Investment efficiency, state-owned enterprises and privatisation: Evidence from Viet Nam in Transition

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Abstract: Our research firstly tests the difference in investment efficiency between state-owned enterprises (SOEs) and private firms and secondly evaluates the effect of privatisiation 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 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 who 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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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 Viet Nam, 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; Viet Nam Development Report 2012; OECD, 2013).

Within this wider context our research considers the effect of ownership on the efficiency of investment in Viet Nam. Despite strong economic growth since the onset of original "Doi Moi" reforms, Viet Nam'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; Viet Nam Development Report, 2012). Soft budget constraints, poor corporate governance and managerial oversight have led to excessive leverage and poor investment efficiency (IMF, 2013).

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 privatisiation and equitisation policies on the investment efficiency of former SOEs. The existing literature 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 research 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).

Our 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. This is facilitated by using 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 methodology has a number of benefits. As it does not require stock market data it can be estimated on non-listed, small and medium-sized enterprises. This facilitates a broader assessment than has been conducted to date as close studies (Chen et al., 2007; Chen et al., 2014) only conduct their evaluation on stock market-listed enterprises. 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 also consider whether differences in investment efficiency exist between firms classified as financially constrained or unconstrained.

We also specifically build on the work of Chen et al. (2014) who test the impact of government and foreign ownership on investment efficiency using a world-wide sample of privatised enterprises. While not relying on cross-country variation, our research provides greater heterogeneity across enterprises than has been possible to date by focusing on a transition economy from East Asian, and applying a the Gilchrist and Himmelberg (1995) approach to include listed and non-listed SMEs. Our disaggregation across size classes and sectors is also novel. This approach, as it is estimated by generalised method of moments techniques, can control for endogeneity, unobserved heterogeneity and measurement error simultaneously. Exploring how the impacts of privatization on investment efficiency differ across different development contexts is important especially given the findings of Boubakri et al. (2005) who note differential outcomes for developing rather than developed economies.

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 per cent ownership) and equitization with the state maintaining a minority shareholding (less than 50 per cent ownership). This provides additional insight and complements the extant literature. By including state-owned firms that have not been privatised as a control group we can also address one of the sample selection issues mentioned by Chen et al. (2014) in terms of the state selection of which enterprises to bring to market.

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. These results suggest no link between fundamentals and investment at SOEs; capital input choices are not linked to firm-specific marginal returns. The results are broadly in line with Chen et al. (2011) who focused on large Chinese

firms and Chen et al. (2014) for a broad cross country sample. In terms of the economic magnitude of the effects, a one standard deviation shock to Q leads to a 0.198 unit increase in investment. As the mean investment in the sample is 0.38, this implies an investment increase of 50 per cent.

On the distributional impacts across groups of enterprises, our main findings of significance holds for both private firms and SMEs as well as across strategic and non-strategic sectors. . The magnitude of the coefficient is smaller for small firms than large firms. Larger enterprises may have better access to internal capital and can react more quickly when opportunities arise. It may also be the case that due to their size, they are more likely to commit risky capital in particular in uncertain environments. SMEs may react with more restraint and be influences by uncertain domestic market developments. The coefficient is also larger for larger in the strategic sector relative to the non-strategic sector. If competition is stronger in the non-strategic sector, this may drive down returns and make firms more uncertain about committing capital. We test whether there are differences in SOEs depending on whether they are controlled centrally or locally as in Chen et al. (2011) and find no evidence of investment efficiency for either group. We also find financial constrained private enterprises are more efficient that unconstrained enterprises. This is unsurprising given such enterprises have higher marginal capital products and are operating at sub-optimal capital stock levels. 7

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 privatisiation 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 exisiting studies that focus on economies in transition such as Claessens, Djankov, and Pohl (1997) who document an improvement in tobins' 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 to 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 per cent. 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.

Testing these effects across groups of firms and industries, the main findings hold for SMEs and firms in non-strategic sectors. Differences are evident for large firms and firms in strategic sectors: enterprises whose divestment mechanism was either equitization with a majority shareholding or firms who were privatised having previously been equitized that display a positive relationship between Q and investment for strategic sectors. For large firms, minority shareholding equitization and privatisation from previous equitization are the divestment routes through which we find a positive and statistically

significant relationship between Q and investment. These findings indicate that there is considerable heterogeneity across groups of firms and industries in the impact of state divestment on investment efficiency.

Our findings have a number of important policy implications for Viet Nam 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 equitizisation 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.

1. Related literature and hypotheses development

In this section, we use the existing literature to pose a number of testable hypotheses with which to investigate using our analytical framework. We present these hypotheses with reference to our specific contributions as well as the extant research. Assessing the differences in investment efficiency between state-owned enterprises and private firms is well researched topic in the literature (Shleifer and Vishny, 1997; Dewenter and Malatesta, 2001; Meggison and Netter, 2001; Chen et al., 2011). It is motivated theoretically by focusing on differences in objective structures, moral hazard and agency problems that lead to a divergence in behavior for SOEs relative to private firms relating to value maximization. In a standard neoclassical investment framework, enterprises will investment up to the position whereby the marginal benefit of capital equals the marginal cost (Modigliani and Miller, 1958; Tobin, 1969). However if their exist frictions in capital markets such as information asymmetries or agency problems, where firms are credit constrained, then investment may be suboptimal relative to a no-friction case. Furthermore, if objectives are not profit maximising, this condition may not hold.

