The impact of privatization on firm performance in a transition economy

The case of Vietnam[1]

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Abstract

The Vietnamese privatization programme, launched in 1992, differs from the usual Western privatization programmes in terms of the residual percentage of shares owned by the state and the portion of shares owned by insiders. This begs the question whether these differences influence the effects of the programme on firm performance. This study measures the impact of privatization on firm performance in Vietnam by comparing the pre- and post-privatization financial and operating performance of 121 former state-owned enterprises (SOEs). We find significant increases in profitability, sales revenues, efficiency and employee income. Results of applying the 'difference-in-difference' (DID) method, wherein a control group of firms is used to pick up the influence of other determinants of firm performance, suggest that the performance improvements may indeed be associated with equitization. Regression analyses reveal that firm size, residual state ownership, corporate governance and stock market listing are key determinants of performance improvements.

JEL classifications: P31, L30, L32, L33, G30.
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1. Introduction

The recent history of privatization begins in the early 1980s when the Thatcher government in the United Kingdom started to privatize state-owned enterprises (SOEs) on a wide scale. After the collapse of the Communist political system in the late 1980s, many transition economies also launched comprehensive privatization programmes. Nowadays, privatization is a worldwide phenomenon that forms an important element of the increasing use of markets to allocate resources.

Although privatization seems to be accepted as a useful method to restructure the economy, it is still not clear under which conditions privatization is successful, and how exactly it affects the firm behaviour and macro-economic performance of a country. Some studies point at success stories (especially in non-transition economies), while others argue that there are major failures, such as the privatization programme in Russia (for recent surveys see Megginson and Netter, 2001, and Parker and Kirkpatrick, 2005). It is therefore no surprise that a lively debate is taking place on the effectiveness of privatization. This debate focuses on a long list of issues, such as the optimal preconditions of privatization, underpricing of initial public offerings (IPOs), the most appropriate form of privatization, the effects of privatization on firm performance and employment, the impact of the economic environment – and especially measures other than privatization (such as price deregulation) – on the effectiveness of privatization, the interrelationship between corporate governance and privatization, and the impact of privatization on the development of the domestic financial system, especially with regard to the stock market.

Many authors argue that much more research is needed to get a better view of the effectiveness of privatization (see, for example, Megginson and Netter, 2001). Among other things, these authors point at the utmost importance of closely examining the process of privatization by means of country case studies, the importance of precisely calculating the employment effects of privatization and the need for additional empirical studies on the effects of privatization on firm performance.

This paper is the first study that examines the effects of privatization, called 'equitization' in Vietnam, using data from 121 equitized firms and 84 SOEs. The case of Vietnam is interesting because this country's equitization approach is different from privatization programmes in many non-transition economies in that residual state ownership after privatization and the percentage of shares transferred to insiders are quite substantial. A more or less standard result from the empirical literature so far, however, is that particularly outside ownership promotes performance improvement of the firms in question (see, for example, Earle and Estrin, 1996). On the basis of that, expectations regarding performance improvement of equitized firms in Vietnam would have to be modest. Following the methodology of Megginson, Nash and Randenborgh (1994), we first compare the pre- and post-equitization financial and operating performance of the full sample of firms. Then we partition the sample into several subgroups based on factors that the literature

documents as potentially important for firm performance following privatization, and test for significant differences in performance between subsamples. In addition, to examine which firms gain most from equitization, we apply cross-sectional regression analyses, wherein the impact of factors such as firm size, the percentage of residual state ownership after equitization, corporate-governance aspects, stock market listing, sectors, equitization years and location are examined. Finally, to overcome the shortcoming of the pre–post comparison method that it, in fact, is unable to isolate the impact of privatization on firm performance from that of other determinants, the so-called difference-in-difference (DID) method is employed.

The remainder of the paper is organized as follows. Section 2 briefly summarizes the equitization programme in Vietnam. Section 3 describes the data used in this paper. Section 4 presents the methodology and some testable predictions. The empirical results from the pre–post comparison method are summarized and discussed in Section 5, while Section 6 reports the outcomes of the regression analyses. The DID method and empirical results from this method are presented in Section 7. Finally, Section 8 concludes the paper and outlines some areas for further research.

2. Overview of the equitization process in Vietnam

The privatization programme in Vietnam, officially called 'Equitization Programme' (*co phan hoa*) started in 1992 as part of the State-Owned Enterprise Reform Programme, in the context of general economic reform. Equitization is defined as the transformation of SOEs into joint-stock companies and selling part of the shares in the company to private investors in order to improve the performance of the firms in question. Equitization differs from privatization in the usual Western sense in that it does not necessarily mean that the government loses its ultimate control over the firm. On the contrary, in the case of Vietnam, the government still holds decisive voting rights in many cases. Another remarkable difference from usual Western privatization practices, to be discussed later on in this section, is that employees and managers of the firms acquire a substantial portion of the shares in the equitized firms.

The equitization process in Vietnam can be divided into two stages. The first one is called the pilot stage, ranging from 1992 to 1996, and the second is the expansion stage, from 1996 onwards.

2.1 The pilot stage of the equitization programme (1992–96)

Based on a resolution of the tenth session of the Eighth National Assembly, the Prime Minister issued Decision 202-CT to launch the equitization programme on June 8, 1992. According to this Decision, SOEs involved in the pilot equitization programme should be small or medium-sized and profitable or at least potentially

**Table 1. Capital and ownership structure of the first five equitized firms
during the pilot period**

Firm name	Capital (billion VND*)	Ownership structure (%)		
		State	Employees	Outsiders
Transportation Service Co.	6,200	18.0	77.0	5.0
Refrigeration & Electrical Engineering Co.	16,000	30.0	50.0	20.0
Hiep An Shoes Co.	4,793	30.0	35.2	34.8
Animal Food Processing Co.	7,912	30.0	50.0	20.0
Longan Export Product Processing Co.	3,540	30.2	48.6	21.2

Source: Chu (2002).
* VND stands for Vietnamese Dong, the currency of Vietnam. The USD/VND exchange rate over the period relevant in the context of this article was around 15,000 VND per USD.

profitable enterprises, but should not be 'strategic enterprises'. Moreover, the Decision stipulated that employees of equitized enterprises have a first right to buy the shares at preferential terms. Being afraid of a social collapse such as in Eastern and Central European countries, the Vietnamese government launched the equitization process very carefully. In the pilot period from 1992 to 1996 only five SOEs were equitized. It involved small SOEs from the transportation, shoes, machine and food-processing industries. In most of those enterprises, the employees hold the dominant portion of shares, and the government still owns nearly 30 percent of the shares. The capital and ownership structure of the first five firms in the pilot stage is summarized in Table 1.

2.2 The expansion stage of the equitization programme (1996–present)

Recognizing the need for a more aggressive approach, the government issued Decree 28-CP in May 1996 to end the pilot stage and open a new stage of the equitization process. This decree maintains the general principles of the pilot equitization programme, extends the scope of equitization to all non-strategic small and medium-sized SOEs, and requires SOEs' controlling agencies (ministries, people's committees and state corporations) to select enterprises for equitization. However, the process did not take off fast. Practically, there were only 25 firms added to the list of equitized firms from 1996 to 1998.

The equitization process has accelerated since the promulgation of Government Decree No. 44/1998/ND-CP in mid-1998. The Decree provides a fairly clear and comprehensive framework for transforming SOEs into equitized firms. Consequently, a hundred SOEs have been equitized annually following the issue of this

Decree. Although Decree 44 played an important role in stimulating the equitization process, it still had some shortcomings, for example, regarding the valuation method of firms to be privatized. As a result, the government by mid-2002 issued Decree 64 to replace Decree 44. The new Decree, which has about 10 major changes compared with the former Decree 44 such as changes concerning firm valuation methods, initial public offering requirements, founders' obligations, has had a strong effect on cranking up the pace of the equitization process. Indeed, the number of SOEs that have been successfully transformed to equitized firms from 2003 to 2004 reached 1,292, accounting for about 57.6 percent of the total number of equitized firms.

Over 12 years of implementation, the equitization process in Vietnam has harvested some first results. In fact, up to the end of 2004 a total of 2,242 SOEs with total capital of about VND 17,700 billion have been completely equitized. However, the equitization process has progressed slowly, and it is hard to achieve the government's goal of converting about 3,000 SOEs into equitized firms by 2005. In addition, most of the SOEs that have been selected for equitization are small and medium-sized. Indeed, according to a report of the National SOE Reform Board, firms that have less than VND 10 billion in capital account for 81.5 percent of the total equitized firms. It is important to note here that the 'strategic' SOEs are not included in the equitization programme. Regarding ownership structure, the report reveals that insiders (employees and management board) hold dominant shares in the equitized firms, and the state still owns over one third of the total issued shares of the firms. Specifically, by the end of 2004, in 2,242 equitized firms insiders on average control 46.5 percent, and the state on average still holds 38.1 percent of the total shares of the firms. The rest, only 15.4 percent on average, belongs to outside investors. Furthermore, firms in which the state owns more than 50 percent of the shares account for 29.5 percent of the total number of equitized firms.[2] Table 2 provides a comparison of ownership structure between equitized firms in Vietnam and privatized firms in other transition countries, showing that, with the exception of Georgia, the share of outsiders in equitized firms in Vietnam is low even compared with other transition economies. Table 3 presents the number of equitized firms in Vietnam for the period 1993 to 2004.

3. Data description

To collect the data for our empirical study, we conducted questionnaire surveys among both equitized firms and SOEs in Vietnam. The first survey, which took place from March 15 to April 30, 2004, focused on equitized firms. To measure the impact of equitization on firm performance, this study first compares post-equitization

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[2] These figures are drawn from a report of the National SOE Reform Board, according to Nguyen (2005).

Table 2. Ownership structure of privatized firms in Vietnam (2004) and other transition countries (%)

Country	The state	Insiders	Outsiders
Vietnam (2004)	38.1	46.5	15.4
Georgia (1997)	23.3	64.4	12.4
Kazakhstan (1997)	16.1	37.6	46.3
Kyrgyz Republic (1997)	5.6	70.8	23.6
Moldova (1997)	23.8	38.0	38.2
Russia (1997)	14.7	59.6	25.7
Ukraine (1997)	15.4	61.5	23.1

Source: Nguyen (2005) for Vietnam and computed from Djankov (1999) for the other transition countries.

