

Do state and foreign ownership affect investment efficiency? Evidence from privatizations

Ruiyuan Chen

University of South Carolina, Columbia, SC 29208, USA

ruiyuan.chen@grad.moore.sc.edu

Sadok El Ghouli

University of Alberta, Edmonton, AB T6C 4G9, Canada

elghoul@ualberta.ca

Omrane Guedhami

University of South Carolina, Columbia, SC 29208, USA

omrane.guedhami@moore.sc.edu

He Wang

University of South Carolina, Columbia, SC 29208, USA

he.wang@grad.moore.sc.edu

Abstract

Using the high-power setting of newly privatized firms from 64 countries, we examine the relationship between ownership type and firm-level capital allocations as captured by investment sensitivity to stock price. Consistent with our predictions that government and foreign institutional owners are associated with different levels of information asymmetry and agency problems, we find strong and robust evidence that government (foreign) ownership weakens (strengthens) investment-Q sensitivity, thereby increasing investment inefficiency (efficiency). Moreover, we find that the relation between foreign ownership and investment efficiency is stronger when governments relinquish control and country-level governance institutions are weaker. Overall, our findings highlight the important role of ownership type in determining firms' investment behavior and efficiency.

July 2013

JEL classification: G32, G34, L33

Key words: privatization, investment efficiency, corporate governance

* We are indebted to Walid Saffar for providing the privatization sample. We appreciate comments from Najah Attig and Oumar Sy, and generous financial support from Canada's Social Sciences and Humanities Research Council.

Do state and foreign ownership affect investment efficiency? Evidence from privatizations

Abstract

Using the high-power setting of newly privatized firms from 64 countries, we examine the relationship between ownership type and firm-level capital allocations as captured by investment sensitivity to stock price. Consistent with our predictions that government and foreign institutional owners are associated with different levels of information asymmetry and agency problems, we find strong and robust evidence that government (foreign) ownership weakens (strengthens) investment- Q sensitivity, thereby increasing investment inefficiency (efficiency). Moreover, we find that the relation between foreign ownership and investment efficiency is stronger when governments relinquish control and country-level governance institutions are weaker. Overall, our findings highlight the important role of ownership type in determining firms' investment behavior and efficiency.

July 2013

JEL classification: G32, G34, L33

Key words: privatization, investment efficiency, corporate governance

1. Introduction

A fundamental question in the finance literature is what determines firms' capital allocation. In a frictionless setting, a firm's investment should depend only on the profitability of its investment opportunities as measured, for example, by its Tobin's (1969) Q . In the real world, however, a firm's investment may become irresponsive to growth opportunities because of capital market frictions, leading to sub-optimal investments.¹ Prior research implies that a firm's investment sensitivity to stock price is determined by the extent of the firm's information asymmetry (Chen et al., 2007) and agency problems (Jiang et al., 2011). Building on these studies, in this paper we empirically examine the relation between ownership type and the sensitivity of firm investment to stock price (i.e., investment efficiency) for a large multinational sample of newly privatized firms (NPFs).

Privatization, defined as the deliberate sale by a government of state-owned enterprises (SOEs) or assets to private economic agents (Megginson and Netter, 2001), offers a unique context for isolating the importance of ownership type to investment efficiency. First, ownership structure undergoes dramatic changes during the privatization process as government ownership is transferred to new private owners, and hence this setting is well suited to addressing questions on how different types of owners affect firm investment and efficiency. Second, the transfer of SOEs to private investors is associated with serious agency and informational problems (e.g., Denis and McConnell, 2003; Boubakri et al., 2005a; Guedhami et al., 2009), which increases the power of our tests. Third, several multinational studies document significant improvements in the financial and operating performance of newly privatized firms;² to the extent that efficient investment leads to better firm performance, our study sheds light on an important channel through which ownership type conditions

¹ Stein (2003) provides a comprehensive survey of the corporate investment literature.

² See Megginson and Netter (2001), Djankov and Murrell (2002), Megginson and Sutter (2006), and Boubakri et al. (2008) for surveys of the empirical literature on privatization.

performance changes.

To analyze the impact of ownership type on investment efficiency, we follow recent privatization studies (e.g., Guedhami et al., 2009; Boubakri et al., 2013) and focus on two specific types of owners, namely, governments and foreign institutions. In line with recent investment literature (e.g., Chen et al., 2011; Jiang et al., 2011; McLean et al., 2012), we employ the sensitivity of investment expenditure to investment opportunities (Tobin's Q) as a proxy for investment efficiency. We argue that state and foreign institutional owners have different degrees of information asymmetry and agency problems, and hence different investment behaviors.

Consistent with government ownership leading to serious information asymmetry and agency problems, we first predict that residual government ownership in NPFs distorts firm investment and hence reduces investment sensitivity to stock price. Prior research suggests that government ownership is typically inconsistent with shareholder wealth maximization or efficient resource allocation as it serves the interests of politicians (Boycko et al., 1996) and provides weak monitoring of managers, who have high discretion to pursue non-value-maximizing activities (Vickers and Yarrow, 1988, 1991; Laffont and Tirole, 1993). In addition, prior research shows that government ownership is associated with lower financial reporting quality and financial transparency (Bushman et al., 2004; Guedhami et al., 2009), which imply greater information asymmetry problems.

In contrast, we predict a positive relationship between foreign institutional ownership in NPFs and investment efficiency, because foreign institutions mitigate agency problems and information asymmetry by improving corporate governance and financial transparency. An extensive literature on foreign institutions suggests that they play a larger role than local investors in improving corporate governance around the world (e.g., Gillan and Starks, 2003; Ferreira and Matos, 2008; Aggarwal et al., 2011). In the context of privatization, NPFs are better governed when foreign investors, who require more informative disclosures and maintain strict

control of managers' actions, own larger stakes (e.g., Dyck, 2001; Boubakri et al., 2007). Consistent with the argument that foreign investors in privatized firms drive better governance, the empirical privatization literature finds that foreign ownership in privatized firms is associated with substantial performance improvements (e.g., D'Souza et al., 2005; Estrin et al., 2009).

To test the above predictions, we draw from Guedhami et al. (2009) and Boubakri et al. (2013) to use a sample of 506 firms privatized in 64 countries over the 1981 to 2008 period – the largest sample of privatized firms to date. Consistent with our first prediction, we find that firm investment is less sensitive to Tobin's Q for NPFs with more government ownership. This evidence continues to hold when we use alternative measures of government influence, including state majority control (state has over 50% ownership), political connections, and golden shares. Consistent with our second prediction, we find that foreign institutional ownership is significantly positively related to investment efficiency. This striking difference in investment- Q sensitivities reflects differences in the degree of agency and information problems associated with government and foreign ownership that translate into different investment behaviors. In additional analyses we find that the impact of foreign institutional ownership on investment efficiency is conditioned by the extent of government control and country-level governance institutions. More specifically, we find that the higher investment efficiency associated with foreign ownership holds only when the government relinquishes direct or indirect control in NPFs. Similarly, we find that the relation between foreign ownership and investment efficiency is stronger in firms operating in countries with weak country-level governance institutions, consistent with prior evidence that foreign institutions play a more important role in countries with weaker institutions (Aggarwal et al., 2011).

One concern with the above analysis is the endogeneity of privatization decisions and the ensuing ownership structure. According to the privatization literature (Megginson and Netter, 2001), governments may privatize higher stakes in better-quality firms or data could be

more available for better-performing firms. In addition, certain types of private owners, such as foreign institutions, may be drawn to better-quality firms in countries with sound institutional environments (Boubakri et al., 2005a; 2007). We address this concern using three econometric approaches: instrumental variable regression, the Heckman sample selection model, and propensity score matching. The results are consistent with our main findings.

Our paper contributes to the corporate investment literature by providing evidence that investment efficiency is affected by ownership type. In particular, our study is related to Jiang et al. (2011), who use East Asia and Western Europe data (22 countries) to examine the role of the separation of ownership and control, and Chen et al. (2011), who use Chinese data to examine the role of government intervention in the form of majority state ownership and political connections. Our study, which is based on a larger set of countries and the high-power setting of NPFs, shows that ownership type (government and foreign owners) influences investment efficiency. Building on evidence in McLean et al. (2012) that investor protection encourages efficient investment behavior, we also show that more developed institutional environments moderate the positive effect of foreign ownership on investment efficiency.

Our paper also contributes to the privatization literature by examining how post-privatization ownership type affects NPFs' investment behavior. Prior privatization studies fail to detect a significant effect of ownership type on firm investment (e.g., Boubakri et al., 2005b). However, these studies employ raw measures of firm investment, in particular, capital expenditures to sales and capital expenditures to total assets, which provide only primitive insights into firms' real investment activities and resource allocation. Our evidence based on investment sensitivity to Q implies that investment efficiency varies with the type of ownership and the strength of country-level institutions. In addition, we extend prior research on the role of ownership type in shaping post-privatization outcomes such as financial reporting choices and risk-taking (e.g., Guedhami et al., 2009; Boubakri et al., 2013), and we contribute to empirical research on the performance outcomes of privatization by identifying an

important mechanism—investment efficiency—through which post-privatization ownership can lead to successful privatizations.