From an agency theory perspective, SOEs inefficiency is a natural consequence of separation of ownership and control over firm investments and activities (Boubakri et al., 2005; Shleifer and Vishny, 1997). Firm ownership is by the public but control is centralized to managerial staff whose objectives are set by politicians. This may lead managers to (either unilaterally or under instruction) maximise objective functions which are not value maximising. Such objective functions could be based on the maximisation of employment or wages, providing a range of below cost or non-market provided products, choosing politically motivated locations for investments etc. (Chen et al., 2014; Boubakri, 2015). Managers are also not exposed to the rigours of the market in terms of ensuring an efficient allocation of capital which further ensures a disconnect between investment and fundamentals (Meggison and Netter, 2001). Within this context, this backdrop provides us with our first testable hypothesis:

H1: Private firms should demonstrate a positive and significant relationship between fundamentals and investment. SOES may have an insignificant relationship or have a lower coefficient size.

Additionally, recent research finds that centrally controlled SOEs are less likely to be affected by agency problems relating to location specific political interference relative to SOEs that are locally controlled (Chen et al., 2011). We therefore test whether there are differences across the type of SOE:

H2: Centrally controlled SOEs should be more efficient than locally controlled SOEs.

One clear finding of the literature on investment efficiency and state-owned enterprises is that following privatization or majority equitization, enterprises display considerably improved efficiency (Guedhami et al, 2009; Meggison et al., 1994; Boubakri and Cosset, 1998) as well as improved governance, financial reporting and financial transparency (Borisova et al, 2012; Bushman et al., 2004; Guedhami et al., 2004). Research also finds improvements in profitability and productivity following the divestment (Shleifer, 1998; La Porta and Lopez de Silanes, 1999; Ramamurti, 1997; Djankov and Pohl, 1997; Claessens and Djankov, 1999). Our data allow us to test these hypothesis as we observe the same firm transitioning from fully state owned to privatised as well as partial or minority equitization. We can therefore pose the following hypothesis:

H3: Investment efficiency improvements following state divestment will depend on the degree of privatisation.

Our data facilitate a split by size and sector that is more granular than the existing literature. We therefore can test a range of further hypotheses which use the granularity in our sample. We distinguish between strategic sectors (mining, steel, transportation, communications and utilities) relative to other sectors. As strategic sectors are under strict regulatory control and in many cases are used to provide public goods from a natural or quasi-natural monopoly position, their investment efficiency is potentially lower than other industries as they are more likely to follow political objective functions relative to enterprises in non-strategic sectors. The impacts of privatisation is also likely to be different from other sectors. If regulation continues in these industries, the divergency of objectives between regulators and owners can lead managers to inefficient outcomes (Boubakri et al. 2009). Additionally, they can be social-service providers, thus the process of privatisation is frought with popular discontent, potential social disquiet and conflicting political objectives (Boubakri et al. (2009)). Additionally, as fixed capital inputs are required differently for different sectors the impacts of privatisation on capital investment efficiency is suspected to be different. This leads us to pose the following hypothesis:

H4: Investment efficiency differs across ownership for strategic and non-strategic sectors.

Furthermore, larger firms may be more likely to suffer from agency problems given the number of layers and opportunities for managers to rent seek or build empires. However, large firms may be less affected by information asymmetries in accessing external capital. In this respect, we can expect differences in investment efficiency across firm size and ownership type:

H5: There are differences in investment efficiency across ownership types between large enterprises and SMEs.

The final hypothesis that we evaluate relates to state-owned enterprises and financing constraints. A range of studies have highlighted the fact that soft budget constraints can lead to over investment and poor capital efficiency for SOEs (Berglof and Roland, 1998; Hersch et al, 1997; Meggison and Netter, 2001; Schaffer, 1998). That is not to say that privatisation or equitization completely dilute the effects of soft budget constraints on investment decisions. Political connections can remain for many of these firms which may allow them to continue to access cheaper credit. Indeed, Boubakri et al. (2012) show that political connections reduce the cost of equity for enterprises. Given this backdrop, it is pertinent to investigate the interaction between financing constraints, firm ownership and investment efficiency. We therefore pose the following hypothesis:

H6: The degree of soft budget constraints should impact investment efficiency. Credit constrained enterprises should have a greater sensitivity of investment to fundamentals.

The final part of this hypothesis is motivated by the fact that for credit constrained enterprises, as they have positive NPV investments that require capital, they will have a higher marginal value product of capital in general. Therefore it should be expected that increases in fundamentals mean a greater response in investment for these groups as they are currently operating with below optimal capitals stock levels.

2. Empirical approach and econometric considerations

A range of previous studies testing investment efficiency focus on the firm's investment sensitivity to variance in its stock price and highlight the role played by asymmetric information and agency problems in determining this sensitivity (Chen et al., 2007; Jiang et al., 2011; Foucault and Fresard, 2012). Building on these papers, to test the efficiency of capital allocation in Viet Nam, 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) and a broader sample of privatised firms by Chen et al. (2014) and 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.

In an empirical setting, 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

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

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 baseline investment model is provided in the following empirical equation:

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

Where I/K_{it} is the investment rate of capital stock, Q_{it} is an empirical estimate of Tobin's Q. The key coefficient in our estimation strategy is β_Q. We expect that this will be lower for SOEs relative to private firms. In all specifications, we include time fixed effects (τ), sector fixed effects μ_j and region fixed effects ϕ_r. This will purge our estimation of many of the confounding factors at these levels. We include a range of controls at the firm level in the vector $\boldsymbol{X_{it-1}}$. This includes firm leverage (total debt to total assets), trade credit access (receivables to total assets)[2], and firm size (dummy for enterprises less than 250 employees to capital SMEs). The vector Z captures time varying sector controls including the Herfindahl Hershman Index (HHI)[3] to measure industry competition and the share of SOEs in the sectors output (SMS) to control for the fact that state dominated sectors may have different investment rates over time due to policy orientation or direction of investments. A listing of the sectors used in the analysis is presented in table A1.

