

Government Ownership and the “Public” Information Content of Insider Trading: International Evidence

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Abstract

This paper investigates the political determinants of informed insider trading using an international sample of 1,719 firms from 28 countries. We show that compared with non-government-owned firms, insider trading in government-owned firms is statistically and economically more profitable and informative. Aside from the well-documented agency problem associated with government ownership, we uncover a new explanation for our baseline findings based on the unique information environments of government-owned firms. Through close ties with public owners, insiders of government-owned firms can better evaluate the prospect of their firm and the overall economy during uncertain economic times. We also find evidence that their aggregate trading is more predictive of the future stock market return. Finally, strong legal institutions and transparent information environments matter to mitigate the effect of government ownership on informed trading.

JEL classification: G14, G32, D82

Keywords: Informed insider trades, government ownership, information advantage, corporate governance.

1. INTRODUCTION

Despite the wave of state privatizations at the early of this millennium, the past decade has witnessed a global resurgence of government involvement in business affairs through holding shares of private enterprises following the 2008 global financial crisis (Borisova, Fotak, Holland, and Megginson, 2015), the recent COVID-19 health crisis (OECD, 2020), and the economic rise of China-style business model (Megginson, 2017). While extensive literature provides valuable insights into its benefits and costs at the firm level¹, little is known about the implications of state ownership for individual corporate executives.² This study examines how government ownership shapes the private incentives of corporate executives through the lens of informed insider trading, which is not only a pervasive governance issue around the world but also the very concern of government shareholders, who shoulder the responsibility for financial market efficiency and transparency. Our international analysis across 28 countries focuses on whether and how government ownership drives informed trading of corporate officers and directors (hereafter, “corporate insiders”).

We hypothesize that there is more informed insider trading in state-owned enterprises (SOEs) than in otherwise similar privately-owned companies. The theoretical support for this prediction is grounded in a large body of literature that emphasizes the

¹ Different studies have documented adverse corporate outcomes associated with government ownership across countries. Megginson et al. (1994), Dewenter and Malatesta (2001), Ehrlich, Gallais-Hamonno, Liu, and Lutter (1994) and others provide empirical evidence that government-owned firms allocate resources less efficiently and are less profitable and productive than privately owned ones. This line of literature is built on the agency problems arising from the presence of state actors in the corporate ownership structure (Borisova, Brockman, Salas, and Zagorchev, 2012). On the other hand, government-owned firms are shown to enjoy lower financing costs and ease to access to bank credit (Claessens et al., 2008, Houston et al., 2014), higher equity valuation (Faccio, 2006), higher bailout probabilities (Faccio et al., 2006), generous government financial support (Duchin and Sosyura, 2012), and better allocation of government contracts (Schoenherr, 2018).

² Two notable exceptions are the discussions about managers' political promotion incentives in Chinese state-owned companies (Kong, Kong, and Lu, 2020) and CEO compensation packages and policies among EU firms (Borisova, Salas, and Zagorchev, 2019). But given each country's unique economic and political institutions, these private managerial incentives may not be generalizable in an international context.

typical agency problem associated with government shareholders. This literature suggests that managers of SOEs are “entrenched bureaucrats” (Chen, El Ghoul, Guedhami, and Nash, 2018) whose objective is to protect their political interests instead of maximizing shareholders’ wealth. Consequently, SOEs exhibit poor corporate governance (Borisova, Brockman, Salas, and Zagorchev, 2012), opaque information environments (Guedhami, Pittman, and Saffar, 2009; Ben-Nasr, Boubakri, and Cosset, 2015), and discourage the participation of informed market investors in their stock trading (Borisova and Yadav 2015). The weakened governance and the accompanying information opaqueness in SOEs create a conduit where managers impound their private information advantage into trading company stocks for monetary benefits. The informed trading in SOEs may be further exacerbated by the lower litigation risk faced by the managers because of the government’s potential favorable treatment of corporate wrongdoing in these companies (Correia, 2014).

While the agency problem that drives up informed trading in SOEs is similar to that in poorly governed companies, the information sources of such trading can differ in SOEs. In particular, the close ties with government shareholders open opportunities for managers of SOEs to gain access to a broad base of public owners’ information sets, including the economic and regulatory policies toward the firm, its industry, and the economy at large ahead of other market investors. With the privileged access to the public owners’ information, we further hypothesize that corporate insiders of SOEs can incorporate this information advantage in two ways. First, they trade more profitably on firm-specific information during uncertain economic episodes with the advanced knowledge of the government’s preferential treatment of their company and industry. For example, frequent interactions with government officials may provide early

information about new economic policies for the firm's industry and the overall economy. Such information helps insiders to judge their own firm's situation amidst economic uncertainty and thus increases the firm-specific information content of their trading when economic uncertainty is highest. Second, their aggregate trades are better able to time the market than those of non-SOE companies as the political ties allow them to pre-empt unanticipated changes in future economic trends and detect systematic market mispricing. By testing these hypotheses, we provide a new explanation for the informed trading of corporate insiders in SOEs that is distinct from the general weak governance problem well documented in the insider trading literature.

Our study of the association between government ownership and insider trading relies on the global coverage of disclosed insider trading activities provided by the 2iQ Research database. Starting from this initial sample, we identify 593 firms with non-zero government equity ownership across 28 countries from the strategic holdings dataset from Refinitiv's Datastream. To ensure the peculiarity of SOEs does not drive our results, each state-owned (treatment) firm is paired with corresponding non-state-owned (control) firms using the propensity score matching method following prior literature (Beuselinck, Cao, Deloof, and Xia, 2017; Boubakri et al., 2018). Merging this matched sample with international financial data from the Worldscope database leads to a final sample of 112,169 insider transactions from 1,719 unique firms (i.e., 393 treatment and 1,326 control firms) for the period 2003 to 2016.

We construct our primary variable of interest, the informativeness of insider trading on firm-specific information based on the profitability of insider trading estimated using insider trades' market-adjusted abnormal returns (i.e., α) over the 180-day window from the transaction date (α) following Jagolinzer et al. (2011). Our

principal analysis then models insiders' profitability at a transaction level as a function of government ownership while controlling for firm-specific factors found in previous research to affect insider trading activity. Our baseline results suggest that corporate insiders in state-owned companies earn significantly higher abnormal returns from trading. These results remain robust when we include various fixed effects and additional controls of board characteristics and country-level economic conditions. We also document similar results with alternative short-term insider trading profitability measures and model specifications. From an economic perspective, the insider trades of SOEs experience a sizeable 65% increase in trading profitability relative to its sample mean, compared to those in privately owned companies. Collectively, the evidence is consistent with our main conjecture that the presence of government ownership gives rise to more informative insider trades.