The rest of the paper is organized as follows. In Section 2, we review related literature and develop our main hypotheses. In Section 3, we describe the sample and variables used in the study and provide descriptive statistics. Section 4 reports empirical results and robustness tests. Section 5 presents results on the impact of country-level institutions on the relation between foreign institutional ownership and investment efficiency. Finally, Section 6 summarizes and concludes.

2. Literature Review and Hypotheses

2.1. Determinants of Investment Efficiency

According to the Modigliani-Miller (1958) paradigm, firm investment should be driven only by its investment opportunities as measured by Tobin's Q (Tobin, 1969). However, both theoretical and empirical literature show that in practice firm investment may deviate from the optimal level because of capital market frictions. Information asymmetry and agency problems are the two main frictions examined in the investment literature (e.g., Stein, 2003; Chen et al., 2007; Jiang et al., 2011; McLean et al., 2012).

Information asymmetry models suggest that information asymmetry between managers and investors leads to underinvestment (Myers, 1984; Myers and Majluf, 1984). Rational investors discount new equity issues because they assume that better-informed managers overprice new issues, which makes managers with good project opportunities reluctant to sell equity and therefore not undertake good projects. Several empirical studies find supportive evidence for this argument (e.g., Fazzari et al., 1988; Hubbard et al., 1995; Lang et al., 1996). In contrast to information asymmetry models, which assume that managers act in the interests of shareholders, agency models suggest that managers are self-interested and may not always act in the interests of shareholders (Jensen and Meckling, 1976), leading to investment inefficiencies.

For example, Jensen (1986) argues that empire-building motives lead managers with free cash flow to overinvest. Empirical evidence supports the view that agency conflicts are linked with overinvestment because of empire-building (e.g., Lang et al., 1991; Morck et al., 1990; Blanchard et al., 1994). Prior research also implies that severe information asymmetry and agency conflicts between government owners and private investors accompany privatization (e.g., Denis and McConnell, 2003; Guedhami et al., 2009; Boubakri et al., 2013).

Against this backdrop, we examine the effects of state and foreign institutional ownership on the sensitivity of investment expenditure to investment opportunities, and argue that the two forms of ownership differ in terms of both information asymmetry and agency problems, leading to different investment behaviors.

2.2. State Ownership and Investment Efficiency

Arguably the greatest problems associated with state ownership are inefficiency and hence value destruction. In an agency theory setting (Shleifer and Vishny, 1997), SOE inefficiencies are a natural outcome of the absence of ownership incentives for (and monitoring of) firm managers, due to the separation of ownership (public) and control (politicians).³ Moreover, unlike private firms, managers of SOEs are not exposed to market pressures such as those of the stock, product, and managerial labor markets. Instead, they are evaluated according to whether they accomplish the political goals of government actors interested in ensuring long tenure in power. These often non-value-maximizing goals include maximizing employment and wages, promoting regional development by locating production in politically desirable rather than economically attractive districts, increasing national security, providing cheap (even underpriced) goods and services, and producing unnecessary goods (Boubakri et al., 2008), which are all related to firms' investment decisions. Information asymmetry problems are also likely to be associated with state ownership as prior research suggests that governments try to

³ Boubakri et al. (2005a) adopt this agency framework to analyze the ownership structure that emerges from privatization and the relation between post-privatization corporate governance (ownership structure and investor protection) and performance.

conceal the politically-motivated diversion of corporate resources (e.g., Bushman et al., 2004; Guedhami et al., 2009; Chaney et al., 2011). These agency and information asymmetry problems are likely to distort firm investment, leading to investment inefficiency.

Consistent with the theoretical arguments above, empirical evidence from the privatization literature reveals significant performance and governance improvements following the divestiture of SOEs. However, these improvements are less pronounced or even disappear when the government continues to be a majority owner following privatization, that is, does not relinquish control (e.g., Megginson et al., 1994; Boubakri and Cosset, 1998; D'Souza and Megginson, 1999; and Guedhami et al., 2009). Borisova et al. (2012) provide cross-country evidence that government ownership is associated with lower governance quality, which the authors interpret as suggesting that the state's political objectives impede effective corporate governance practices.⁴ Studies on the consequences of residual government ownership in NPFs (e.g., Ben-Nasr et al., 2012) further suggest that government ownership leads to higher financing costs, reflecting the greater agency and information asymmetry problems faced by NPFs associated with residual government ownership. Related to our research, Chen et al. (2011) report less efficient investment in Chinese SOEs and Boubakri et al. (2013) find that state residual ownership in NPFs is negatively related to corporate risk-taking.

Based on the above discussion, we first hypothesize that state ownership in NPFs distorts investment decisions and hence leads to investment inefficiency. That is, we predict that state ownership in NPFs is negatively related to investment efficiency. More formally:

H₁: State ownership in NPFs is negatively related to investment efficiency.

⁴ According to Borisova et al. (2012), government ownership facilitates firms' access to financing through implicit guarantees, reducing the monitoring incentives and thereby increasing agency problems. In addition, the non-value maximizing objectives of government owners could prevent governance improvements that would interfere with the achievement of these goals.

2.3. Foreign Ownership and Investment Efficiency

In contrast to state owners, we expect foreign institutional investors to be associated with improved investment efficiency since they help mitigate information asymmetry and agency problems in NPFs through two channels: the *monitoring* channel and the *information* channel. With respect to the monitoring channel, institutional investors are expected to implement strong corporate governance to safeguard their investments. Extant research suggests that among institutional investors, foreign institutional investors play a more important role than domestic institutional investors in improving firm-level governance (e.g., Gillan and Starks, 2003; Ferreira and Matos, 2008; Aggarwal et al., 2011), which promotes investment efficiency. With respect to the information channel, institutional investors are better able to collect and process information due to their superior investment experience and expertise and hence are better informed than other investors (e.g., Kang and Stulz, 1997), which helps reduce information asymmetry problems. Further, Doidge et al. (2009) and Leuz et al. (2009) find that foreign investors are reluctant to invest in poorly governed firms, which they attribute to foreign investors' increased information problems. Prior research shows that the quality of a firm's information environment is associated with investment efficiency (Chen et al., 2007; Biddle et al., 2009; Cheng et al., 2013).

In the context of privatized firms, Megginson and Netter (2001) and Estrin et al. (2009) conclude that prior empirical studies show that foreign ownership is associated with greater post-privatization restructuring and performance improvements. Guedhami et al. (2009) further show that greater foreign participation in NPFs is associated with better financial reporting quality, and Boubakri et al. (2013) find that foreign ownership is positively related to corporate risk-taking, which is an outcome of firms' investment decisions.

The above discussion leads to our second hypothesis:

H₂: Foreign ownership in NPFs is positively related to investment efficiency.

3. Research Design

In this section, we describe our sample, our empirical model, and the variables used in the analysis, and we present descriptive statistics.

3.1. Sample Selection

To empirically assess the effect of ownership type on investment efficiency, we draw on Guedhami et al. (2009) and Boubakri et al. (2013) to use a sample of 506 non-financial firms privatized in 64 countries over the 1981 to 2008 period. To the best of our knowledge, this is the largest sample of privatized firms to date. We exclude financial firms (SIC codes between 6000 and 6999) from the sample because their investment behavior is shaped by different regulatory environments across countries. As mentioned earlier, the change in ownership structure resulting from privatization provides an ideal setting to test the role of different ownership types on investment efficiency, as it captures changes in a firm's information environment and agency problems. This new database is particularly well suited to our research question as it tracks ownership over 7 years after the first privatization.

In their survey of the privatization literature, Megginson and Netter (2001) highlight the importance of diversifying sources of privatization data and including more privatization transactions from developing countries to minimize selection bias.⁵ Our sample comprises firms from countries with diverse development levels and different legal, political, and institutional environments. Our sample includes 3,054 firm-year observations representing 506 privatized firms.⁶ Table 1 provides descriptive statistics for the 506 sample firms.

[Insert Table 1 Here]

⁵ Megginson and Netter (2001) suggest that data availability is superior for developed countries, which may have a higher concentration of better-performing firms.

⁶ Our sample is larger than Boubakri et al.'s (2013) sample of 1,600 firm-year observations representing 381 privatized firms. Note that Boubakri et al. (2013) require four consecutive years of data to compute their risk-taking proxy (i.e., the volatility of ROA). We do not impose such a stringent data filter in our paper.

