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Investment Efficiency, State-Owned Enterprises and Privatisation: Evidence from Vietnam in Transition

Conor M. O'Toole^a, Edgar Morgenroth^{b,c} and Ha Thi Thu Thuy^d

Abstract: Our research tests the difference in investment efficiency between state-owned enterprises (SOEs) and private firms and then evaluates the effect of privatisation and equitisation policies on the investment efficiency of former state owned enterprises (SOEs). We use a novel dataset from Viet Nam which covers large and non-listed SMEs across the construction, manufacturing, and services sectors. Our methodology uses a structural model to test the relationship between Tobin's Q and capital spending. We find no evidence of investment spending being linked to marginal returns by SOEs across all sectors and size classes. However, former SOEs which have been privatised and equitized with a minority state shareholding display positive links between Q and investment. In fact, the link is stronger for these firms than for private firms.

Keywords: Investment efficiency, Privatisation, State-ownership, Corporate governance

JEL Classification: G31, G32, G34, L33, P31

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1. Introduction

The efficient allocation of capital is an important determinant of long term growth prospects and the productive capacity of the economy. In a neoclassical Solow model, it is not only the volume of investment that affects growth but also the marginal value product of capital. It is therefore important to understand the corporate determinants of capital efficiency. One particular theme in the international literature on firm investment efficiency focuses on the effect of ownership, in particular state versus private ownership, on firm performance (Shleifer, 1998; La Porta and Lopez de Silanes, 1999; Ramamurti, 1997). Many of the studies focus on transition countries which moved from socialist to market-oriented economic systems (Frydman, Gray, Hessel, and Rapaczynski, 1999; Claessens, Djankov, and Pohl, 1997; Claessens, and Djankov, 1999). This research has also informed many of the structural reform programmes that are encouraged by the international financial institutions, and can become part of the conditionality attached to official assistance.

Focusing specifically on transition economies in East Asia such as China and Vietnam, there have been a number of studies which highlight that despite successfully following investment intensive growth, the efficiency of investment has been poor. This is particularly the case where continued state-owned enterprise activity is a considerable share of economic activity and where state owned enterprises (SOEs) suffer from weak corporate governance and conflicting policy and return objectives (Dollar & Wei, 2007; IMF, 2012; Vietnam Development Report 2012; OECD, 2013).

Within this wider context our research considers the effect of ownership on the efficiency of investment in Vietnam. Despite strong economic growth since the onset of original “Doi Moi” reforms, Vietnam’s more recent growth has slowed. While many factors have contributed, one of the areas which continues to pose policy challenges is the performance and ongoing reform of the SOE sector (IMF, 2013; OECD, 2013; VEPR, 2012). SOE restructuring has been a core policy focus of the government and is a key element in the 2011-2015 strategic plan. However, despite ongoing restructuring including privatisation and equitization programmes, the SOE sector continues to display poor returns to factor inputs (IMF, 2013; Vietnam Development Report, 2012). Soft budget constraints, poor corporate governance and managerial oversight have led to excessive leverage and poor investment efficiency (IMF, 2013). These outcomes arose despite of policy initiatives designed to level the playing field between SOEs and private firms such as the 2005 Enterprise Law.

Given this backdrop, our research attempts to 1) test the difference in investment efficiency between SOEs and private firms and 2) evaluate the effect of privatisation and equitisation policies on the investment efficiency of former SOEs. Our specific contribution is as follows: Firstly, we build on the literature which focuses on the impacts of ownership objectives and corporate governance on firm efficiency in transition economies (Meggison and Netter, 2001; Chen et al., 2011). The literature suggests these objectives can differ between SOEs and private firms due a number of factors including moral hazard (Meggison and Netter, 2001; Chen et al., 2011) or soft budget constraints (Berglof and Roland, 1998; Hersch et al, 1997; Meggison and Netter, 2001; Schaffer, 1998). We use a novel dataset which includes both SMEs and large firms in Vietnam that is more extensive than has been used in the literature to date. The focus on SMEs is salient, given their importance in the development process and their greater susceptibility to capital market and product market frictions (Beck et al, 2006; Beck et al; 2008). We use the fundamental Q model of investment proposed by Gilchrist and Himmelberg (1995) and applied empirically by Bierlen and Featherstone (1998), Ryan et al (2014) and O'Toole et al. (2014) to test the difference in investment efficiency between SOEs and non-SOEs. This is the first paper which has used this approach to evaluate investment efficiency in a developing country context.

This research builds on the work of Chen et al. (2011) and Dollar and Wei (2007) but is the first study in the literature to apply a structural model to an extensive dataset which includes both large firms and micro, small and medium-sized firms across manufacturing, services and construction sectors. Our research therefore contributes to the extant literature by applying a structural investment model and exploring the heterogeneity of ownership effects on investment efficiency across groups of firms and industries.

Our second contribution builds on the literature which evaluates efficiency changes following ownership changes through SOE privatisation and equitization, mainly in Eastern European transition economies (Claessens, Djankov, and Pohl, 1997; Earle and Telegdy, 2002; Brown et al., 2006a:b). There is a large body of evidence which indicates that the privatisation of state-owned firms leads to significant improvements in productivity and profitability (Shleifer, 1998). We build on the existing research (La Porta and Lopez de Silanes, 1999; Ramamurti, 1997; Djankov and Pohl, 1997; Claessens and Djankov, 1999) by focusing on an East Asian transition economy and by applying a structural investment model for both SMEs and large firms across difference sectors. We also simultaneously test the differential effects of full privatisation, equitization with SOE retaining a controlling shareholding (greater than 50 percent ownership) and equitization with the state maintaining a minority shareholding (less than 50 percent ownership). This provides additional insight and complements the extant literature.

A number of findings emerge from our analysis. We find no significant relationship between Q and investment for SOEs and a positive and significant effect for private firms. The results are broadly in line with Chen et al. (2011) who focused on large Chinese firms. This also holds for both private firms and

SMEs as well as across manufacturing, construction and market services sectors. These results suggest no link between fundamentals and investment at SOEs; capital input choices are not linked to firm-specific marginal returns. This is indicative of poor investment efficiency.

Using the structural Q model, we also test the effect of privatisation and equitization policies on the investment efficiency of former SOEs. We find that fully privatised former SOEs that have been equitized with the state only retaining a minority state shareholding have a positive relationship between Q and investment suggesting, that full privatisation improves the efficiency in capital allocation. Our findings of an improvement in performance following privatisation are in line with many studies in the existing literature (La Porta and Lopez de Silanes, 1999; Ramamurti, 1997). Our findings are also in line with existing studies that focus on economies in transition such as Claessens, Djankov, and Pohl (1997) who document an improvement in Tobin's Q following privatisation in Czech republic. The results are also in line with Pohl, Anderson, Claessens, and Djankov (1999) who use a cross-country study and identify the improvement in productivity of privatised to non-privatized firms. Frydman, Gray, Hessel, and Rapaczynski (1999) test the differing performance of SOEs and private firms for a sample of 90 SOEs and 128 private firms in Czech republic, Hungary and Poland and find privatisation to an outside owner improves productivity by 9 percent. Our findings indicate that post privatization and equitization, reformed firms have a larger sensitivity of investment to Q than private firms which would suggest positive efficiency gains following privatisation. These results are also in line with the work of Earle and Telegdy (2002) who find positive effects of privatisation on labour productivity in Romania and Brown et al. (2006 b) and find a positive effect on domestic firms post privatisation in Hungary, Romania, Russia and Ukraine using a multifactor productivity model.