While a propensity-score-matched sample mitigates endogeneity problems due to observable firm characteristics, the effect of government ownership may still manifest in unobservable factors. We further address the endogeneity concern using three alternative econometric tests: (1) entropy balancing matching, (2) Mahalanobis's matching, and (3) the instrumental variable (IV) estimator. Our results continue to hold in these additional endogeneity tests, supporting the notion that government ownership's observed effect on informed trading is causal.

Our further analysis zooms in on the unique information channel enjoyed by the managers of SOEs through their political ties with public owners. We consider two distinct information-based trading in SOEs: firm- and market-level information trading. We find that insider trades in SOEs are more informative in uncertain macroeconomic environments (i.e., national elections and uncertain economic prospects reflected in the

Economist Intelligence Unit country reports) or during turbulent market times (i.e., the 2008 global financial crisis and volatile market episodes). This finding is consistent with the privileged access to the information about the government's favorable treatment of SOEs and even its industry during market crises. Our evidence suggests that state ownership provides fertile ground for firm-specific information-based trading in SOEs when macro-level uncertainty is highest.

To test the market-level information-based trading, we compare the market return predictability of the aggregate insider trading between SOEs and non-SOEs. Our market-level analysis shows that the aggregated net insider purchases in SOEs are significantly more predictive of stock market returns than that in non-state-owned firms. Economically, the predictive power of market returns by aggregate insider trading in SOEs is almost twice as high as that in non-SOEs. We interpret this evidence as corporate insiders of SOEs learning about the economic policy from government owners. Thus, they can better forecast future economic trends and time the market in their trading activity. Even if some macro news is publicly available, insiders of SOEs can be more skilled investors in interpreting the information thanks to their close communication with government actors.

Undoubtedly, any front-running insider trading activity, irrespective of the information sources, erodes financial market confidence and compromises market fairness (Seyhun, 1992). In the supplementary analysis, we utilize the rich variability in cross-country institutional environments and analyze cross-sectional factors that may mitigate the adverse effect of government ownership on the informativeness of insider trading. We find that the positive impact of government ownership on informed insider trading is weaker for firms followed by more financial analysts, whose stock prices are

more informative, and those in countries with stringent disclosure requirements and strong investor protection.

This study makes several significant contributions to the existing literature. We provide the first evidence of private managerial benefits associated with government ownership in an international context. While the agency problem in SOEs has been extensively studied, most existing studies focus on firm-level outcomes (e.g., Ben-Nasr, Boubakri, and Cosset, 2012; Borisova and Yadav, 2015; Megginson and Netter, 2001, etc.). One particular strand of the literature suggests that government equity ownership undermines corporate financial transparency (Bushman et al., 2004), auditor choice (Guedhami, Pittman, and Saffar, 2009), and earnings quality (Ben-Nasr, Boubakri, Cosset, 2015; Chaney, Faccio, and Parsley, 2011). We take a deliberate departure from this literature and examine the information impact of government ownership at the corporate insider level. We document more profitable insider trading in the presence of government ownership in line with the agency concern in SOEs. More importantly, we also uncover a unique channel through which corporate insiders of SOEs leverage close ties with government owners to make profitable transactions of their company stocks based on their information advantage about the firm and the economy at large.

In addition, we contribute to a large body of insider trading literature by focusing on the unique information advantage of corporate insiders in politically connected companies. In this vein, two contemporary studies are closely related to ours. Jagolinzer et al. (2020) document that politically connected insiders traded on the information about the Troubled Asset Relief Program (TARP) infusions during the Global Financial Crisis in the U.S. However, they examine the informed insider trading of financial firms, which we exclude from our analysis. Sun, Ye, and Zeng (2022) find that net insider purchase

significantly increases in the month firms receive government subsidies among Chinese listed firms. Such an effect is more pronounced in politically connected firms. Both studies define political connections based on corporate insiders' current or previous work experience in government agencies. Our study differs from theirs by investigating another more direct form of political connections, state ownership (Faccio, 2006), in a cross-country setting and offering novel evidence on the presence of public information in the aggregate insider trades of SOEs.

Finally, the granular nature of our data allows us to extend the literature on the role of institutional environments in promoting corporate accountability. Prior studies such as Bushman et al. (2004) suggest that investor protection is conducive to corporate financial transparency. Leuz, Nanda, and Wysocki (2003) also document that country-level governance provisions may improve disclosure transparency by reducing insiders' ability and incentives to mask their firm performance. Similarly, Fidrmuc, Korczak, and Korczak (2013) and Gebka et al. (2017) contend that strong investor protection facilitates the incorporation of private information from insider transactions into stock prices, thereby enhancing market efficiency. Consistent with this line of literature, our analysis shows that outside economies with better investor protection and improved country-level governance quality exhibit lower profitability of insider trades in government-owned firms. These findings carry essential insights for the market regulators into which institutional factors mitigate the disproportionately private access to firm-specific and macro information of corporate insiders through political ties among SOEs.

The rest of the paper proceeds as follows. Section 2 discusses related literature on government ownership and insider trading to develop our testable hypotheses. Section 3 describes the data and measurement of variables. Section 4 presents our key empirical

results and the underlying mechanisms of the association between government ownership and insider trading profitability. Section 5 extends our primary analysis with additional tests, and Section 6 concludes.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In this section, we review the prominent literature on the effects of government ownership on the corporate information environment and develop our testable hypotheses regarding whether and how the presence of government investors facilitates or curtails informed insider trading.

2.1. Government ownership and corporate information environment

The role of government involvement in the market economy has been a debatable topic following a recent significant shift from a free market setting toward crony capitalism in the private sector due to firm rescues during the 2008 financial crisis³ (Borisova et al., 2012; 2015). Unlike typical shareholders, governments usually have incentives to pursue socially desirable and/or political objectives, which rarely coincide with profit maximization (Megginson and Netter, 2001; Shleifer, 1998; Shleifer and Vishny, 1994). Under the classical agency framework, the conflicts of interest suggest that government investors could tunnel corporate resources for political benefits and induce managers to restrict or manipulate the release of firm-specific information to prevent public awareness and scrutiny of their expropriation activities (Guedhami et al., 2009; Ben-Nasr et al., 2015; Borisova and Yadav, 2015). Subsequently, these politically motivated actions are conducive to a less transparent corporate information environment (Leuz et al., 2003).