Panel A of Table 1 reports the distribution of sample firms by year. Less than 10% of privatization transactions occurred in the 1980s, almost 70% in the 1990s, and 20% in the 2000s. Panel B of Table 1 reports the distribution of sample firms across industries as classified by Campbell (1996), and reveals that 29.84% of firms are in utilities, 15.61% in basic industries, and 12.25% in transportation. Panel C of Table 1 reports the distribution of sample firms across four different geographical regions as categorized by the World Bank. Consistent with the trend toward privatization in recent years, especially in emerging markets, European transition economies, and China, 5.34% of sample firms are from Africa and the Middle East, 41.11% from East and South Asia and the Pacific, 11.66% from Latin America and the Caribbean, and 41.9% from Europe and Central Asia.

3.2. Regression Models and Variables

To examine the effect of ownership on investment efficiency, we employ an investment model following Fazzari et al. (1988), Whited (1992), Baker et al. (2003), and Mclean et al. (2012), among others. Specifically, we proxy for investment efficiency using the sensitivity of investment to investment opportunities (Tobin's Q) and test for ownership effects:

$$I_{j,t} = \alpha_j + \alpha_t + \beta_1 \cdot CF_{j,t-1} + \beta_2 \cdot Q_{j,t-1} + \beta_3 \cdot OWNERSHIP_{j,t} + \beta_4 \cdot OWNERSHIP_{j,t} \times Q_{j,t-1} + \varepsilon_{j,t} \quad (1)$$

where the dependent variable, $I_{j,t}$, is firm j 's investment expenditure in year t , which is given by capital expenditures deflated by lagged book value of assets. The independent variables are cash flow, Tobin's Q , ownership variables, and interaction terms between the ownership variables and Q . Cash flow (CF) is measured as earnings before extraordinary items plus depreciation and amortization deflated by lagged book value of assets. Fazzari et al. (1988) argue that in imperfect capital markets, internal funds are cheaper than external funds and hence firms rely more on internal funds to finance their investment projects. Therefore, we expect β_1 to be positive. Q , which captures investment opportunities, is measured as market

capitalization plus total assets minus book equity all over total assets. Classical investment theory predicts a positive relationship between Tobin's Q and investment. Therefore, we expect β_2 to be positive. Ownership variables include state ownership ($STATEOWN$) and foreign ownership ($FOREIGNOWN$), where $STATEOWN$ is the percentage of shares held by a government and $FOREIGNOWN$ is the percentage of shares held by foreign institutions.

To test our primary hypotheses, we use the interaction terms between the ownership variables and Tobin's Q . $STATEOWN \times Q$ is the interaction between state ownership and Tobin's Q . We argue that more state ownership is associated with more information asymmetry and agency problems, which result in less investment efficiency. Our first hypothesis therefore predicts that β_4 is negative, that is, the relation between Q and investment is weaker with more state ownership. $FOREIGNOWN \times Q$ is the interaction between foreign institutional ownership and Tobin's Q . We conjecture that foreign institutional ownership is associated with less information asymmetry and better corporate governance. Our second hypothesis therefore predicts that β_4 is positive, that is, the relation between Q and investment is stronger with more foreign institutional ownership.

Governments are not likely to randomly select firms to privatize. Megginson and Netter (2001), for instance, argue that governments may privatize the healthiest firms to make privatization "look good." To mitigate selection effects, Frydman et al. (1999) use a model with firm fixed effects. Megginson and Netter (2001) argue that Frydman et al.'s (1999) approach is the best empirical strategy to address the selection bias. We therefore estimate equation (1) using firm (α_j) and year (α_t) fixed effects to capture unobserved firm- and year-specific effects.

Table 2 presents descriptive statistics for all regression variables. To avoid the influence of outliers, we winsorize all financial variables at the 1% level on both sides of the sample distribution. As reported in Panel A of Table 2, the average share of state ownership ($STATEOWN$) is 23.89%, which not surprisingly confirms a sharp decline in state ownership after privatization (Boubakri et al., 2005a). In 27% of firms in our sample, governments maintain

majority control (*CONTROL*), retaining more than 50% of shares. Consistent with prior privatization studies (e.g., Jones et al. 1999; Boubakri, et al., 2005a), governments tend to preferentially allocate higher stakes to domestic investors over foreign investors. Foreign institutions on average have 8.17% ownership in privatized firms. Guedhami et al. (2009, p. 157) summarize arguments in the privatization literature suggesting that favoring local investors through share allocations allows governments to generate more political support for privatization, create an equity ownership culture, and facilitate the development of domestic stock markets. Panel A of Table 2 also shows that 31.6% of the sample firms are politically connected. Panel B of Table 2 presents Pearson correlation coefficients for the variables of interest. As expected, both *Q* and *CF* are significantly positively related to investment.

[Insert Table 2 Here]

4. Empirical Evidence

4.1. The Impact of State Ownership on Investment Efficiency

Model 1 of Table 3 reports results of regressing investment (*I*) on cash flow (*CF*), investment opportunities (*Q*), state ownership (*STATEOWN*), and the interaction between state ownership and *Q* (*STATEOWN*×*Q*). Consistent with our expectations, cash flow (*CF*) is significantly positively related to investment, suggesting that market imperfections make firms dependent on internal funds to finance investments. Investment opportunities (*Q*) are also significantly positively associated with investment, consistent with classical investment literature. Interestingly, the coefficient on state ownership is significantly positive, indicating that firms invest more as state ownership increases. The *STATEOWN*×*Q* interaction term is negative and statistically significant at the 1% level, which indicates that, consistent with our first hypothesis, state ownership is negatively associated with investment efficiency. This result is economically significant as well: The coefficient on *Q* is 0.0405, the coefficient on *STATEOWN*×*Q* is -0.0004, and the mean value of *STATEOWN* is 23.887, which together imply that investment-*Q*

sensitivity evaluated at the mean level of *STATEOWN* is $0.0405 + (-0.0004 \times 23.887) = 0.0309$. Holding all other variables constant, increasing state ownership by one standard deviation (i.e., 27.990) decreases investment-*Q* sensitivity by 36% from 0.0309 to 0.0197.

[Insert Table 3 Here]

As we discuss earlier, selection bias is a major problem that plagues the privatization literature. In our context, one potential concern is that *STATEOWN* may not be exogenous, that is, unobserved determinants of corporate investment behavior may also explain state ownership, leading the estimates in Model 1 of Table 3 to be biased and inconsistent. Another concern is that state ownership may be shaped by firm characteristics. For example, a government may maintain a higher stake in an inefficient firm because it is less attractive to outside investors. Although using firm and year fixed effects in the regression help mitigate these concerns, it cannot capture unobserved time-varying country- and industry-level effects. We therefore also use instrumental variable (IV) regression, Heckman (1979) two-stage analysis, and propensity score matching (PSM) to further address these concerns.

Model 2 of Table 3 reports the results of the IV regression. We use a country's regulatory quality score (*RQ*) as an instrument for state ownership. Regulatory quality is derived from World Governance Indicators (WGI) and captures perceptions of the government's ability to implement sound policies and regulations that promote private sector development. This choice of instrument is motivated by prior literature that shows that a government's stability is negatively associated with state ownership in privatized firms (Boubakri et al., 2005a). In the first-stage regression, we regress *STATEOWN* on *RQ* along with *CF*, *Q*, and year, industry, and country effects. Consistent with prior research, the first-stage regression (unreported for the sake of space) shows that *RQ* is a good predictor of state ownership. Indeed, *RQ* enters negatively and significantly at the 1% level, suggesting that governments retain lower stakes in good-regulatory-quality countries. In the second stage we replace *STATEOWN* by its fitted values from the first-stage. We continue to find that the coefficient on *STATEOWN*×*Q* is negative

and statistically significant at the 1% level, consistent with our earlier result that state ownership is associated with reduced investment efficiency.

Model 3 of Table 3 reports regression results of the Heckman two-stage analysis. In the first stage, we use a probit model to predict the presence of state ownership. We regress a dummy variable set to 1 if state ownership is higher than 0, and 0 otherwise, on RQ , CF , Q , and year and industry effects to estimate the inverse Mills ratio ($LAMBDA1$).⁷ In the second stage, we include $LAMBDA1$ as an additional independent variable in the investment efficiency regression. The results are statistically unchanged: the coefficients on both CF and Q are positive and statistically significant at the 1% level, state ownership is associated with a higher investment level, and most importantly, the coefficient on $STATEOWN \times Q$ is negative and statistically significant at the 1% level, consistent with both the baseline regression and the IV regression.