Our findings have a number of important policy implications for Vietnam in transition. We find that SOEs do not appear to link investment to neoclassical determinants of returns. Additionally, we find following privatisation and equitization with minority SOE shareholdings does improve the investment efficiency of firms. A continued focus on reforming the SOE sector and undertaking managed and balanced privatisation and equitization policies can contribute to improved investment efficiency. This will in turn improve growth outcomes over time.

The rest of this paper is structured as follows: section 2 presents existing literature, section 3 outlines the empirical approach and econometric considerations, section 4 presents the data and summary statistics. Section 5 contains the empirical results and section 6 concludes.

2. Empirical Approach and Econometric Considerations

To test the efficiency of capital allocation in Vietnam, we use the Q model of finance (Tobin, 1969)¹. In this framework we test whether the link between fundamentals and investment differs by firm ownership. This approach has been used in the context of China by Chen et al. (2011).

This methodology is well established in the international finance literature (Hennessy, Levy, Whited, 2007; Bond and Soderbom, 2013). The Q model is derived from the value maximisation problem of the firm and the Q statistic captures the shadow benefit of investment to the firm i.e. the extra benefit the firm gets in terms of profitability of an additional unit of capital. With perfect capital markets, no other variable other than the marginal Q is expected to affect investment.

In this simple investment framework, the relationship between Q and firm investment growth is expected to be positive i.e. the higher the potential return of additional units of capital, the greater the investment rate. While the majority of research to date uses this model to test for the presence and extent of capital market imperfections (Erickson and Whited, 2000; Bond and Soderbom, 2013; O'Toole et al., 2014, Ryan et al., 2014), it can also be used to test for the efficiency of investment (Chen et al., 2011). In essence, by testing how sensitive investment spending is to the marginal product value of capital, an evaluation can be made as to how closely investment plans are informed by the underlying profitability of the enterprise; a larger coefficient on the Q statistic indicates a greater responsiveness of investment to fundamentals and thus greater efficiency in capital allocation.

Our particular contribution to the literature lies in exploring the degree to which the relationship between investment and Q is altered by firm ownership. In particular we are interested in evaluating whether or not investment responds differently to the Q statistic depending on whether or not the firm is state-owned or privately-owned. Our research hypothesis to be tested is therefore:

H1: Private firms should demonstrate a positive and significant relationship between the Q statistic and investment spending. SOEs may have an insignificant relationship or the coefficient is lower.

Our expectation is that, if the state firms maximise an objective function based on the achievement of non-profit, social or political objectives, then the link between Q (capturing capital profitability) and new investment should be lower or non-existent. Private firms, maximising a standard firm valuation problem, should have a strong relationship between Q and investment, particularly in their development phase.

¹ For an overview of this model and related literature, please see Erickson and Whited (2000) or O'Toole et al. (2013).

To empirically test this research hypothesis, we estimate the following empirical equation:

$$\frac{I}{K_{it}} = \alpha_0 + \beta_Q Q_{it} + \theta X_{it-1} + \gamma Z_{jt} + \tau_t + \mu_j + \phi_r + \varepsilon_{it} \quad (3)$$

Where I/K_{it} is the investment rate of capital stock, Q_{it} is an empirical estimate of tobins Q. The key coefficient in our estimation strategy is β_Q . We expect that this will be lower for SOEs relative to private firms.

From the firm's perspective, if no capital market imperfections exist, then investment decisions should be made only on the basis of the expected returns. In this case, if we include a measure of Q in an empirical equation driving investment, then no other factors should affect investment other than Q, the marginal return per unit.

A difficulty remains in developing an empirical proxy for the unobservable marginal Q. Hayashi (1982) outlines the conditions under which average Q is a suitable proxy for marginal Q and this allows the estimation of the statistic from observable information. The most well known measure of Q is the ratio of the market value of equity and bonds to the book value of the firm (Erikson and Whited, 2006). In the context of our research this metric is not applicable as our interest is in SMEs, the majority of whom do not have financial market listings.

We therefore use an alternative methodology outlined by Gilchrist and Himmelberg (1995) and used empirically by Ryan et al. (2014), O'Toole et al. (2014), Bierlen and Featherstone (1998) and Benjamin and Phimister (2002). This method uses a vector auto regression (VAR) on firm performance indicators to estimate a "fundamental Q" which can be used as a proxy for the Q statistic for firms without bond or market listings. This methodology does not draw tobins Q from market data but instead uses an alternative which is based on proxies for the marginal value product of capital. It has previously been used for Vietnam by O'Toole and Newman (2012).

This is the first time that this method, to estimate a measure of Q for both listed and non-listed SMEs across both private and state owned enterprise in a developing country context, has been utilised in the literature on investment efficiency. Previous research has only focused on listed firms. The VAR is as follows:

$$\mathbf{V}_{it} = \mathbf{H}\mathbf{V}_{it-1} + \varepsilon_{it} \quad (4)$$

$$Q_{it} = (\mathbf{c}'[\mathbf{I} - \delta\mathbf{H}])\mathbf{V}_{it} \quad (5)$$

Where the vector \mathbf{V}_{it} contains proxies for the marginal product value of capital and the error term is a composite as in $\varepsilon_{it} = c_i + \theta_j + \mu_r + \tau_t + \epsilon_{it}$. This errors structure requires the VAR to be estimated once the data has been purged of firm-specific time invariant factors, year-fixed effects, region fixed effects, and sector fixed effects. The proxies for the marginal value product of capital used in our analysis are both the sales to capital and the profits to capital ratio. \mathbf{c} is a vector which identifies the main mvpk proxy. We chose the sales to capital ratio as this indicator so as to avoid issues relating to loss management through depreciation or other allowances that might occur. The discount rate δ is set by the econometrician.² The coefficient vector \mathbf{H} is taken from the VAR. The VAR system is estimated using the method outlined by Holtz-Eakin et al. (1988) and applied empirically by Love and Zicchino (2007). Orthogonal deviations are used to remove firm-fixed effects while year, sector, and ownership fixed effects are removed by demeaning prior to estimation.

