PRIVATIZATION OF VIETNAMESE FIRMS AND ITS EFFECTS ON FIRM PERFORMANCE

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ABSTRACT

The paper analyzes the effects of privatization on the performance of firms switching their ownership from state-owned to private-owned ownership. By using difference-in-difference with control variables and propensity score matching techniques, this study overcomes some shortcomings in previous studies on the effect of privatization on performance in transition economies such as no control of selection bias and the inadequateness to single out the privatization effect from the concurrent effects of other economic factors. We find that a shift from state or collective ownership to private ownership can consistently enhance the performance of switchers in terms of profitability. This suggests that privatization is an efficient way to improve the financial performance of Vietnamese state-owned enterprises.

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Keywords: Privatization, Firm performance, Propensity score matching, Difference-in-difference, Selection bias, Concurrent effect, Non-random sample selection.

JEL Classification: P31.

Contribution/ Originality

This study contributes in existing literature by overcoming methodological shortcomings of previous studies on the effect of privatization on performance in transition economies such as no control for selection biases due to non-random drawn characteristics of privatized sample and an inadequate control for concurrent effects of other economic factors.

1. INTRODUCTION

In the past two decades, reducing the dominant role of government as a stakeholder in firms and stimulating an active private sector by privatization has been considered as a key element of economic reform process in developing countries. Privatization could set off a change in the ownership structure and corporate governance of firms (Boubakri *et al.*, 2008). Privatization is defined as the deliberate sale of state-owned enterprises (SOEs) to private economic agents (Megginson and Netter, 2001).

In Vietnam, under the central planning regime, there existed only two types of firm ownership in the economy, namely state and collective enterprises. After the sixth National Congress of 1986, the Vietnamese government launched the 'doi moi' reform program of transforming the centrally-planned economy into a more market-oriented economy. From 1992, similar to other transition economies, the Vietnamese government launched a privatization process with the objective of improving the performance of state owned enterprises (SOEs). The process of privatization proceeded in a slow and gradual manner, starting with the easier and smaller SOEs and then continuing with the more difficult and larger ones. The Vietnamese government has kept a tight rein over major industries - such as utilities and banking - through large state-owned economic groups and enterprises. Contrary to the rapid privatization in other transition economies (Estrin *et al.*, 2009), the privatization process in Vietnam was inhibited by factors such as the fear of losing authority and perks by those in control, the problems of asset valuation, the fear of losing preferential credit from state commercial bank (Truong and Ha, 1998) and the persistence of soft budget constraints leading to loss making firms (Kornai, 1986).

A key question is whether privatization of SOEs contributes to a more efficient use of resources and firm performance. The purpose of this paper is to analyze the effects on multiple attributes of performance with respect to firms switching ownership from public to private, after controlling extensively as possible for other factors affecting performance as well as tackling some of methodological issues raised in other studies. As a result, this study's contribution is twofold. First, this paper provides additional evidence as to whether or not privatization improves firm performance in economies in transition. Vietnam is a particularly interesting case as its privatization approach is different from that in many other transition economies. With the implementation of a partial and gradual privatization, SOE candidates being privatized are often larger in later periods. Also, the scope of privatization extends to many sectors of the economy in later periods. In addition, the government still retains a stake of ownership and does not give up its ultimate control over all privatized firms following privatization. Second, this paper employs statistical techniques such as difference in difference (DID) with control variables and propensity score matching (PSM) to overcome problems of inadequate control for selection biases, a major shortcoming of other research in this field.

In following sections, the paper discusses the relevant economic theory on why performance of SOEs is likely to differ from privately owned firms and possible hypotheses to be tested. Then, we

discuss some methodological shortcomings of the previously empirical studies on performance changes after privatization in emerging economies. The data are described in the next section. Then, the statistical procedures to test for differences in performance are discussed and followed by the presentation and discussion of the empirical results. Finally, conclusions, possible extensions and limitations of the present study are presented.

2. ECONOMIC THEORY OF PRIVATIZATION AND HYPOTHESIS DEVELOPMENT

Arguments for privatization mainly come from ownership literature, a political view of SOEs, a managerial view of SOEs and the agency theory framework, all emphasizing a lack of performance and efficiency of state owned enterprises (Boubakri *et al.*, 2008). It is argued that inefficiency and value destruction are the most frequent problems of state ownership. One of the important objectives for governments in developed as well as developing countries to launch privatization programs is to improve the economic and financial performance of state-owned enterprises by ownership shifts (Boubakri *et al.*, 2004). Taking a political science view of SOEs, it is argued that the political interference could result in operational constraints and distorted objectives. Proponents emphasizing a managerial view argue that inadequate monitoring of SOE managers lead to weak incentives to improve operational efficiency (Rousseau and Xiao, 2008). The agency framework which combines both the political and managerial view proposes that the separation of ownership (public) and control (politicians) and the absence of ownership incentives create agency problems (Boubakri *et al.*, 2008).