Model 4 of Table 3 reports regression results of the PSM analysis. PSM, developed by Rosenbaum and Rubin (1983), aims to randomize the sample selection procedure by matching firms without state ownership to firms with state ownership according to observable firm characteristics. The first stage involves estimating the same probit model as in the Heckman analysis. We then match a firm without state ownership to the firm with state ownership with the closest propensity score (i.e., predicted probability of the presence of state ownership) estimated from the first stage. This leads to a sample of 2,170 firm-year observations. Although PSM reduces our sample size, it enables us to correct for sample selection bias due to observable differences between the treatment (i.e., presence of state ownership) and comparison (i.e., absence of state ownership) groups. In the second stage, we estimate our regression on the matched sample. As reported in Model 4, we continue to find that $STATEOWN \times Q$ loads positively and significantly at the 5% level.

In the remaining models of Table 3, we employ alternative proxies for state control. In

⁷ Since the fixed effect model for a non-linear regression could be problematic (Abrevaya, 1997), we include country, year, and industry dummies in the probit regression.

Model 5, we follow Guedhami et al. (2009) and Boubakri et al. (2013) and replace *STATEOWN* with the indicator variable *CONTROL*, which is equal to 1 for governments that retain majority control of NPFs (i.e., maintain more than 50% of a firm's shares). Reinforcing the state ownership evidence in Models 1-4, *CONTROL*×*Q* is negatively related to investment and statistically significant at the 1% level. Economically, investment-*Q* sensitivity declines by 43% from 0.071 to 0.0403 when a government relinquishes majority control (i.e., when *CONTROL* switches from 1 to 0).

In Model 6 of Table 3, we substitute *STATEOWN* with the dummy variable *CONNECTED*, which equals 1 if a firm is politically connected and 0 otherwise. We obtain political connection data from Faccio (2006). A firm is recorded as politically connected if “at least one of its large shareholders (anyone controlling at least 10 percent of voting shares) or one of its top officers (CEO, president, vice-president, chairman, or secretary) is a member of parliament, a minister, or is closely related to a top politician or party.” Governments eager to maintain control over firm's decisions could use political connections as a substitute for formal ownership. We expect politically connected NPFs to deviate from efficient investment because they serve the government's political goals.⁸ Consistent with this expectation, we find that *CONNECTED*×*Q* loads negatively and significantly at the 1% level.

In Model 7 of Table 3, we use the dummy variable *GOLDEN*, which is equal to 1 if a government holds a golden share in a NPF and 0 otherwise, as a proxy for state control.⁹ With a

⁸ Consistent with our prediction, Boubakri et al. (2013) find evidence suggesting that politically connected NPFs show low risk-taking propensity. In addition, Boubakri et al. (2008) and Fan et al. (2007) find that politically-connected underperform their non-connected counterparts, which they attribute to government intervention leading to rent extraction.

⁹ Bortolotti and Faccio (2009: p. 2918) define a golden share as “the set of the state's special powers and statutory constraints on privatized firms. Typically, special powers include i) the right to appoint members in corporate boards; (ii) the right to consent to or to veto the acquisition of relevant interests in the privatized companies; (iii) other rights such as the consent to the transfer of subsidiaries, dissolution of the company, ordinary management, etc. The above mentioned rights may be temporary or not. On the other hand, statutory constraints include (i) ownership limits; (ii) voting caps; (iii) national control provisions.”

golden share, a government has special veto power over major financing and operating decisions. Borisova et al. (2012) show that golden shares have an incremental negative effect on corporate governance beyond government ownership. We expect NPFs in which the government holds a golden share to be associated with less investment efficiency. Consistent with this expectation, we find that $GOLDEN \times Q$ is negative and statistically significant at the 5% level.¹⁰

In summary, the results in Table 3 show that state ownership is negatively related to investment efficiency, suggesting that state ownership leads to departures from optimal investment decisions. These results continue to hold when we address endogeneity concerns and when we use alternative measures of government ownership. We next test our second hypothesis on the impact of foreign ownership on investment efficiency.

4.2. The Impact of Foreign Institution Ownership on Investment Efficiency

Model 1 of Table 4 reports the results of regressing investment (I) on cash flow (CF), investment opportunities (Q), foreign institutional ownership ($FOREIGNOWN$), and the interaction between foreign institutional ownership and Q ($FOREIGNOWN \times Q$). Consistent with our second hypothesis, we find that the coefficient on $FOREIGNOWN \times Q$ is positive and statistically significant at the 1% level, suggesting that in contrast to state ownership, foreign institutional ownership is associated with higher investment efficiency. In terms of economic significance, increasing foreign institutional ownership by one standard deviation improves investment efficiency by 38% from 0.0287 to 0.0397, holding all other variables constant.

Next, similar to the regressions in Table 3, we use IV regression, Heckman two-stage analysis, and PSM to address potential endogeneity of foreign institutional ownership.

¹⁰ In Model 7, we do not include $GOLDEN$ as stand-alone variable because it is time-invariant and therefore will be absorbed by firm fixed effects. In unreported OLS regressions including country, year, and industry effects, we find that $GOLDEN$ is statistically insignificant, while the interaction $GOLDEN \times Q$ is negative and significant at the 5% level.

In Model 2 of Table 4, we use IV regression to address endogeneity concerns. Following Boubarki et al. (2013), we use the political rights index derived from Freedom House, *POLRIGHTS*, as an instrument for foreign institutional ownership. This choice of proxy is motivated by evidence in Boubakri et al. (2007) that foreign owners are more inclined to invest in firms located in countries with strong political institutions and low political instability. A high political rights rating indicates that minority political groups have self-government or can participate in the government through informal consensus. In the (unreported) first-stage regression, we regress foreign institutional ownership on *POLRIGHTS* along with cash flow, Tobin's *Q*, and year, industry, and country effects. We find that *POLRIGHTS* loads positively, significant at the 1% level, suggesting that foreign institutional investors tend to acquire more stakes in NPFs located in countries with strong political rights. Using the fitted value of *FOREIGNOWN* in the second-stage regression reported in Model 2 of Table 4, we continue to find that the coefficient on *FOREIGNOWN*×*Q* is positive and statistically significant at the 1% level.

[Insert Table 4 Here]

Model 3 of Table 4 reports regression results of the Heckman two-stage analysis. In the first-stage regression, we predict the presence of foreign institutional ownership. We regress a dummy variable equal to 1 if foreign institutional ownership is higher than 0, and 0 otherwise, on *POLRIGHTS*, *CF*, *Q*, and year, industry, and country effects. In the second-stage regression, we include the resulting inverse Mills ratio (*LAMBDA2*) in our regression to control for self-selection effects. The coefficient on *LAMBDA2* is insignificant, suggesting that there is no self-selection in our sample. Importantly, we continue to find that *FOREIGNOWN*×*Q* enters positively and significantly at the 1% level, consistent with both our baseline model and the IV regression.

In Model 4 of Table 4, we employ PSM to match firms with foreign institutional ownership to firms without foreign institutional ownership along observable firm characteristics (i.e.,

POLRIGHTS, *CF*, *Q*, and year, industry, and country effects). Following the same PSM methodology as above, we obtain a matched sample of 2,868 firm-year observations. Using this matched sample, we repeat our baseline regression (Model 1 of Table 4) and find that the coefficient on *FOEIGNOWN*×*Q* is positive and statistically significant at the 5% level.

In a natural extension of the analysis in Model 5 of Table 3, Models 5 and 6 of Table 4 split the sample according to whether a government retains or relinquishes majority control, respectively. Boubakri et al. (2013) find that when a government maintains control after privatization, the impact of foreign ownership on risk-taking is not significant. Similarly, we expect that if a government continues to play a significant role after privatization, the effect of foreign institutional ownership on investment efficiency is significantly reduced. Consistent with this idea, *FOREIGNOWN*×*Q* loads positively and significantly at the 5% level in Model 6, when the government no longer holds a majority equity stake. In sharp contrast, the coefficient on *FOREIGNOWN*×*Q* is statistically indistinguishable from 0 when the government retains control in Model 5, implying that foreign institutional ownership promotes investment efficiency only in firms in which foreign institutions are less likely to face government interference.

In Models 7 and 8 of Table 4, we divide our sample according to whether a firm is politically connected. Political connections could be used by a government to maintain indirect control over a firm's decisions. We expect that the government has both the ability and the incentive to influence politically connected firms' investment decisions. Consistent with this prediction, we find that *FOREIGNOWN*×*Q* is positive and statistically significant at the 5% level only in the non-politically-connected sample (Model 8).

In Models 9 and 10 of Table 4, we divide our sample firms according to whether the government holds a golden share. Bortolotti and Faccio (2009) find that governments in common law countries typically use golden shares to retain control of NPFs while governments in civil law countries tend to retain large ownership positions. The dummy variable *GOLDEN*,

which is equal to 1 for firms holding a golden share, is drawn from Boubakri et al. (2013). We find that $FOREIGNOWN \times Q$ loads positively and significantly only in the subsample of firms in which the government does not hold a golden share.