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 autoregression (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 Tobin's 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 Viet Nam by O'Toole and Newman (2012). The VAR is as follows:

$$\mathbf{V_{it}} = \mathbf{HV_{it-1}} + \varepsilon_{it} \tag{2}$$

$$Q_{it} = (\mathbf{c'}[I - \delta\mathbf{H}])\mathbf{V_{it}} \tag{3}$$

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

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[2] Trade credit financing is shown to be an important source of credit for Vietnamese enterprises (McMillan and Woodruff, 2004).

[3] This is measured as the sum of the squares of the firms market shares per sector as standard.

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. **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 and affect the profits to capital indicator. The discount rate δ is set by the econometrician.[4] The coefficient vector **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 also removed.

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 (1) using GMM with lagged values of the marginal value product of capital variables as instruments for Q. 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.

Identification strategy and subsample selection

We outline a range of hypotheses in section 2 which provide us a strategy to achieve identification. To identify our main effects we will estimate equation (1) for a range of subsamples. Using a subsample approach is possible with our dataset which has a large number of observations for all groups of focus. In this case, our approach is superior to using interactions as it allows all variables to react differently and take different parameter values for each subsample. This reduces the error that an interaction between a single variable and a group dummy could be picking up the variation belonging to the group-specific difference or differences in group specific effects related to the other covariates.

In our analytical framework, some such subsamples fall naturally out of the data. For example, testing hypotheses 1 and 2 can be conducted by simply creating different subsamples from the ownership data for private, SOE, and local- and centrally-owned SOEs. Testing effects by size class is conducted by splitting the sample into large firms (> 250 employees) and SMEs (less than 250 employes). Sectoral splits are either strategic (mining, quarrying, metals, utilities, transport and communications) and non-strategic sectors (rest).

A greater difficulty arises to estimate the impact on credit constrained enterprises. In our dataset, we do not have the range of variables that allows us to estimate a Whited and Wu (2006) index, nor do we have sufficient information to include cash flow and test investment-cash flow sensitivities which would be standard in the literature (Bond and Soderbom, 2014). We therefore use a type of Rajan and Zingales (1996) logic to identify groups of enterprises that are potentially credit constrained. We use data on the debt-to-asset ratio and the debt-to-equity ratio and split firms into percentiles based on these indicators on a sector-year basis. We then define as potentially constrained enterprises that are in lowest 25 per

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[4] 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.

cent of each distribution. As firms in similar sectors should have a common latent requirement for external financing as per Rajan and Zingales (2003), firms who have the lowest use of volume of debt financing per sector are those that potentially have access to financing problems. While this may capture some firms who have a preference for internal financing and against debt funding, in the main, it is likely our measure captures the credit constrained enterprises per sector at each point in time. Using these indicators, we split the sample into two groups per variable (constrained and unconstrained) and estimate the model separately for both to test whether ownership affects the relationship between investment and Q differently for constrained and unconstrained firms.

Given the fact that we do not observe actual financing constraints, we use a second methodology to attempt to dichotomise the sample into constrained and unconstrained. There is a large literature which indicates that location choice matters for corporate performance (Almazan, Motta, Titman and Uysal. 2010; El Ghoul, Guedhami, Pittman and Saadi 2013). Additionally, there is also a large literature which indicates that location also matters for investment efficiency as the degree of access to finance to a broad range of financing types or general financial development should facilitate more ease of undertaking investments (Love, 2003). Given the differences in financial development across regions in Viet Nam and its impact on financing constraints (O'Toole and Newman, 2012), we split regions up into those with a stock market and those without a stock market. Firms in regions with a stock market should be less financially constrained that those without a stock market and therefore should have better access to a range of financial services. We then estimate our Q model on the two subsamples of regions. In Viet Nam, our split is between the Mekong Delta and Red River Delta regions which contain the Ho Chi Min and Ha Noi stock markets and all other regions.

For our final tests, we wish to evaluate the effects of equitization and privatisation of SOEs on investment efficiency. For this assessment, we first remove private firms from the sample and identify the difference between current fully-owned SOEs and SOEs who received full or partial divestment using interaction terms between ownership categories and the Q statistic as:

$$\frac{I}{K_{it}} = \alpha_0 + \beta_Q Q_{it} + \boldsymbol{\theta X_{it-1}} + \boldsymbol{\beta OWN_i} + \boldsymbol{\sigma} Q_{it} * \boldsymbol{OWN_i} + \boldsymbol{\gamma Z_{jt}} + \epsilon_{it} \tag{4}$$

Where OWN is vector of dummies which splits SOEs into 1) fully state-owned enterprises (both centrally and locally owned firms) or equitized enterprises in which the firm did not have any change in ownership during our sample period, 2) SOEs who have been equitized but the state retains a controlling shareholding (> 50 per cent of equity) 3) equitized firms in which the state retains a minority shareholding (< 50 per cent of equity) 4) firms who have been equitized and then fully privatised and 5) firms who were fully privatized immediately. $\boldsymbol{\sigma}$ is a vector of coefficients on the interaction term i.e $[\sigma_1, \dots, \sigma_5]$. These coefficients capture the differences in Q from the base category identified by β_Q. The error structure including the fixed effects is as in equation (1). X and Z controls are also included as per equation (1). This allows us to identify hypothesis 3 (H3). To further explore the heterogeneity across groups of firms, we undertake these tests across size and sector subsamples as mentioned above. As the

research indicates that SOEs often overinvest following political objectives, we also split our sample into those enterprises who over and under invest relative to fundamentals as per Biddle et al. (2009).[5]

3. Data and summary statistics

Sample description

For our research, the data are 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 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 of this paper 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 and whose investment could be expected to follow neoclassical determinants.