³ The average government equity ownership of equity comprises roughly 14% of the global market capitalization as of 2017, and more than 8% of the world's listed firms are majority-owned by the government (De La Cruz et al., 2019).

In line with the agency problems in state-owned firms, Bushman et al. (2004) document a negative association between government ownership and financial transparency in a cross-country setting, suggesting that the government impedes the dissemination of corporate information to protect their economic rents. Similarly, Guedhami et al. (2009) find that financial reporting credibility manifested by a firm's auditor choice deteriorates with the proportion of its shares held by local governments using a dataset of 176 privatizations from 32 countries. Related, Chaney, Faccio, and Parsley (2011) find that the quality of reported earnings in politically connected firms is significantly lower than that of comparable non-connected firms in 20 countries. The authors attribute their findings to the preferential treatment of politicians toward the affiliated companies, lowering these firms' incentives to portray their disclosed accounting information accurately. For a single-country setting, Piotroski, Wong, and Zhang (2015) report that Chinese government-affiliated firms are less (more) likely to experience stock price crashes before (after) major political events. This result supports the notion that affiliated firms tend to withhold negative economic news in advance of political events to shield local bureaucrats' and their affiliated firms' political interests.

In summary, the above empirical evidence suggests an opaquer reporting system and less transparent information environment in state-owned firms following the agency problems of government ownership.

2.2. Information environment and insider trading

Insider trading remains one of the most pervasive governance issues across countries. Numerous studies have ascribed insider trades to the information gap between corporate insiders and outside investors. Generally, these studies identify two primary types of information contained in insider trading. The first line of research pertains to the firm-

specific information reflected in insider trading. Scholars contend that insiders can use their privileged access to private information about their own firms to identify mispricing in current stock prices and earn abnormal returns by trading on their company stocks. For instance, Fidrmuc, Goergen, and Renneboog (2006) find that managers' or executives' trading conveys essential firm-level information to the public, indicating that these insiders utilize private information. Aboody, Hughes, and Liu (2005) argue that corporate insiders trade more profitably in firms subject to higher earnings management. Also, Chowdhury, Mollah, and Farooque (2018) show that corporate insiders tend to increase discretionary accruals and manipulate to profit from their informed trades. In terms of the external information environment, Frankel and Li (2004) find that increased analyst following and financial statement informativeness enhance corporate information transparency and result in less informed insider trading. Likewise, Ellul and Panayides (2018) observe more profitable insider trades after their firms lose all analyst coverage.

In addition, research also suggests that aggregate insider trading contains market-wide information, which can be used to time the market. For instance, Seyhun (1992) finds that from 1975 to 1989, the net insiders' purchasing ratio over the past 12 months predicts up to 60 percent of the variation in one-year-ahead U.S. stock market returns. Lakonishok and Lee (2001) reach the same finding after controlling for the effects of a contrarian strategy. In an international context, Brochet (2018) documents that a one-standard-deviation increase in aggregate net insider purchases is associated with 0.95% higher market returns, calculated as country-level index return adjusted for the country-specific risk-free rate and the contemporaneous MSCI World Index return), in the next quarter. These findings on the predictive power of aggregate insider trades to future market returns are consistent with insiders possessing advanced knowledge of the

market-wide information not reflected in market indices at the time of their stock transactions.

2.3. Government ownership and insider trading

We take an agency-based perspective and argue that the less transparent information environment in government-owned firms constitutes an opportune ground for corporate insiders to earn higher profits using their information advantages while trading their company stocks. Also, Correia (2014) contends that politically affiliated firms and executives are less likely to be involved in Securities and Exchange Commission (SEC) enforcement actions and face lower penalties if prosecuted. Therefore, one might expect that insiders in government-affiliated firms are subject to lower litigation costs. Accordingly, we develop our first hypothesis concerning the relationship between the extent of government ownership and insider trading as follows⁴:

Hypothesis 1: *Government ownership is associated with increased informed insider trading.*

While informed insider trading as a consequence of agency problems and the associated opaque information environment is well understood in the literature, the unique mechanisms through which insiders of SOEs profit from their trading activity remain unknown. In the review of prior literature, we propose two information

⁴ Notably, there is a competing view to our hypothesis. Ex-ante, one could anticipate that increasing levels of government equity ownership could exacerbate the political costs of greater public scrutiny on informed insider trades, thereby inhibiting managers from using political resources for personal grievance (Borisova et al., 2012; Jagolinzer et al., 2020). Also, state-owned firms may provide more voluntary disclosures to help politicians establish a public image of accountability (Huang, 2022), thereby alleviating the information gap between insiders and outsiders. Thus, this line of reasoning advocates a negative relationship between the extent of government ownership and insider trading.

However, Chaney et al. (2011) outline three explanations to negate this view. First, insiders in government-connected firms have more incentives to hide, obscure, or at least attempt to delay disclosing their information as it allows them to simultaneously extract political favors from governments and trading benefits at the expense of other shareholders (Leuz and Oberholzer-Gee, 2006). Second, enjoying greater protections by government officials, connected firms may simply become inattentive to the quality of information they disclose. Third, it could be simply be the case that governments can be allured more easily by less transparent firms.

mechanisms that arise from the political ties between corporate insiders and government owners.