Once the empirical proxy for Q is developed, it can be included in the investment equation. As with all Q proxies, as it is an estimate of the underlying, unobservable Q , it is measured with error. This measurement error must be treated. We therefore estimate the investment equation (3) using GMM with lagged values of the marginal value product of capital variables as instruments. This ensures that both measurement error is dealt with, as well as controlling for any endogeneity between investment, Q and the control variables. Additionally, using GMM with instrumental variables cleanses potential omitted variable bias that may occur in our model.

3. Data and Summary Statistics

In Vietnam, the process of SOE reform and the initiatives which are contained in this, has led to a reduction in both the number of fully-State-owned SOEs and reduced the scope of their activities in terms of both sectoral activity and output contribution (VEPR, 2012; Vietnam Development Report, 2012). The total number of SOEs has fallen from approximately 12,000 in 1986 to circa 3,000 currently, approximately 33 percent of whom are 100% state-owned (Nguyen Ding Cung, 2014). However, in many sectors SOEs still remain dominant, for example, the telecommunications, fertilizer, coal, electricity, water supply and insurance sectors all have over 88 percent of output produced by SOEs (Nguyen Ding Cung, 2014).

For our research, the data used is novel and has not to date been applied to the investment efficiency literature. It is taken from the Vietnamese Enterprise Survey which is conducted annually by the General Statistics Office of Vietnam. It is a national survey compiled across all 64 provinces and is used as part of their National Accounts determination. The survey takes a census of firms with over 30 employees and a

² In line with Gilchrist and Himmelberg (1995) we use a discount rate of 0.8. Sensitivity analysis of values ranging from 0.6 to 0.9 have been conducted and the main results hold in all cases.

representative sample of firms under 30 employees. It has rich data coverage and asks firms to compile information on ownership, employment, profitability, output, investment, capital stocks, assets, liabilities. Given that the data also cover non-listed firms and in particular micro-, small- and medium-sized firms, this is of particular interest and provides a contribution to this literature.

All sectors of the economy are surveyed which again facilitates a broad review. However, to appropriately compare profit oriented private firms to SOEs with alternative objective functions, we limited the sectors included in the analysis. As is standard practice, we excluded firms in financial intermediation and insurance, education and social work, social, sports and entertainment activities and not-for-profit activities. These assumptions are important as they provide us with a test of the effect of ownership on enterprise activities in sectors that are traditionally profit-oriented.

For the sample used in our analysis, we apply a number of standard cleaning techniques. We remove outlier observations that are in the 1 percent tails of the distribution of each of the continuous variables. As we are applying a GMM model and require lags as instruments, we remove firms that do not have at least five consecutive observations. This restriction is required to facilitate using deeper lags as instruments if higher-order autocorrelation is evident. Our sample period runs from 2001 to 2012 which provides a long-panel element. All value variables are deflated using annual GDP deflators produced by the General Statistics Office of Vietnam.

Our estimation sample is described in table 1. In total, our sample includes 7,903 firms of which 5,709 are private and 2,194 are SOEs. Our data cover 24,493 observations across these firms with 17,377 observations for private and 7,116 observations for SOEs. The large number of observations available supports our identification strategy which estimates each sample individually, allowing investment to react to all variables differently for private and SOE firms.

Table 1: Overview of Firms and Observations in Sample

	Observations			Firms		
	Overall	Private	SOE	Overall	Private	SOE
Total	24,493	17,377	7,116	7,903	5,709	2,194
% of Total	100%	71%	29%	100%	72%	28%
% of Each Group						
	Overall	Private	SOE	Overall	Private	SOE
Large, Manufacturing	12%	9%	21%	12%	9%	19%
SME, Manufacturing	31%	34%	23%	29%	31%	22%
Large, Construction	5%	2%	14%	6%	3%	13%
SME, Construction	13%	15%	10%	15%	16%	12%
Large, Services	3%	1%	8%	3%	1%	8%
SME, Services	36%	41%	26%	36%	40%	25%
	100%	100%	100%	100%	100%	100%
Total	24,493	17,377	7,116	7,903	5,709	2,194

Source: Authors calculations using VES

Splitting the data by size categories and high-level sectors, it becomes evident that the majority of observations and firms are SMEs and in the manufacturing and market services sectors. Having a representative dataset which facilitates our analysis for both SMEs and large firms is an important contribution of our research. Table 2 presents the mean values for the key variables used in our analysis. The average investment rate is 24% for all firms. It is higher for private firms than SOEs at 27% and 17% respectively. Table 3 presents a simple t-test of whether these mean differences are significant and we reject H0 of equivalence at the 1 percent level.

The sales to capital ratio is high overall and is again higher for private firms than SOEs. Given the labour intensive nature of many activities in Vietnam it is unsurprising that high levels of output per unit of capital are evident. Private firms also appear to earn additional sales per unit capital relative to SOEs. This may be indicative of poor investments, which we test formally in the next section. The difference between the sales to capital ratios for state firms and for private firms is statistically significant at the 1 percent level (Table 3). We also present the ratio of sales to total assets to reflect the fact that in some sectors, the contribution of tangible fixed assets to output is lessened.

Turning to profitability, the ratio of profits to capital is 0.56 overall, 0.53 for private firms and 0.62 for SOEs. The profitability to total assets is also presented. It suggests a return on assets of approximately 5 percent overall, with 5 percent for private and 6 percent for SOEs. Both of these variables appear to indicate higher profitability for SOEs than private firms. This is unsurprising in that many of the SOEs are active in protected and highly concentrated sectors. This ensures they can earn monopoly or oligopoly

rents. This suggests that it is important to control for market competition in our formal econometric testing. Again comparing the means in Table 3, the differences are statistically significant.

Table 2: Overview of Firms and Observations in Sample

Variable	Overall		Private		SOE	
	Mean	St. Dev	Mean	St. Dev	Mean	St. Dev
I/K	0.24	0.92	0.27	0.97	0.17	0.77
S/K	24.54	58.44	27.79	65.82	16.60	32.97
S/TA	1.79	2.22	1.93	2.43	1.45	1.56
Profits/K	0.56	1.71	0.53	1.78	0.62	1.50
Profits/TA	0.05	0.10	0.05	0.10	0.06	0.10
Q	30.98	73.57	35.06	82.84	21.03	41.59
Leverage	0.50	0.31	0.49	0.31	0.53	0.31
Receivables/TA	0.23	0.18	0.22	0.17	0.27	0.19
Manufacturing	0.42	0.49	0.42	0.49	0.43	0.49
Construction	0.18	0.39	0.16	0.37	0.23	0.42
Market Services	0.39	0.49	0.42	0.49	0.33	0.47
Red River Delta	0.40	0.49	0.39	0.49	0.41	0.49
South Region	0.33	0.47	0.37	0.48	0.24	0.43
Other regions	0.24	0.43	0.22	0.41	0.29	0.45
SME	0.80	0.40	0.89	0.31	0.58	0.49
HHI	0.02	0.04	0.02	0.03	0.03	0.05
State MP	0.37	0.17	0.35	0.17	0.40	0.19

Source: Authors calculations using VES data.