In a SOE, ownership is with the state and the management of firm assets is by civil servants and public sector management. Ownership of a SOE is ultimately in the hands of decision makers with legitimized political, social and economic goals. Management and staff of SOEs have incentives to seek firm-specific rents such as high pay, fringe benefits and low effort levels. CEOs of the 'state-owned' enterprises are usually appointed by the government (Sun *et al.*, 2002) and their compensation is not necessarily linked to firm performance (Perkin, 1994). These politically-connected CEOs could be dictated by their political interests. For example, to win an election, politically appointed managers may take decisions benefiting special interest groups. CEOs chosen for their political connection instead of their managerial qualities can be regarded as an adverse selection problem. This may inflate agency costs in state-owned companies, which could damage performance. Moreover, the agency cost in state-owned companies possibly emanates from the lack of management autonomy, a bureaucratic mentality and a culture of dependency (Zhou and Witteloostuijn, 2010).

Such problems may be much relieved or eliminated in private companies. Owners of private firms face more economic and financial pressures to monitor management closely compared to political decision makers, due to the ultimate risk of company bankruptcy or the continuous stock market valuation of the company in case of listed companies. Managers in private companies are

more constrained to seek rents as they face the risk of replacement or dismissal (Nguyen and Do, 2007) and must cope with the external control mechanism of the labor market for managers as well as the internal control mechanism such as executive compensation (Cuervo and Villalonga, 2000).

As mentioned above, the objective of privatization program in Vietnam is to improve the productive, economic and financial performance of firms. The government has implemented a policy to reform key sectors of the economy and at least partially privatizes state-owned enterprises, but the implementation has been gradual so that the state sector still accounts for a large fraction of GDP. SOEs are backed by government and receive a favorable treatment by the authorities and are considered as an instrument of government to implement its social and political objectives besides the firms' profitably maximized objectives. Whereas in private companies the profit and value objectives are key goals, no such single clear bottom-line objective exists in SOEs, often characterized by soft-budget constraints and widely diversified concerns. Therefore, a variety of incentives may exist in 'state-owned' enterprises. Generally, in SOEs the principal-agent problem tends to be worse than in private companies as the firm's objectives are less straightforward, more diffuse and more difficult to monitor.

Essential differences between the nature of management in the public sector and management in the private sector may explain difference in company performance. The classical definition of management - "Management is getting things done through the organization of efforts of others…" - emphasizes three key elements of managerial effort: the choice of goals, the choice of people and the choice of organization. In the private sector, managers have the power to choose (and limit) the goals they pursue, to change the organization and to hire and fire people (of course subject to legal constraints and to within the rules of corporate governance). In the public sector, managers have more limited choice of what goals to pursue and far less power to modify organizational structure (the bureaucracy) which is quite often fixed and difficult to change and where civil servants and company workers often enjoy job protection (Boyne, 2002)

From the above, it could be argued that privatization is a suitable policy to mitigate the agency problem and improve the performance of SOEs. First, incentives of manangers and shareholders are more aligned after privatization since managers face threat of dismissal in case of underperformance. Together with instruments such as pay-performance compensation, rent-seeking attitudes of managers can be mitigated. Second, privatization forces managers to face the pressure of market mechanisms. Third, privatization is often accompanied with a change of management and the performance of privatized firms is improved by introducing a new qualified managent team. Fourth, after privatization the extent of the government's interference on day-to-day business of the firm is limited and hence these firms can focus on the objectives of profit and value maximization (Tran, 2008).

More specifically, privatization or a switch from state or collective ownership to private ownership is likely to have an effect on different aspects of company performance. Several specific hypotheses can be formulated on various company performance indicators on switching from state

to private ownership. A distinction between two types of performance indicators is helpful, namely profitability and efficiency measures. First, it is to be expected that private ownership redirects the focus from a variety of diffuse goals of SOEs to (long-term) profit goals. The increases in profitability could emanate from many sources. Privatization shifts both the control rights and the cash flow rights from politicians to managers. Thus, managers could redress spending on excess labor, on the promotion of regional development and on national security for electoral and political purposes and could make use of the firm's human, financial and technological resources more efficiently. All these actions could result in the improvements of firms' efficiency gains and thus increase firm profitability (Truong *et al.*, 2006). In this study, the gains in profitability are measured by changes in the rate of *return on total assets* (ROA) and *return on equity* (ROE). Other research provides evidence on the improvement of firm profitability following privatization (Frydman *et al.*, 1999; Claessens and Djankov, 2002; Sun and Tong, 2002; Omran, 2004; Truong *et al.*, 2006; Grygorenko and Lutz, 2007). Hence, we expect that:

Hypothesis 1: A shift from state to private ownership is likely to lead to an improvement of profitability.