Overall, the results in Table 4 show that foreign institutional ownership is positively associated with investment- Q sensitivity. This result holds after we control for the potential endogeneity of foreign institutional ownership. Overall, our evidence suggests that increasing foreign institutional ownership promotes optimal investment decisions, especially if the government relinquishes (direct and indirect) control.

4.3. Additional Tests

Table 5 presents additional tests to ensure the robustness of our results. In Model 1 of Table 5, we control for state ownership and foreign institutional ownership simultaneously. We find that the coefficient on $STATEOWN \times Q$ is negative and statistically significant at the 1% level, while the coefficient on $FORIENGOWN \times Q$ is positive and statistically significant at the 5% level.

[Insert Table 5 Here]

Boubakri et al. (2005a) and Guedhami and Pittman (2006) find that the stake divested by the government is mainly absorbed by local investors. Therefore, it is possible that the effects of state ownership and foreign institutional ownership are driven by local investors. To address this concern, in Model 2 of Table 5 we include the ownership stake of local investors ($LOCALOWN$) and its interaction with Q in our regression. The coefficient on $LOCALOWN \times Q$ is negative but statistically insignificant, suggesting that local investors do not influence a firm's investment efficiency after privatization. Importantly, the coefficient on $STATEOWN \times Q$ ($FOREIGNOWN \times Q$) continues to load negatively (positively) and significantly at the 5% level. Therefore, it seems that the effects of state ownership and foreign institutional ownership are not driven by local investors.

Another concern is that firm ownership may capture omitted firm-level characteristics that influence a firm's investment efficiency. For example, Aivazian et al. (2005) find that financial leverage impacts a firm's investment decisions, and Hadlock and Pierce (2010) suggest that size is a good predictor of whether a firm is financially constrained and hence has an effect on investment decisions. In Model 3 of Table 5, we additionally control for *SIZE*, *LEVERAGE*, and *ROA* to ensure that the effects of state and foreign institutional ownership on investment efficiency are not capturing these firm-level characteristics. We continue to find that the coefficient on *STATEOWN*×*Q* is negative and statistically significant at the 1% level and that the coefficient on *FOREIGNOWN*×*Q* is positive and statistically significant at the 5% level. Therefore, our evidence does not seem to be driven by potentially omitted firm-level variables.

McLean et al. (2012) show that firms located in sound institutional environments (e.g., common law countries) exhibit higher investment-*Q* sensitivities. Therefore, we include the interaction term *COMMON*×*Q* in our regression to ensure that the effects of state ownership and foreign institutional ownership are not capturing the effect of a country's legal environment. Because *COMMON* does not vary over time and our regressions include firm fixed effects, we do not include *COMMON* as a stand-alone control in our regressions, as time-invariant variables have no explanatory power in a firm fixed effects framework. The results are reported in Model 4 of Table 5 and show that our evidence remains qualitatively unchanged.

5. The Impact of Country-Level Institutions on the Relation between Investment Efficiency and Foreign Ownership

In this section we extend the above analyses to examine whether country-level institutions influence the relationship between foreign institutional ownership and investment efficiency. Foreign ownership mitigates information asymmetry (Guedhami et al., 2009) and improves corporate governance (Aggarwal et al., 2011) in countries with poor institutions. Our analysis is also motivated by evidence in McLean et al. (2012) that investor protection is associated with greater investment efficiency. Therefore, we expect that the positive relationship that we

document between foreign institutional ownership and investment efficiency is more pronounced in countries with poor institutions. To test this hypothesis, we employ four measures that capture country-level institutions, namely, the anti-self-dealing index (*ANTISELF*) derived from Djankov et al. (2008) and the government stability (*GOVSTAB*), investment profile (*INVPROF*), and law and order (*LAW_ORDER*) measures from the International Country Risk Guide (ICRG).

[Insert Table 6 Here]

ANTISELF captures the regulation of corporate self-dealing transactions along three dimensions: disclosure, approval procedures for transactions, and facilitation of private litigation when self-dealing is suspected. The index is designed such that higher scores reflect better governance. *GOVSTAB* is defined by the ICRG as “an assessment of both of the government’s ability to carry out its declared program (s), and its ability to stay office.” *INVPROF* ranges from 0 to 12 and is defined by the ICRG as “an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components.” Finally, *LAW_ORDER* is assessed on the Law and Order sub-components separately, with each sub-component comprising 0 to 3 points. The Law sub-component assesses the strength and impartiality of the legal system, while the Order sub-component assesses popular observance of the law. A higher *LAW_ORDER* score indicates a better legal environment. Consistent with our prediction, we find that *FOREIGNOWN*×*Q* loads positively and significantly in countries with poor institutions, but is not statistically distinguishable from 0 in countries with good institutions.

In summary, the results of this section suggest that although foreign institutional ownership tends to promote optimal investment behavior, this relation is stronger in countries with poor governance institutions.

6. Conclusion

In this study we investigate the impact of state ownership and foreign institutional ownership on investment efficiency. For a large sample of 506 privatized firms from 64 countries over the 1981 to 2008 period, we find statistically and economically significant evidence that state (foreign) ownership is negatively (positively) related to investment efficiency. This striking difference in investment behavior reflects differences in the degree of agency and information problems associated with government and foreign ownership. Our findings are robust to endogeneity tests, alternative measures of investment efficiency and ownership, and additional control variables. Moreover, we find that the relationship between foreign ownership and investment efficiency becomes stronger when governments relinquish majority control and in countries with poor institutions.

Our paper contributes to the literature in several ways. First, we add to the corporate finance literature by examining the determinants of investment efficiency and providing evidence that investment efficiency is affected by ownership type. Second, we contribute to the privatization literature by highlighting an important mechanism—investment efficiency—through which post-privatization ownership can lead to successful privatizations (Frydman et al., 1999; Guedhami et al., 2009; Boubakri et al., 2013). Finally, we contribute to the literature on the institutional environment by documenting that country-level governance institutions influence the effect of ownership type on investment efficiency.

Appendix

Variables, definitions, and sources

Variable	Definition	Source
<i>Panel A: Dependent variable</i>		
<i>I</i>	Capital expenditures deflated by lagged book value of assets.	Compustat Global
<i>Panel B: Ownership and state control variables</i>		
<i>STATEOWN</i>	Percentage of shares held by a government.	Firms' annual reports and offering prospectuses
<i>FOREIGNOWN</i>	Percentage of shares held by foreign institutional investors.	As above
<i>LOCALOWN</i>	Percentage of shares held by local investors.	As above
<i>CONTROL</i>	Dummy variable equal to 1 for firms in which the state maintains control following privatization, and 0 otherwise.	As above
<i>CONNECTED</i>	Dummy variable equal to 1 for politically connected firms, and 0 otherwise.	Faccio (2006)
<i>GOLDEN</i>	Dummy variable equal to 1 for firms holding a golden share, and 0 otherwise.	Boubakri, Cosset, and Guedhami (2009)
<i>Panel C: Firm-level control variables</i>		
<i>CF</i>	Earnings before extraordinary items plus depreciation and amortization deflated by lagged book value of assets.	Compustat Global
<i>Q</i>	Market value of equity, minus book value of equity, plus book value of assets, all scaled by book value of assets.	As above
<i>SIZE</i>	Natural logarithm of book value of assets.	As above
<i>LEVERAGE</i>	Ratio of total debt to book value of assets.	As above
<i>ROA</i>	Ratio of earnings before interest and taxes to book value of assets.	As above
<i>Panel D: Country-level control variables</i>		
<i>COMMON</i>	Dummy variable equal to 1 if the country's legal origin is common law, and 0 otherwise.	La Porta et al. (1998)
<i>ANTISELF</i>	Average of ex-ante and ex-post private control of self-dealing.	Djankov, La Porta, Lopez-de-Silanes and Shleifer (2008)
<i>GOVSTAB</i>	ICRG assessment of the country's government stability.	International Country Risk Guide (2008)

<i>INVPROF</i>	Assessment of factors affecting investment risk that are not covered by other political, economic, and financial risk components. The subcomponents are: contract viability/expropriation; profits repatriation; and payment delays. This variable ranges from 0 to 12, with higher scores indicating lower risk.	International Country Risk Guide (2009)
<i>LAW_ORDER</i>	Law and Order are assessed separately, with each sub-component receiving 0 to 3 points. The Law sub-component assesses the strength and impartiality of the legal system, while the Order sub-component assesses popular observance of the law.	International Country Risk Guide (2010)
<i>POLRIGHTS</i>	Index of political rights from 1980 to 2010. These ratings rely upon the following criteria: free and fair elections take place; rulers are elected; there are competitive parties or other competitive political groupings; the opposition has real power and plays a significant role; and minority groups have moderate self-government power or can participate in the government through informal consensus. These criteria are grouped into three subcategories: electoral process (three criteria), political pluralism (four criteria), and functioning of the government (three criteria). For each criterion, 0 to 4 points are granted, where 0 denotes the lowest degree and 4 the highest degree of rights. These scores are then combined to construct the political rights index. The index ranges from 1 (weak political rights) to 7 (strong political rights).	Freedom House (2010)
<i>RQ</i>	Regulatory quality, which captures perceptions of the government's ability to implement sound policies and regulations that promote private sector development.	Worldwide Governance Indicators