As a linear combination of the sales to capital and profits to capital, its mean follows a similar pattern. It is higher for private firms than for SOEs. Considering sales growth, $\Delta \ln S$, in our sample firms post approximately 4 percent output growth annually in real terms. Private firms had slightly higher output growth 4.3 percent, with SOEs at 3.7 percent. Leverage, measured as total outstanding liabilities, stands at approximately 50 percent of total assets. SOEs have slightly higher levels of leverage than private firms. This may represent legacy issues or alternatively better access to credit from state-owned financial institutions. Receivables to total assets are 0.23 and are higher for SOEs than private firms.

On the composition of the sample, 42 percent of the observations are in the manufacturing sector and the share of manufacturing firms is generally similar across SOE and private firms. Construction represents 18 percent of the sample and market services accounts for 39 percent of the data. In terms of the geographic distribution of the data, 40 percent of the observations are based in the Red River Delta region which contains the capital Ha Noi. Circa 33 percent of observations are in the South East region, which contains Ho Chi Minh City. Other regions represent an additional 24 percent of the data.

The sample is dominated by SMEs, which account for nearly 80 percent of observations. However the share of SMEs is much lower for SOEs than state-firms.

HHI and the state market power variable capture time-varying sector controls. The sectoral breakdown is presented in table A1 in Annex A. The most concentrated industry, as expected, is mining and utilities. Focusing on the market presence of SOEs, the average share of SOEs in sectoral output is 17 percent.

Table 3: T-Tests of Mean Differences for Selected Variables

	Private	SOE	Difference
I/K	0.27	0.17	0.10 ***
S/K	27.79	16.60	11.19 ***
Profits/K	0.53	0.62	-0.09 ***
S/TA	1.93	1.45	0.48***
Profits/TA	0.05	0.06	-0.02 ***
Q	35.06	21.03	14.03 ***
Leverage	0.49	0.53	-0.036 ***
Receivables/TA	0.22	0.27	-0.05 ***
SME	0.89	0.58	0.31 ***

Source: Authors calculations using VES data. *** indicate significant at the 1 percent level,

Table 4 presents the correlation coefficients for the main variables used in our assessment of the ownership effects of efficiency. The correlation coefficients are estimated firstly for the whole sample and then separately for private firms and SOEs. Focusing on the correlation coefficients between investment and the other control variables, the coefficients with the sales to capital, the profits to capital and the generated Q statistic are 0.18, 0.12 and 0.18 respectively. Limiting the sample to include only private firms, the correlation coefficients are similar with the profit to capital, investment correlation slightly higher. For SOEs, the coefficients are 0.17, 0.10 and 0.17 respectively. This would indicate that a slightly lower correlation between investment and indicators of the marginal benefit of capital is evident for SOEs relative to private firms. Formally testing these relationships in a causal manner is the main aim of our econometric section.

The correlation coefficient between investment and sales growth is 0.04. Comparing private firms and SOEs, the picture is slightly different as the correlation coefficient is lower for private; 0.03 to 0.07. While this is in contrast to the measures of the marginal benefit of capital, simple correlation coefficients can be misleading as they do not control for any confounding factors or other covariates.

Finally focusing on the correlation between investment and the financial measures (leverage and trade receivables), we find a higher correlation of investment to external finance for private firms relative to

SOEs. This may reflect the softer budget constraints and easier access to finance for SOEs who operate with an implicit or explicit government guarantee on liabilities and government financing of deficits or investment.

Table 4: Correlation coefficients for Main Variables by Ownership

All Firms						
	I/K	S/K	P/K	Q	Leverage	Receivables/TA
I/K	1.00					
S/K	0.18	1.00				
P/K	0.12	0.34	1.00			
Q	0.18	1.00	0.34	1.00		
Leverage	0.03	0.03	-0.03	0.03	1.00	
Receivables/TA	0.02	0.09	0.06	0.09	0.22	1.00
Private Firms						
	I/K	S/K	P/K	Q	Leverage	Receivables/TA
I/K	1.00					
S/K	0.18	1.00				
P/K	0.13	0.34	1.00			
Q	0.18	1.00	0.34	1.00		
Leverage	0.04	0.02	-0.03	0.02	1.00	
Receivables/TA	0.03	0.09	0.06	0.09	0.17	1.00
SOES						
	I/K	S/K	P/K	Q	Leverage	Receivables/TA
I/K	1.00					
S/K	0.17	1.00				
P/K	0.10	0.40	1.00			
Q	0.17	1.00	0.41	1.00		
Leverage	0.03	0.10	-0.03	0.10	1.00	
Receivables/TA	0.00	0.18	0.03	0.18	0.32	1.00

Source: Authors calculations using VES data

The final contribution of this paper to the literature is to test the effect on investment efficiency of changes in ownership of SOEs, through privatisations and equitizations. In our data, we are able to classify state-owned enterprises into five categories: 1) fully state-owned enterprises (both centrally and locally owned firms), 2) SOEs who have been equitized but the state retains a controlling shareholding (> 50 percent of equity) 3) equitized firms in which the state retains a minority shareholding (< 50 percent of equity) 4) firms who have been equitized and then fully privatised and 5) firms who were fully privatized immediately. A key contribution of this paper is to test whether or not such changes in ownership alter the investment efficiency of the enterprise.

Table 5 and table 6 present the data on the number of observations in our sample for the SOEs and former SOEs who changed ownership overall and by firm size and sector.³ In total, nearly 50 percent of the SOEs in the data underwent some ownership change. The most frequent mode of ownership transfer was through direct privatisation. Just over 26 percent of the firms in our data indicate they transferred to full, direct privatization from state ownership. Nearly 10 percent of the firms were previously equitized but then became fully privatized. A further 8.7 percent of firms were partially equitized but the state retained a majority shareholding and 7.4 percent were equitized with the state holding a minority stake.

Table 5: Breakdown of Observations of State-owned Enterprises by Ownership Change

	Obs.	Percent	Firms	Percent
SOE	5,497	49.3%	1,772	48.0%
Equitized (SOE Share > 50%)	901	8.1%	320	8.7%
Equitized (SOE Share < 50%)	735	6.6%	272	7.4%
Privatised from Equitized	1,085	9.7%	361	9.8%
Privatised from SOE	2,926	26.3%	967	26.2%
All	11,144	100.0%	3,692	100.0%

Source: Authors calculations using VES data.

Table 6 presents the distribution of the observations by enterprise size and main sector of operation. The degree of privatization and equitization has been greater for SMEs than for large firms. This is unsurprising as many of the large firms owned by the Vietnamese state are in strategic sectors whereas many of the SMEs may be more likely a legacy issue from the command economy era. For large firms, the most frequently observed transition is to partial but controlling equitization whereas for SMEs, the majority of firms who transition, have been privatized completely.