Furthermore, it is expected that indicators of efficiency will change with a switch in ownership. The shift in incentives for managers to focus on value and profit maximization, rather than on a myriad of political and social objectives, most likely leads to a redress of excess labor spending and more efficiency in the use of capital, human and technologies resources mentioned. The measure to proxy efficient use of capital is *turnaround of total assets* (sales/total assets). Efficiency in labor use is approximated by the *value added per employee*. Evidence for more efficient use of labor and capital after privatization is found in other work such as by Claessens and Djankov (2002), Grygorenko and Lutz (2007), Boubakri *et al.* (2004); Mathur and Banchuenvijit (2006); Truong *et al.* (2006). Thus, we propose the following hypothesis:

Hypothesis 2: A shift from state to private ownership is likely to lead to a more efficient use of capital and labor as measured by turnaround over total sales (capital) and value added per employee (labor).

Another likely effect of privatization is a change in leverage and debt restructuring. For SOEs operating in a command or planned economic environment, the cost of capital is not a well defined concept. The allocation of capital for replacement and investment is decided by government agencies or the state banking system. In principle, SOEs have unconditional access to capital (Boubakri *et al.*, 2004). Privatization comes with different rules for deciding on the level of investment and the method of financing investments. In private firms, investment is guided by the principle that the expected marginal return on investment should cover the marginal cost of capital. For private companies, the cost of capital is a weighted average between the return on equity capital and the cost of borrowed funds at market prices. Following privatization, the cost of borrowing is likely to increase due to the absence of government debt guarantees and the risk of bankruptcy (Truong *et al.*, 2006). Privatized firms have access to an alternative source of financing

that is public equity markets (Megginson *et al.*, 1994). Both elements, the increase in the cost of debt and access to equity capital markets, contribute to a restructuring of the financial structure of the company. It is expected that the level and share of debt will be reduced following privatization. Previous studies indeed find a decline in leverage post privatization (Sun and Tong, 2002; Omran, 2004; Mathur and Banchuenvijit, 2006). As a result, we propose the following hypothesis:

Hypothesis 3: A shift from state to private ownership is likely to be associated with a decline in the use of debt.

3. METHODOLOGICAL SHORTCOMINGS IN PREVIOUS STUDIES

The performance of firms following privatization is studied across a variety of contexts, ranging from developed countries to emerging markets. A brief review of the empirical studies on performance changes after privatization in emerging economies show that most of these studies concern three regions, Eastern and Central Europe, Africa and Asia. From this literature it follows that most of studies show evidence for an improvement of profitability, efficiency and output following privatization in a range of countries in Eastern and Central Europe, Africa and Asia (Frydman *et al.*, 1999; Claessens and Djankov, 2002; Sun and Tong, 2002; Omran, 2004; Truong *et al.*, 2006; Grygorenko and Lutz, 2007). However, some studies present different results (Chen *et al.*, 2006; Cook and Uchida, 2008). Most studies consistently report a decline in leverage for privatized firms (Sun and Tong, 2002; Omran, 2004; Mathur and Banchuenvijit, 2006).

Reviewing the literature, two methodological issues may be raised which could impact the evidence being found. The first issue is the major drawback in previous studies, namely the inadequate control for the fact that privatized firms are not a random selection of firms. Hence, the sample of privatized firms is a non-random drawn selection. With random sampling, all members of a population have an equal and independent chance of being selected. The randomized design ensures equivalent distributions of the treatment and the control groups on all observed and unobserved characteristics. As a result, any observed difference on outcome could be due to treatment effect (Li, 2013). With respect to privatized firms, especially in countries which follow a partial or gradual privatization, the government stipulates which kind of SOEs are privatized firms according to its political and economic objectives. These objectives could change over time and thus the SOE candidates to be privatized also change over time. As a consequence, the estimator for the causal effect (privatization effect) would be biased if we simply compare the mean difference of the outcome variables in two groups (privatized and non-privatized firms) since the distribution of the observational variables of these two groups may differ (e.g. in peer-comparison). Furthermore, Li (2013) argues that investigation of the causal effect by regressing an outcome variable on an intervention dummy variable (e.g. privatization dummy) could be wrong since regression can not detect the distribution overlap on observed characteristics between treated group and control group as well as can not adjust for the distribution between these groups.