Table 3. Number of equitized firms and their capital

Year	No. of equitized firms	Total capital (million VND)	Mean of capital per firm (million VND)
1993	2	22,200	11,100
1994	1	4,793	4,793
1995	2	11,452	5,726
1996	6	19,032	3,172
1997	4	55,800	13,950
1998	101	480,223	5,163
1999	254	1,311,636	12,171
2000	212	n.a.	n.a.
2001	206	n.a.	n.a.
2002	164	n.a.	n.a.
2003	537	n.a.	n.a.
2004	753	n.a.	n.a.
Total	**2,242**		

Source: Dang (2000) and Nguyen (2004, 2005).

performance indicators of equitized firms to pre-equitization ones. Therefore, the firms that were chosen for being included in the first survey had to satisfy two conditions. First, they had to be former SOEs and, second, their financial informa-tion should be available and sufficient (at least 1 year before and after equitization). Additionally, to serve as the basis for the collection of data for the DID method,

the second survey on SOEs was conducted, from March 20 to May 20, 2005. Both of the surveys were conducted in the southern region of Vietnam (Ho Chi Minh City (HCMC) and the Mekong River Delta (MRD)) because of budget limitations.

It should be mentioned that for the collection of firms' financial data some public officers who have worked for local SOE Reform Boards[3] and researchers of the HCMC Institute for Economic Research were asked to do the survey and may have influenced the results. There was, however, no other way of acquiring the information; we had to rely on the access of the interviewers to the firms concerned.

Since the number of equitized firms in the region that satisfy the conditions above was limited, we decided to try to interview all of them. Unfortunately, some of them absolutely refused when interviewers tried to contact them. Consequently, only 88 equitized firms were interviewed. A similar approach in the second survey among SOEs resulted in financial information obtained from 84 SOEs.

Furthermore, we obtained information on equitized companies from a different part of Vietnam in other ways. First, financial data and other information on listed companies were collected by downloading information from their websites. By regulation these companies have to expose all their financial information to investors. Second, we contacted some organizations that store the information and data of equitized companies, to acquire a dataset. As a result, we received a dataset for 21 equitized firms in Northern provinces. These data contain some useful information, but not as much as expected. Specifically, they include several pre- and post-equitization performance measures, such as sales, income, number of employees, average salary of employees, and return on equity. However, information regarding the equitization process, ownership structure and corporate governance of these firms is not available.

Finally, by combining the data from different sources we have a dataset for 121 equitized firms and 84 SOEs. Some descriptive statistics of sample firms are presented in Tables 4–6.

4. Hypotheses and methodology

Privatization is usually seen as a means to improve the performance of the firms in question. To examine the impact of privatization on financial and operating performance of firms, many studies compare pre- and post-privatization performance measures (Boubakri and Cosset, 1998; D'Souza and Megginson, 2001; Harper, 2002; Megginson et al., 1994). Because the first study published using this methodology was Megginson, Nash and Van Randenborgh (1994), the methodology is usually referred to as the MNR methodology (Megginson and Netter, 2001). In our

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[3] Each province has its own SOE Reform Board.

Table 4. Structure of the sample of equitized firms by sector, location, capital and residual state share

	Number of firms	Percentage
By sectors		
Manufacturing	69	57.0
Trade and services	52	43.0
Total	**121**	**100.0**
By location		
The MRD region	37	30.6
HCMC	58	47.9
Northern part of Vietnam	26	21.5
Total	**121**	**100.0**
By chartered capital		
Less than VND 5 billion	31	31.0
From VND 5 to 10 billion	22	22.0
More than VND 10 billion	47	47.0
Total	**100**	**100.0**
By the state's residual share		
Less than 30%	50	50.0
From 30% to 50%	36	36.0
More than 50%	14	14.0
Total	**100**	**100.0**

Source: Own survey in 2004.

Table 5. Size and ownership of the equitized firms in the sample

	Obs.	Min.	Mean	Median	Max.	Std. dev.
Size						
Chartered capital (million VND)	100	590.0	14,546.0	8,902.0	150,000.0	121,233.0
Employment	119	11.0	352.0	159.0	3,681.0	575.0
Ownership structure						
State	100	0.0	29.8	30.0	77.6	16.5
Insiders	100	5.3	36.1	33.5	100.0	20.8
Outsiders	100	0.0	34.1	32.0	78.1	19.1

Source: Own survey in 2004.

Table 6. Sample structure of the surveyed SOEs by sectors and locations

	Number of firms	Percentage
By sectors		
Manufacturing	43	51.2
Trade and services	41	48.8
Total	**84**	**100.0**
By location		
The MRD region	70	83.3
HCMC	14	16.7
Total	**84**	**100.0**

Source: Own survey in 2004.

study we first apply this methodology to measure the effects of equitization on firm performance in Vietnam. Some of the measures used in the MNR methodology, such as capital investment and dividends, cannot be employed in our study due to a lack of appropriate data. Moreover, some of the measures have to be adjusted to the Vietnamese situation. Specifically, we use income before tax to calculate the profitability ratios of firms instead of net income as in the MNR methodology. Similarly, we replace net income efficiency by income-before-tax efficiency. An explanation for this adjustment is that in Vietnam the equitized firms have some income tax advantages for the first years after equitization, so to avoid a bias in measuring the impact of equitization *per se* on profitability, we have to use income before tax instead of net income.

To measure the effects of equitization on firm performance, we first calculate performance measures for every firm for the years before and after equitization. Then, the mean of each measure is computed for each firm over the pre-equitization (years −3 to −1) and post-equitization (years +1 to +3) periods. However, it is important to note that we also included firms for which we only have data for 1 year before and after equitization in our sample. We did that to enlarge our sample.[4] Because the year of equitization includes both public and private ownership phases for many firms, it is eliminated from our analyses.

It is expected that as firms move from public to private ownership, their profitability increases. First, privatization leads managers to focus on profit goals because under private ownership, management is directly responsible to shareholders (Yarrow, 1986). Second, to the extent that privatization transfers both control rights and cash flow rights from politicians to managers, profitability increases through

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[4] We also conducted some analyses with a 2-year and 1-year data screen. The results were very similar to those presented in this paper.

efficiency gains in the form of redress of the excess labour spending that politicians needed for electoral reasons (Boycko *et al.*, 1996). Similarly, after privatization firms should employ their human, financial and technological resources more efficiently because of a greater stress on profit goals and a reduction of government subsidies (Boycko *et al.*, 1996; Kikeri *et al.*, 1992). Moreover, it is also expected that output (sales revenues) will increase following privatization, because of better incentives, more flexible financing opportunities, and greater scope for entrepreneurial initiative (Megginson *et al.*, 1994). Regarding leverage, the shift from public to private ownership can be expected to lead to a decrease in the share of debt in the capital structure since with the end of government debt guarantees the firm's cost of borrowing will increase and the firm has new access to public equity markets (Megginson *et al.*, 1994). In addition, if the bankruptcy costs are significant, once government guarantees are removed the newly privatized firm should reduce its debt (Boubakri and Cosset, 2002). Furthermore, we expect that the level of employment should decline once the SOE, which is usually overstaffed, turns private and no longer receives government subsidies. Finally, once the productivity of newly privatized firms increases as a result of privatization, employee income should improve. Table 7 presents definitions and expected changes of the performance measures investigated in this paper.

Given a general improvement in performance as a result of privatization, the literature documents that differences would arise due to differences in size, sector, ownership structure, corporate governance and capital market discipline (Comstock *et al.*, 2003; D'Souza *et al.*, 2001; Harper, 2002; Pistor and Turkewitz, 1996). Therefore, in the next step we divide our data into five subsamples.

Table 7. Performance measures: Definitions and expected changes

Performance measures	Definition	Expected change
1. Profitability		
Income before tax on assets (IBTA)	Income before tax/total assets	Increase
Income before tax on sales (IBTS)	Income before tax/sales	Increase
Income before tax on equity (IBTE)	Income before tax/equity	Increase
2. Operating efficiency		
Sales efficiency	Real sales/number of employees	Increase
Income efficiency	Income before tax/number of employees	Increase
3. Output (real sales)	Nominal sales/price index	Increase
4. Leverage	Total debt/total assets	Decrease
5. Employment	Number of employees	Decrease
6. Employee income	Annual income per employee	Increase

We first partition the firms into two groups, larger firms and smaller firms, based on their pre-equitization real sales average. Firms with pre-equitization real sales average above the median of the sample are referred to as larger firms; otherwise they belong to the second group of smaller firms. The literature is not unambiguous about the role of firm size in performance improvement after privatization. On the one hand, Comstock *et al.* (2003) suppose that larger firms will have greater improvements in their performance due to being better prepared for the post-privatization environment, especially in terms of facing competition.[5] On the other hand, Harper (2002) holds that smaller firms will show greater improvement in performance after equitization than larger firms because it would be easier for them to restructure and adjust their business. In addition to that, it could be relevant in the case of Vietnam that the residual state share in small equitized firms is usually lower than for large firms. As will be discussed later in this section, the literature suggests that the percentage of state ownership in newly privatized firms has a negative effect on firm performance after privatization.

Next, a split is made on the basis of the sectors in which the firms operate: either trade and services or manufacturing. The underlying idea is that firms in the trade and services sector have an easier job in improving their performance since in this sector there is less need for investment in fixed assets that may be a necessary component of the adjustment process (Harper, 2002).

The literature further documents that ownership structure plays an important role in improving firm performance following privatization. To measure such effects, we divide the sample firms into two subgroups on the basis of the median of the full sample (30 percent residual state ownership). The reason for splitting the sample in this way is to generate subgroups with the same number of observations. It is expected that the former subgroup will show greater performance improvements than the latter one. The reason underlying this expectation is that the state as a shareholder has multiple interests – economic, social and political – that can be antagonistic to the interests of private shareholders in the direction of performance improvement (see, for example, Pistor and Turkewitz, 1996).