Table 6: Breakdown of Observations by Size and Sector

	Large		SME		Manufacturing		Construction		Services	
	Obs	Percent	Obs	Percent	Obs	Percent	Obs	Percent	Obs	Percent
SOE	2,280	65.7%	3,217	41.9%	2,408	50.2%	1,213	49.6%	1,876	48.0%
Equitized (SOE Share > 50%)	403	11.6%	498	6.5%	361	7.5%	238	9.7%	302	7.7%
Equitized (SOE Share < 50%)	305	8.8%	430	5.6%	307	6.4%	222	9.1%	206	5.3%
Privatised from Equitized	237	6.8%	848	11.1%	567	11.8%	203	8.3%	315	8.1%
Privatised from SOE	247	7.1%	2,679	34.9%	1,151	24.0%	569	23.3%	1,206	30.9%
Total	3,472	100.0%	7,672	100.0%	4,794	100.0%	2,445	100.0%	3,905	100.0%

Source: Authors calculations using VES data.

³ Please note that the number of firms and observations from this data do not correspond to the tables above as in this data on the ownership change, a particular firm can shift category and therefore will be double counted. Identifying these firms who change is a key element in our identification strategy. In table 1, the firms and observations are discrete categories.

Splitting the data by sector, we observe that the rate of retention of SOEs has been highest in manufacturing and the largest number of full privatisations from full SOE ownership have occurred in the market services sector. Partial equitization, with retention of majority or minority stakes, are highest in the construction sector.

Table 7 presents the mean values for the main variables for the privatisation and equitization analysis. The data are split out for all firms and then divided by sector and size. Focusing firstly on all firms, we observe the investment rates are highest for privatized firms and lowest for firms with partial equitization. For equitized firms the profits to capital ratio is higher than full SOEs as well as for privatized firms. However, controlling for market structure and the ability to capture rents must be controlled for in a comparison of marginal products. The sales to capital ratio and Q are higher for privatized firms relative to all other groups.

Table 7: Mean Values of Main Variables for Privatisation/Equitization Analysis

	All	Manufacturing		Construction		Services	
		Large	SME	Large	SME	Large	SME
		SOE					
I/K	0.18	0.22	0.16	0.16	0.16	0.18	0.19
S/K	17.28	10.8	11.43	21.82	16.12	13.96	27
P/K	0.6	0.53	0.49	0.7	0.75	0.63	0.65
Q	21.87	13.71	14.49	27.61	20.46	17.72	34.1
		Equitized (SOE Share > 50%)					
I/K	0.12	0.12	0.1	0.15	0.03	0.09	0.15
S/K	14.55	9.53	5.78	19.18	19.56	15.01	20.49
P/K	0.71	0.51	0.26	0.64	0.59	1.11	1.2
Q	18.48	12.12	7.34	24.27	24.73	19.17	26.08
		Equitized (SOE Share < 50%)					
I/K	0.12	0.08	0.14	0.12	0.06	0.2	0.14
S/K	14.5	8.05	6.87	17.25	16.33	10.23	24.95
P/K	0.67	0.46	0.46	0.73	0.7	0.84	0.93
Q	18.4	10.25	8.77	21.87	20.71	13.09	31.6
		Privatised from Equitized					
I/K	0.25	0.17	0.23	0.49	0.19	0.3	0.34
S/K	18.29	10.25	12.99	19.69	13.18	27.94	32.49
P/K	0.58	0.54	0.44	0.85	0.56	0.41	0.77
Q	23.14	13.03	16.44	24.98	16.72	35.21	41.03
		Privatised from SOE					
I/K	0.23	0.24	0.23	0.18	0.27	0.49	0.21
S/K	35.05	11.23	17.07	12.35	12.13	17.63	64.73
P/K	0.46	0.49	0.28	0.18	0.3	0.63	0.69
Q	44.15	14.25	21.52	15.57	15.32	22.32	81.5

Source: Authors calculations based on VES data.

Table 8 presents the correlation coefficients between investment and the Q statistic for each of the ownership groupings by sector and size. It is interesting to note that the highest correlation overall is for the group of firms that were privatized from equitization. With the direct privatization group displaying the joint lower correlation. However, this pattern does not hold when the correlation is estimated by sector and size.

Table 8: Correlation Coefficients for Investment and Q statistic

	All	Manufacturing	Construction	Services	Large	SME
SOE	0.17	0.15	0.24	0.17	0.20	0.16
Equitized (SOE Share > 50%)	0.13	0.13	0.14	0.13	0.12	0.13
Equitized (SOE Share < 50%)	0.19	0.36	0.29	0.12	0.24	0.17
Privatised from Equitized	0.22	0.14	0.19	0.25	0.12	0.23
Privatised from SOE	0.13	0.19	0.16	0.16	0.26	0.13

Source: Authors calculations using VES data.

4. Empirical Results

This section presents the results of our main estimations. We firstly present our tests of the effects of ownership on marginal products, secondly present our estimates of the investment –sales growth elasticities by ownership, thirdly we test the relationship between investment and the Q statistic by ownership and finally we evaluate whether the effects of privatization and equitization alter the relationship between the Q statistic and investment.

4.1 Investment, Fundamental Q and Ownership

In this section, we present the estimates of our Q model to test the relationship between Q and investment by ownership. Our estimation strategy uses a GMM model with instruments to deal with measurement error in Q and potential omitted variable bias. Instruments are again taken from lags dated t-4 and t-5. Year controls are included in all regressions.

Table 13 presents the coefficients estimates for the Q model for all firms (column (1)), for SOEs (column (2)), and for private firms (column (3)). Our estimates indicate a positive coefficient on the Q statistic for all firms that is statistically significant at the 1 percent level. In column (2), there is no significant relationship between Q and investment for the SOEs while the relationship for the private firms is positive and significant at the 1 percent level. These findings are clear and support our a-priori research hypotheses. Our estimated model does not identify a relationship between fundamentals and investment as indicated by the Q statistic for SOEs. This suggests that investment activities, investment strategies and plans are not driven solely by profitability concerns as measured by the marginal product of capital for SOEs. Our evidence does indicate that private firms evaluate investment in terms of its marginal benefit. Our findings is in line with the literature which suggests that SOEs objective functions

are not purely profit maximizing, focusing instead on social policy or political objectives. These findings are also in line with our results from the sales-investment elasticities in the above section.

In terms of control variables, the coefficient on leverage is negative and significant for private firms. This may indicate that debt overhang is acting as a drag on the investment of private firms in Vietnam. If outstanding credit balances are constraining current investment, this may restrict their future growth opportunities. The model also identifies investment as higher in the construction and services sectors relative to the manufacturing sector. This finding is driven by firms in the private sector. We do not find any effect of trade receivables on investment.