Indeed, the literature review shows that the dominant methods used in previous studies to detect the effect of privatization are pre- and post- comparison, proportion test, Wilcoxon signed rank test, OLS regression, fixed effects, random effects and DID. Statistical methods such as pre- and post- comparison, proportion test or Wilcoxon signed rank test have no controls for selection biases and can not control for the concurrent effects of other economics factors. Other methods such as regression and DID are also constrained on controlling selection bias due to non-random draw of privatized sample. As a result, this important methodological shortcoming may lead to possible biases and inconsistent results. The second issue is the data used for testing hypothesis. We observe that almost these prior studies use a sample of firms being privatized in a single period of time. We argue that in developing countries, the macroeconomic environment may be relatively unstable, so that economic reforms at different points in time could have an important effect on privatization outcome. As a result, if the control for the effect of macroeconomic factors on privatization outcomes during the time window of research is inadequate, the results could easily be biased. For example, Zhang *et al.* (2012) argue that the performance of privatized firms could improve in post-privatization years, provided the privatization of SOEs takes place during a period of accelerating economic growth. Thus, a favorable macroeconomic environment may be the most important driving force of performance improvements of these privatized firms and not necessarily the act of privatization itself. In this study we explicitly tackle these shortcomings by applying the method of propensity score matching (PSM) to detect whether privatization increases the performance of privatized firms. This technique is widely used in many social science disciplines such as public health and economics. The technique of PSM allows to control more adequately for the nonrandom sample selection. First, PSM reconstructs counterfactuals by adjusting covariates between the treated and control groups. Second, PSM can detect the lack of covariate distribution between two groups and adjust the distribution accordingly (Li, 2013). A more detailed discussion of this method will follow in a section of this study. To neutralize cohort effects due to differences in the macroeconomic contexts, we extract a sample of firms being privatized in the same year. Therefore, these firms face the same macroeconomic environment, so that privatization effects are not likely to be contaminated by differences in the macroeconomic context pre- and post-privatization.

4. EMPIRICAL METHODOLOGY

In this section, the data and variable measurement are described, followed by the discussion of the statistical procedures to test for differences in performance as well as the presentation and discussion of their empirical results. The analysis improves methodologically upon the existing literature by controlling in difference in difference analysis for concurrent effects of other economic factors affecting firm performance (difference-in-difference with control variables). Further, using propensity score matching – i.e. creating two control samples for those firms

privatized in 2006 consisting of full period SOEs respectively full period private firms – the analysis aims to control for the non-random nature of the sample of privatized firms.

4.1. Data and Variable Measurement

The analysis is based on a commercial source of data extracted from the annual business surveys, which are conducted by the Vietnamese General Statistics Office (VGSO) for the period 2004-2008, an annual census collecting financial and other data on all business firms in Vietnam. Firms were classified in three groups: (i) SOEs including all firms defined by the VGSO as "central/local state-owned enterprises (SOEs) and central/local state limited company"; (ii) private firms including firms defined as "private enterprise, partnership company, private limited company, joint stock company without state capital and joint stock company with state capital being smaller than 50%" and (iii) foreign firms defined in the VGSO survey as "wholly foreign-owned company and joint-venture (SOE and foreign partners; non state company and foreign partners)".

Firms who switch their legal types from group (i) of 100% SOEs to group (ii) of private firms are considered as privatized firms. With this specification, we focus on the cases of SOEs in which the government gives up their control following privatization. In some joint stock companies in Vietnam, the government may have a share in ownership rights of less than 50% but still maintain control due preferential shares in terms of voting. The selection criterion for being in the sample is that each firm is present every year from 2004 to 2008 in terms of reporting its legal type. The number of firms for which data are available during five years is 24,607. Based on this panel, values for most firms for the variables listed in Table 1 are constructed for the period 2004-2008.

Table-1. Variable description

Variable name	Definition
Performance indicators	
ROA	Return on total assets or pre-tax profit[1]/total assets
ROE	Return on equity or pre-tax profit/equity
SOLV	Solvency ratio or debt/total assets
TURN	Turnaround or sales/total assets
VAEMP	Value added per employee (million VND) (Value added is defined sales minus purchases of goods and services)
Characteristics	
AGE	Age of the company (years)
LNEMP	Natural logarithm of employees
LNASSET	Natural logarithm of total assets
Industry dummies	Fishing, agriculture, manufacturing, electricity/gas, construction, wholesale/retail, hotel/restaurant, science/technology, transport, financial, mining/quarrying, real estate (= reference group)

[1] Due to the lack of data, we use pre-tax profits to calculate ROA. As an attempt to overcome this shortcoming, we use profit from business as a proxy of EBIT to re-calculate ROA. We found a correlation coefficient of 0.84 between these two measures and an estimated coefficient of 0.91 when we regres ROA used in the current study on the proxy of ROA re-calculated by dividing profit from business by total assets. The more detail result will be provided upon the request.

The study focuses on a sub-sample of companies that changed their ownership mid period, more specifically from state-owned or collective ownership to private ownership so that pre-ownership change and post-ownership change observations for the same company are available. From the panel data, SOEs that switched mid-period (2006) were extracted (n=309). It is important to note that, unlike previous studies such as Truong *et al.* (2006) whose sample assembles privatized firms in a period of time (1993-2002), our extracted subsample contains all SOEs privatized in the same year of 2006. Therefore, these firms face the same macroeconomic environment which could help to eliminate the possible cohort effect of macroeconomic influences on these privatized firms.