Additionally, to examine the impact of corporate governance on firm performance we partition our sample into firms that have a chairperson of the board of directors representing the state (FCBDRS), and firms that have a chairperson of the board of directors representing private investors (FCBDRP). In Vietnam, the board of directors has the highest authority to make decisions relevant to the company, except on some issues that have to be approved by shareholders at the shareholders' meeting. For instance, the board of directors exerts full power in the appointment or dismissal of the general manager and senior managers. We expect that the

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[5] This, however, assumes that privatization is equivalent to the introduction of competition, which conceptually is incorrect. See, for example, Shirley and Walsh (2000) for a discussion in which competition and firm ownership are clearly distinguished conceptually.

improvements in performance measures are greater for firms in the latter group in that chairpersons representing the private sector will give priority to improving firm performance and do not have to compromise with the other interests that state representatives have to take into account.

Moreover, our data are split into two subgroups, listed and non-listed firms. Listed firms are the equitized firms that have shares that are traded in the HCMC Stock Exchange. The corporate governance literature suggests that stock market listing provides important possibilities to monitor the management of firms. The fear of replacement and the linkage of compensation to performance stimulate a firm's management to maximize the firm's profit. Moreover, the listed firm could get other benefits from the listing of its shares on the stock market. First, through the stock market the firm can mobilize more capital at low cost. Second, since the firm's share price is publicly announced in many media, there are free channels for advertising the firm's image. Taking into account these factors, we expect that listed firms have greater performance improvements than non-listed ones following equitization.

Furthermore, the sample is divided into two subgroups, namely firms located in HCMC and other firms. HCMC is Vietnam's biggest city, and it is also the country's main economic centre. With the advantages of location, it is expected that firms in HCMC have larger gains in performance measures than firms in other regions.

As mentioned in the Section 2, the equitization programme in Vietnam consists of two stages, namely the pilot and expansion stages. Although the expansion stage officially started in 1996, the equitization process, in fact, only accelerated since the issuance of Decree No. 44 in mid-1998. Therefore, the sample is finally partitioned into two further subgroups: firms equitized before 1999 (January 1, 1999) and other firms. Firms in the first group had to face some disadvantages such as lack of experience, the state's imperfect regulations and the short time for preparing for equitization compared to firms in the second group. Thus, the first group is expected to have lower performance gains than the second one.

Although the pre–post comparison method has been applied in many studies, it has its shortcomings. Indeed, this method is unable to isolate the impact of privatization on firm performance from concurrent effects of other economic factors. To deal with this issue, the DID method is also employed in this paper. A detailed description of this method and its results are presented in Section 7.

5. Effect of equitization on firm performance: Results from the pre–post comparison method

5.1 Results for the full sample

In this section we present our empirical results for the full sample. The results are summarized in Table 8. It is important to note that before testing for significant

Table 8. Summary of results from tests of predictions for the full sample of equitized firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after − before)	Proportion of firms that performed as expected	Z-statistic for significant of proportion change
Profitability							
IBTA	100	0.0935	0.1243	0.0308		0.690	3.80[a]
		(0.0759)	(0.1082)	(0.0323)	2.69[a]		
IBTS	121	0.0610	0.0843	0.0233		0.793	6.44[a]
		(0.0384)	(0.0604)	(0.0220)	3.21[a]		
IBTE	121	0.2292	0.2751	0.0459		0.678	3.91[a]
		(0.1737)	(0.2294)	(0.0557)	3.36[a]		
Operating efficiency							
Sales efficiency (million VND)	119	1.0204	1.2631	0.2427		0.740	5.23[a]
		(1.0000)	(1.1410)	(0.1410)	4.82[a]		
Income efficiency (million VND)	118	1.1011	3.2056	2.1045		0.915	9.03[a]
		(1.0000)	(1.6993)	(0.6993)	9.23[a]		
Real sales (million VND)	121	1.0048	1.4102	0.4054		0.810	6.81[a]
		(0.9996)	(1.1907)	(0.1911)	7.67[a]		
Leverage							
Total debts/total assets	100	0.5299	0.5006	−0.0293		0.520	0.40
		(0.5622)	(0.5443)	(−0.0179)	0.90		
Employment	119	352	382	30		0.336	−3.58[a]
(Number of employees)		(159)	(155)	(−4)	0.52		
Annual income per employee	95	12.2	17.3	5.1		0.884	7.02[a]
(million VND)		(11.3)	(14.9)	(3.6)	3.41[a]		

[a] Significant at the 1% level.

changes in performance, we employ the Jarque-Bera test to examine whether the performance measures of the surveyed firms are normally distributed. The result (not reported in this paper, but can be obtained upon request) is that the null hypothesis that the main variables in the sample are normally distributed is rejected for most measures. Consequently, the non-parametric two-tailed Wilcoxon signed rank test is used to test for significant changes in the median of performance measures following equitization.[6] The Wilcoxon signed rank method tests the null hypothesis that the median difference in measure values between the pre- and post-equitization samples is zero. This test takes into account information about the magnitude of differences within pairs and gives more weight to pairs that show large differences than to pairs that show small differences. The test statistic is based on the ranks of the absolute values of the differences between the two measures.[7] Moreover, we also use a proportion (binominal) test to determine whether the proportion (P) of firms with the anticipated changes is greater than would be expected by chance, typically testing whether P = 0.5.

5.1.1 Profitability

Profitability is the most important indicator to measure the performance of firms. As expected the results of our study show that all profitability ratios, to wit income before tax on assets (IBTA), income before tax on sales (IBTS), and income before tax on equity (IBTE), increase significantly after equitization. Specifically, the mean (median) IBTA increases significantly (at the 1 percent level), from 9.35 (7.59) percent in the pre-equitization period to 12.43 (10.82) percent in the post-equitization period. Furthermore, Table 8 shows that a statistically significant 69.0 percent of the full sample has positive changes in IBTA. Similarly, the mean (median) of IBTS and IBTE increases from 6.10 (3.84) percent to 8.43 (6.04) percent, and from 22.92 (17.37) to 27.51 (22.94) percent, respectively. These increases are significant at the 1 percent level. These results strongly confirm that equitization in Vietnam has a positive effect on the profitability of the firms in question.

5.1.2 Efficiency

To measure efficiency we use the inflation-adjusted sales per employee and income before tax per employee. In addition, they are normalized to equal 1.00 in year 0 (the year of equitization), so the figures for other years are expressed as a fraction of values of the efficiency measures in the year of equitization. The results of our study reveal that both efficiency measures show a significant increase (at the 1 percent level) after equitization. For instance, sales efficiency rises from an average (median) 1.02 (1.00) in the pre-equitization period to 1.26 (1.14) in the post-equitization period. Similarly, income efficiency increases from an average

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[6] Statistically, the non-parametric Wilcoxon test is more powerful in detecting the existence of significant differences than the parametric *t*-test when the sample is not normally distributed.

[7] For a detailed description of the Wilcoxon signed rank test, see Berenson *et al.* (1988).

(median) 1.10 (1.00) during the pre-equitization period to 3.21 (1.70) after equitization. Further, our proportion tests show that sales efficiency and income efficiency increase in 74.0 and 91.5 percent of the total sample of firms, respectively, both significant at the 1 percent level. These results suggest that the equitized firms use their resources with much greater efficiency after equitization.

5.1.3 Output

In our study output is measured by inflation-adjusted sales (real sales). Similar to the efficiency measures, real sales are also normalized to 1.00 in year 0. Using the Wilcoxon test we find that real sales increase significantly (at the 1 percent level) following equitization. Specifically, the mean (median) real sales increases from 1.00 (1.00) during the pre-equitization period to 1.41 (1.19) after equitization. The proportion test also shows a significant increase (at the 1 percent level) in real sales after equitization. In fact, 81.0 percent of the firms in our sample improve their real sales level in the years following equitization. This result confirms that equitization in Vietnam has a positive effect on the output of firms.

5.1.4 Leverage

To measure the effect of equitization on the leverage of firms, we compare the pre-equitization ratio of total debt to total assets to the post-equitization ratio. Many scholars believe that leverage is reduced following privatization due to a combination of greater retained earnings and new share offerings. In the case of Vietnam we also find a decline in leverage, but it is insignificant. In fact, the mean (median) leverage decreases from 52.99 percent (56.22 percent) over the pre-equitization period to 50.06 percent (54.43 percent) in the years following equitization. Our data further show that 52 percent of the sample firms reduce their debt ratio after equitization. However, the proportion test shows that the decline in leverage following equitization is insignificant. Clearly, the effect of equitization on leverage of firms in Vietnam is not significant. The debt ratio of equitized firms is still high following equitization, 50 percent on average.

5.1.5 Employment

The literature documents that the effect of privatization on employment is ambiguous. Some researchers (Boubakri and Cosset, 1998; Megginson et al., 1994) reported an increase in employment after privatization, while other authors (Harper, 2002; La Porta and López-de-Silanes, 1999) found a significant decline in the number of employees after privatization, which is in line with the theoretical model of Boycko et al. (1996) referred to earlier in this paper. Our results are consistent with the findings of Megginson et al. (1994) and Boubakri and Cosset (1998) in that employment does not decrease significantly over the post-privatization period. Specifically, mean employment increases by 30 employees after equitization, from 352 to 382 employees, although the Wilcoxon test shows that this increase is insignificant. Contrary to this test, the proportion test reveals that the increase in

employment is significant at the 1 percent level, with 63.9 percent of the sample firms increasing employment level following equitization.

5.1.6 Employee income
We measure the change in employee income by calculating the change in inflation-adjusted annual income per employee. The results of the study reveal that the mean (median) inflation-adjusted annual income per employee rises from 12.2 million VND (11.3 million) in the pre-equitization period to 17.3 million VND (14.9 million) in the post-equitization period, and 88.4 percent of the sample firms report paying higher salaries to their employees. Both Wilcoxon and proportion tests show that the increase in inflation-adjusted annual income per employee is significant at the 1 percent level.

In short, our results suggest that equitization has positive effects on firm performance in Vietnam. In fact, we find that profitability, efficiency, and output of equitized firms increase significantly after equitization. In addition, we document a decline in leverage (measured by total debt to total assets) of firms in the post-equitization period, although it is statistically insignificant. Remarkably, we find no evidence of a significant decline in employment in the years following equitization. Finally, our findings confirm that equitization results in a significant increase in employee income after equitization. Our results go against the hypothesis that performance improvement of privatized firms results go together with redress of the excess labour spending that is characteristic of SOEs according to the model of Boycko *et al*. (1996). A possible explanation for this result may be that employees, holding substantial portions of the shares of equitized firms in the case of Vietnam, are able to prevent reductions in employment of the firms in question and are even able to achieve rises in their income. The remarkable result that this does not prevent improvements in profitability and efficiency may be explained by the incentive effect of the income rises in that they stimulate the employees to work more efficiently.