References

- Abrevaya, J., 1997. The equivalence of two estimators of the fixed-effects logit model. *Economics Letters* 55, 41-43.
- Aggarwal, R., Erel, I., Ferreira, M., and Matos, P., 2011. Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics* 100, 154-181.
- Aivazian, V. A., Ge, Y., and Qiu, J., 2005. The impact of leverage on firm investment: Canadian evidence. *Journal of Corporate Finance* 11, 277-291.
- Baker, M., Stein, J. C., and Wurgler, J., 2003. When does the market matter? Stock prices and the investment of equity-dependent firms. *The Quarterly Journal of Economics* 118, 969-1005.
- Ben-Nasr, H., Boubakri, N., and Cosset, J.-C., 2012. The political determinants of the cost of equity: Evidence from newly privatized firms. *Journal of Accounting Research* 50, 605-646.
- Biddle, G. C., Hilary, G., and Verdi, R. S., 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48, 112-131.
- Blanchard, O. J., Lopez-de-Silanes, F., and Shleifer, A., 1994. What do firms do with cash windfalls? *Journal of Financial Economics* 36, 337-360.
- Borisova, G., Brockman, P., Salas, J. M., and Zagorchev, A., 2012. Government ownership and corporate governance: Evidence from the EU. *Journal of Banking and Finance* 36, 2917-2934.
- Bortolotti, B., and Faccio, M., 2009. Government control of privatized firms. *Review of Financial Studies* 22, 2907-2939.
- Boubakri, N., and Cosset, J.-C., 1998. The financial and operating performance of newly privatized firms: evidence from developing countries. *Journal of Finance* 53, 1081-1110.
- Boubakri, N., Cosset, J.-C., Guedhami, O., and Omran, M., 2007. Foreign investor participation in privatizations: Does the institutional environment matter? *Journal of Financial Research* 30, 129-146.
- Boubakri, N., Cosset, J.-C., and Guedhami, O., 2005a. Postprivatization corporate governance: The role of ownership structure and investor protection. *Journal of Financial Economics* 76, 369-399.
- Boubakri, N., Cosset, J.-C., and Guedhami, O., 2005b. Liberalization, corporate governance and the performance of privatized firms in developing countries. *Journal of Corporate Finance* 11, 767- 790.
- Boubakri, N., Cosset, J.-C., and Guedhami, O., 2008. Privatisation in developing countries: Performance and ownership effects. *Development Policy Review* 26, 275-308.
- Boubakri, N., Cosset, J.-C., and Saffar, W., 2008. Political connections of newly privatized firms. *Journal of Corporate Finance* 14, 654-673.

- Boubakri, N., Cosset, J.-C., and Saffar, W., 2013. The role of state and foreign owners in corporate risk-taking: Evidence from privatization. *Journal of Financial Economics* 108, 641-658.
- Boycko, M., Shleifer, A., and Vishny, R. W., 1996. A theory of privatisation. *Economic Journal* 106, 309-319.
- Bushman, R. M., Piotroski, J. D., and Smith, A. J., 2004. What determines corporate transparency? *Journal of Accounting Research* 42, 207-252.
- Campbell, J. Y., 1996. Understanding risk and return. *Journal of Political Economy* 104, 298-345.
- Chaney, P. K., Faccio, M., and Parsley, D., 2011. The quality of accounting information in politically connected firms. *Journal of Accounting and Economics* 51, 58-76.
- Chen, Q., Goldstein, I., and Jiang, W., 2007. Price informativeness and investment sensitivity to stock price. *Review of Financial Studies* 20, 619-650.
- Chen, S., Sun, Z., Tang, S., and Wu, D., 2011. Government intervention and investment efficiency: Evidence from China. *Journal of Corporate Finance* 17, 259-271.
- Cheng, M., Dhaliwal, D., and Zhang, Y., 2013. Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting? *Journal of Accounting and Economics*.
- Denis, D. K., and McConnell, J. J., 2003. International corporate governance. *Journal of Financial and Quantitative Analysis* 38, 1-36.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A., 2008. The law and economics of self-dealing. *Journal of Financial Economics* 88, 430-465.
- Djankov, S., and Murrell, P., 2002. Enterprise restructuring in transition: A quantitative survey. *Journal of Economic Literature* 40, 739-792.
- Doidge, C., Karolyi, G. A., Lins, K. V., Miller, D. P., and Stulz, R. M., 2009. Private benefits of control, ownership, and the cross-listing decision. *Journal of Finance* 64, 425-466.
- D'Souza, J., and Megginson, W. L., 1999. The financial and operating performance of privatized firms during the 1990s. *Journal of Finance* 54, 1397-1438.
- D'Souza, J., Megginson, W. L., and Nash, R., 2005. Effect of institutional and firm-specific characteristics on post-privatization performance: Evidence from developed countries. *Journal of Corporate Finance* 11, 747-766.
- Dyck, A., 2001. Privatization and corporate governance: Principles, evidence, and future challenges. *The World Bank Research Observer* 16, 59-84.
- Estrin, S., Hanousek, J., Kočenda, E., and Svejnar, J., 2009. The effects of privatization and ownership in transition economies. *Journal of Economic Literature* 699-728.

- Fan, J. P. H., T. J. Wong, and T. Zhang, 2007. Politically-connected CEOs, corporate governance and post-IPO performance of China's newly partially privatized firms. *Journal of Financial Economics* 84, 330-357.
- Fazzari, S., Hubbard, R. G., and Petersen, B. C., 1988, Financing constraints and corporate investment. *Brookings Papers on Economic Activity* 1988, 141-206.
- Ferreira, M. A., and Matos, P., 2008. The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics* 88, 499-533.
- Frydman, R., Gray, C., Hessel, M., and Rapaczynski, A., 1999. When does privatization work? The impact of private ownership on corporate performance in the transition economies. *The Quarterly Journal of Economics* 114, 1153-1191.
- Gillan, S., and Starks, L., 2003. Corporate governance, corporate ownership, and the role of institutional investors: A global perspective. *Journal of Applied Finance* 13(2).
- Guedhami, O., Pittman, J. A., and Saffar, W., 2009. Auditor choice in privatized firms: Empirical evidence on the role of state and foreign owners. *Journal of Accounting and Economics* 48, 151-171.
- Hadlock, C. J., and Pierce, J. R., 2010. New evidence on measuring financial constraints: Moving beyond the KZ index. *Review of Financial Studies* 23, 1909-1940.
- Heckman, J. J., 1979. Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society* 153-161.
- Hubbard, R. G., Kashyap, A. K., and Whited, T. M., 1995, Internal finance and firm investment. National Bureau of Economic Research.
- Jensen, M., 1986. Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review* 76(2).
- Jensen, M. C., and Meckling, W. H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305-360.
- Jiang, L., Kim, J.-B., and Pang, L., 2011. Control-ownership wedge and investment sensitivity to stock price. *Journal of Banking & Finance* 35, 2856-2867.
- Jones, S. L., Megginson, W. L., Nash, R. C., and Netter, J. M., 1999. Share issue privatizations as financial means to political and economic ends. *Journal of Financial Economics* 53, 217-253.
- Kang, J.-K., and Stulz, R., 1997. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics* 46, 3-28.
- Laffont, J.-J., and Tirole, J., 1993. *A theory of incentives in procurement and regulation*. Cambridge, Mass: MIT press.
- Lang, L., Ofek, E., and Stulz, R., 1996. Leverage, investment, and firm growth. *Journal of Financial Economics* 40, 3-29.

