non-state firms. As mentioned earlier, the Vietnamese government still retains the philosophy that state firms must take the dominant and decisive economic role. With this philosophy, compared to non-state firms, state firms take more preferences, privileges and support from the government; they are protected by the government; they keep sole positions in the economy such as important and profitable industries; their scopes of business are not limited, etc. Hence, there is an unequal business environment between state and non-state firms in Vietnam.

In sumamary, the results from this decomposition show that the differences in

characteristics between state and non-state firms explain very little of the difference in exit rate. The differences in covariates that actually widen the gap in exit rate between state and non-state firms include the industrial sector, initial assets, asset growth, and return on sales. The differences in covariates that actually reduce the ownership gap in the exit rate include the service sector, initial employment, initial debt, initial capital intensity, productivity, employment growth, return on assets, and leverage. In fact, the ownership gap in the exit rate is almost explained by the effects of differences in the coefficients of covariates. In particular, differences in the coefficients of covariates of initial assets, the industrial sector (firms in mining, construction and manufacturing industries), and the service sector remarkably increase the ownership gap in exit rate, but the difference in the coefficient of initial employment reduces the ownership gap in the exit rate. The differences in the coefficients have a much greater effect on differences in the exit rate than characteristics that may be due to existing discrimination between state and non-state firms.

5. Conclusion and policy implications

5.1. Conclusion

In this study, the Oaxaca-Blinder decomposition extended for non-linear models are used to analyse the dataset of 7,962 Vietnamese firms in order to discover factors for explaining differences in the exit rate between state and non-state firms.

The most important finding for this study is from the Oaxaca-Blinder decomposition extended for the nonlinear version. That is, a very large part of the ownership gap in exit rate between state and non-state firms cannot be explained by the included covariates, but it is almost explained by the effects of differences in the coefficients of covariates. In

particular, the differences in coefficients of covariates of initial assets, the industrial sector (firms in mining, construction and manufacturing industries), and the service sector considerably increase the ownership gap in exit rate, but the difference in the coefficient of initial employment reduces the ownership gap in the exit rate. Moreover, differences in explanatory variables between state and non-state firms explain a very small part of the ownership gap in exit rate. This means that an estimate of the reduction in state and non-state firms' exit rates (resulting from giving non-state firms the same characteristics as state firms) is very small. The differences in coefficients have a much greater impact on differences in exit rates than characteristics that may be due to existing discrimination between state and non-state firms (especially the

government's discrimination against non-state firms).

5.2. Policy implications

From the findings of the decomposition analysis above, some policies may be issued following: i) to decrease the support, preference, and privileges of state firms (compared to foreign and domestic private firms), ii) to stop discrimination in business among all types of firms and to generate a more equal business environment for all types of firms, iii) to allow domestic private and foreign firms access to some industries where state firms are exclusive at present. iv) to push the process of privatizing state firms so that domestic private and foreign ownerships can enter into these state firms, thus increasing survival prospects of privatized firms.

Table 1: The predicted probabilities of exit rate between state and non-state firms

Variable	State firms		Non-state firms	
	Mean(\bar{X}^s)	$-\bar{X}^s\beta^s$	Mean(\bar{X}^o)	$-\bar{X}^o\beta^o$
InduSector	0.2690	0.1264	0.3832	0.0951
ServSector	0.7152	0.2644	0.6123	0.1275
Lnsizes	2.8061	0.0420	2.7855	0.0817
Lnassets	7.2938	0.8003	7.6682	0.3824
Initialdebt	13344.80	0.0278	6399.43	0.0207
Capintensive	42.93	-0.0070	72.20	0.0014
LagSaleslabor	627.74	0.0047	606.75	-0.0130
LagEBTlabor	10.18	0.0156	4.6756	0.0081
LagGrowth	0.1805	-0.0022	0.2894	0.0276
LagGrowthSq	1.3847	-0.0010	2.6409	-0.0149
LagAssetgrowth	0.2656	0.0344	0.4282	0.0718
LagAssetgrowthSq	2.2962	-0.0135	3.7348	-0.0206
LagROS (returns on sales)	0.0427	-0.0182	-0.0808	-0.0033
LagROA (returns on assets)	0.0860	0.0404	0.0091	0.0066
LagLeverage	0.0950	-0.0320	0.1515	-0.0309
Constant		2.4910		1.7643
Total		3.7731		2.5046
\bar{P}	0.0225		0.0755	
Gap	-0.0531			

Note: β^s and β^o are the coefficients of logistic estimations for the sample of state and non-state owned firms in Appendix 1, respectively.