First, state ownership may allow corporate insiders to gain early information on a broad base of critical firm-specific, industry-wide, or macroeconomic news, especially on preferential government treatments or new policies toward their firms during uncertain economic episodes. With such privileged information access, insiders in SOEs can make more accurate predictions of their firm's future cash flows than those in non-SOE firms. In line with this mechanism, Jagolinzer et al. (2020) find evidence of abnormal trading returns by politically connected officers and directors at U.S. financial institutions 30 days before the TARP disbursements. These insiders' trades have a significantly higher predictive ability of future stock performance and are, therefore, more informative. Similarly, Sun, Ye, and Zeng (2022) document higher net insider purchases in politically connected firms in China during the month of government subsidy receipt, which indicates that insiders possess an informational advantage concerning forthcoming subsidies and exploit the advantage for personal gains. In what follows, if corporate insiders of politically connected firms can acquire advanced knowledge of government policies toward their firms and anticipate the policy impact ahead of other market investors, we expect that their information advantage is most pronounced when macroeconomic uncertainty is highest. As such, insider trading of SOEs should be more informative than non-SOEs during uncertain economic conditions. These arguments lead to the second hypothesis as follows:

Hypothesis 2: *The informed insider trading in government-owned firms is more pronounced during uncertain economic conditions.*

The second mechanism relates to the market-wide information content of informed insider trading. Prior studies find that aggregate insider trading shows robust forecasting ability for future stock market returns (Brochet, 2018; Huang, Lin, and Zheng, 2019; Seyhun, 1992). In particular, Seyhun (1992) postulates two macro information advantages of insiders for this empirical evidence: (1) insiders at the front line of business operations have superior capabilities to acquire and use macro or industry information to predict macroeconomic trends and their firm's future cash flows compared to outside investors and (2) insiders can react to systematic market mispricing more quickly as they can observe both firm fundamentals and market values at the same time. Based on these two channels, we argue that the frequent interactions with government officials can also give the insiders of SOEs a macroeconomic information edge and allow them to be better informed of market conditions relative to other insiders of non-SOEs. Under this conjecture, the aggregate insider trades of SOEs are expected to be more informative of future stock market returns than those in privately owned firms. We summarize this hypothesis below:

Hypothesis 3: *Aggregate insider trades in government-owned firms are more predictive of future stock market movements than in privately owned firms.*

3. EMPIRICAL DESIGN

3.1 Sample selection

This study employs data from various sources: (1) global insider trading transactions data from the 2iQ Research dataset; (2) firm-level government ownership and stock trading information from Refinitiv's Datastream database; and (3) financial accounting data from Refinitiv's Worldscope database.

Our initial sample starts with the global insider transaction data from 2iQ Research, which covers about 8.1 million share transactions made by over 200,000 directors and officers of public companies across 50 countries. 2iQ Research collects insider transaction data from multiple sources, including stock exchanges, news portals, or company announcements to shareholders following disclosure regulations. For a given insider transaction, the information provided includes the insider's name, his/her position in the company, the transaction type, the transaction date, the security involved, the average price and number of shares traded, the total transaction value, the insider's post-trade holdings, and the date on which the transaction was reported. The security identifiers are ISIN and SEDOL, firm name, and the country where the transaction occurred and was announced.

Following previous literature, we consider only open-market insider purchases and sales of common stock in our sample. We exclude transactions of fewer than 100 shares and stocks with daily trading prices of less than \$2. Next, we merge the filtered insider trading sample with the firm-level ownership data from Thomson Reuters (now known as Refinitiv's Datastream database). The ownership data provides the aggregate ownership in stock by the types of investors who hold more than 5% of shares outstanding every month.⁵ Our analysis uses the end-of-the-year government ownership for each firm. While our study focuses on government equity ownership, other investor types using the same data source are also examined in prior literature (e.g., Ng, Wu, Yu, and Zhang 2016; Choi, Gao, and Jiang 2020). By merging the initial insider trading sample

⁵ Datastream provides information about strategic holdings, which are disclosed holdings exceeding 5% of the total number of shares outstanding. These holdings items include: (i) government shareholdings (NOSHGV); (ii) cross holdings of corporations (NOSHCO); (iii) pension or endowment funds (NOSHPPF); (iv) investment banks or institutions (NOSHIC); (v) employees/families or those with substantial positions in a firm (NOSHFM); (vi) foreign investors domiciled in a country other than that of a firm (NOSHFR); and (vii) others, outside the above categories with a disclosed holding over 5% (NOSHOF). We identify the government-owned firms if the data item "NOSHGV" is non-missing.

with the government ownership data, we can identify 593 firms with non-zero government equity ownership, which we refer to as treatment firms in our setting.⁶ We then obtain the control sample for our treatment firms using the propensity score matching (PSM) approach to tackle sample selection bias.⁷ In particular, we pair each state-owned firm with five nearest non-state-owned counterparts from the same country with the propensity scores within a caliper of 0.05.⁸ This matching procedure yields 2,965 control firms. The treatment and control groups intersect other databases with non-missing values for the main variables used in the baseline analysis, producing a final sample of 112,169 insider transactions for 1,719 unique firms from 2003 to 2016.

3.2 Definitions of key variables

3.2.1. Measuring government ownership

For our primary analysis, we employ three alternative measures for the extent of a firm's government equity ownership: (1) *GovtOwnership*, the proportion of a firm's shares held by the government in a given year; (2) *GovtDummy*, an indicator variable which takes the value of one if *GovtOwnership* is positive and zero otherwise; and (3) *GovtControl*, an indicator variable equal to one if the government is a controlling shareholder (i.e., *GovtOwnership* > 50%) and zero otherwise. Panel A of Table 1 displays the summary statistics of government ownership variables over the years. It could be seen that, though government ownership is on a decreasing trend over our sample, the governments still hold a significant proportion of firms' equity at roughly 20% over time.

⁶ Prior literature (e.g., Borisova, Fotak, Holland, and Megginson, 2015) also extracts the government ownership information from Thomson Reuters' other product, Thomson One Banker. But this product had been discontinued.

⁷ The propensity score is constructed using a pre-specified list of firm characteristics we control for in our baseline model. These are firm size, book-to-market ratio, share turnover, stock return volatility, and past stock return.

⁸ We present the post-PSM mean difference tests of covariates for the treatment and control firms in Appendix 2.

The proportion of shares held by the government for an average firm in our sample is 0.207, comparable to that reported in Ben-Nasr and Cosset (2014). We have also seen an increasing number of state-owned firms since 2009 after the GFC.

<Insert Table 1 about here>

3.2.2 *Measuring insider trading profitability*

This study follows Jagolinzer et al. (2011) and adopts the insiders' abnormal trading returns (profitability) as our primary insider trading measure. In particular, the insider trading profitability variable, denoted as *Alpha*, is calculated using the risk-adjusted abnormal stock returns from the market model estimated over the 180 trading days following the transaction date. The 180-day window accommodates the "short-swing" rule that requires corporate insiders to reverse any profitable positions within a six-month interval.⁹ *Alpha* is multiplied by (-1) for insider sale transactions to capture the losses avoided by insiders in these transactions. Panel B of Table 1 presents the descriptive statistics of *Alpha* in the full sample and suggests that an average insider in our sample earns an abnormal return of 2% over 180 days post the transaction.