For the sample used in our analysis, we apply a number of standard cleaning techniques. We remove outlier observations that are in the 1 per cent 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 Viet Nam.

Our estimation sample is described in table 1. Our data cover 23,120 observations with 15,990 observations for private and 7,130 observations for SOEs. 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 non-strategic industries sector. Having a representative dataset which facilitates our analysis for both SMEs and large firms is an important contribution of our research. In column 1 of Table 1, we break down all

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[5] The Biddle et al. (2009) methodology splits the sample into those who under and over investment by estimating an investment equation as the sector level controlling for industry sales growth and a dummy for whether or not industry sales are growing. The predicted values from this regression are then mapped to the firm level regression and a firm indicated as overinvesting (underinvesting) in each year if its investment level is greater (less than) the predicted fundamental level.

firms by the ownership type.[6] In total 69 per cent of our observations relate to private firms while 31 per cent relate to SOEs. Private enterprises dominate the SME sample with over 77 per cent of SMEs private. Unsurprisingly, SOEs have a higher share of large firms (61 per cent) relative to private firms.

For the purposes of this analysis, we break sectors down into strategic and non-strategic sectors. Strategic sectors are those in which it is expect the state would be more likely to maintain its presence through SOE ownership. We define strategic sectors as enterprises operating in mining, metals, transport, communications and utilities. More detail of the sectoral mapping is provided in table A1.[7] Private firms dominate the non-strategic sectors while the split of strategic between private and SOE is even (roughly 50 per cent each).

Table 1: Breakdown of Observations by Ownership Type, Size and Sector

	All	SME	Large	Non-Strategic Sector	Strategic Sector
	(1)	(2)	(3)	(4)	(5)
Private	15,990	14,048	1,912	15,108	882
% of column total	*69%*	*77%*	*39%*	*71%*	*51%*
SOE	7,130	4,127	2,986	6,268	862
% of column total	*31%*	*23%*	*61%*	*29%*	*49%*
Always Private	11,997	10,543	1,428	11,293	704
% of column total	*52%*	*58%*	*29%*	*53%*	*40%*
Always SOE	5,488	3,199	2,278	4,743	745
% of column total	*24%*	*18%*	*47%*	*22%*	*43%*
Equitized (SOE Share > 50%)	904	498	403	819	85
% of column total	*4%*	*3%*	*8%*	*4%*	*5%*
Equitized (SOE Share < 50%)	738	430	305	706	32
% of column total	*3%*	*2%*	*6%*	*3%*	*2%*
Privatised from Equitized	1,067	828	237	986	81
% of column total	*5%*	*5%*	*5%*	*5%*	*5%*
Privatised from SOE	2,926	2,677	247	2,829	97
% of column total	*13%*	*15%*	*5%*	*13%*	*6%*
Total	23,120	18,175	4,898	21,376	1,744

A main contribution of this paper 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

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[6] Note that the first representation of private includes observations for firms that were always private or those that were equitized or privatised with majority private ownership. The categories following disentangle whether the ownership was always private or a firm undergoing ownership change.

[7] Industries in our data are classified as per the Vietnamese Standard Industry Classification which is the official classification used in Viet Nam as dictated by the Ministry of Planning and Investment.

enterprises into five categories: 1) fully state-owned enterprises (both centrally and locally owned firms) or equitized enterprises in which the firm did not have any change in ownership during our sample period, 2) SOEs who have been equitized but the state retains a controlling shareholding (> 50 per cent of equity) 3) equitized firms in which the state retains a minority shareholding (< 50 per cent of equity) 4) firms who have been equitized and then fully privatised and 5) firms who were fully privatized immediately in our data. By grouping firms into these categories, we can identify the impact of changes to efficiency within firm which is a more powerful finding than simply comparing across groups of enterprises.

Table 1 presents 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.[8] In total, over 50 per cent of the SOEs in the data underwent some ownership change. The most frequent mode of ownership transfer was through direct privatisation. Just over 13 per cent of the observations in our data relate to enterprises who transferred to full, direct privatization from state ownership. Nearly 5 per cent of the observations relate to firms who were previously equitized but then became fully privatized. A further 4 per cent of firms were partially equitized but the state retained a majority shareholding and 3 per cent were equitized with the state holding a minority stake.

Table 1 also 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.

While not displayed in table 1, in terms of the geographic distribution of the data, 40 per cent of the observations are based in the Red River Delta region which contains the capital Ha Noi. Circa 33 per cent of observations are in the South East region, which contains Ho Chi Minh City. Other regions represent an additional 24 per cent of the data.

Summary statistics

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 per cent level.

The sales to capital ratio is high overall and is again higher for private firms that 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.

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[8] 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.

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 per cent level (Table 2).

Turning to profitability, the ratio of profits to capital is 0.56 overall, 0.53 for private firms and 0.62 for SOEs. While not presented in the table, our data on the profit to asset ratio suggests a return on assets of approximately 5 per cent overall, with 5 per cent for private and 6 per cent 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 2, the differences are statistically significant. For Q, 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. Leverage, measured as total outstanding liabilities, stands at approximately 50 per cent 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.