Table 13: GMM Estimates of Fundamental Q Model

Dep Var: $(I/K)_{it}$	All Firms (1)	SOEs (2)	Private Firms (3)
Q	0.002*** (0.001)	0.001 (0.002)	0.002*** (0.001)
Leverage $_{t-1}$	-0.173 (0.134)	0.071 (0.137)	-0.330* (0.192)
Receivables/TA $_{t-1}$	0.358 (0.377)	-0.094 (0.525)	0.387 (0.477)
T	-0.057*** (0.008)	-0.024** (0.010)	-0.075*** (0.010)
Construction	0.199* (0.121)	-0.088 (0.141)	0.400* (0.210)
Services	0.251*** (0.085)	0.150 (0.122)	0.351** (0.136)
South East region	-0.056 (0.041)	-0.059 (0.066)	-0.072 (0.050)
Other regions	0.010 (0.031)	-0.036 (0.078)	-0.007 (0.038)
SME	-0.028 (0.030)	-0.046 (0.034)	-0.030 (0.050)
HHI	-0.073 (1.271)	-0.591 (1.043)	1.930 (2.951)
State MP	-0.238 (0.185)	-0.225 (0.231)	-0.261 (0.263)
N	24,769	8,177	16,592
AR(1) Test	0.000	0.000	0.000
AR(2) Test	0.053	0.473	0.030
Sargan Test	0.124	0.997	0.217
Instruments	140	140	140

Notes: Model estimated using GMM with lagged values of all variables dated t-4 and t-5 as instruments. Standard errors are robust to heteroskedasticity and clustered at the firm level. Year dummies also included in all regressions.

Our main finding from table 13 suggests that SOEs do not set investment plans based on the marginal product of capital whereas private firms are guided by such considerations. This finding is in line with the extant literature (Chen et al., 2011). To better explore the heterogeneity of the effects across firms in Vietnam, we present the results separately for firm size and sector in tables 14 and 15.

Table 14 presents the breakdown between SMEs and Large firms. In columns (1) and (2) we present the results combining private and SOEs. Our estimates identify a positive effect of the Q statistic for both SMEs and large firms. The coefficients are statistically significant at the 5 percent and 10 percent levels respectively. The coefficient for large firms is higher than that for small firms indicating a greater responsiveness of large firms to fundamentals in driving investment spending. This may be due to the fact that large firms have better access to internal and external capital and can react more quickly when opportunities arise. It may also be the case that their scale provides large firms with a buffer to withstand investment uncertainties and allows them to commit to projects more quickly than their SME counterparts.

Considering the relationship between Q and investment for SOEs, again, we do not identify a statistically significant relationship for either large firms or SMEs. In columns (5) and (6) our estimates indicate that there is a positive and significant effect of Q on investment for both SMEs and large private enterprises. To conclude, our findings again suggest that while both private SMEs and large firms have a positive and significant relationship between Q and investment, we find no evidence that SOEs plan investment spending on the basis of marginal product returns.

Focusing on the control variables, our estimates indicate that private SMEs face a negative effect of debt overhang. In the period 2005 onwards, Vietnam experienced very rapid private sector credit growth (O'Toole and Newman, 2012). In fact, McInerney and O'Toole (2014) identify 2007 as a formal credit boom in Vietnam. While much of this credit expansion may be due to convergence effects, the increased indebtedness of private enterprise would now appear to be acting as a drag on corporate investment by SMEs. We also find a strong negative trend in investment for private SMEs with the investment rates falling considerably year on year. We find that the investment rates are higher for construction and service SMEs and for large service firms.

Table 14: GMM Estimates of Fundamental Q Model – By Firm Size

	All Firms		SOEs		Private firms	
	SME (1)	Large (2)	SMEs (3)	Large (4)	SMEs (5)	Large (6)
Q	0.002** (0.001)	0.007* (0.004)	-0.000 (0.001)	0.004 (0.004)	0.002** (0.001)	0.014** (0.007)
Leverage t_{-1}	-0.480*** (0.168)	-0.058 (0.251)	-0.309 (0.217)	-0.021 (0.323)	-0.560*** (0.208)	-0.176 (0.292)
Receivables/TA t_{-1}	0.565 (0.475)	0.555 (0.492)	0.383 (0.787)	0.483 (0.530)	0.590 (0.538)	-0.689* (0.397)
T	-0.345*** (0.112)	0.053 (0.197)	-0.183 (0.160)	-0.014 (0.283)	-0.390*** (0.141)	0.084 (0.241)
Construction	0.266* (0.137)	0.119 (0.250)	-0.035 (0.216)	-0.160 (0.232)	0.336* (0.204)	1.673 (1.082)
Services	0.277*** (0.092)	0.197 (0.185)	0.206 (0.165)	-0.068 (0.153)	0.301** (0.130)	1.752* (0.947)
South East region	-0.077 (0.052)	0.016 (0.051)	-0.112 (0.108)	-0.010 (0.067)	-0.074 (0.059)	-0.055 (0.093)
Other regions	0.003 (0.035)	0.095 (0.070)	-0.026 (0.113)	-0.038 (0.080)	-0.016 (0.041)	0.208* (0.121)
HHI	-0.209 (1.181)	1.212 (2.068)	-0.017 (1.161)	-0.552 (1.653)	-0.111 (2.508)	12.825 (8.620)
State MS	-0.105 (0.244)	-0.258 (0.360)	0.187 (0.358)	-0.352 (0.493)	-0.281 (0.307)	-0.370 (0.366)
N	18,796	4,107	4,572	2,734	14,224	1,373
AR(1) Test	0.000	0.000	0.000	0.000	0.000	0.008
AR(2) Test	0.008	0.607	0.148	0.566	0.008	0.704
Sargan Test	0.070	0.761	0.491	0.060	0.137	0.445
Instruments	121.000	121.000	121.000	121.000	121.000	121.000

Notes: Model estimated using GMM with lagged values of all variables dated t-4 and t-5 as instruments. Standard errors are robust to heteroskedasticity and clustered at the firm level. Year dummies also included in all regressions.

Table 15 estimates the relationship between investment and Q for firms in different industrial sectors: manufacturing and industry, construction and market services. The sectoral estimates are provided for all firms, SOEs and private firms.

In the manufacturing sector, we identify a positive and significant effect of Q on investment for all firms and private firms. The coefficient is positive and significant at the 1 percent level. No effect is evident for SOEs. These findings are mirrored for firms in the construction and service sectors: we identify a positive and significant effect for all firms and for private firms but find no evidence of a significant relationship

for SOEs. The private firm coefficients are significant at the 1 percent level in the construction sector and the 10 percent level in the market services sector.

On the magnitude of the coefficients for private firms, it appears that firms in the manufacturing sector display the highest sensitivity of investment to Q closely followed by the construction sector. The estimated coefficient for service firms is considerably lower. Given the profile of production in manufacturing and construction industries, physical investment may be more important in terms of the production structure. These firms may be more capital intensive therefore, react quicker to marginal products.