3.2.3 *Control Variables*

Our baseline analyses incorporate a list of firm-specific characteristics that affect the incentives for insider trading activities in the extant literature. For instance, Lakonishok and Lee (2001) report that insiders trade more profitably in smaller firms. In our specifications, we first control firm size (*Size*), which is the natural logarithm of the previous year's market capitalization. We further control for the book-to-market ratio (*BTM*, the ratio of the book value of equity to market capitalization), and past stock

⁹ As part of our robustness tests, we estimate insiders' abnormal trading returns over shorter trading windows and use them as alternative dependent variables.

returns (*PastReturn*, the market-adjusted stock returns over a window $[-240, -1]$ before the first transaction in a given calendar year) as prior studies suggest that insiders trade as contrarians (Rozeff and Zaman, 1998; Piotroski and Roulstone, 2005). We also use share turnover (*Turnover*) as a proxy for stock market liquidity since informed insiders can frequently trade in liquid stocks. Lastly, we follow Frankel and Li (2004) and include the annualized standard deviations of the daily market-adjusted returns over a 240-trading day period ending one day before the first insider transaction in a given year (*Volatility*) as a control variable for information asymmetry between corporate insiders and outside investors. To alleviate the concern that outliers bias our estimation results, we winsorize all continuous variables at the top and bottom 1% of the sample distribution. The descriptive statistics of these control variables are presented in Panel B of Table 1.

Panel C of Table 1 presents the pairwise correlations between the main dependent and independent variables of interest. Most of the correlations are significant at a 1% level and well below 0.80, except for that between *GovtDummy* and *GovtControl*, suggesting that our baseline model is unlikely to be subject to multicollinearity problems. Notably, the correlations between *Alpha* and all three proxies for government ownership are all positive and statistically significant.

4. Government ownership and insider trading

4.1 Baseline results

To begin with, we compare insider trading profitability between government-owned and non-government-owned companies in a univariate analysis reported in Table 2. The average value of *Alpha* is 0.029 for SOEs and 0.019 for non-SOE firms, and their difference is statistically significant. The univariate test provides initial evidence that

insider trading profitability is significantly higher in government-owned than non-government-owned firms, in line with the prediction of our first hypothesis.

<Insert Table 2 about here>

We then estimate the following regression specification to investigate how government ownership affects insider trading profitability:

$$\begin{aligned} \text{Alpha}_{i,s,t} = & \alpha_0 + \alpha_1 \text{Government Ownership} + \alpha_2 \text{Size}_{t-1} + \alpha_3 \text{BTM}_{t-1} \\ & + \alpha_4 \text{Turnover}_{t-1} + \alpha_5 \text{Volatility}_{t-1} + \alpha_6 \text{PastReturns}_{t-1} \end{aligned} \quad (1)$$

where i , s , and t index firms, insider transactions, and years of transactions, respectively. *Alpha* denotes the insider trading profitability measure, which is the risk-adjusted stock return earned by a corporate insider over a 180-day window following the transaction dates. *Government Ownership* alternatively represents our three proxies for the extent of government ownership, including *GovtOwnership*, *GovtDummy*, and *GovtControl*. The set of control variables is discussed in section 3.2.3. Our baseline specification is estimated at the insider transaction level and includes country, industry, and year fixed effects to account for time variations and unobservable industry- and country-level characteristics. The standard errors are adjusted for heteroskedasticity and clustered at the firm-transaction date level following Jagolizer et al. (2011).

Table 3 reports the baseline estimation results of Eq. (1). The results show that government ownership is significantly and positively associated with insider trading profitability across all specifications. For instance, the coefficient of *GovtOwnership* is 0.049 (t -value = 10.60) in column (1). Its magnitude slightly increases to 0.048 (t -value = 9.78) in column (4) when we control for firm-specific attributes, industry, country, and year fixed effects. Regarding economic significance, this coefficient suggests that corporate insiders

earn 21.4% more than the average when the extent of government ownership increases by one standard deviation. In columns (2) and (5), we use *GovtDummy* as an alternative explanatory variable to address the concern that the presence of government owners, rather than the extent of their ownership, drives insider opportunism. These models continuously exhibit positive and statistically significant coefficients on *GovtDummy*, reaffirming the positive association between government ownership and insider trading profitability. The estimation regressions in columns (3) and (6) again demonstrate that corporate insiders can earn significantly higher abnormal returns from trading their shares when the government holds a controlling stake in a firm. The signs of the control variable coefficients are broadly in line with those reported in prior literature. *Size*, *Turnover*, and *Volatility* are negatively correlated with *Alpha*, indicating that insiders' abnormal trading returns are higher for small, thinly traded, and more volatile stocks, which are often associated with more severe information asymmetry between insiders and outsiders. These results are consistent with findings in Lakonishok and Lee (2001) and Frankel and Li (2004).

We substantiate our findings by examining how the effects of government ownership on insider trading profitability vary across different levels of insiders. Our conjecture is based on prior literature documenting that top executive insiders such as the Chairman or CEO possess more material private information and earn considerably higher trading returns than the members of management teams thanks to their positional advantages (Lin and Howe, 1990; Seyhun, 1992). In government-owned firms, top executives are typically bureaucrats appointed by the government and thus can learn about macroeconomic conditions and policy-related information more easily. Such an

advantage could complement superior access to firm-specific knowledge and create a fertile ground for top managers to trade profitably.

To test this conjecture, we first identify the transactions made by top executive insiders (classes A and B) and those made by non-executive board members and lower-level managers (classes C and D) of a firm using the insider classification provided by 2iQ Research.¹⁰ We then replicate the baseline analysis for each subgroup of insiders in Appendix 3. As depicted in the table, the estimated coefficients of government ownership are positive and statistically significant for the subsample of top executive insiders while insignificant for non-executive and subordinate insiders. The coefficients between the two subgroups are also significantly different, as evident by the χ^2 -statistics of the coefficient difference tests. These results suggest that top executive insiders, who closely and frequently interact with government officials, are more likely to benefit from the information advantage of government ownership than non-executive and lower-tier insiders.