Table 2 also presents the mean values for the main variables for the privatisation and equitization analysis. The data are split out for 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, 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 2: Mean Values for Key Variables

	Overall	Private	SOE	Difference (Priv to SOE)
I/K	0.24	0.27	0.17	0.10 ***
S/K	24.54	27.79	16.60	11.19 ***
Profits/K	0.56	0.53	0.62	-0.09 ***
Q	30.98	35.06	21.03	14.03 ***
Leverage	0.50	0.49	0.53	-0.036 ***
Receivables	0.23	0.22	0.27	-0.05 ***
SME	0.80	0.89	0.58	0.31 ***
	Equitized (SOE Share > 50%)	Equitized (SOE Share < 50%)	Privatised from Equitized	Privatised from SOE
I/K	0.12	0.12	0.25	0.23
S/K	14.55	14.5	18.29	35.05
Profits/K	0.71	0.67	0.58	0.46
Q	18.48	18.4	23.14	44.15

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

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

Exploring correlations

Table 3 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 private firms and SOEs then for each of the ownership groupings. Focusing on the correlation coefficients between investment and Q, the coefficients with the generated Q statistic is 0.18 for private firms. For SOEs, the correlation is slightly lower at 0.17. This would indicate that a slightly lower correlation between investment and our proxy for the return on an additional unit of capital (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.

Finally focusing on the correlation between investment and the financial measures (leverage and trade receivables), we find a higher correlation of investment to leverage 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 3 also presents the correlation coefficients between investment and the main variables for each of the ownership groupings. In regard to the correlation between Q and investment, it is interesting to note that the highest correlation overall is for the group of firms that were privatized from equitization. The second highest correlation between Q and investment is for enterprises equitized to a minority holding. With the direct privatization, and enterprises that were equitized with a remaining government majority stake display a lower correlation between investment and Q.

There is considerable variance in the correlation coefficients between investment and the leverage and trade credit indicators across the ownership changes. The highest correlation between leverage and investment is for firms who were privatised fully from SOEs. Enterprises equitized to a minority holding actually display a negative correlation between leverage and investment. If these firms were attempting to re-build balance sheets and reduce debt overhangs, this negative relationship is plausible.

Table3: Correlation Coefficients for Main Variables by Ownership Types

	I/K	Q	Leverage	Receivables/TA
Private Firms				
I/K	1			
Q	0.18	1		
Leverage	0.04	0.02	1	
Receivables/TA	0.04	0.09	0.17	1
SOEs				
I/K	1			
Q	0.17	1		
Leverage	0.03	0.10	1	
Receivables/TA	0.00	0.18	0.32	1
Equitized (SOE Share > 50%)				
I/K	1			
Q	0.13	1		
Leverage	0.03	0.06	1	
Receivables/TA	0.06	0.24	0.23	1
Equitized (SOE Share < 50%)				
I/K	1			
Q	0.19	1		
Leverage	-0.04	0.07	1	
Receivables/TA	0.01	0.12	0.13	1
Privatised from Equitized				
I/K	1			
Q	0.21	1		
Leverage	0.03	0.02	1	
Receivables/TA	0.05	0.20	0.20	1
Privatised from SOE				
I/K	1			
Q	0.13	1		
Leverage	0.07	-0.0176	1	
Receivables/TA	0.04	-0.03	0.28	1

4.   Empirical results

This section presents the results of our main estimations. We firstly test the relationship between investment and the Q statistic by ownership. Second, we explore whether there are differences in these relationships for different firms across size and industry. Thirdly we test the impact relationship between investment and Q for firms who are financially constrained. Finally we evaluate whether the effects of privatization and equitization alter the relationship between the Q statistic and investment.

Investment, fundamental Q and ownership

In this section, we 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. All controls as per equation (1) are included in the models.

Table 4 presents the coefficients estimates for the Q model for all firms (column (1)), for private firms (column (2)), for SOEs (column (3)). Our estimates indicate a positive coefficient on the Q statistic for all firms that is statistically significant at the 1 per cent 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 5 per cent level. 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 are in line with the literature which suggests that SOEs objective functions are not purely profit maximizing, focusing instead on social policy or political objectives. In this regard our findings support the first hypothesis proposed (H1) which indicates that Q should be positive for private firms but either insignificant or of lower value for SOEs.

We further split the SOE group into those firms who are centrally controlled (column (4)) and locally controlled SOEs (column (5)). This test corresponds to H2 which posits that centrally controlled SOEs should be more efficient (Chen et al., 2011). We do not find evidence of this: the results do not indicate any significant relationship between Q and investment for either centrally or locally controlled SOEs. In our setting it would appear that the agency difficulties that plague SOEs are equally prevalent between local and centrally operated enterprises.

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 Viet Nam. If outstanding credit balances are constraining current investment, this may restrict their future growth opportunities. We do not find any effect of trade receivables on investment for state owned enterprises with some effect for private firms at the 10 per cent level.

Table 4: GMM Estimates of Fundamental Q Model

	All Firms	Private Firms	SOEs	SOE (Central)	SOE (Local)
	(1)	(2)	(3)	(4)	(5)
Q	0.002***	0.002**	0.002	-0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
Leverage $_{t-1}$	-0.140	-0.326*	0.065	-0.284	0.254
	(0.129)	(0.187)	(0.144)	(0.223)	(0.243)
Receivables/TA $_{t-1}$	0.779**	0.987*	-0.019	0.832	0.325
	(0.383)	(0.505)	(0.552)	(0.516)	(0.472)
Year FE	Y	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y
Sector-Time Controls	Y	Y	Y	Y	Y
N	23,419	15,245	8,174	1,853	3,254
AR(1) Test	0.000	0.000	0.000	0.000	0.000
AR(2) Test	0.032	0.017	0.407	0.939	0.136
Sargan Test	0.042	0.255	0.832	1.000	1.000
Instruments	122	122	121	109	116

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.