To conclude, in this section, we found evidence in support of our research hypothesis 3 (H3) that the Q statistic is not a driver of investment for SOEs in Vietnam. Our results suggest that private firms appear to link investment expenditure to marginal products and are investing in line with traditional model expectations. SOEs do not display behaviour in line with traditional models which assume investment takes place until the marginal cost and marginal benefit of investment are equated. Our results would therefore suggest that investment efficiency is highest for private firms with no evidence of profit maximising investment spending by SOEs. It must be noted however that, given the SOEs may be set different policy objectives, decoupling investment spending from marginal products may be in line with broader political or social policy objectives. However, if such objectives are to increase efficiency in capital spending, then this evidence would suggest investment planning needs to be realigned.

Table 15: GMM Estimates of Fundamental Q Model – Sectoral Breakdown

	Manufacturing			Construction			Services		
	All Firms (1)	SOEs (2)	Private (3)	All Firms (1)	SOEs (2)	Private (3)	All Firms (1)	SOEs (2)	Private (3)
Q	0.007*** (0.002)	0.000 (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.004 (0.003)	0.006*** (0.002)	0.001* (0.001)	0.000 (0.001)	0.001* (0.001)
Leverage t_{-1}	0.131 (0.189)	0.102 (0.215)	0.095 (0.230)	-0.372 (0.436)	0.349 (0.432)	-1.328 (1.034)	-0.368* (0.207)	-0.185 (0.277)	-0.497* (0.288)
Receivables/TA t_{-1}	-0.764 (0.472)	0.760 (0.638)	-0.438 (0.480)	0.185 (0.536)	-0.022 (0.565)	0.486 (0.741)	0.153 (0.564)	0.568 (0.651)	0.182 (0.676)
T	-0.039*** (0.015)	-0.026 (0.022)	-0.057*** (0.017)	-0.049*** (0.019)	-0.010 (0.032)	-0.077*** (0.026)	-0.043 (0.031)	-0.045 (0.031)	-0.052 (0.032)
South East region	-0.025 (0.041)	-0.086 (0.079)	-0.019 (0.049)	-0.011 (0.107)	-0.079 (0.148)	0.005 (0.149)	-0.219** (0.093)	-0.019 (0.149)	-0.276** (0.109)
Other regions	-0.057 (0.045)	-0.158** (0.074)	-0.018 (0.058)	0.053 (0.087)	-0.072 (0.120)	0.005 (0.114)	-0.014 (0.048)	-0.073 (0.105)	-0.031 (0.062)
SME	-0.009 (0.040)	-0.045 (0.054)	0.011 (0.057)	-0.028 (0.061)	-0.006 (0.063)	-0.073 (0.130)	-0.056 (0.069)	-0.012 (0.072)	-0.135 (0.142)
N	10,159	3,410	6,749	4,167	1,788	2,379	9,189	2,738	6,451
AR(1) Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) Test	0.567	0.059	0.398	0.631	0.805	0.524	0.688	0.887	0.380
Sargan Test	0.997	0.269	0.999	0.024	0.995	0.001	0.783	0.076	0.906
Instruments	95	95	95	88	88	88	95	95	95

Notes: Notes: Model estimated using GMM with lagged values of all variables dated t-4 and t-5 as instruments. Standard errors are robust to heteroskedasticity and clustered at the firm level. Year dummies also included in all regressions. Time varying sector controls include HHI and State MP.

4.2 Exploring the Effects of Equitization and Privatisation

The final contribution of this paper is to build on the extant literature on firm performance following privatisation. Table 16 presents the results of the Q model estimated on the sample of current and former state-owned enterprises. Our main research question in this section is whether or not the relationship between the Q statistic and investment changes when SOEs in Vietnam have been privatised or equitized. If that privatization, or equitization improves the performance of the firm, or at realigned its objective function towards profit maximisation, we would expect that Q would be positive or higher for groups of firms who have undergone such an ownership change.

In table 16, we test the effect of Q on investment, and interact Q with indicator variables for the 4 groups of ownership change identifiable in our data. These are 1) Equitized (SOE Share > 50%), 2) Equitized (SOE Share < 50%), 3) Privatised from Equitized and 4) Privatised from SOE . We use interaction effects to avoid issues that occur due to the small samples of firms in some of these categories. We also present the results by industrial sector and firm size to explore the heterogeneity of ownership changes on investment efficiency across the Vietnamese economy. The models are estimated using GMM again with instruments dated t-4 and t-5. The Sargan test supports instrument validity at standard significance levels. Controls for leverage, receivables, HHI and state market power are included in all regressions. Year, sector and region dummies are also included.

Table 16: Test of Investment-Q Relationship for Equitized and Privatized Firms with SOEs

	All Firms	Sectors			Size	
		Manufacturing	Construction	Services	Large	SME
	(1)	(2)	(3)	(4)	(5)	(6)
Q	-0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.001)	0.004* (0.002)	-0.001 (0.001)
Equitized (SOE Share > 50%)	0.030 (0.176)	-0.329 (0.327)	0.080 (0.174)	-0.433 (0.346)	-0.296 (0.261)	-0.012 (0.128)
Equitized (SOE Share < 50%)	-0.042 (0.189)	-0.260 (0.245)	-0.142 (0.183)	-0.087 (0.266)	-0.418 (0.305)	-0.112 (0.146)
Privatised from Equitized	-0.125 (0.206)	-0.268 (0.345)	0.115 (0.226)	-0.380 (0.274)	-0.744** (0.299)	0.127 (0.199)
Privatised from SOE	-0.312 (0.273)	-0.213 (0.311)	-0.145 (0.324)	-0.465 (0.323)	-0.335 (0.243)	-0.005 (0.258)
Equitized (Share > 50%) x Q	0.005 (0.004)	0.026 (0.020)	-0.001 (0.002)	0.011 (0.014)	0.011 (0.009)	0.003 (0.003)
Equitized (Share < 50%) x Q	0.010*** (0.003)	0.017 (0.014)	0.009** (0.003)	0.000 (0.004)	0.018* (0.010)	0.011*** (0.003)
Privatised from Equitized x Q	-0.001 (0.003)	0.012 (0.019)	-0.002 (0.005)	0.001 (0.003)	0.039*** (0.013)	-0.002 (0.003)
Privatised from SOE x Q	0.007*** (0.002)	0.010*** (0.004)	0.018* (0.010)	0.004** (0.002)	0.018 (0.012)	0.007*** (0.002)
N	11,320	4,767	2,332	3,847	3,664	7,656
ar1p	0.000	0.000	0.000	0.000	0.000	0.000
ar2p	0.074	0.108	0.221	0.467	0.306	0.068
Sargan Test	0.995	0.438	0.9999	0.986	0.020	0.983
Instruments	212	226	184	211	222	226

Notes: Additional year controls included in all regressions. Estimates are produced using GMM estimation techniques with lagged levels as instruments. Lags are dated t-4, t-5 for all variables. Orthogonal deviations are used to remove firm-specific heterogeneity. Sectoral dummies, and regional dummies also included as are firm size classes. Controls for leverage, receivables, HHI and State MP also included in the regressions.