Table 2: Contribution of each variable to the ownership gap in characteristics effect and the coefficients effect ^(*)

Variable	Characteristics effects			Coefficient effects		
	$\bar{P}_i^{(a)}$ (counterfactuals)	$\bar{P}_i - \bar{P}_{i-1}$	% to gap	\bar{P}_i (counterfactuals)	$\bar{P}_i - \bar{P}_{i-1}$	% to gap
InduSector	0.0213	-0.00115	-2.17%	0.0698	-0.0057	10.79%
ServSector	0.0221	0.00081	1.52%	0.0637	-0.0061	11.59%
Lnsize	0.0221	0.00001	0.01%	0.0661	0.0024	-4.57%
Lnassets	0.0213	-0.00087	-1.64%	0.0428	-0.0233	43.87%
Initialdebt	0.0216	0.00030	0.57%	0.0431	0.0003	-0.58%
Capintensive	0.0217	0.00010	0.19%	0.0437	0.0005	-1.03%
LagSaleslabor	0.0217	0.000003	0.01%	0.0429	-0.0007	1.36%
LagEBTlabor	0.0218	0.00018	0.34%	0.0430	0.0000	-0.08%
LagGrowth	0.0219	0.00003	0.05%	0.0443	0.0013	-2.44%
LagGrowthSq	0.0219	0.00002	0.04%	0.0437	-0.0005	1.03%
LagAssetgrowth	0.0214	-0.00045	-0.84%	0.0444	0.0007	-1.29%
LagAssetgrowthSq	0.0216	0.00018	0.34%	0.0445	0.0001	-0.11%
LagROS	0.0205	-0.00109	-2.05%	0.0429	-0.0016	2.97%
LagROA	0.0213	0.00074	1.39%	0.0430	0.0001	-0.18%
LagLeverage	0.0217	0.00040	0.75%	0.0438	0.0008	-1.57%
Constant	0.0217	0.00000	0.00%	0.0217	-0.0221	41.72%
Total		-0.0008^(b)	-1.49%		-0.0539^(c)	101.49%
Gap	-0.0531^(d) (100.00%)					
F (47, 22062)	0.6552					
Prob > F	0.5812					

Note: ^(*) Results from this table is from appendix 2 and 3

^(a): $\bar{P}(X^o \beta^s)$; ^(b): $\bar{P}(X^o \beta^s) - \bar{P}(X^s \beta^s)$; ^(c): $\bar{P}(X^o \beta^s) - \bar{P}(X^o \beta^o)$

$(d) = (c) - (b) = \left[\bar{P}(X^s \beta^s) - \bar{P}(X^o \beta^s) \right] + \left[\bar{P}(X^o \beta^s) - \bar{P}(X^o \beta^o) \right]$

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Appendix 1: The Logistic results of exit rates by state firms and non-state firms in Vietnam^(*)

Variables	Parameter estimates (Exit)	
	State firms	Non-state firms
Constant	-2.491** (1.144)	-1.764 (1.117)
InduSector	-0.470 (0.294)	-0.248 (0.379)
ServSector	-0.370 (0.292)	-0.208 (0.378)
Lnsizes	-0.015 (0.051)	-0.029 (0.031)
Lnassets	-0.110*** (0.044)	-0.050** (0.025)
Initialdebt	-2.08e-06 (1.86e-06)	-3.24e-06 (2.08e-06)
Capintensive	0.0002 (0.0004)	-1.9e-05 (0.000148)
LagSaleslabor	-7.41e-06 (3.64e-05)	2.14e-05 (2.01e-05)
LagEBTlabor	-0.002 (0.002)	-0.002** (0.001)
LagGrowth	0.012 (0.069)	-0.095*** (0.034)
LagGrowthSq	0.001 (0.004)	0.006*** (0.002)
LagAssetgrowth	-0.130** (0.060)	-0.168*** (0.033)
LagAssetgrowthSq	0.006** (0.003)	0.006*** (0.002)
LagROS (returns on sales)	0.427* (0.244)	-0.041 (0.036)
LagROA (returns on assets)	-0.470** (0.243)	-0.723*** (0.149)
LagLeverage	0.337** (0.160)	0.204*** (0.086)
Age dummies	Yes	Yes
Log Likelihood	-2,188.7	-5,296.5
LR (p value)	0.000	0.000
Number of firms (N)	2,401	5,617
Observations	5,507	16,602