- Lang, L. H., Stulz, R., and Walkling, R. A., 1991. A test of the free cash flow hypothesis: The case of bidder returns. *Journal of Financial Economics* 29, 315-335.
- Leuz, C., Lins, K., Warnock, F., 2009. Do foreigners invest less in poorly governed firms? *Review of Financial Studies* 22, 3245-3285.
- McLean, R. D., Zhang, T., and Zhao, M., 2012. Why does the law matter? Investor protection and its effects on investment, finance, and growth. *Journal of Finance* 67, 313-350.
- Meggison, W. L., and Netter, J. M., 2001. From state to market: A survey of empirical studies on privatization. *Journal of Economic Literature* 39, 321-389.
- Meggison, W. L., Nash, R., and van Randenborgh, M., 1994. The financial and operating performance of newly privatized firms: An international empirical analysis. *Journal of Finance* 49, 403-452.
- Meggison, W. L., and Sutter, N. L., 2006. Privatisation in developing countries. *Corporate Governance: An International Review* 14, 234-265.
- Modigliani, F., and Miller, M. H., 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* 48, 261-297.
- Morck, R., Shleifer, A., and Vishny, R. W., 1990. Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31-48.
- Myers, S. C., 1984. The capital structure puzzle. *The Journal of Finance* 39, 574-592.
- Myers, S. C., and Majluf, N. S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187-221.
- Rosenbaum, P. R., and Rubin, D. B., 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* 70, 41-55.
- Shleifer, A., and Vishny, R. W., 1997. A survey of corporate governance. *Journal of Finance* 52, 737-783.
- Stein, J. C., 2003. Agency, information and corporate investment. *Handbook of the Economics of Finance* 1, 111-165.
- Tobin, J., 1969. A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking* 1, 15-29.
- Vickers, J., and Yarrow, G., 1991. Economic perspectives on privatization. *The Journal of Economic Perspectives* 5, 111-132.
- Vickers, J., and Yarrow, G. K., 1988. *Privatization: An economic analysis*. Cambridge, Mass: MIT Press.
- Whited, T. M., 1992. Debt, liquidity constraints, and corporate investment: Evidence from panel data. *Journal of Finance* 47, 1425-1460.

Table 1
Sample distribution.

<i>Panel A: By Year</i>			<i>Panel B: By Industry</i>		
Year	Number	Percentage	Industry	Number	Percentage
1981	1	0.20	Basic industry	80	15.81
1983	1	0.20	Capital goods	23	4.55
1984	1	0.20	Construction	45	8.89
1985	2	0.40	Consumer durable	33	6.52
1986	4	0.79	Food and tobacco	32	6.32
1987	8	1.58	Leisure	12	2.37
1988	6	1.19	Petroleum	35	6.92
1989	11	2.17	Services	8	1.58
1990	15	2.96	Textiles and trade	15	2.96
1991	30	5.93	Transportation	62	12.25
1992	48	9.49	Utilities	151	29.84
1993	29	5.73	Other	10	1.98
1994	45	8.89	Total	506	100.00
1995	39	7.71			
1996	31	6.13			
1997	48	9.49			
1998	35	6.92			
1999	26	5.14			
2000	23	4.55			
2001	14	2.77			
2002	12	2.37			
2003	14	2.77			
2004	10	1.98			
2005	12	2.37			
2006	25	4.94			
2007	10	1.98			
2008	6	1.19			
Total	506	100.00			

<i>Panel C: By Region</i>		
Region (countries)	Number	Percentage
Africa & the Middle East (12)	27	5.34
East and South Asia & the Pacific (15)	208	41.11
Latin America & the Caribbean (9)	59	11.66
Europe & Central Asia (28)	212	41.90
Total (64)	506	100.00

This table reports the distribution of the sample of 506 privatized firms by year, industry, and region.

Table 2
Descriptive statistics and Pearson correlation matrix.

<i>Panel A: Descriptive Statistics</i>						
	N	Mean	Median	Std.dev	Min	Max
<i>INVESTMENT</i>	3054	0.056	0.026	0.143	-0.281	0.793
<i>CF</i>	3054	0.106	0.095	0.081	-0.138	0.382
<i>Q</i>	3054	1.359	1.156	0.769	0.329	4.865
<i>STATEOWN</i>	3054	23.887	6.19	27.99	0	99.59
<i>CONTROL</i>	3054	0.27	0	0.444	0	1
<i>CONNECTED</i>	2711	0.316	0	0.465	0	1
<i>GOLEDN</i>	3054	0.197	0	0.398	0	1
<i>FOREIGOWN</i>	3054	8.172	0.4	13.72	0	97.04

<i>Panel B: Pearson Correlation Coefficients</i>							
	<i>INVESTMENT</i>	<i>CF</i>	<i>Q</i>	<i>STATEOWN</i>	<i>CONTROL</i>	<i>CONNECTED</i>	<i>GOLEDN</i>
<i>CF</i>	0.162***						
<i>Q</i>	0.113***	0.464***					
<i>STATEOWN</i>	0.0413*	-0.0184	-0.0237				
<i>CONTROL</i>	0.0327	-0.0426*	-0.0393*	0.866***			
<i>CONNECTED</i>	0.0316	-0.0411*	-0.0422*	0.881***	0.965***		
<i>GOLEDN</i>	-0.023	0.0353	0.0417*	-0.0202	-0.0521**	-0.0563**	
<i>FOREIGOWN</i>	-0.0259	-0.0513**	-0.0647***	0.0169	0.0285	0.0225	-0.0567**

This table reports descriptive statistics (Panel A) and Pearson correlation coefficients (Panel B) for the regression variables used in the tests examining the impact of state and foreign ownership on investment efficiency. The full sample includes 506 privatized firms from 64 countries. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Definitions and data sources for the variables are provided in the Appendix.

Table 3

Impact of state ownership on investment efficiency.

Variables (prediction)	Endogeneity of state ownership				Alternative state control variables		
	Basic model	Instrumental variable	Heckman	PSM	<i>CONTROL</i>	<i>CONNECTED</i>	<i>GOLDEN</i>
		2 nd Stage	2 nd Stage				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
<i>CF</i> (+)	0.2937*** (5.996)	0.2747*** (5.181)	0.2768*** (5.088)	0.2282*** (3.976)	0.2897*** (5.913)	0.2597*** (4.700)	0.2997*** (6.119)
<i>Q</i> (+)	0.0405*** (5.416)	0.1099*** (4.237)	0.0507*** (5.964)	0.0514*** (5.883)	0.0403*** (5.931)	0.0354*** (4.826)	0.0319*** (5.215)
<i>STATEOWN</i> (?)	0.0008** (2.011)	0.0078** (2.504)	0.0010* (1.985)	0.0002 (0.430)			
<i>STATEOWN</i> × <i>Q</i> (-)	-0.0004*** (-2.718)	-0.0029*** (-3.844)	-0.0005*** (-2.779)	-0.0004** (-2.012)			
<i>LAMBDA1</i> (?)			-0.1741** (-1.78)				
<i>CONTROL</i> (+)					0.0537*** (2.600)		
<i>CONNECTED</i> (+)						0.0436** (2.031)	
<i>CONTROL</i> × <i>Q</i> (-)					-0.0332*** (-3.456)		
<i>CONNECTED</i> × <i>Q</i> (-)						-0.0272*** (-2.748)	
<i>GOLDEN</i> × <i>Q</i> (-)							-0.0277** (-1.877)
Intercept	0.0417 (0.317)	-0.2359*** (-3.934)	0.0001 (0.005)	0.0258 (1.133)	0.0421 (0.321)	0.0513 (0.390)	0.0652 (0.498)
R-squared	0.071	0.066	0.067	0.073	0.072	0.063	0.069

Observations	3,054	2,653	2,508	2,170	3,054	2,711	3,054
--------------	-------	-------	-------	-------	-------	-------	-------

This table reports fixed effect regression estimates of equation (1). Model 1 is our basic model. Models 2, 3, and 4 report results from additional tests that address endogeneity of state ownership using instrumental variable regression, Heckman two-stage selection analysis, and propensity score matching (PSM), respectively. In the first-stage regression (unreported), we regress state ownership (*STATEOWN*) on regulatory quality (*RQ*, the instrument) along with cash flow (*CF*), Tobin's Q (*Q*), and year, industry, and country effects. In Model 2, we report the second-stage regression that uses the fitted values of *STATEOWN*. In Models 3 and 4, we report the investment efficiency regression results from Heckman selection and PSM. Before estimating these two models, we run a first stage regression (probit model) to predict the presence of state ownership. We regress a dummy variable set to 1 if state ownership is higher than 0, and 0 otherwise, on regulatory quality (*RQ*) along with cash flow (*CF*), Tobin's Q (*Q*), and year, industry, and country effects. We estimate the inverse Mills ratio (*LAMBDA1*) and include it as an additional independent variable in the Heckman model (Model 3). For the PSM analysis, we match a firm without state ownership to the firm with state ownership with the closest propensity score (i.e., predicted probability of the presence of state ownership) estimated from the first stage. We estimate Model 4 on the corresponding matched sample. Models 5, 6, and 7 control for whether the firm is politically connected (*CONNECTED*), whether the government retains majority control (*CONTROL*), and whether the government holds a golden share (*GOLDEN*), respectively, instead of *STATEOWN*. The full sample includes 506 privatized firms from 64 countries. All regressions include firm and year fixed effects. Variables are defined in the Appendix. We report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, one-tailed when directional predictions are made and two-tailed otherwise.

Table 4

Regressions of investment efficiency on foreign ownership and control variables.