There are different reasons to motivate the choice of 2006 as a focal point. Although the privatization program in Vietnam started in 1992, only a few SOEs were privatized in the period 1993-1998. The pace of privatization accelerated onwards from 1998. In the context of Vietnam, Truong *et al.* (2006) document an increase in profitability, efficiency and the number of employees using data from 121 SOEs privatized during the 1993-2002 period. SOEs chosen to be privatized in this period are mostly small and medium-sized companies and not representative for the whole of Vietnamese industry. By covering a later period, the size of SOEs being privatized is on average larger and more representative. So, it is worthwhile to examine whether the improvements in firm performance following privatization recorded by Truong *et al.* (2006) hold up in later periods. By choosing 2006 as the pivotal year, a relatively large sample size is available which enhances the power of the statistical tests. However, our sample may subject to nonrandom drawing of firms privatizing. We tackle this shortcoming by using statistical methods with a stronger power to control for this nonrandom nature of the sample in subsequent sections of this paper. This is one of the key points of this study and improves on the studies by Truong *et al.* (2006) and other researchers. Table 2 below highlights a descriptive analysis for this sub-sample.

Table-2. Descriptive statistics for switchers in 2006

Variable	Obs	Mean	Std. Dev.	Min	Max
AGE	309	13	11	1	47
EMPLOYEE	309	314	493	15	3668
ROA	309	0.04	0.05	-0.15	0.35
ROE	309	0.09	0.22	-1.53	0.84
SOLV	309	0.63	0.22	0.02	0.97
TURN	309	1.70	1.91	0.04	17.08
VAEMP	309	481	1291	12	19881

4.2. Difference-In-Difference with Control Variables

The measured changes in performance between pre- and post- switched periods as well as the straightforward difference in difference method may include the effects on performance from other factors than just ownership change. This is corrected by conducting a multivariate approach with further controls in both periods. This specification not only has the same statistical power as the

standard DID, but explicitly controls for other relevant firm characteristics including firm age, firm size and firm sector. With this specification, we construct a "pseudo" panel with a two "period" windows (pre- and post- privatization) namely:

$$Perf_{it} = \alpha + \beta T_i * time + \gamma T_i + \delta time + \eta X_{it} + \varepsilon_{it} \ (1)$$

Where $Perf_{it}$ is performance indicators of firm i at time t and t=2004-2005, 2007-2008; *time* is period dummy (Post-privatization period (t=2007-2008) is coded as 1, otherwise 0); T_i is privatization dummy (Switchers 2006 are coded as 1, otherwise 0); T_i*time is the interaction term of *privatization dummy and period* dummy; X_{it} is a vector of control variables including firm age (AGE), firm size (LNASSET and LNEMP) and firm sector (industry dummies). DID estimators will be embedded in β coefficients (β=DID) which represent the performance changes in the post-privatization period for 2006 switchers or mid-period switched firms, *ceteris paribus*. In other words, the interaction term shows the performance changes in post-privatized stage for 2006 privatized firm compared with their counterparts of control groups.

This method is applied to two subsamples. Each subsample consists of switched firms and those of each control group. From the panel data, two control groups of non-switched SOEs (or full period SOEs) consisting of 15,703 firms and non-switched private firms (or full period private firms) consisting of 2,971 firms are constructed. We run the model (1) on each subsample to derive the estimates of Table 3 displayed below[2]. The inclusion of control dummies in the model aims at controlling for the possibility of performance changes between two periods due to the effects of firm size, firm age and the sector in which the firm operates.

The significantly positive coefficients of interaction terms with respect to ROA and ROE in Table 3 and in unreported table in case of control group of non-switched private firms imply that mid-period switchers significantly outperform their peers with similar characteristics from both full period SOEs and private firms in terms of profitability. Also, we observe that the solvency ratio of 2006 switchers is lower than those of full period private firms.

Table-3. DID estimators with control variables in case of control group of non-switched SOEs

	ROA	ROE	SOLV	TURN	VAEMP
Privatization*Time	0.03***	0.08***	-0.03	-0.13	-3.33
	(0.01)	(0.02)	(0.02)	(0.45)	(108.10)
Privatization dummy	-0.02***	-0.05***	0.10***	-0.03	-138.86*
	(0.01)	(0.02)	(0.01)	(0.32)	(77.33)
Time dummy	0.00	-0.00	0.00	0.12	244.67***
	(0.00)	(0.01)	(0.01)	(0.14)	(33.19)
AGE	-0.00***	-0.00	0.00***	0.00	0.72
	(0.00)	(0.00)	(0.00)	(0.01)	(1.44)
LNASSET	-0.02***	-0.02***	0.02***	-1.26***	337.76***
	(0.00)	(0.00)	(0.00)	(0.05)	(12.13)
					Continue

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[2] Due to space reason, we do not display the estimates in case of control group of non-switched private firms and also suppress the coefficients of industry dummies in Table 3. They are provided upon the request.