In summary, the baseline regression results support our Hypothesis 1 that, to the detriment of shareholders, insiders' profitability increases with the proportion of shares held by the government. Given the robustness of our findings across three different measures of government ownership in various model specifications in Table 3, we only report the results of regression models using *GovtOwnership* as the primary variable of interest in our subsequent analyses.

<Insert Table 3 about here>

¹⁰ Insiders are classified into eight levels, denoted from A to H corresponding to the followings: (A) top insiders (executive board, chairman, and top 5), (B) upper level management (executive committee and top 20), (C) non-executives and supervisory board members, (D) lower-level executives, (E) legal entities, funds, and trust, (F) outsider (Finland only), (G) family and other relatives, and (H) partner, large shareholder, founder, investor, family holding.

4.2 Robustness tests

We subject our results to a battery of robustness tests. We replicate our baseline analysis using alternative samples, model specifications, and different measures of insider trading profitability. Table 4 reports the regression results of the robustness tests.

First, as shown in Panel A of Table 1, there were significantly fewer government-owned firms before 2010. While the time pattern of government ownership resembles that in Borisova et al. (2015), it is likely that the coverage of government ownership information is incomplete and thus introduces a sample selection bias in the early sample period. To tackle this data concern, we repeat our baseline analysis with an alternative sample, excluding those observations before 2010. We report the estimation result in column (1) of Table 4, which does not overturn our previous findings.

Second, the international panel data of this study allows us to use different sets of fixed effects to mitigate the unobservable heterogeneity in our specifications. In column (2) of Table 4, we replace the industry and country fixed effects from our baseline regressions with firm dummies to control for firm-level time-invariant attributes that might affect our inferences. Column (3) adds *Industry*Year* and *Country*Year* fixed effects to alleviate the concerns of time-varying unobservable industry and country characteristics. The results presented in both columns reaffirm a positive relationship between government ownership and insider trading informativeness.

Third, we expand our baseline regression with several additional control variables to alleviate the concerns that the relationship between state ownership and insider trading profitability is driven by other firm and country-level characteristics. At the firm level, we add firm-level corporate governance attributes, including board size, board independence, and CEO duality, to account for the possibility that our results reflect

increased insider opportunism due to a weak governance structure. At the country level, we include the gross domestic product (GDP) growth, GDP per capita, and market capitalization to GDP value to control a nation's economic development. After considering all these additional controls in columns (4) and (5) of Table 4, we continue to find that state ownership is positively and significantly associated with insider trading profitability.

Last but not least, previous studies suggest insiders could still profit from trading over a short period, despite the increased litigation risk (Fidrmuc et al., 2006; Ali and Hirshleifer, 2017). We employ alternative measures of insider trading profitability over shorter estimation windows to account for this possibility. Specifically, we re-estimate insiders' abnormal trading returns over 30- and 60-day periods following the transaction dates, denoted as *Alpha30* and *Alpha60*, respectively. We subsequently use these insider trading profitability measures as the dependent variables in the regressions reported in columns (6)–(7) of Table 4. The results consistently show positive and statistically significant coefficients of *GovtOwnership*, reinforcing our baseline findings that government ownership facilitates informed insider trading even measured in a shorter time horizon.

<Insert Table 4 about here>

4.3. Identification strategies

Our previous findings show that insider trading profitability increases with the extent of government ownership. Despite the many controls in our analyses, a legitimate concern is that omitted variables could simultaneously affect government investors' propensity to hold a particular firm's stock and insider trading profitability. For example, financially distressed firms that are critical for job creation or national interests not only attract

government equity investment, but their innate information asymmetry also encourages informed insider trading (Beneish, Press, and Vargus, 2012; Seyhun and Bradley, 1997). This section addresses this endogeneity concern by adopting three identification strategies: (1) entropy balancing matching, (2) the Mahalanobis matching method, and (3) the instrumental variable (IV) analysis.

4.3.1 *Alternative matching approaches*

Though our baseline analysis uses the propensity score (PSM) method (Dehejia and Wahba, 2002) to address the sample selection bias due to observable firm characteristics, this matching estimator is subject to some methodological flaws. Shipman et al. (2017) argue that PSM fails to consider unmatched control observations, which reduces the amount of relevant information. Also, this method tries to achieve covariate balancing via the estimated mean propensity scores between two samples. Yet, other methods like entropy balancing (Hainmueller, 2012) can assign appropriate weights to all the observations and achieve higher-order moments of covariate distributions between treatment and control samples. Furthermore, PSM has such parameters as a caliper or the number of nearest neighbors at the researcher's discretion. In recognition of these drawbacks, we use alternative matching approaches to establish the causal relationship between government ownership and insider trading.

First, we adopt the multivariable matching approach (entropy balancing) developed by Hainmueller (2012). The entropy balancing method overcomes several drawbacks of the propensity score matching, such as its statistical inferences being less sensitive to design choices (e.g., caliper). We re-estimate our baseline Eq. (1) using post-entropy balancing weights and report the results for this test in column (1) of Table 5. Panel A of the table tests if any differences in observable characteristics exist between

treatment and control subsamples and subsequently shows no differences, thereby validating our matching approach. Panel B shows the estimates of Eq. (1) using the entropy-balancing matched sample and finds consistent evidence of increased insider trading profitability in the presence of government and public owners. Second, we strengthen our identification with the Mahalanobis matching approach, which generates the one-on-one matching sample based on the smallest Mahalanobis distance. In column (2) of Panel B Table 5, we report Eq. (1) estimation results with the Mahalanobis-matched sample. Of note, the number of observations drops significantly due to the one-on-one matching algorithm of this method. We, once again, document a positive association between government ownership and insider trading profitability.

4.3.2 Instrumental variable (IV) analysis

We complement previous analyses with the IV estimator that relies on the exogenous variation in government shareholdings correlated with a good IV. In our context, the instrumental variables should be strongly related to government ownership but should not be directly linked to informed insider trading. Following Chen et al. (2018), we re-estimate our regressions of insider trading profitability on the extent of government ownership instrumented by the country-level collectivist culture, denoted as *Collectivism*. This IV is measured as 100 minus the value of Hofstede's (2001) individualism index. We argue that *Collectivism* is an appropriate instrument since Boubakri et al. (2016) show that the government maintains a larger proportion of ownership in firms operating in more collectivistic societies. Hence, one can expect that firms' proportion of equity held by the government is higher in collectivistic communities. Meanwhile, no direct evidence justifies a relationship between collectivistic culture and corporate insider trading behavior.