Note: (*): Y = F(InduSector, ServSector, Lnsizes, Lnassets, Initialdebt, Capintensive, LagSaleslabor, LagEBTlabor, LagGrowth, LagGrowthSq, LagAssetgrowth, LagAssetgrowthSq, LagROS, LagROA, LagLeverage, Age dummies)

The reference group for dummies is AgriSector

Std. Error-values are in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Appendix 3: The contribution of each independent variable in the coefficients effect to the gap of exit rate

To replace the means of non-state firm variables into state firm variables (coefficients effect)																
Variables	InduSector	ServSector	Lnszie	Lnassets	Initial debts	Cap intensive	LagSales labor	LagEBT labor	Lag Grwoth	Lag GrowthSq	LagAsset growth	LagAsset growthSq	LagEBT sales	Lag ROA	Lag Leverage	Constant
InduSector	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801	0.1801
ServSector	0.1275	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263	0.2263
Lnszie	0.0817	0.0817	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417	0.0417
Lnassets	0.3824	0.3824	0.3824	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413	0.8413
Initialdebt	0.0207	0.0207	0.0207	0.0207	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133	0.0133
Capintensive	0.0014	0.0014	0.0014	0.0014	0.0014	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118	-0.0118
LagSaleslabor	-0.0130	-0.0130	-0.0130	-0.0130	-0.0130	-0.0130	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045
LagEBTlabor	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072
LagGrowth	0.0276	0.0276	0.0276	0.0276	0.0276	0.0276	0.0276	0.0276	-0.0035	-0.0035	-0.0035	-0.0035	-0.0035	-0.0035	-0.0035	-0.0035
LagGrowthSq	-0.0149	-0.0149	-0.0149	-0.0149	-0.0149	-0.0149	-0.0149	-0.0149	-0.0149	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019
LagAssetgrowth	0.0718	0.0718	0.0718	0.0718	0.0718	0.0718	0.0718	0.0718	0.0718	0.0718	0.0555	0.0555	0.0555	0.0555	0.0555	0.0555
LagAssetgrowthSq	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0206	-0.0219	-0.0219	-0.0219	-0.0219	-0.0219
LagROS	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	-0.0033	0.0345	0.0345	0.0345	0.0345
LagROA	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0043	0.0043	0.0043
LagLeverage	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0309	-0.0510	-0.0510
Constant	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	1.7643	2.4910
Total	2.5896	2.6884	2.6484	3.1074	3.0999	3.0868	3.1043	3.1033	3.0723	3.0853	3.0690	3.0677	3.1054	3.1031	3.0830	3.8097
\bar{P}_i	0.0698	0.0637	0.0661	0.0428	0.0431	0.0437	0.0429	0.0430	0.0443	0.0437	0.0444	0.0445	0.0429	0.0430	0.0438	0.0217
$\bar{P}_i - \bar{P}_{i-1}$	-0.0057	-0.0061	0.0024	-0.0233	0.0003	0.0005	-0.0007	0.0000	0.0013	-0.0005	0.0007	0.0001	-0.0016	0.0001	0.0008	-0.0221
% to gap	10.79%	11.59%	-4.57%	43.87%	-0.58%	-1.03%	1.36%	-0.08%	-2.44%	1.03%	-1.29%	-0.11%	2.97%	-0.18%	-1.57%	41.72%
Sum changes in $\bar{P}_i - \bar{P}_{i-1}$ (Characteristics effects)														-0.05386 (101.49%)		