5.2 Subsample results

To determine the significant changes in performance measures between subsamples, the Mann–Whitney *U*-test is employed. The Mann–Whitney *U*-test is used to examine whether or not two independently drawn samples came from the same population. This test is designed to test the null hypothesis that two populations are identical against the alternative hypothesis that they differ.[8]

5.2.1 Larger firms versus smaller firms
In Table 9 we compare the performance changes of larger firms with the performance changes of smaller firms. As discussed above, the literature comes up with conflicting

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[8] For a detailed description of the Mann–Whitney test, see Zuwaylif (1984).

Table 9. Comparison of post-equitization performance changes for larger and smaller firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
IBTA						
Larger firms	55	0.0982	0.1237	0.0255		
		(0.0726)	(0.1013)	(0.0287)	1.73[c]	
Smaller firms	45	0.0879	0.1251	0.0372		1.33
		(0.0767)	(0.1159)	(0.0392)	2.16[b]	
IBTS						
Larger firms	60	0.0490	0.0607	0.0117		
		(0.0379)	(0.0476)	(0.0097)	1.79[c]	
Smaller firms	61	0.0728	0.1075	0.0347		3.42[a]
		(0.0432)	(0.0843)	(0.0411)	2.97[a]	
IBTE						
Larger firms	60	0.2818	0.2681	−0.0137		
		(0.2091)	(0.2326)	(0.0234)	0.92	
Smaller firms	61	0.1774	0.2820	0.1046		2.86[a]
		(0.1528)	(0.2214)	(0.0686)	3.56[a]	
Sales efficiency						
Larger firms	58	1.0341	1.4523	0.4182		
		(1.0000)	(1.1584)	(0.1584)	3.12[a]	
Smaller firms	61	1.0074	1.3628	0.3554		2.04[b]
		(1.0000)	(1.1547)	(0.1547)	3.71[a]	
Income efficiency						
Larger firms	58	1.0330	2.7360	1.7030		
		(0.9909)	(1.3415)	(0.3506)	6.15[a]	
Smaller firms	61	1.1479	3.5995	2.4516		2.24[b]
		(1.0000)	(1.1911)	(0.1911)	6.83[a]	
Real sales						
Larger firms	60	1.0178	1.4523	0.4345		
		(0.9924)	(1.2061)	(0.2137)	6.22[a]	
Smaller firms	61	0.9920	1.3688	0.3768		0.16
		(1.0000)	(1.1678)	(0.1678)	4.59[a]	

**Table 9. (cont) Comparison of post-equitization performance changes
for larger and smaller firms**

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
Total debts/total assets						
Larger firms	55	0.5858	0.5353	−0.0505		
		(0.6154)	(0.5916)	(−0.0238)	1.20	
Smaller firms	45	0.4616	0.4583	−0.0033		1.70[c]
		(0.4487)	(0.4742)	(0.0255)	0.05	
Number of employees						
Larger firms	58	596	654	58		
		(307)	(355)	(48)	0.79	
Smaller firms	61	120	123	3		3.92[a]
		(93)	(101)	(8)	0.18	
Annual income per employee (million VND)						
Larger firms	40	14.2	17.8	3.6		
		(13.0)	(15.7)	(2.7)	2.25[b]	
Smaller firms	55	10.8	16.9	6.1		0.28
		(9.6)	(12.7)	(3.1)	2.63[a]	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

hypotheses regarding the role of firm size in post-privatization performance improvement. The outcome of our comparison is that for most criteria smaller firms show greater performance improvements after equitization than larger ones. Specifically, smaller firms report greater rises in IBTA, IBTS, IBTE, income efficiency and employee income. For instance, the mean (median) increase in IBTS for the smaller firms is 2.30 percentage points (3.14 percentage points) higher than the larger firms, 3.47 percent (4.11 percent) compared to 1.17 percent (0.97 percent). Similarly, the mean (median) change in IBTE for smaller firms is 10.46 percent (6.86 percent) as compared to −1.37 percent (2.34 percent) for the larger firms. The Mann–Whitney test shows that the difference in performance changes between the two subsamples is significant at the 1 percent level for IBTS, IBTE, and at the 5 percent level for income efficiency. No significant difference is found for IBTA and employee income. On the other hand, improvements in real sales and sales efficiency of the larger firms are greater than for the smaller firms. The mean (median) increase in real sales for the larger firms is 43.45 percent (21.37 percent) compared to 37.68 percent (16.78 percent) for the smaller firms, and the mean (median)

improvement in sales efficiency for the larger firms is 6.82 percentage points (0.37 percentage points) higher than for the smaller firms. The differences in improvements between the two subgroups are significant at the 5 percent level for sales efficiency, but insignificant for real sales. Finally, we find that there is a significant difference (at the 1 percent level) in employment change between the two subgroups. The mean (median) increase for the larger firms is 58 (48) employees while this increase is only 3 (8) employees for the smaller firms.

To sum up, for almost all criteria smaller firms show a greater performance improvement following equitization than larger ones, thereby supporting the Harper (2002) hypothesis that smaller firms are more flexible in adjusting to the new environment.

5.2.2 Trade and services firms versus manufacturing firms

Performance comparisons of trade and services firms with manufacturing firms are presented in Table 10. Our findings show that after equitization both subgroups report significant changes in the predicted direction for all measures, except for leverage and employment. However, for different measures the pattern is different between the two subgroups. We find greater changes in IBTA, IBTE, real sales, income efficiency, and employee income for the first subgroup. On the other hand, somewhat higher improvements in IBTS, sales efficiency, leverage, and employment

Table 10. Comparison of performance changes following equitization for trade and services firms and manufacturing firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after − before)	Z-statistic for difference in medians between subsamples
IBTA						
Trade and services firms	47	0.0764 (0.0673)	0.1102 (0.0807)	0.0338 (0.0134)	1.64[c]	
Manufacturing firms	53	0.1087 (0.0764)	0.1368 (0.1241)	0.0281 (0.0477)	2.13[b]	0.46
IBTS						
Trade and services firms	52	0.0681 (0.0365)	0.0894 (0.0607)	0.0213 (0.0242)	1.73[c]	
Manufacturing firms	69	0.0557 (0.0384)	0.0804 (0.0604)	0.0247 (0.0220)	2.97[a]	0.75
IBTE						
Trade and services firms	52	0.1875 (0.1757)	0.2456 (0.2237)	0.0581 (0.0480)	2.17[b]	

Table 10. (cont) Comparison of performance changes following equitization for trade and services firms and manufacturing firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
Manufacturing	69	0.2606	0.2974	0.0368		0.27
firms		(0.1632)	(0.2498)	(0.0866)	2.59[a]	
Sales efficiency						
Trade and	51	1.0005	1.2200	0.2195		
services firms		(0.9952)	(1.1410)	(0.1458)	2.80[a]	
Manufacturing	68	1.0353	1.2955	0.2602		0.64
firms		(1.0000)	(1.1599)	(0.1599)	3.93[a]	
Income efficiency						
Trade and	50	1.1695	3.5137	2.3442		
services firms		(0.9643)	(1.5016)	(0.5373)	5.59[a]	
Manufacturing	68	1.0509	2.9790	1.9281		0.78
firms		(1.0000)	(1.7970)	(0.7970)	7.28[a]	
Real sales						
Trade and	52	0.9700	1.3837	0.4137		
services firms		(0.9679)	(1.1454)	(0.1775)	5.16[a]	
Manufacturing	69	1.0310	1.4303	0.3993		0.32
firms		(1.0000)	(1.2524)	(0.2524)	5.69[a]	
Total debts/total assets						
Trade and	47	0.5496	0.5240	−0.0256		
services firms		(0.5768)	(0.5666)	(−0.0102)	0.42	
Manufacturing	53	0.5125	0.4799	−0.0326		0.93
firms		(0.5451)	(0.5288)	(−0.0163)	0.87	
Number of employees						
Trade and	51	217	231	14		
services firms		(87)	(103)	(16)	0.41	
Manufacturing	68	453	495	42		0.78
firms		(192)	(217)	(25)	0.50	
Annual income per employee (million VND)						
Trade and	44	13.3	20.0	6.7		
services firms		(11.1)	(15.3)	(4.2)	2.11[b]	
Manufacturing	51	11.3	14.9	3.6		0.29
firms		(11.3)	(14.7)	(3.4)	2.64[a]	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

are reported for the manufacturing firms. However, the Mann–Whitney test shows that the differences between the two subgroups are not statistically significant for all performance measures.

5.2.3 Firms with residual state ownership less than 30 percent versus firms with the residual state ownership greater than or equal to 30 percent

The results presented in Table 11 show that firms with residual state ownership less than 30 percent have greater performance improvements in profitability, income efficiency, employment, and employee income than firms where residual state ownership is greater than or equal to 30 percent. For instance, the mean (median) gain in IBTS for the former subgroup is 4.02 percent (3.78 percent), while this increase for the latter is only 1.72 percent (1.92 percent). Moreover, we find that the average employment increase for the firms with residual state ownership less than 30 percent is 52 employees compared to 14 employees for the other group. However, the latter subgroup has greater improvements in real sales, sales efficiency and leverage. The differences found are, however, not statistically significant for any of the variables.