LNEMP	0.03***	0.05***	0.03***	1.65***	-301.16***
	(0.00)	(0.00)	(0.00)	(0.08)	(20.13)
Industry dummies	*yes*	*yes*	*yes*	*yes*	*yes*
Constant	0.11***	0.10***	0.12***	7.33***	-1,240.17***
	(0.01)	(0.02)	(0.02)	(0.44)	(105.62)
R^2	0.05	0.03	0.34	0.13	0.27
F-statistic	12.43***	6.82***	190.33***	34.59***	132.02***
N	6,510	6,509	6,212	6,553	6,555

* p<0.1; ** p<0.05; *** p<0.01; Standard errors in parentheses; Reference group: Real estate

4.3. Propensity Score Matching

In the previous section, the changes in performance for 2006 privatized firms are measured compared with full period SOEs and full period private firms while controlling for firm characteristics such as firm age, firm size and industry. However, the previous method and other methods applied in previous studies can not control for the potential bias due to the nonrandom draw of the sample of privatized firm. In this section, we use propensity score matching method (PSM)[3] which enables us to assign a match for each of the 2006 privatized firms, so-called treated group, with a closely comparable firm from the full period SOEs and from the full period private firms, so-called untreated groups. The match is found by using a scoring rule, based on a logit model. By using properly matched samples of privatized firms, SOEs and private firms, less biased-performance differences may be estimated. The key causal inference studied here is whether of not privatization increases the performance of firms. Experimental data can produce an unbiased estimator for this causal effect, provided the distributions of the treated (privatization) and the control groups (non-privatization) are equivalent. This can be assured by a randomized design. Yet, in our case, field experiments are impractical. Furthermore, the estimation of causal effect by regressing an outcome variable on an intervention dummy variable could be biased since a regression cannot adjust for distribution differences between treated and control groups[4].

It is argued that PSM is a better technique to draw causal inferences using observational data for a number of reasons. First, PSM allows us to reconstruct proper counterfactuals by adjusting covariates between the treated and control groups. Second, PSM can detect the lack of covariate distribution between two groups and adjust the distribution accordingly. Third, violations of model assumptions are less likely when using PSM to calculate the causal effect since although the procedure to calculate propensity scores is parametric (by probit or logit regression), the computation of causal effects by using propensity scores (stratified matching, nearest neighbor matching, caliper and radius matching and kernel matching) is largely nonparametric.

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[3] PSM refers to a procedure that uses propensity scores and matching algorithm to calculate the causal effect. A propensity score is defined as the probability of study participants receiving a treatment based on observed characteristics, while a causal effect is defined as the average effect due to a certain intervention or treatment. When making a causal inference, researchers may face the problem of how to reconstruct the counterfactuals, the outcomes that are not observed. For more details of a guide of using PSM, please see Li (2013).

[4] Two sources of biases when using observational data are the lack of distribution overlap and the different density weighting.

Consequently, using PSM here intends to controls for the nonrandom sample selection in this study.

From the panel data, the treatment group is constructed by selecting SOEs switching ownership to private in 2006 (n=309). Also, full period SOEs and full period private firms are also extracted (n= 2,971 and 15,703). First, the likelihood of switching is estimated, using logistic regression applied to the sample consisting 2006 privatized firms and full period SOEs (n=3,280) and also to the sample consisting 2006 privatized firms and full period private firms (n=16,012). The explanatory variables (covariates) in these logistic regression models include a range of characteristics (averages for the full period) such as AGE, LNASSET, LNEMP, industry dummy and pre-2006 performance characteristics (ROA, ROE, SOL, TURN, and VAEMP). Here, for each sample a good compromise model should be selected (with the criteria of significance of the coefficients and explanatory power of the logistic regression) as a scoring rule (propensity score). Next, the selected logistic equation is used as a scoring rule. With a small caliper of say 0.01[5] two matched samples are constructed consisting of the switched firm on the one hand (treatment group) and closely matched SOEs and private firms on the other hand (untreated group). To further check the quality of the matching, the characteristics (descriptive statistics) of two matched samples, SOE matched sample and private matched sample will be inspected. Also, the tests of balancing of covariates on the assumption that covariates are balanced for the treated and control group are performed. Finally, based on these matched samples, we estimate treatment effects for each of the performance indicators in the post-switched period (2007-2008). Consequently, this matching method comes down to identify the average effect for firm privatized mid-period, the year 2006 (the Average Treatment effect on the Treated - ATT).

To obtain a good compromise model, we proceed as follows. First, a full model including all control variables considered as relevant is estimated using logistic regression. The dependent variable in this model is a dummy (1 if switched, 0 else), while explanatory variables are based on characteristics (averages for the full period) including AGE, LNASSET, LNEMP, industry dummy and pre-2006 performance characteristics (ROA, ROE, SOL, TURN, VAEMP). To evaluate the predictive quality of this model, the percentage of correct classified cases is considered. Then, a reduced model is estimated by dropping explanatory variables with coefficients not significantly different from zero (10% level). The percentages of correctly classified cases of the reduced models are compared. The model with the largest percentage correctly classified is used as a scoring rule[6].