In addition to testing the improvement in investment efficiency following privatisation and equitization against existing SOEs, it is also of interest to benchmark how these firms stack up against private firms. In table 17, we estimate the average Q for private firms, equitized firms with a less than 50 percent state holding and immediately privatised firms. We can see that the value of Q is higher for both privatised groupings with fully privatised higher than equitized firms. This result holds across all firms and for SMEs. The average effects are not significant for large firm. These former SOEs may find restructuring and legacy size issues difficult to deal with. Across sectors, in both manufacturing and services privatised firms have a higher average Q than private firms. These findings indicate that privatisation, in improving the efficiency of capital allocation, is a successful policy initiative in the Vietnamese case.

Table 17: Test of Investment-Q Relationship for Equitized and Privatized Firms with Privatized Firms

	All Firms	Sectors			Size	
		Manufacturing	Construction	Services	Large	SME
	(1)	(2)	(3)	(4)	(5)	(6)
Private	0.002*** (0.001)	0.007*** (0.002)	0.007*** (0.002)	0.001** (0.001)	0.005*** (0.001)	0.002*** (0.001)
Equitized (Share < 50%)	0.005* (0.003)	0.011 (0.007)	0.006*** (0.001)	0.001 (0.004)	0.000 (0.008)	0.005* (0.003)
Privatised from SOE	0.014* (0.008)	0.009** (0.005)	0.001 (0.012)	0.013* (0.007)	-0.014 (0.018)	0.014* (0.007)
N	15,566	6,364	2,233	5,983	1,875	13,691
ar1p	0.000	0.000	0.000	0.000	0.000	0.000
ar2p	0.062	0.784	0.980	0.542	0.219	0.033
Sargan Test	0.904	1.000	0.000	0.980	1.000	0.886
Instruments	263	256	191	224	241	258

Notes: Additional year controls included in all regressions. Estimates are produced using GMM estimation techniques with lagged levels as instruments. Lags are dated t-4, t-5 for all variables. Orthogonal deviations are used to remove firm-specific heterogeneity. Sectoral dummies, and regional dummies also included as are firm size classes. Controls for leverage, receivables, HHI and State MP also included in the regressions. Also included is the average Q effect for privatised from equitized but it is insignificant.

5. Conclusions and Policy Implications

This paper evaluates the efficiency of capital allocation amongst Vietnamese firms. It contributes to the literature on corporate governance and capital allocation and the literature on the effects of ownership change and efficiency in transition economies. It also provides important insights into the policy reform agenda for Vietnam.

Using a structural Q model of finance, we find no significant relationship between Q and investment for SOEs and a positive and significant effect for private firms. This also holds for both private firms and SMEs and across manufacturing, construction and market services sectors.

Using the structural Q model, we also test the effect of privatisation and equitization policies on the investment efficiency of former SOEs. We find that fully privatised former SOEs which are equitized SOEs that retain only a minority state shareholding have a positive relationship between Q and investment suggesting efficiency in capital allocation. We also find that the investment of these categories of firms has a stronger link to our Q measure relative to private firms, again reinforcing the positive benefits of reform.

Our findings have a number of important policy implications for Vietnam in transition. We find no link between investment and firm fundamentals for Vietnamese SOEs. This would suggest that a continued implementation of reform-oriented policies should improve capital allocation in the economy. Additionally, the results suggest that the reform agenda to date has had a positive effect on the performance of privatised or equitized firms. A continued focus on reforming the SOE sector and undertaking managed and balanced privatisation and equitisation policies can contribute to improved investment efficiency. Such reforms can lay the platform for continued Vietnamese growth in the medium term.

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A1: Data Appendix

Additional summary statistics and description of the data cleaning process.

Table A1: Sector Means of Time Varying Sector Controls

Sector	HHI (Mean)	SOE Market Share
1. Manufacturing of food, beverages and tobacco	0.7%	37.2%
2. Manufacturing of leather, textiles, garments	1.0%	27.0%
3. Manufacturing of chemicals and chemicals	2.7%	38.1%
4. Manufacturing of wood, paper, and furniture	0.6%	25.0%
5. Manufacturing of rubber and plastics	0.9%	23.0%
6. Manufacturing of other non-metalic metals	1.6%	47.5%
7. Manufacturing of basic or fabricated metals	1.4%	23.2%
8. Manufacturing of machinery, equipment and other n.e.c.	3.4%	22.0%
9. Other Manufacturing	3.0%	26.6%
10. Construction and Real Estate	0.5%	53.2%
11. Wholesale trade	1.1%	47.1%
12. Retail trade	1.0%	35.7%
13. Wholesale and retail motor trade	1.4%	37.3%
14. Transport, storage and communication	6.1%	66.4%
15. Other market Services	0.8%	35.4%
16. Mining and utilities	17.9%	75.6%
Sectoral breakdown used in analysis: Manufacturing (1-9, 16), Construction (10), Services (11-15)		

Source: VES Sample data

Table A2: Comparison of Means of Main Variables by Firm Type

	All	Large Firms			SMEs		
		Manufacturin g	Constructio n	Service s	Manufacturin g	Constructio n	Service s
		Private Firms					
I/K	0.27	0.21	0.26	0.43	0.23	0.27	0.31
S/K	27.79	10.88	23.62	20.24	15.22	13.94	47.05
Q	35.06	13.76	29.81	25.70	19.20	17.60	59.33
P/K	0.53	0.36	0.50	0.97	0.30	0.33	0.83
		State Firms					
I/K	0.17	0.20	0.15	0.17	0.15	0.13	0.18
S/K	16.60	10.43	20.68	13.87	10.12	16.56	25.93
Q	21.03	13.24	26.17	17.62	12.85	21.01	32.78
P/K	0.62	0.52	0.70	0.71	0.46	0.73	0.73

Year	Number	Title/Author(s) ESRI Authors/Co-authors <i>Italicised</i>
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	494	The Effects of Wind Generation Capacity on Electricity Prices and Generation Costs: a Monte Carlo Analysis <i>Muireann Lynch and John Curtis</i>
	493	The Effect of Wind on Electricity CO2 Emissions: The Case of Ireland <i>Valeria di Cosmo and Laura Malaguzzi Valeri</i>
	492	Financial Structure and Diversification of European Firms <i>Martina Lawless, Brian O'Connell and Conor O'Toole</i>
	491	SME Recovery Following a Financial Crisis: Does Debt Overhang Matter? <i>Martina Lawless, Brian O'Connell and Conor O'Toole</i>
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