Table 11. Comparison of performance changes following equitization for firms with residual state ownership less than 30 percent and the other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after − before)	Z-statistic for difference in medians between subsamples
IBTA						
State	59	0.0829	0.1231	0.0402		
ownership < 30%		(0.0703)	(0.1081)	(0.0378)	2.55[a]	
State	41	0.1089	0.1261	0.0172		0.79
ownership ≥ 30%		(0.0891)	(0.1083)	(0.0192)	1.06	
IBTS						
State	59	0.0529	0.0828	0.0299		
ownership < 30%		(0.0384)	(0.0531)	(0.0147)	2.71[a]	
State	41	0.0769	0.0899	0.0130		1.52
ownership ≥ 30%		(0.0594)	(0.0715)	(0.0121)	1.02	
IBTE						
State	59	0.2287	0.2600	0.0313		
ownership < 30%		(0.1538)	(0.2282)	(0.0744)	2.54[a]	
State	41	0.2381	0.2459	0.0078		1.06
ownership ≥ 30%		(0.2101)	(0.2070)	(−0.0031)	0.79	

Table 11. (cont) Comparison of performance changes following equitization for firms with residual state ownership less than 30 percent and the other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after − before)	Z-statistic for difference in medians between subsamples
Sales efficiency						
State	59	1.0484	1.1751	0.1267		
ownership < 30%		(1.0000)	(1.1043)	(0.1043)	1.79[c]	
State	39	0.9890	1.2732	0.2842		1.42
ownership ≥ 30%		(1.0000)	(1.1410)	(0.1410)	3.12[a]	
Income efficiency						
State	59	1.1648	4.2864	3.1216		
ownership < 30%		(0.9818)	(1.9111)	(0.9293)	5.96[a]	
State	38	1.0581	1.7954	0.7373		1.76[c]
ownership ≥ 30%		(0.9643)	(1.4722)	(0.5079)	5.47[a]	
Real sales						
State	59	1.0369	1.3125	0.2756		
ownership < 30%		(0.9881)	(1.1420)	(0.1539)	4.34[a]	
State	41	0.9610	1.4913	0.5303		1.17
ownership ≥ 30%		(0.9831)	(1.1835)	(0.2004)	5.17[a]	
Total debts/total assets						
State	59	0.5488	0.5287	−0.0201		
ownership < 30%		(0.5897)	(0.5794)	(−0.0103)	0.43	
State	41	0.5028	0.4603	−0.0425		0.88
ownership ≥ 30%		(0.5450)	(0.5059)	(−0.0391)	0.88	
Number of employees						
State	59	455	507	52		
ownership < 30%		(163)	(173)	(10)	0.52	
State	39	206	220	14		0.78
ownership ≥ 30%		(152)	(134)	(−18)	0.60	
Annual income per employee (million VND)						
State	44	13.1	20.3	7.2		
ownership < 30%		(12.9)	(16.4)	(3.5)	2.32[b]	
State	30	12.7	16.9	4.2		0.38
ownership ≥ 30%		(11.2)	(15.5)	(4.3)	2.68[a]	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

5.2.4 Firms that have a chairperson of the board of directors representing the state (FCBDRS) versus firms that have a chairperson of the board of directors representing private investors (FCBDRP)

Our results, shown in Table 12, indicate that improvements in almost all performance measures are in line with expectations in that they are greater for the FCBDRP as compared to the FCBDRS. First, FCBDRP yield greater changes in profitability and real sales following equitization. Indeed, the average increase in IBTA for the FCB-DRP is 6.58 percent as opposed to 1.91 percent for the FCBDRS. Additionally, the mean (median) real sales increase for the latter subgroup is 44.91 percent (33.77 percent) against 35.56 percent (14.73 percent) for the former one. Secondly, our findings also confirm that FCBDRP trigger higher improvement in efficiency measures. In fact, mean (median) sales efficiency increase for the FCBDRP is 23.62 percent (13.90 percent), while this increase is only 16.94 percent (10.43 percent) for the FCBDRS. Surprisingly, the mean (median) leverage of the FCBDRP increases following equitization (1.28 percentage points in mean and 2.72 percentage points in median), while the mean (median) leverage of the FCBDRS falls by 4.58 percentage points (4.06 percentage points) after equitization. The Mann–Whitney test, however, reports that, except for the difference in real sales between the two subgroups (significant at the 5 percent level), no significant differences are found for any of the other variables.

Table 12. Comparison of performance changes following equitization for FCBDRS and FCBDRP

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
IBTA						
FCBDRS	72	0.0958	0.1149	0.0191		
		(0.0724)	(0.1073)	(0.0349)	2.19[b]	
FCBDRP	26	0.0895	0.1553	0.0658		1.41
		(0.0762)	(0.1311)	(0.0392)	1.61	
IBTS						
FCBDRS	72	0.0679	0.0878	0.0199		
		(0.0433)	(0.0646)	(0.0213)	2.24[b]	
FCBDRP	26	0.0484	0.0816	0.0332		0.45
		(0.0390)	(0.0517)	(0.0127)	1.58	
IBTE						
FCBDRS	72	0.2260	0.2476	0.0216		
		(0.1821)	(0.2136)	(0.0315)	1.76[c]	

Table 12. (cont) Comparison of performance changes following equitization for FCBDRS and FCBDRP

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
FCBDRP	26	0.2430	0.2720	0.0290		1.46
		(0.1538)	(0.2409)	(0.0871)	2.17[b]	
Sales efficiency						
FCBDRS	71	1.0334	1.2028	0.1694		
		(1.0000)	(1.1043)	(0.1043)	2.63[a]	
FCBDRP	25	0.9963	1.2325	0.2362		0.35
		(1.0000)	(1.1390)	(0.1390)	1.80[c]	
Income efficiency						
FCBDRS	71	1.0494	2.5701	1.5207		
		(0.9543)	(1.4890)	(0.5347)	7.17[a]	
FCBDRP	24	1.3507	5.6642	4.3135		0.93
		(0.9897)	(2.2701)	(1.2804)	3.19[a]	
Real sales						
FCBDRS	72	1.0225	1.3781	0.3556		
		(0.9861)	(1.1334)	(0.1473)	4.86[a]	
FCBDRP	26	0.9545	1.4036	0.4491		2.28[b]
		(0.9710)	(1.3087)	(0.3377)	4.75[a]	
Total debts/total assets						
FCBDRS	72	0.5469	0.5011	−0.0458		
		(0.5901)	(0.5495)	(−0.0406)	1.30	
FCBDRP	26	0.4663	0.4791	0.0128		1.49
		(0.4739)	(0.5011)	(0.0272)	0.19	
Number of employees						
FCBDRS	71	336	367	31		
		(165)	(161)	(−4)	0.34	
FCBDRP	25	287	343	56		0.81
		(100)	(115)	(15)	0.60	
Annual income per employee (million VND)						
FCBDRS	55	13.0	16.7	3.6		
		(12.4)	(16.3)	(3.9)	2.96[c]	
FCBDRP	19	12.8	25.5	12.7		0.17
		(13.0)	(14.9)	(1.9)	1.61	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

5.2.5 Listed versus non-listed firms

Table 13 presents comparisons of performance changes between listed and non-listed firms. As expected, we find higher increases in real sales, sales efficiency, and employment for listed firms as compared to non-listed firms. In fact, the mean (median) real sales of listed firms increases by 60.73 percentage points (39.77 percentage points) following equitization compared to an improvement of 37.02 percentage points (15.15 percentage points) for the non-listed firms. Moreover, Table 13 shows an average (median) increase of 58 employees (137 employees) for the listed firms as opposed to 25 employees (3 employees) for the non-listed ones. The differences are significant at the 10 percent level for real sales and at the 5 percent level for employment. Furthermore, we also find a greater decrease in leverage for the listed firms than for non-listed firms, but the difference is statistically insignificant. Contrary to the predictions, our findings indicate that non-listed firms have higher profitability improvements than listed firms. For instance, the mean (median) improvement in IBTS for non-listed firms is 2.66 percentage points (2.53 percentage points) compared to 0.40 percentage points (0.67 percentage points) for listed firms. In addition, the mean (median) IBTE of the non-listed firms increases by 6.66 percentage points (5.65 percentage points) while the mean (median) IBTE of listed firms decreases by 7.18 percentage points (4.90 percentage points) following equitization. Using the Mann–Whitney test we find that the differences between the two subsamples are significant at the 1 percent level for IBTS and IBTE, and at the 5 percent level for IBTA. Our results also show a significant difference (at the 5 percent level) in income efficiency improvement between these subgroups. Indeed, income efficiency of the non-listed firms increases by a mean (median) of 234.53 percentage points (79.46 percentage points) while this measure also increases

Table 13. Comparison of performance changes following equitization for listed firms and non-listed firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
IBTA						
Listed firms	18	0.1380	0.1265	−0.0115		
		(0.1067)	(0.1229)	(0.0162)	0.24	
Non-listed firms	82	0.0838	0.1238	0.0400		2.46[b]
		(0.0707)	(0.1039)	(0.0332)	2.81[a]	
IBTS						
Listed firms	18	0.0963	0.1003	0.0040		
		(0.0659)	(0.0726)	(0.0067)	0.11	

Table 13. (cont) Comparison of performance changes following equitization for listed firms and non-listed firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
Non-listed firms	103	0.0549	0.0815	0.0266		2.99[a]
		(0.0337)	(0.0590)	(0.0253)	3.40[a]	
IBTE						
Listed firms	18	0.3234	0.2516	−0.0718		
		(0.3033)	(0.2543)	(−0.0490)	0.74	
Non-listed firms	103	0.2127	0.2793	0.0666		3.14[a]
		(0.1666)	(0.2231)	(0.0565)	3.71[a]	
Sales efficiency						
Listed firms	17	1.0587	1.4473	0.3886		
		(1.0000)	(1.3313)	(0.3313)	3.38[a]	
Non-listed firms	102	1.0140	1.2325	0.2185		0.35
		(1.0000)	(1.0933)	(0.0933)	3.83[a]	
Income efficiency						
Listed firms	17	0.9944	1.6679	0.6735		
		(1.0000)	(1.4226)	(0.4226)	2.93[a]	
Non-listed firms	101	1.1191	3.4644	2.3453		2.06[b]
		(1.0000)	(1.7946)	(0.7946)	8.64[a]	
Real sales						
Listed firms	18	1.0521	1.6594	0.6073		
		(1.0000)	(1.3977)	(0.3977)	4.57[a]	
Non-listed firms	103	0.9965	1.3667	0.3702		1.65[c]
		(0.9942)	(1.1457)	(0.1515)	6.51[a]	
Total debts/total assets						
Listed firms	18	0.5156	0.4711	−0.0445		
		(0.5306)	(0.5392)	(0.0086)	0.36	
Non-listed firms	82	0.5331	0.5071	−0.0260		0.31
		(0.5740)	(0.5443)	(−0.0297)	0.75	
Number of employees						
Listed firms	17	850	908	58		
		(518)	(655)	(137)	0.38	
Non-listed firms	102	269	294	25		2.39[b]
		(126)	(129)	(3)	0.44	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

in the case of the listed firms, but the gains are less impressive, only 67.35 percentage points (42.26 percentage points).