We present the estimation results of the two-stage least squares (2SLS) regression in the last two columns of Table 5. In the first-stage model, we regress the extent of government ownership (*GovtOwnership*) on *Collectivism* and document a significantly positive association between *Collectivism* and *GovtOwnership*, consistent with Boubakri et al. (2016). The partial *F*-statistic is well above ten and suggests that *Collectivism* is unlikely to be subject to the weak-instrument problem. Besides, the Hausman *p*-value is 0.002, implying that the 2SLS regression is more appropriate than the OLS regression. After controlling for endogeneity in column (4), we continue to observe a positive relationship between insider trading profitability and government ownership, indicating that our baseline results are less likely to be driven by the endogeneity concern.

<Insert Table 5 about here>

4.4. The information channels of insider trading in government-owned firms

Our baseline results thus far are consistent with the agency problem of government ownership. While this evidence is well expected based on the prior literature, it remains unknown what underlying information channels are exploited by corporate insiders in SOEs. Guided by Hypotheses 2 and 3, we seek to unravel the information content of insider trading due to the political connections that naturally arise from government equity ownership in the subsequent analyses.

4.4.1 Government ownership and the firm-specific information content of insider trades

Hypothesis 2 states that insiders of SOEs can benefit from frequent interactions with government officials and gain early insights into new government policies and their effects on their firm performance. As a result, the unique informational advantage of insiders in SOEs should be most pronounced in uncertain economic environments, where macro uncertainty is greatest to other market participants.

To test this hypothesis, we capture the uncertain economic conditions using five different variables. First, Julio and Yook (2012) contend that political uncertainty and the accompanying economic policy uncertainty heighten when a country goes through changes in national leadership. We, therefore, define *Election* as our first indicator of economic uncertainty that takes the value of one for years in which a country experienced a national election and zero otherwise.¹¹ For robustness, we also adopt two other proxies for country-level economic uncertainty: (1) *EPU* is Baker, Bloom, and Davis's (2016) composite economic policy uncertainty index, and (2) *WUI* is the World Uncertainty Index developed by Ahir, Bloom, and Furceri (2022), which is estimated by counting the percent of word "uncertain" (or its variant) in the Economist Intelligence Unit country report. In addition, we also control for financial market uncertainty using two market-based measures. *Mkt Volatility* is the standard deviation of a country's daily stock market index over a given year. Further, *Financial Crisis* is set equal to one for the 2007 global financial crisis and zero otherwise.

We then interact each of these five variables with the extent of government ownership and add the interaction terms to our baseline Eq. (1). The estimation results of the expanded regressions are displayed in columns (1) to (5) of Table 6. The results show that all the interaction terms are positive and statistically significant at a 5% level, suggesting a more pronounced effect of government ownership on insider trading profitability in uncertain economic episodes. The evidence supports our second hypothesis that insiders in state-owned firms can exploit privileged political resources gained from government owners to predict future firm performance better and earn trading profits during the most volatile economic and market conditions.

¹¹ The election data is obtained from www.electionresources.org.

<Insert Table 6 about here>

4.4.2 Government ownership and the macro information content of insider trades

In addition to firm-specific information advantage, corporate insiders are also found to forecast macro changes earlier and interpret the economic consequences of these changes more accurately than outside investors. Hypothesis 3 argues that state ownership strengthens the macro information advantage of insiders in SOEs in the sense that political connections help these insiders better understand the government policies on the overall economy. We test this hypothesis by comparing the power of aggregate insider trading between government-owned and non-government-owned firms in predicting future market returns using the following specification:

$$\text{Market Return}_{j,q+1} = \beta_0 + \beta_1 \text{NPR}_{j,q}^G + \beta_2 \text{NPR}_{j,q}^{NG} + \gamma X_{j,q} + \varepsilon_{j,q+1} \quad (3)$$

where j and q index countries and quarters, respectively. Eq. (3) is estimated at a country-quarter level. The dependent variable is $\text{Market Return}_{j,q+1}$, which alternatively represents the raw local market index return of one leading quarter (i.e., quarter $q+1$) and the market index return adjusted for the contemporaneous MSCI world index return (Brochet, 2018). NPR^G (NPR^{NG}) is the ratio of net insider purchases, measured as the difference between the total number of insider purchases and sales in a country during quarter q , scaled by the sum of purchases and sales in SOEs (in non-SOE firms). The vector X is the list of control variables. These variables include contemporaneous and past country-level market returns ($\text{Market Return}_{j,q}$ and $\text{Market Return}_{j,q-1}$), along with other fundamental attributes such as the mean values of *Size*, *BTM*, and *Turnover*, computed at a country-quarter level.

Table 7 displays the estimation results of Eq. (3). In columns (1) and (2), we estimate the regressions of future market return on an aggregate NPR variable, which is the number of purchases minus the number of sales in a given quarter q , scaled by the total number of transactions. We document positive and statistically significant coefficients of aggregate NPR , confirming the predictive power of insider net purchases on stock market performance. More importantly, we examine how government ownership affects the predictability of aggregate insider trades on future market return by classifying the net purchases into those of government-owned ($NPR_{j,q}^G$) and non-government-owned ($NPR_{j,q}^{NG}$) companies in columns (3) and (4) of the table. We observe positive coefficients for both components. However, only the $NPR_{j,q}^G$ coefficient is statistically significant, and its magnitude is almost twice that of the $NPR_{j,q}^{NG}$ coefficient. These results indicate that aggregate insider trades of government-owned stocks are more predictive of future market returns than those of non-government-owned stocks, consistent with the macro information advantage of insiders in SOEs.

<Insert Table 7 about here>

5. CROSS-SECTIONAL ANALYSES

In this section, we examine the heterogeneous effects of government ownership on insider trading across different institutional settings and information environments to corroborate our baseline findings.