Variables (prediction)	Basic model	Endogeneity of foreign ownership			<i>CONTROL</i>		<i>CONNECTED</i>		<i>GOLDEN</i>	
		Instrumental variable	Heckman	PSM	Yes	No	Yes	No	Yes	No
		2 nd Stage	2 nd Stage							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>CF</i> (+)	0.2943*** (6.005)	0.3215*** (5.969)	0.3046*** (6.158)	0.3004*** (5.910)	0.4339*** (4.237)	0.2614*** (4.587)	0.4432*** (4.421)	0.2032*** (2.987)	0.3515*** (3.052)	0.2873*** (5.295)
<i>Q</i> (+)	0.0222*** (3.624)	0.0108 (0.966)	0.0238*** (3.825)	0.0241*** (3.810)	-0.0003 (-0.030)	0.0351*** (4.442)	0.0013 (0.113)	0.0306*** (3.576)	0.0152 (1.024)	0.0260*** (3.807)
<i>FOREIGNOWN</i> (?)	-0.0012** (-2.126)	0.0004 (0.077)	-0.0012** (-2.001)	-0.0009 (-1.557)	0.0004 (0.204)	-0.0009 (-1.434)	-0.0006 (-0.372)	-0.0012 (-1.486)	-0.0031 (-1.386)	-0.001 (-1.639)
<i>FOREIGNOWN</i> × <i>Q</i> (+)	0.0008*** (2.539)	0.0036*** (2.628)	0.0008*** (2.357)	0.0007** (2.176)	0.0000 (0.003)	0.0007** (1.852)	0.0002 (0.198)	0.0007** (1.782)	0.0017 (1.266)	0.0007** (2.130)
<i>LAMBDA2</i> (?)			0.0030 (0.48)							
Intercept	0.0753 (0.574)	0.0714 (0.535)	0.0437 (0.333)	0.0431 (0.325)	0.0880 (0.692)	0.1410 (1.066)	0.0905 (0.715)	0.1477 (1.102)	0.0341 (0.273)	0.0141 (0.106)
R-squared	0.070	0.073	0.067	0.065	0.090	0.083	0.088	0.072	0.061	0.085
Observations	3,054	3,017	3,003	2,868	824	2,230	856	1,855	603	2,451

This table reports fixed effect regression estimates of equation (1). Model 1 is our basic model. Models 2, 3, and 4 report results from additional tests that address endogeneity of foreign institutional ownership using instrumental variable regression, Heckman two-stage selection analysis, and propensity score matching (PSM), respectively. In the first-stage regression (unreported), we regress foreign institutional (*FOREIGNOWN*) on political rights (*POLRIGHTS*, the instrument) along with cash flow (*CF*), Tobin's *Q* (*Q*), and year, industry, and country effects. In Model 2, we report the second-stage regression that uses the fitted values of *FOREIGNOWN*. In Models 3 and 4, we report the investment efficiency regression results from Heckman selection and PSM. Before estimating these two models, we run a first stage regression (probit model) to predict the presence of foreign institutional ownership. We regress a dummy variable set to 1 if foreign institutional ownership is higher than 0, and 0 otherwise, on political rights (*POLRIGHTS*) along with cash flow (*CF*), Tobin's *Q* (*Q*), and year, industry, and country effects. We estimate the inverse

Mills ratio (*LAMBDA2*) and include it as an additional independent variable in the Heckman model (Model 3). For the PSM analysis, we match a firm with foreign institutional ownership to the firm without foreign institutional ownership with the closest propensity score (i.e., predicted probability of the presence of foreign institutional ownership) estimated from the first stage. We estimate Model 4 on the corresponding matched sample. Models 5 through 10 split the sample according to whether the firm is politically connected (*CONNECTED*), whether the government retains majority control (*CONTROL*), and whether the government holds a golden share (*GOLDEN*), respectively. The full sample includes 506 privatized firms from 64 countries. All regressions include firm and year fixed effects. Variables are defined in the Appendix. We report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, one-tailed when directional predictions are made and two-tailed otherwise.

Table 5
Robustness tests.

Variable (prediction)	Basic model	Additional controls		
	(1)	(2)	(3)	(4)
<i>CF</i> (+)	0.2905*** (5.930)	0.2920*** (5.925)	0.3601*** (7.122)	0.3602*** (7.121)
<i>Q</i> (+)	0.0339*** (4.188)	0.0391*** (2.978)	0.0375*** (2.915)	0.0375*** (2.903)
<i>STATEOWN</i> (?)	0.0007* (1.845)	0.0010** (2.145)	0.0009** (2.067)	0.0009** (2.067)
<i>FOREIGNOWN</i> (?)	-0.0010* (-1.831)	-0.0009 (-1.587)	-0.0012** (-2.146)	-0.0012** (-2.118)
<i>LOCALOWN</i> (?)		0.0004 (1.166)	0.0008** (2.031)	0.0008** (2.014)
<i>STATEOWN</i> × <i>Q</i> (-)	-0.0004*** (-2.320)	-0.0004** (-2.059)	-0.0005*** (-2.402)	-0.0005*** (-2.394)
<i>FOREIGNOWN</i> × <i>Q</i> (+)	0.0007** (2.129)	0.0007** (1.904)	0.0008** (2.254)	0.0008** (2.218)
<i>LOCALOWN</i> × <i>Q</i> (-)		-0.0001 (-0.548)	-0.0003* (-1.552)	-0.0003* (-1.525)
<i>SIZE</i> (+)			0.0169*** (8.259)	0.0169*** (8.216)
<i>LEVERAGE</i> (+)			0.1912*** (6.724)	0.1912*** (6.723)
<i>ROA</i> (+)			0.1095** (2.014)	0.1097** (2.015)
<i>COMMON</i> × <i>Q</i> (+)				0.0008 (0.065)
Intercept	0.0509 (0.387)	0.0339 (0.255)	-0.1554 (-1.189)	-0.1558 (-1.191)
R-squared	0.072	0.073	0.116	0.116
Observations	3,054	3,028	3,026	3,026

This table reports fixed effect regression estimates of equation (1). Model 1 is our basic model. Model 2 includes *LOCALOWN* and *LOCALOWN*×*Q* as additional control variables. Model 3 adds *SIZE*, *LEVERAGE*, and *ROA* to the control variables in Model 2. Model 4 adds *COMMON*×*Q* to the control variables in Model 3. The full sample includes 506 privatized firms from 64 countries. All regressions include firm and year fixed effects. Variables are defined in the Appendix. We report t-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, one-tailed when directional predictions are made and two-tailed otherwise.

Table 6

The impact of country-level governance institutions on investment efficiency by foreign owners.

Variable (prediction)	<i>ANTISELF</i>		<i>GOVSTAB</i>		<i>INVPROF</i>		<i>LAW_ORDER</i>	
	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>CF</i> (+)	0.2481*** (3.777)	0.3330*** (4.526)	0.2929*** (3.678)	0.3430*** (5.041)	0.3523*** (4.391)	0.2778*** (4.627)	0.2205*** (2.648)	0.2562*** (3.758)
<i>Q</i> (+)	0.0403*** (4.527)	0.0050 (0.591)	0.0277*** (2.511)	0.0238*** (2.907)	0.0052 (0.559)	0.0400*** (4.370)	-0.0002 (-0.015)	0.0335*** (3.925)
<i>FOREIGNOWN</i> (?)	-0.0010 (-1.325)	-0.0014 (-1.583)	-0.0006 (-0.709)	-0.0005 (-0.578)	-0.0012 (-1.266)	-0.0012 (-1.522)	-0.0024* (-1.671)	-0.0011 (-1.482)
<i>FOREIGNOWN</i> × <i>Q</i> (+)	0.0008** (2.035)	0.0005 (0.942)	0.0010** (2.220)	0.0000 (0.047)	0.0008** (1.660)	0.0005 (1.101)	0.0024*** (2.556)	0.0002 (0.452)
Intercept	0.0430 (0.312)	0.0385 (0.316)	-0.0103 (-0.074)	0.0354 (0.271)	0.1925 (1.250)	0.0093 (0.115)	0.1033 (0.683)	0.0463 (0.411)
R-squared	0.089	0.098	0.102	0.086	0.073	0.096	0.083	0.063
Observations	1,691	1,363	1,375	1,679	1,563	1,491	1,267	1,787

This table reports fixed effect regression estimates of equation (1) in subsamples based on country-level governance measures, namely, *ANTISELF*, *GOVSTB*, *INVPROF*, and *LAW_ORDER*. Models 1 and 2 split the sample according to whether the *ANTISELF* score is high or low, respectively. Models 3 and 4 split the sample according to whether *GOVSTAB* is high or low, respectively. Models 5 and 6 split the sample according to whether the *INVPROF* score is high or low, respectively. Models 7 and 8 split the sample according to whether the *LAW_ORDER* score is high or low, respectively. The full sample includes 506 privatized firms from 64 countries. All regressions include firm and year fixed effects. Variables are defined in the Appendix. We report t-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, one-tailed when directional predictions are made and two-tailed otherwise.