In general, the results indicate that listed firms show greater improvements in real sales, sales efficiency, leverage, and employment compared to non-listed firms. However, gains in profitability measures are lower for listed firms than for non-listed ones. A possible explanation for the differences is that by exploiting the benefits from the listing, listed firms substantially expand their business. This results in substantial increases in real sales and employment. The profit margin of listed firms is almost unchanged after equitization (the average IBTS increases only 0.4 percent), while the total assets of the firms increase considerably due to business expansion. This causes the decrease in IBTA of listed firms following equitization. The average leverage of listed firms falls in years following equitization while their total assets increase. This results from increases in the equity of listed firms. Similar to the return on assets, the increase in equity explains the decline in IBTE of listed firms after equitization.

5.2.6 Firms located in HCMC versus the other firms

Comparisons of performance improvements between firms located in HCMC and the other firms are shown in Table 14. As can be readily seen from the table, only

Table 14. Comparison of performance changes following equitization for firms located in Ho Chi Minh City (HCMC) and other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
IBTA						
Firms located in HCMC	58	0.0960 (0.0724)	0.1226 (0.1095)	0.0266 (0.0371)	2.12[b]	
Other firms	42	0.0902 (0.0807)	0.1267 (0.1048)	0.0365 (0.0241)	1.68[c]	0.14
IBTS						
Firms located in HCMC	58	0.0602 (0.0386)	0.0869 (0.0573)	0.0267 (0.0187)	2.54[b]	
Other firms	63	0.0618 (0.0378)	0.0819 (0.0624)	0.0201 (0.0246)	2.03[b]	1.75[c]
IBTE						
Firms located in HCMC	58	0.2300 (0.1657)	0.2579 (0.2223)	0.0279 (0.0566)	1.66[c]	

Table 14. (cont) Comparison of performance changes following equitization for firms located in Ho Chi Minh City (HCMC) and other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
Other firms	63	0.1993	0.2910	0.0917		1.13
		(0.1872)	(0.2500)	(0.0628)	3.13[a]	
Sales efficiency						
Firms located	57	1.0233	1.1896	0.1663		
in HCMC		(1.0000)	(1.0801)	(0.0801)	2.07[b]	
Other firms	62	1.0178	1.3308	0.3130		1.46
		(1.0000)	(1.1811)	(0.1811)	4.79[a]	
Income efficiency						
Firms located	57	1.0187	3.2802	2.2615		
in HCMC		(0.9272)	(1.6373)	(0.7101)	6.66[a]	
Other firms	62	1.1592	3.0323	1.8731		0.59
		(1.0000)	(1.6367)	(0.6367)	6.15[a]	
Real sales						
Firms located	58	1.0254	1.4291	0.0437		
in HCMC		(0.9895)	(1.1193)	(0.1298)	3.86[a]	
Other firms	63	0.9858	1.3928	0.4070		1.63
		(1.0000)	(1.2676)	(0.2676)	6.99[a]	
Total debts/total assets						
Firms located	58	0.5580	0.5013	−0.0567		
in HCMC		(0.5868)	(0.5703)	(−0.0165)	1.31	
Other firms	42	0.4912	0.4998	0.0086		1.67[c]
		(0.5450)	(0.5264)	(−0.0186)	−0.00	
Number of employees						
Firms located	57	450	495	45		
in HCMC		(196)	(181)	(−15)	0.43	
Other firms	62	262	278	16		0.47
		(120)	(129)	(9)	0.41	
Annual income per employee (million VND)						
Firms located	45	13.5	17.5	4.0		
in HCMC		(13.0)	(16.4)	(3.4)	2.84[a]	
Other firms	50	11.0	17.1	6.1		1.30
		(9.6)	(12.4)	(2.8)	2.18[b]	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

performance changes in IBTS and leverage are statistically significant differences between two groups.

Specifically, contrary to the prediction, a significantly lower improvement in the median IBTS is reported for the group of firms in HCMC. In addition, firms located in HCMC have a significantly lower reduction in the median leverage than the other firms, but an insignificantly higher reduction in the mean leverage.

5.2.7 Firms equitized before 1999 versus the other firms

Performance changes following equitization for firms equitized before 1999 and other firms are presented in Table 15. Statistically, no significant evidence to be found from the table supports the expectation that the first group of firms have lower performance improvements than the second one. In other words, performance improvements of firms following equitization are not dependent on the stage of the equitization process in which equitization took place.

6. The sources of performance changes: Cross-sectional regression results

To validate the non-parametric tests and to examine what determines differences in effects of equitization, a cross-sectional regression is used to measure the sources

Table 15. Comparison of performance changes following equitization for firms equitized before 1999 and other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
IBTA						
Firms equitized	14	0.1342	0.1791	0.0449		
before 1999		(0.1002)	(0.1619)	(0.0617)	1.08	
Other firms	86	0.0869	0.1154	0.0285		0.10
		(0.0716)	(0.0965)	(0.0249)	2.45[b]	
IBTS						
Firms equitized	14	0.0911	0.1448	0.0537		
before 1999		(0.0731)	(0.1151)	(0.0420)	1.49	
Other firms	107	0.0571	0.0764	0.0193		1.58
		(0.0375)	(0.0531)	(0.0156)	3.00[a]	
IBTE						
Firms equitized	14	0.2790	0.2925	0.0135		

Table 15. (cont) Comparison of performance changes following equitization for firms equitized before 1999 and other firms

Measures	N	Mean (median) before	Mean (median) after	Mean (median) change	Z-statistic for difference in medians (after – before)	Z-statistic for difference in medians between subsamples
before 1999		(0.2209)	(0.3019)	(0.0810)	0.90	
Other firms	107	0.2055	0.2729	0.0674		0.91
		(0.1724)	(0.2231)	(0.0507)	3.23[a]	
Sales efficiency						
Firms equitized	14	0.9802	1.2429	0.2627		
before 1999		(1.0000)	(1.0151)	(0.0151)	0.67	
Other firms	106	1.0161	1.2659	0.2498		0.03
		(1.0000)	(1.1428)	(0.1428)	4.90[a]	
Income efficiency						
Firms equitized	14	0.9135	2.8931	1.9796		
before 1999		(1.0000)	(1.4631)	(0.4631)	3.47[a]	
Other firms	106	1.1051	3.1864	2.0813		0.26
		(1.0000)	(1.7493)	(0.7493)	8.30[a]	
Real sales						
Firms equitized	14	0.9686	1.6161	0.6475		
before 1999		(0.9992)	(1.2826)	(0.2834)	2.23[b]	
Other firms	107	1.0095	1.3833	0.3738		0.77
		(0.9996)	(1.1835)	(0.1839)	7.33[a]	
Total debts/total assets						
Firms equitized	14	0.4659	0.3819	−0.0840		
before 1999		(0.3643)	(0.3812)	(0.0169)	0.80	
Other firms	86	0.5404	0.5200	−0.0204		0.91
		(0.5740)	(0.5601)	(−0.0139)	0.60	
Number of employees						
Firms equitized	14	175	232	57		
before 1999		(89)	(121)	(32)	0.48	
Other firms	106	372	402	30		0.98
		(163)	(161)	(−2)	0.50	
Annual income per employee (million VND)						
Firms equitized	9	14.8	18.6	3.8		
before 1999		(15.3)	(16.0)	(0.7)	0.79	
Other firms	86	12.0	17.1	5.1		0.03
		(10.7)	(14.8)	(4.1)	3.25[a]	

[a, b, c] Significant at the 1%, 5%, and 10% levels, respectively.

Table 16. Definitions of explanatory variables used and expected sign in regression analyses

Variable	Definition	Expected sign
Size (X_1)	Log of pre-equitization real sales average	Negative
State ownership (X_2)	Percentage of shares owned by the state at the time of the first share issue	Negative
Chairperson of the board of directors (CBD) (X_3)	Dummy variable equal to 1 if the chairperson of the board of directors represents the state, 0 otherwise	Negative
Chairperson of the board of supervisors (CBS) (X_4)	Dummy variable equal to 1 if the chairperson of the board of supervisors represents the state, 0 otherwise	Negative
Listed firms (X_5)	Dummy variable equal to 1 if a firm is listed on the stock exchange, 0 otherwise	Positive
Trade and services (X_6)	Dummy variable equal to 1 if a firm is in the trade or services industries, 0 otherwise	Positive
Equitization before 1999 (X_7)	Dummy variable equal to 1 if a firm is equitized before 1999, 0 otherwise	Negative
Equitization in 2000 (X_8)	Dummy variable equal to 1 if a firm is equitized in 2000, 0 otherwise	Positive or negative
Equitization in 2001 (X_9)	Dummy variable equal to 1 if a firm is equitized in 2001, 0 otherwise	Positive or negative
HCMC (X_{10})	Dummy variable equal to 1 if a firm is located in HCMC, 0 otherwise	Positive
The North (X_{11})	Dummy variable equal to 1 if a firm is located in the North, 0 otherwise	Positive or negative

of performance changes after equitization. In our regression equations the dependent variables represent the percentage changes in income before tax on assets (PIBTA), income before tax on sales (PIBTS), income before tax on equity (PIBTE), real sales (PRS), sales efficiency (PSE), income efficiency (PIE) and employment (PEmp) following equitization. To explain the changes in performance measures (dependent variables), size (log of pre-equitization real sales average), residual state ownership, background of the chairperson of the board of directors, background of the chairperson of the board of supervisors, stock market listing of firms, sectors, equitization years and location of firms are used as independent variables. It is important to note here that dummy variables for equitization years are added

to the regressions in order to control for macroeconomic factors that change over time and may affect the equitization results.[9] Definitions of explanatory variables used in the regression analyses are shown in Table 16.

The first equation used for each performance measure is:

$$Y_i = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11}$$
$$(1)$$

where Y_i represents the percentage change in a given performance measure. Then, based on the results of the first equation, some independent variables with a low *t*-value (less than one) are eliminated (hereafter the revised equation is referred to as the second equation). The results of the regression analyses from the first and second equations are shown in Table 17.