In Table 4, with matching (using the above scoring rules and a caliper of 0.01), the average treatment effect on the treated (ATT) on outcome variables is estimated for switchers (Treated) and for matched firms (Control). Our ATT estimates show that SOEs with higher likelihood of mid-period privatization gain significantly in higher profitability (ROA, ROE) in the post-privatized

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[5] With caliper matching, an individual from the comparison groups is assigned as a matching partner for a treated individual as it satisfies the condition that it lies within the caliper ('propensity range') and is closest in terms of propensity score Caliendo and Kopeinig (2008).

[6] Due to the space reason, we do not display the findings of scoring rules, they will be provided upon the request.

period than their matched full period SOEs as well as matched full private firms[7]. These results are consistent with the estimates of difference-in-difference with control variables. There seems to be no differences in the efficient use of capital and labor. Also, we find no significant differences in the level of debt usage between privatized firms and their counterparts from both control groups of SOEs and privatized firms with this method. This result contrasts with the findings of a decrease in debt usage in previous section and also in previous studies. Our evidence shows that privatized firms, non-switched SOEs as well as private firms all maintain a relative high level of leverage. A possible explanation is that privatized firms face limited availability of equity capital in the capital market in Vietnam and thus are forced to rely on debt financing. Le (2013) finds that despite the introduction and rapid growth of equity and the privatization wave since 1992, listed state-owned firms and private firms still face constraints on finding equity capital. As a robustness check, we re-estimate the average treatment effect on the treated on outcome variables by using other matching algorithms, namely Kernel matching. We find the same results as in case of caliper matching.

Table-4. Average Treatment Effect on the Treated for post-switched period (2007-2008)

Matching Sample	Outcome variable	Treated	Control	Difference	S.E.	T-stat
Non-switched SOEs	ROA	0.06	0.03	0.03	0.01	3.93
	ROE	0.13	0.08	0.05	0.03	1.98
	SOL	0.61	0.62	-0.01	0.02	-0.19
	TURN	1.72	1.69	0.03	0.20	0.15
	VAEMP	623	624	-1	127	-0.01
Non-switched private firms	ROA	0.06	0.03	0.03	0.01	5. 70
	ROE	0.13	0.05	0.08	0.02	3.47
	SOL	0.61	0.61	0	0.02	0.11
	TURN	1.74	1.91	-0.17	0.22	-0.77
	VAEMP	624	624	0	116	0

5. CONCLUSIONS, POSSIBLE EXTENSIONS AND LIMITATIONS

This study uses DID with controls for age of the firm, firm size and industry, that is a multivariate approach in which DID estimators are embedded in an interaction term between a privatization dummy and time in order to overcome the shortcomings of simple prior-posterior comparisons and standard difference-in-difference method in controlling for the concurrent effects of other economic factors on privatized firms. In addition, this study employs propensity score matching which is a powerful technique to draw causal interference using observational data. This technique allows for constructing a counterfactual group of firms by adjusting covariates between the treated and control group, detect a lack of covariate distribution between two groups and adjusting the distribution accordingly. Also, this technique is less likely to violate model assumptions since the computation of causal effect by using propensity scores is largely

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[7] The test of balancing of covariates supports the assumption that covariates are balanced for the treated and control group which confirms the quality of our matching between privatized firms and their counterparts from both control groups of full period SOEs and private firms.

nonparametric. In sum, propensity score matching is appropriate to control for the nonrandom sample selection.

A sample of privatized firms, who switch their ownership from state or collective to private ownership in the middle of the period of observation 2004-2008 namely 2006, is constructed so that performance of two years prior and two years post privatization is available. Earlier studies on privatization effects in Vietnam, such as Truong *et al.* (2006), used data from an earlier period in which privatization was rather limited to small firms in non strategic sectors. In this study we use more recent data and especially from a period where privatization included larger firms operating in more vital industries in Vietnam.

With the elimination of the possible effects on performance from other factors such as size, age and industry besides time dependent factors, DID estimators with control variables show an outperformance in term of profitability for switchers compared to their peers from non-switched SOEs and private firms. Also, with the implementation of propensity score matching (with caliper matching and kernel matching), privatized firms are also found to have a higher profitability in the post-privatized stage than their matched SOEs and private firms. Here, we provide evidence that the privatization process in Vietnam still leads to a positive outcome in terms of profitability for privatized firms in later periods compared with that of Truong *et al.* (2006). Hence, it could be argued that privatization could be considered as an instrument for former Vietnamese SOEs to improve their profitability. Our results emphasize the importance of the methodology used to reveal effects of privatization. The empirical literature on the effects of privatization in emerging economies often yields mixed results. This study shows that such inconclusiveness could stem from differences in methodology and proper control for other factors affecting firm performance than ownership change may contaminate effects found by simple comparison prior to posterior of privatization.