To provide some insight into the economic magnitude of the estimated coefficients, we test the impact of a single standard deviation shock to Q on investment and provide a simple interpretation as per McClean et al. (2012). The standard deviation of Q in the private sample is 99.11. As the coefficient is 0.002, a one standard deviation shock to Q leads to a 0.198 unit increase in investment. As the mean investment in the sample is 0.38, this implies an investment increase of 50 per cent.

Our main finding from table 13 suggests that SOEs do not set investment plans based on the marginal product of capital regardless of whether these firms are locally or centrally controlled SOEs. Private firms are guided by such considerations. This finding is in line with the extant literature (Chen et al., 2011; Chen et al, 2014).

Exploring differences across size and sector

To better explore the heterogeneity of the effects across firms in Viet Nam, we present the results separately for firm size and sector in table 5. The model is estimated separately for SOEs and private firms across large firms, SMEs, firms in strategic and non-strategic sectors. Focusing on the sectoral breakdown in columns (1)-(4), we find a positive effect for enterprises in the private sector in both strategic and non-strategic sectors with the coefficient significant at the 5 per cent level. The coefficient size is larger in the strategic sector relative to the non-strategic sector. If competition is stronger in the non-strategic sector, this may drive down returns and make firms more uncertain about committing capital. Therefore their responsiveness to improving fundamentals is lower. We do not find any

evidence of a statistically significant effect of Q on investment for SOEs in either sectoral grouping. This is in line with our previous finding for the sample as a whole.

On firm size, we find a positive and significant impact of Q on investment for private large firms and for SMEs. There is no statistically significant relationship between Q and investment for SOEs in either size class. The coefficient for large firms is higher than that for small firms indicating a greater responsiveness of investment to fundamentals. This may be due to the fact that large firms have better access to internal 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. SMEs may react with more restraint and be more influenced by uncertain market developments.

We find a negative effect of leverage on private investment in the non-strategic sector and for SOEs in the strategic sectors. This suggests the influence of debt overhang on investment acts as a drag for these groupings. For both private and SOE owned SMEs, we find a similar negative effect of leverage on investment. The effect of trade credit receivables on investment is positive and significant non-strategic sector enterprises and all SMEs.

Table 5: Investment Determinants by Sector and Firm Size: Cross Ownership Comparisons

	Non-Strategic Sectors		Strategic Sectors		Large Firms		SMEs	
	Private	SOE	Private	SOE	Private	SOE	Private	SOE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Q	0.002**	0.002	0.015**	0.001	0.010**	0.003	0.002**	0.000
	(0.001)	(0.002)	(0.007)	(0.004)	(0.005)	(0.003)	(0.001)	(0.001)
Leverage $_{t-1}$	-0.208***	-0.125	-0.078	-0.413***	-0.149	-0.161	-0.168***	-0.271**
	(0.056)	(0.095)	(0.240)	(0.149)	(0.117)	(0.126)	(0.060)	(0.123)
Receivables/TA $_{t-1}$	0.270***	0.399***	0.833	0.350	0.438**	0.150	0.279***	0.482***
	(0.083)	(0.127)	(0.542)	(0.242)	(0.191)	(0.155)	(0.093)	(0.177)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Sector-Time Controls	Y	Y	Y	Y	Y	Y	Y	Y
N	14,215	7,215	739	838	1,373	2,732	12,889	4,571
AR(1) Test	0.000	0.000	0.001	0.006	0.007	0.000	0.000	0.000
AR(2) Test	0.072	0.221	0.298	0.537	0.518	0.804	0.019	0.078
Sargen Test	0.017	0.612	0.165	0.826	0.387	0.327	0.018	0.058
Instrument Count	92	91	83	77	91	91	91	91

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.

While there are evident differences in the size of the coefficients in the table (large firms and strategic industries with larger coefficients relative to non-strategic industries and SMEs), this may be driven by

the variation in values across the different samples. To better understand the magnitude of the effects, we again estimate the impact of a one standard deviation shock to Q in each subsample on the average investment level in the sample. It is important to use the within subsample values of Q and investment to calculate the shocks as the coefficients relate to these data only. The results are presented in table 6.

Table 6: Impact of Q on Investment for Private Firms: St Dev Shock

	Strategic Sectors	Non-Strategic Sectors	SMEs	Large Firms
Q Coefficient	0.015	0.002	0.002	0.01
Q STDEV	69.0	100.6	89.0	30.3
I Mean	0.5	0.4	0.3	0.2
I % Increase	*217%*	*53%*	*63%*	*171%*

For firms in strategic sectors, a one standard deviation increase in Q would increase the investment rate by 217 per cent above its mean level of 0.5. In the non-strategic sectors case, the corresponding increase in investment for a one standard deviation increase in Q is a 53 per cent increase. For SMEs the corresponding increase in investment for a standard deviation increase in Q is 63 per cent while the value for large firms is approximately 170 per cent. These are large size increases which could be expected in a very capital intensive economy going from the mean investment level to the outer tail of the distribution.

Financing constraints and location: do differences exist?