6.1 Profitability

Consistent with the results of Harper (2002) for the Czech Republic, the regression analyses show a significant negative relationship between profitability changes (PIBTA, PIBTS, and PIBTE) and firm size. Moreover, according to Table 17, corporate governance appears as an important determinant to explain profitability changes of firms following equitization. Specifically, our results indicate that the chairperson of the board of directors representing the state has a significant negative effect on PIBTA and PIBTE, and the chairperson of the board of supervisors representing the state has a significant negative effect on PIBTS. Contrary to expected signs, regression analyses show a significant negative relationship between listing on the stock exchange and all profitability measures. The possible explanation for the negative impact of listing is presented in the previous section. Similarly, regression results reveal that being part of the trade and services sector has a significant negative effect on PIBTE. Finally, it is found from Table 17 that the dummy variable for equitized firms in HCMC has a positive impact on PIBTS at the 1 percent significance level.

Overall, in line with the predictions, regression results reveal a significant negative effect of corporate governance (X_3 and X_4) and firm size on the profitability improvements of equitized firms. In addition, a significantly greater improvement in PIBTS is reported for equitized firms in HCMC compared to ones in the other regions. Unexpectedly, the regression analyses provide evidence that listing on the stock exchange and belonging to the trade and services sector have a significant negative impact on profitability improvements of equitized firms following equitization.

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[9] We would like to thank an anonymous referee for this useful comment.

Table 17. Cross-sectional regression results

	PIBTA (1)	PIBTA (2)	PIBTS (1)	PIBTS (2)	PIBTE (1)	PIBTE (2)	PRS (1)	PRS (2)	PSE (1)	PSE (2)	PIE (1)	PIE (2)	PEmp. (1)	PEmp. (2)
Constant	1.331	12.163	9.360	9.379	4.106	36.669	2.569	9.479	56.135	69.751	824.171	839.457	−20.632	−10.616
	(2.97)[a]	(2.68)[a]	(5.63)[a]	(6.09)[a]	(3.65)[a]	(3.73)[a]	(0.09)	(1.31)	(1.93)[c]	(2.43)[b]	(4.56)[a]	(4.78)[a]	(−0.95)	(−0.558)
Size	−0.778	−0.648	−0.804	−0.792	−2.717	−2.359	−0.121	−	−7.529	−7.697	−34.236	−38.988	5.031	3.518
	(−1.96)[c]	(−1.57)	(−5.40)[a]	(−5.10)[a]	(−2.74)[a]	(−2.46)[b]	(−0.04)	−	(−2.98)[a]	(−3.02)[a]	(−3.26)[a]	(−3.44)[a]	(2.33)[b]	(1.73)[c]
State ownership	0.018	−	−0.004	−	−0.037	−	0.737	0.802	0.770	0.613	−5.403	−5.409	0.082	−
	(0.45)	−	(−0.25)	−	(−0.41)	−	(2.58)[b]	(3.80)[a]	(2.77)[a]	(2.44)[b]	(−3.03)[a]	(−3.51)[a]	(0.37)	−
CBD	−2.235	−1.883	0.203	−	−5.104	−5.914	−17.809	−25.930	−12.611	−13.080	−93.009	−110.516	−17.142	−20.559
	(−1.80)[c]	(−1.60)	(0.43)	−	(−1.76)[c]	(−2.74)[a]	(−2.08)[b]	(−3.47)[a]	(−1.43)	(−1.67)[c]	(−1.97)[c]	(−2.21)[b]	(−1.89)[c]	(−2.51)[b]
CBS	−1.130	−1.208	−1.235	−1.132	−3.334	−2.721	21.267	21.293	20.743	22.614	−33.978	−19.084	−3.556	−
	(−1.05)	(−1.08)	(−2.76)[a]	(−2.55)[b]	(−1.30)	(−1.10)	(2.10)[b]	(2.89)[a]	(2.93)[a]	(3.21)[a]	(−1.15)	(−0.71)	(−0.67)	−
Listed firms	−2.168	−3.436	−1.241	−1.254	−6.747	−7.491	21.173	24.155	33.776	33.708	−62.927	−83.582	−7.442	−4.551
	(−1.90)[c]	(−2.57)[b]	(−1.83)[c]	(−1.73)[c]	(−1.87)[c]	(−2.61)[b]	(1.75)[c]	(2.13)[b]	(3.55)[a]	(3.44)[a]	(−1.54)	(−2.37)[b]	(−1.05)	(−0.74)
Trade and services	−0.205	−	−0.450	−	−4.320	−4.423	1.040	−	1.157	−	5.799	−	−3.170	−
	(−0.21)	−	(−1.08)	−	(−1.84)[c]	(−2.12)[b]	(0.14)	−	(0.18)	−	(0.22)	−	(−0.57)	−
Equitization before 1999	−1.527	−	0.312	−	−0.831	−	23.504	17.178	11.048	−	−57.635	−	7.950	−
	(−0.77)	−	(0.36)	−	(−0.21)	−	(1.74)[c]	(1.48)	(0.91)	−	(−0.99)	−	(0.74)	−
Equitization in 2000	−1.626	−0.938	0.133	−	2.166	−	5.254	−	6.100	−	−87.905	−62.098	−8.848	−
	(−1.20)	(−0.82)	(0.24)	−	(0.63)	−	(0.55)	−	(0.63)	−	(−1.69)[c]	(−1.67)	(−0.96)	−
Equitization in 2001	−1.630	−1.378	0.768	0.604	2.207	−	1.854	−	7.636	−	−53.307	−4.006	−4.564	−
	(−1.22)	(−1.22)	(1.17)	(1.31)	(0.57)	−	(0.25)	−	(0.79)	−	(−1.07)	(−0.12)	(−0.47)	−
HCMC	0.942	−	1.521	1.550	−2.211	−	1.502	−	12.324	11.077	−19.454	−	−7.146	−
	(0.87)	−	(2.97)[a]	(3.52)[a]	(−0.77)	−	(0.19)	−	(1.52)	(1.43)	(−0.43)	−	(−0.89)	−
The North	2.424	2.218	−1.379	−1.338	−0.637	−	46.570	43.229	37.868	61.259	−47.737	−	6.368	−
	(1.32)	(1.63)	(−1.03)	(−1.05)	(−0.10)	−	(2.04)[b]	(2.03)[b]	(1.37)	(4.82)[a]	(−0.73)	−	(0.43)	−
Observations	84	84	84	84	84	84	84	84	84	84	56	56	91	91
Adjusted R^2	0.133	0.162	0.421	0.443	0.207	0.259	0.232	0.353	0.268	0.344	0.372	0.401	0.071	0.108
F-statistic	2.16[b]	3.29[a]	6.50[a]	12.02[a]	2.96[a]	6.79[a]	3.27[a]	8.53[a]	3.76[a]	7.21[a]	3.96[a]	6.26[a]	1.62	4.62[a]

[a, b, c] Significant at the 1%, 5%, and 10% level, respectively.

t-values in parentheses (they are based on White Heteroskedasticity-Consistent Standard Errors & Covariances).

(1) results from the first equation, and (2) results from the second equation.

6.2 Real sales

As predicted, Table 17 shows that firms where the chairperson of the board of directors represents the state have significantly lower improvements in real sales after equitization than firms where the chairperson of the board of directors represents private owners. Specifically, firms in the former group show a 17.81 percentage points lower improvement, according to the first equation, in real sales than firms in the latter group. Additionally, we find a significant positive impact of listing on real sales change following equitization. Indeed according to the first regression equation, listed firms experience a 21.17 percentage point greater increase in real sales than non-listed firms. These results could mirror the effect hypothesized above that listed firms exploit the benefits from the listing through enlarging their business and market share. These lead to a higher growth rate of sales compared to non-listed firms. Contrary to predictions, our results show a significant positive relationship between real sales and state ownership, and between real sales and the chairperson of the board of directors representing the state. Finally, findings from Table 17 indicate that equitized firms located in the North have a significantly greater improvement in real sales than the remaining firms.

6.3 Efficiency

First, the regression results for sales efficiency are discussed. The regression for this performance measure reveals a significant negative effect of firm size on the improvement in sales efficiency in the post-equitization period. The employment regression shows a significant positive relationship between the size of firms and employment change. However, in the regression for real sales we find that size has a negative effect on real sales, although it is insignificant. A combination of these results may explain the negative relationship between size and sales efficiency. In addition, we find that listed firms experience a significantly higher increase in sales efficiency than non-listed firms. Similar to the real sales measure, the regression results show that state ownership and the chairperson of the board of directors representing the state also have a significantly positive impact on sales efficiency. Finally, results from the second regression equation indicate a significant positive relationship between sales efficiency and firms in the North, but a significant negative relationship between sales efficiency and firms that have a chairperson of the board of supervisors representing the state.

Besides the sales efficiency regression, we also conducted an income efficiency regression. It turns out that firm size has a significant negative impact on the change in income efficiency. Moreover, our results confirm the prediction that state ownership has a negative effect on firm performance, including income efficiency. Specifically, according to the first equation, a 1 percent increase in state ownership causes a 5.40 percentage point decrease in income efficiency. This relationship is

statistically significant at the 1 percent level. Similar to sales efficiency, the regression results show a significantly lower increase in income efficiency for FCBDRS as compared to FCBDRP. In fact, FCBDRS have a 93.01 percentage point lower improvement in income efficiency than FCBDRP. Contrary to what was found for sales efficiency, it is found that listing on the stock exchange has a significant negative impact on income efficiency. However, the significant negative effect is only reported in the second regression equation. In fact, the listed firms' gain in income efficiency is 83.58 percentage points lower than the non-listed firms'.

Generally, our data indicate that firm size, residual state ownership, corporate governance and listing on the stock exchange are the major determinants of post-equitization efficiency improvements. Specifically, our results reveal that firm size has significant negative effects on both efficiency measures. Moreover, the regression results show a significant negative relationship between state ownership and both efficiency measures, and between stock exchange listing and the efficiency measures. Indeed, while state ownership has a positive effect on sales efficiency, the impact on income efficiency is negative. Finally, it turns out that the chairperson of the board of directors representing the state has a significant negative relationship with the efficiency measures, but the chairperson of the board of supervisors representing the state has a significant positive effect on sales efficiency.