This study still encounters some limitations. The performance changes after privatization could be affected by corporate governance mechanisms such as board composition, CEO duality, ownership structure, the presence of institutional and foreign owners and economic environment factors such as trade and stock market liberalization. Furthermore, the ownership distribution (who are the new owners?) following privatization could have a potential effect on firm performance. Due to the problem of data availability, we cannot control for the possible influence of these factors on firm performance. However, these factors could be important and call for further research.

REFERENCES

Boubakri, N., J. Cosset and O. Guedhami, 2004. Privatization, corporate goverance and economic environment: Firm-level evidence from Asia. Pacific-Basin Finance Journal, 12(1): 65-90.

Boubakri, N., J. Cosset and O. Guedhami, 2008. Privatisation in developing countries: Performance and ownership effects. Development Policy Review, 26(3): 275-308.

Boyne, G.A., 2002. Public and private management: What's the difference. Journal of Management Studies, 39(1): 97-122.

Caliendo, M. and S. Kopeinig, 2008. Some practical guidance for the implementation of propensity score matching. Journal of Economic Surveys, 22(1): 31-72.

Chen, G., M. Firth and O. Rui, 2006. Have China's enterprise reforms led to improved efficiency and profitability. Emerging Markets Review, 7(1): 82-109.

Claessens, S. and S. Djankov, 2002. Privatization benefits in Eastern Europe. Journal of Public Economics, 83(3): 307-324.

Cook, P. and Y. Uchida, 2008. The performance of privatised enterprises in developing countries. Journal of Development Studies, 44(9): 1342-1353.

Cuervo, A. and B. Villalonga, 2000. Explaining the variance in the performance effects of privatization. Academy of Management Review, 25(3): 581-590.

Estrin, S., J. Hanousek, E. Kocenda and J. Svejnar, 2009. The effects of privatization and ownership in transition economies. Journal of Economic Literature, 47(3): 699-728.

Frydman, R., C. Gray, M. Hessel and A. Rapaczynski, 1999. When does privatization work? The impact of private onwership on corporate governance in the transition economies. The Quarterly of Journal of Economies, 114(4): 1153-1191.

Grygorenko, G. and S. Lutz, 2007. Firm performance and privatization in Ukraine. Econ Change, 40(3): 253-266.

Kornai, J., 1986. The soft budget constraint. Kyklos, 39(1): 3-30.

Le, L.H., 2013. The role of financial markets for the Vietnamese economy. PhD Dissertation. University of Antwerp.

Li, M., 2013. Using the propensity score method to estimate causal effects: A review and practical use. Organizational Research Methods, 16(2): 188-226.

Mathur, I. and W. Banchuenvijit, 2006. The effects of privatization on the performance of newly privatized firms in emerging markets. Emerging Markets Review, 8(2): 134-146.

Megginson, W.L., R.C. Nash and M. Van Randenborgh, 1994. The financial and operating performance of newly privatized firms: An international empirical analysis. Journal of Finance, 49(2): 403-452.

Megginson, W.L. and J.M. Netter, 2001. From state to market: A survey of empirical studies on privatization. Journal of Economic Literature, 34(2): 321-389.

Nguyen, T.B.H. and H.L. Do, 2007. The equitization process in Vietnam: Making a headstart in a long journey, in best practices in Asian corporate governance. Tokyo: Asian Productivity Organization.

Omran, M., 2004. The performance of state-owned enterprises and newly privatized firms: Does privatization really matter. World Development, 32(6): 1019-1041.

Perkin, D., 1994. Completing China's move to the market. Journal of Economics Perspectives, 8(2): 23-46.

Rousseau, P.L. and S. Xiao, 2008. Change of control and the success of China"S share-issue privatization. China Economic Review, 19(4): 605-613.

Sun, Q. and H.S. Tong, 2002. Malaysian privatization: A comprehensive study. Financial Management, Winter, 31(4): 79-105.

Sun, Q., W.H.S. Tong and J. Tong, 2002. How does government ownership affect firm performance? Evidence from China's privatization experience. Journal of Business Finance & Accounting, 29(1-2): 1-27.

Tran, G., 2008. The impact of corporate governance on the performance of privatized firms in Vietnam. In FMA European Conference Program.

Truong, D.L., G. Lanjouw and R. Lensink, 2006. The impact of privatization on firm performance in a transition economy: The case of Vietnam. Economics of Transition, 14(2): 349-389.

Truong, Q. and K.D. Ha, 1998. Human resource development in state-owned enterprises in Vietnam. Practice in Human Resource Management, 6(1): 85-103.

Zhang, X., Z. Tang and J. He, 2012. Impact of macro and firm-specific characteristics on post-privatization performance. The Chinese Economy, 45(5): 50-91.

Zhou, C. and A.V. Witteloostuijn, 2010. Institutional constraints and ecological processes: Evolution of foreign-invested enterprises in the Chinese construction industry. 1993-2006. Journal of International Business Studies, 41(3): 539-556.