The existing literature highlights that soft budget constraints are a source of investment inefficiency for state-owned enterprises (Berglof and Roland, 1998; Hersch et al, 1997; Meggison and Netter, 2001; Schaffer, 1998). In this section, we explore whether or not differences exist between constrained and unconstrained firms in terms of their investment efficiency. As noted in section 3, we do not have survey data to identify firms either rejected for credit applications or firms who are discouraged from applying. We therefore have to use indirect measures of financing constraints to identify groups of firms that we a-priori expect to be financially constrained. We use two methodologies to do this.

First, we follow a Rajan & Zingales (1998) type of approach and group firms as constrained and unconstrained relative to their position in the distribution of debt to equity or debt to total assets within each sector-year. We then take the bottom 25 percentile of each distribution and use these as our financially constrained proxy group. Second, we compare the investment efficiency of firms located in a region with a major stock market to those firms in other regions. The stock market region location is proxying for higher levels of financial development and better access to capital for these firms.

The results of the estimations for the sample splits on the "constrained" and "unconstrained" groups are presented in table 7. The regressions are estimated on separate samples for SOEs and private firms respectively. Columns (1)-(4) contain the sample splits using the debt-to-equity ratio distributions while

columns (5)-(8) are the estimates using the sample splits of data using the debt-to-asset ratio. Across all the specifications, we find no statistically significant effect for SOEs across constrained or unconstrained groups. The Q statistic is positive and significant for all regressions for private firms. For private firms, the size of the coefficient is larger for the constrained versus the unconstrained groups for each of the distributions splits.

The second split of firms across constrained and unconstrained relates to firms who are in a region with and without a stock market. The results for these subsamples are presented in columns (9)-(12). We find a significant and positive impact of Q on investment for private firms in both groups at the 5 per cent significant level. The magnitude of the coefficient is higher for the group in the region without a stock market. As we expect these firms to have poorer access to external financing, this finding is in line with our findings using the distributional splits of the debt-to-equity and debt-to-asset distributions that private enterprises in a-priori credit constrained subsamples in the data show a greater sensitivity between Q and investment. Our results are therefore in line with hypothesis 6.

We also find a significant impact of Q on investment for SOEs in the region without the subsample. As this result is only significant at the 10 per cent level, it must be treated with caution. However, it does suggest that SOEs in regions outside the main commercial hubs appear to display some link between investment and fundamentals.

Table 7: Investment Model Estimates: Test of Efficiency for Constrained and Unconstrained Firms

	Unconstrained (>25p DE)		Constrained (<25p DE)		Unconstrained (> 25p D/TA)		Constrained (< 25p D/TA)		Regions without Stock Market		Region with Stock Market	
	Private	SOE	Private	SOE	Private	SOE	Private	SOE	Private	SOE	Private	SOE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Q	0.002*	0.004	0.004***	0.002	0.002*	0.000	0.003***	0.005	0.004**	0.006*	0.002 **	0.002
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.004)	(0.001)	(0.002)
Leverage $_{t-1}$	-0.162***	-0.254**	-0.208	-0.143	-0.206***	-0.172*	-0.115	-0.295	-0.064	-0.513***	-0.164***	-0.088
	(0.059)	(0.103)	(0.126)	(0.19)	(0.069)	(0.099)	(0.096)	(0.226)	(0.168)	(0.163)	(0.1)	(0.100)
Receivables/TA $_{t-1}$	0.285***	0.371**	0.419**	0.471**	0.374***	0.461***	0.144	0.268	0.304*	0.276	0.342***	0.481***
	(0.089)	(0.148)	(0.197)	(0.197)	(0.103)	(0.138)	(0.142)	(0.269)	(0.167)	(0.204)	(0.151)	(0.151)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sector-Time Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	11,502	5,734	3,743	2,440	10,987	6,303	4,258	1,871	2,293	1,919	12,091	6,013
AR(1) Test	0	0	0	0	0	0	0	0	0	0	0	0
AR(2) Test	0.058	0.711	0.178	0.174	0.043	0.222	0.18	0.472	0.047	0.22	0.282	0.588
Sargen Test	0.305	0.734	0.152	0.235	0.159	0.85	0.02	0.263	0.95	0.704	0.035	0.874
Instrument Count	92	91	92	91	92	91	92	91	78	73	92	92

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 8: Impact of Q on Investment for Private Firms: Constrained/ Unconstrained Firms

	Unconstrained (<25p DE)	Constrained (<25p DE)	Unconstrained (<25p D/TA)	Constrained (<25p D/TA)	Province without Stock Market		Province with Stock Market
	Private	Private	Private	Private	Private	SOE	Private
Q	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q STDEV	80.1	93.6	87.2	73.9	54.8	41.0	89.9
I Mean	0.3	0.3	0.3	0.2	0.3	0.2	0.3
I % Increase	*59%*	*131%*	*61%*	*93%*	*82%*	*124%*	*65%*

To test the economic magnitude of these findings, table 8 provides the impact of a one standard deviation shock to Q on investment for each of the groups with statistically significant findings in the above regressions. Firms classified as a-priori credit constrained would increase investment above the mean by between 93 and 131 per cent following a positive one standard deviation shock to Q relative with the increases for unconstrained firms between 59 and 61 per cent. Similarly for private firms in regions without a stock market, investment increases by 82 per cent following an increase in Q of one standard deviation shock. The equivalent figure for private firms in provinces with a stock market is 65 per cent. SOEs in provinces with a stock market would increase investment by 124 per cent following a positive one standard deviation shock to Q. It is difficult to benchmark this finding as this is the only case in our analysis where Q has a positive relationship with investment for SOEs.

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 9 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 Viet Nam 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.