6.4 Employment

According to the regression results, the size of firms and the background of the chairperson of the board of directors are the major determinants of the changes in employment following equitization. Specifically, a significant positive relationship between size and employment change after equitization is found. It suggests that larger size entails a greater increase in employment. A possible explanation for this relationship is that with a new capital source through issuing new shares after equitization, large firms realize a greater expansion in their production and business as compared to small firms. Greater expansion of business requires large firms to hire more employees compared to small firms. Further, firms with the chairperson of the board of directors representing the state show a significantly lower increase in employment compared to firms where the chairperson of the board of directors represents private owners.

7. Effect of equitization on firm performance: Results from the DID method

The DID method is an approach that is developed to overcome the shortcomings of the pre–post comparison method, which ignores the concurrent impact of other

determinants when measuring the impact of equitization on firm performance.[10] The main advantage of the DID method is that it helps to examine the impact of a policy or policy programme by comparing the difference in given measures of a treatment group over time – from before the policy was implemented until after its implementation – to the difference in the measures of the control group for the same periods.

In this study the treatment group is formed by the equitized firms, while the control group contains SOEs. Since most of the equitized firms in the sample were completely equitized in the year 2000 or 2001, the DID method is only applied to these groups. Moreover, due to insufficient data on the SOEs, only IBTA, IBTS, IBTE, real sales and the ratio of total debts to total assets are used as measures. Because of data limitations the differences in these measures, for both the treatment and the control group, are calculated on the basis of only one year before and after equitization. Following the DID method, first the difference in the performance measures between before and after equitization is computed for all individual firms in the treatment and control groups. Second, the mean (median) of the difference is separately calculated for the treatment and control groups. Then, the impact of equitization on firm performance is examined as the difference between the differences in the performance measures for the two groups. Finally, to test for statistical significance of the difference in the performance measures between the treatment and control group, the non-parametric Mann–Whitney test is applied. Results of the DID method are shown in Tables 18 and 19.

Table 18 presents the results of the DID method for the group of former SOEs equitized in the year 2000. As can be seen from the table, all profitability measures of the equitized firms increase significantly (after taking into account the difference in differences) following equitization. Specifically, the mean (median) gains in IBTA and IBTS are 1.72 percentage points (2.36 percentage points) and 1.19 percentage points (1.10 percentage points), respectively. Similarly, the mean (median) increase in IBTE is 3.90 percentage points (10.32 percentage points). Statistically, the performance improvements are significant at the 10 percent level for IBTA and at the 5 percent level for IBTS and IBTE. Moreover, Table 18 reveals that the mean real sales of equitized firms increase by 19.8 percentage points, but the median slightly decreases (2.75 percentage points) after equitization. The decrease in the median real sales is statistically significant at the 5 percent level. Finally, the results of the DID method show that the leverage of equitized firms is almost unchanged following equitization.

Similarly, results from the DID approach for the group of SOEs equitized in the year 2001, presented in Table 19, indicate that profitability and real sales measures of equitized firms improve, after adjusting for other effects, following equitization.

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[10] For a detailed decription of the DID method and a comparison between the DID and the pre–post comparison method, see Wooldridge (2002).

Table 18. Summary of results from the DID test for the group of SOEs equitized in the year 2000

Measures	N	Control group (SOEs)			N	Treatment group (equitized firms)			Mean (median) change between two groups	Z-statistic for difference in medians between two groups
		Mean (median) for the year 1999	Mean (median) for the year 2001	Mean (median) change		Mean (median) pre-equitization (1999)	Mean (median) post-equitization (2001)	Mean (median) change		
Profitability										
IBTA	51	0.1587	0.1628	0.0041	40	0.0940	0.1153	0.0213	0.0172	1.9071[c]
		(0.1236)	(0.1279)	(0.0043)		(0.0723)	(0.1002)	(0.0279)	(0.0236)	
IBTS	51	0.0962	0.0976	0.0014	56	0.0531	0.0664	0.0133	0.0119	2.1675[b]
		(0.0791)	(0.0860)	(0.0069)		(0.0332)	(0.0511)	(0.0179)	(0.0110)	
IBTE	51	0.4423	0.4518	0.0095	56	0.2194	0.2679	0.0485	0.0390	2.2299[b]
		(0.3296)	(0.2698)	(−0.0598)		(0.1753)	0.2187	(0.0434)	(0.1032)	
Real sales	51	0.8968	1.0042	0.1074	56	0.9754	1.2815	0.3061	0.1987	2.0053[b]
(million VND)		(0.8649)	(1.0491)	(0.1842)		(1.0000)	(1.1567)	(0.1567)	(−0.0275)	
Leverage	51	0.5856	0.5344	−0.0512	40	0.5491	0.5027	−0.0464	0.0048	0.5237
(Total debts/		(0.6160)	(0.5444)	(−0.0716)		(0.5701)	(0.4900)	(−0.0801)	(−0.0085)	
total assets)										

[b, c]: Significant at the 5% and 10% levels, respectively.

Table 19. Summary of results from the DID test for the group of SOEs equitized in the year 2001

Measures	N	Control group (SOEs)			N	Treatment group (equitized firms)			Mean (median) change between two groups	Z-statistic for difference in medians between two groups
		Mean (median) for the year 2000	Mean (median) for the year 2002	Mean (median) change		Mean (median) pre-equitization (2000)	Mean (median) post-equitization (2002)	Mean (median) change		
Profitability										
IBTA	48	0.1619	0.1657	0.0038	29	0.0835	0.1136	0.0301	0.0263	2.0763[b]
		(0.1209)	(0.1399)	(0.0190)		(0.0732)	(0.1075)	(0.0343)	(0.0153)	
IBTS	48	0.0934	0.0948	0.0014	32	0.0644	0.0883	0.0239	0.0225	2.3914[b]
		(0.0664)	(0.0584)	(−0.0080)		(0.0558)	(0.0711)	(0.0153)	(0.0233)	
IBTE	48	0.5474	0.5632	0.0158	32	0.1885	0.2241	0.0356	0.0198	1.4781
		(0.3311)	(0.3193)	(−0.0118)		(0.1799)	(0.2042)	(0.0243)	(0.0361)	
Real sales	48	0.9432	1.1319	0.1887	32	1.0104	1.3156	0.3052	0.1165	0.5647
(million VND)		(0.8530)	(1.1173)	(0.2643)		(1.0000)	(1.2898)	(0.2898)	(0.0255)	
Leverage	48	0.5960	0.5882	−0.0078	29	0.5382	0.5431	0.0049	0.0127	0.3417
(Total debts/		(0.6370)	(0.6140)	(−0.0230)		(0.5882)	(0.5839)	(−0.0043)	(0.0187)	
total assets)										

[b] Significant at the 5% level.

However, only the performance improvements in IBTA and IBTS are significant at the 5 percent level. Contrary to expectation, the leverage of the equitized firms increases after equitization, although the increase is statistically insignificant.

In conclusion, the results of the DID approach are mostly consistent with the results of the pre–post comparison method reported in Section 5. Indeed, it is evidenced that equitization has a significantly positive effect on profitability measures of equitized firms after equitization. In addition, findings from both methods reveal that equitization seems to have no impact on equitized firms' leverage. However, regarding the real sales measure, results from the employed methods are somewhat different. Specifically, the results of the pre–post comparison method show a significant increase in median real sales, while those of the DID method show a significant decrease (for the first group of equitized firms) or an insignificant increase (for the second group of equitized firms).

8. Summary and conclusions

In this paper we examine the effects of equitization, the Vietnamese version of privatization, on firm performance in Vietnam by using data from 121 firms that were equitized during the 1993–2002 period. Applying the methodology of Megginson, Nash and Van Randenborgh (1994), we find that profitability (measured by income before tax on assets, income before tax on sales, and income before tax on equity), efficiency (measured by real sales efficiency and income efficiency), real sales, and employee income increase significantly following equitization (all significant at the 1 percent level). These findings are in line with the growing empirical evidence that firms become more profitable and efficient following privatization. In the case of Vietnam the performance improvement is, however, remarkable since the equitization process in that country is such that the state retains a considerable portion of the shares of equitized firms, and employees of the firms acquire a substantial portion of the shares, whereas in the literature the performance improvement after privatization is often ascribed to control by outside shareholders (see, for example, Earle and Estrin, 1996).

In addition, consistent with the results of Megginson *et al.* (1994), Boubakri and Cosset (1998), and D'Souza and Megginson (2001), we come up with an increase in employment and an increase in employee income for the equitized firms after equitization, although the increase in employment is not statistically significant. Nevertheless, this finding is at odds with the model of Boycko *et al.* (1996) where the positive effect of privatization on firm performance hinges on the redress of excess labour spending. An explanation for the absence of a negative employment effect of equitization in Vietnam may be that employees hold substantial portions of the shares of equitized firms and consequently are able to influence firms' decision-making in the sphere of employment and wages. It is remarkable, however, that the employment and employee-income effects of equitization do not seem to lead

to negative effects in terms of profitability and efficiency of equitized firms, which could indicate that the rises in employee income after privatization have positive incentive effects in the sense of stimulating rises in labour productivity.

Given the empirical evidence of performance gains after equitization, we go further to identify the sources of these improvements. The cross-sectional regression results show significant negative effects of size on the change on the profitability and efficiency measures, thus supporting the hypothesis that smaller firms may be more flexible in the necessary adjustment process after privatization. On the other hand, firm size appears to have a significant positive impact on employment change of equitized firms in the Vietnamese case. Additionally, ownership and corporate governance are uncovered as key determinants of the performance improvements of firms after equitization. Indeed, we find a significant negative relationship between state ownership and the change in before-tax income on sales, and between state ownership and the change in income efficiency. Similarly, the regression analyses reveal that firms that have a chairperson of the board of directors who represents the state experience a significantly lower increase in real sales, sales efficiency, income efficiency, and employment compared to firms having a chairperson of the board of directors from the private sector. Contrary to the predictions, our results show a significant negative effect of stock market listing on profitability changes and income efficiency improvement. However, being listed has a significant positive impact on real sales and sales efficiency changes.

Overall, our empirical results suggest that equitization in Vietnam works in the sense of improving firm performance in terms of most performance measures. Apart from equitization, performance improvements could, however, also be attributable to other determinants of firm performance, such as macroeconomic developments. Through application of the 'difference-in-difference' (DID) method we have tried to correct for this possible bias. The outcomes of the DID analysis suggest that the performance improvements of equitized firms, especially those in terms of the profitability of the firms in question, after having been corrected for the impact of other determinants, can still be associated with equitization.

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