We test the effect of Q on investment by interacting 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 sector, firm size, and whether or not the firm is under or over investing relative to investment fundamentals 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.

In column (1), we test the impact for all firms in this sample. We observe a positive and statistically significant effect for enterprises that were equitized to below 50 per cent state ownership and for those enterprises who were fully privatised from SOEs. Looking across groups of firms and industries, these main findings hold for SMEs and firms in non-strategic sectors. For firms in strategic sectors, we find that it is enterprises whose divestment mechanism was either equitization with a majority shareholding or firms who were privatised having previously been equitized that display a positive relationship between Q and investment. For large firms, minority shareholding equitization and privatisation from previous equitization are the divestment routes through which we find a positive and statistically significant relationship between Q and investment. There does not appear to be statistically significant differences in the relationship between Q and investment across the under investment/over investment groups.

Table 9: Test of Investment-Q Relationship for Equitized and Privatized Firms with SOEs

	All	Non-Strategic Sector	Strategic Sector	Large Firms	SMEs	Under Invest	Over Invest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q	0.001	0.000	0.001	0.003	-0.000	-0.000	0.003
	(0.002)	(0.001)	(0.004)	(0.002)	(0.001)	(0.000)	(0.007)
Equitized (SOE Share > 50%)	-0.129	-0.244	-0.416***	-0.164	-0.247	0.011	-0.730
	(0.155)	(0.164)	(0.154)	(0.234)	(0.181)	(0.042)	(2.601)
Equitized (SOE Share < 50%)	-0.088	-0.238	-0.758**	-0.187	0.039	0.025	-5.020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.241)	(0.230)	(0.358)	(0.264)	(0.285)	(0.061)	(6.006)
Privatised from Equitized	-0.299	-0.211	-0.675**	-0.539	-0.175	-0.041	10.724
	(0.329)	(0.373)	(0.320)	(0.543)	(0.320)	(0.058)	(11.075)
Privatised from SOE	-0.244	-0.315	-0.131	-0.307	0.064	-0.089	-1.091
	(0.243)	(0.232)	(0.566)	(0.330)	(0.274)	(0.060)	(4.669)
Equitized (Share > 50%) x Q	0.003	0.004	0.055***	0.005	0.002	-0.001	-0.249
	(0.003)	(0.003)	(0.013)	(0.007)	(0.002)	(0.001)	(0.796)
Equitized (Share < 50%) x Q	0.010***	0.010***	0.036	0.019**	0.012**	-0.002	-0.184
	(0.003)	(0.003)	(0.022)	(0.009)	(0.005)	(0.001)	(0.140)
Privatised from Equitized x Q	-0.004	-0.003	0.018**	0.030**	-0.002	0.002*	0.045
	(0.004)	(0.003)	(0.008)	(0.014)	(0.003)	(0.001)	(0.031)
Privatised from SOE x Q	0.005**	0.006***	0.004	0.023	0.007***	0.000	0.059
	(0.002)	(0.002)	(0.006)	(0.017)	(0.001)	(0.001)	(0.128)
Year FE	Y	Y	Y	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y
Sector-Time Controls	Y	Y	Y	Y	Y	Y	Y
N	11,299	10,134	988	3,096	7,157	6,576	146
AR(1) Test	0.000	0.000	0.005	0.000	0.000	0.000	0.699
AR(2) Test	0.083	0.086	0.825	0.863	0.009	0.195	0.430
Sargen Test	0.992	0.991	0.959	0.136	0.996	0.790	0.651
Instrument Count	278	278	149	252	268	265	40

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 10, we estimate the average Q for private firms, equitized firms with a less than 50 per cent 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 10: Test of Investment-Q Relationship for Equitized and Privatized Firms with Privatized Firms

	All Firms	Non-Strategic Sectors	Strategic Sectors	Large Firms	SMEs
	(1)	(2)	(3)	(4)	(5)

Equitized (Share < 50%)	0.010***	0.010***	0.035	0.023**	0.011*
	(0.003)	(0.003)	(0.026)	(0.010)	(0.006)
Privatised from SOE	0.006***	0.007***	0.001	0.028	0.007***
	(0.001)	(0.001)	(0.005)	(0.018)	(0.001)
Private	0.003***	0.002***	0.014*	0.012*	0.002**
	(0.001)	(0.001)	(0.007)	(0.006)	(0.001)
N	23,073	21,095	1,548	4,007	17,167

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.

Table 11: Impact of Q on Investment for Different Groups of Privatisation

	Equitized (Share < 50%)	Privatised from SOE	Private
Q	0.01	0.006	0.003
Q St Dev	31.3	94.5	84.1
I Change	0.3	0.6	0.3
I Mean	0.1	0.2	0.3
I Increase	*254%*	*249%*	*87%*

To provide some insight into the economic magnitude of these findings, table 11 provides the impact of a one standard deviation shock to Q on investment for each of the groups in table 10. Equitized firms with minority remaining state shareholding increase investment by 254 per cent following a one standard deviation increase in Q. The equivalent impacts for privatised firms direct from SOE and private firms is 249 per cent and 87 per cent.

These findings indicate that there is considerable heterogeneity across groups of firms and industries in the impact of state divestment on investment efficiency. For the majority of firms in non-strategic sectors, where the enterprise is an SMEs, the most effective divestment strategy is either a full direct privatisation or a equitiziation where only a minority holding remains. These results provide insight on the distributional impacts and divestment route which is unexplored to date in the existing literature.

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 insight into the policy reform agenda for Viet Nam.

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 as well as 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 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 Viet Nam 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 equitizisation 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