5.1 The effect of government ownership conditional on legal and regulatory institutions

The economics of the public sector suggests that a country's institutional environment plays a central role in the fight against government rent-seeking activities such as corruption and the mismanagement of funds that can divert precious political resources

away from their best uses (Biswas, Tortajada, and Boey, 2016; Hope, 2017; Rose-Ackerman, 1999). Therefore, one can expect that, in countries with weak legal protection and a lack of control over corruption issues, the agency problems arising from government involvement in the private sector are more hazardous since politicians and their affiliates are poorly governed. In what follows, insiders in government-owned firms are more likely to gain access to private information through their interactions with government officials and engage in informed insider trading.

Based on this notion, we examine whether the effects of government ownership on insider trading profitability are more pronounced when legal institutions are not sufficiently strong to protect shareholders against insider opportunism. We develop five proxies for the quality of a country's institutional environments for our tests, including the strength of shareholder rights (*Shareholder rights*), legal origin (*Common law*), country-level governance score (*Governance*), and the extent of the control of corruption (*Anti-corruption*). The first three measures capture a country's investor protection against insider expropriation, while the last measure reflects the country's resolve to tackle corruption or prevent government expropriation (La Porta et al., 1999). Detailed definitions and data sources of these variables are provided in Appendix 1.

Our research design then conditions the effects of government ownership on these legal factors by adding their respective interaction terms with government ownership to our baseline Eq. (1). The extended regression results are reported in Table 8. Across all regression specifications, we consistently document a positive and statistically significant coefficient of *GovtOwnership* at a 1% level, substantiating our baseline findings. More importantly, columns (1)-(3) show that the interaction terms between government ownership and three legal environment proxies are significantly negative at the 1% level.

This evidence is consistent with the notion that the effects of government equity holdings on insider trading profitability weaken in countries with stronger shareholder rights protection rights in place to rein in the agency problem. We also find in column (4) of Table 8 that a country's control of corruption displays a mitigating effect on the agency problem associated with government ownership.

<Insert Table 8 about here>

5.2 The effect of government ownership conditional on corporate information transparency

Prior literature finds that high-quality and timely financial disclosures can help outside investors promptly react and incorporate insiders' information into the stock prices, leaving less leeway for insiders to profit from their private information (Frankel and Li, 2004; Huddart and Ke, 2007; Yip and Yung, 2012). In light of these findings, it stands to reason that a more transparent firm-level information environment can theoretically mitigate the impacts of government shareholdings on insider trading profitability. To answer this question, we estimate the following regression model:

We employ five proxies for the transparency of a firm's information environment at both the firm- and country-level. They are (1) the number of analysts following the firm (*Analyst*), (2) analyst forecast errors (*AFErrors*), (3) stock price synchronicity (*Synchronicity*), (4) country-level disclosure requirement index (*Disclosure*), and (5) a country's accounting standard quality index (*AcctStandards*). *Analyst* is the natural logarithm of one plus the number of financial analysts following a specific firm reported in the I/B/E/S database. *AFErrors* is the absolute difference between analysts' actual and average forecast earnings per share, scaled by the closing stock price at the previous year-end, following Armstrong et al. (2012). *Synchronicity* represents the natural logarithm of

the ratio of $(1 - R^2)/R^2$, where the R^2 is the coefficient of determination from the market model estimated using the daily stock returns over a given year. At the country level, *Disclosure* is the country-level disclosure requirement index from Hail and Leuz (2006). *AcctStandards* is the accounting standard quality index from La Porta et al. (1998). As for all these proxies except *AFErrors*, a higher value indicates a more transparent information environment.

Next, we augment the baseline regression by incorporating each of the five proxies for information transparency and its interaction with *GovtOwnership* and investigate the heterogeneous effects of government ownership on informed insider trading across firms with different levels of transparency. We present the regression results in Table 9. Consistent with our conjecture, the results suggest that the effect of government ownership on insider trading profitability weakens in firms followed by more financial analysts, with lower analyst forecast errors and higher stock price synchronicity, and those subject to more stringent disclosure regulations and high-quality accounting standards. The evidence collectively highlights that financial information disclosures are effective instruments to countervail the information advantage of insiders in SOEs and level the playing field for outside investors.

<Insert Table 9 about here>

6. CONCLUSION

Prior literature has shown that the presence of local governments in the corporate ownership structure could provide firms with various forms of support, such as preferential access to financing and policy-related information, which are strategic resources to maximize shareholders' wealth. However, the misalignment of interests between governments and private shareholders could turn those strategic advantages

into devices for entrenched managers to pocket private benefits from trading shares of their firm.

Using a comprehensive sample of 112,169 insider transactions in 1,719 unique firms from 2003 to 2016, we find that the extent of government ownership is associated with significantly higher profitability of insider trading, consistent with the conflicts of interest between governments and private investors. These results persist even after performing a battery of robustness and endogeneity tests, indicating that the relationship between government ownership and insider trading is causal. Our empirical results further unveil the two unique channels through which government ownership facilitates informed insider trades. First, we show that insiders in SOEs are more likely to benefit from their political ties with government officials when the economic uncertainty is highest. This evidence implies that insiders in government-owned firms gain better access to information about government interventions and the effects of these interventions on their firm or industry. Such information advantage assists insiders in predicting their firm's future cash flows and trading on their predictions before other market participants. Second, we find that the aggregate insider trades in state-owned firms are more informative about future stock market performance than those in non-state-owned counterparts. This finding suggests improved abilities of insiders in state-owned companies to gather, decipher, and use market-wide information to predict macroeconomic changes and detect systematic deviations in market values from fundamentals. Finally, our study emphasizes the role of institutional factors in mitigating the disproportionate distribution of information to corporate insiders in the setting of state-owned companies.

Our study deviates from the traditional line of literature that investigates the value relevance of government ownership. We explore how government ownership affects managers' personal decisions regarding insider trading and add novel evidence of unexplored channels through which corporate insiders privately benefits from being politically connected to government officials. For regulators and policymakers, our paper sheds light on the important aspects of institutional environments needed to ameliorate the adverse consequences of government intervention at the expense of minority shareholders, who are the very stakeholders a government is intended to protect.

REFERENCES

- Aboody, D., Hughes, J., and Liu, J. (2005), Earnings quality, insider trading, and cost of capital. *Journal of Accounting Research*, 43, 651-673.
- Ahir, H., Bloom, N., and Furceri, D. (2022). The world uncertainty index (No. w29763). *National Bureau of Economic Research Working Papers*.
- Ali, U., and Hirshleifer, D. (2017). Opportunism as a firm and managerial trait: Predicting insider trading profits and misconduct. *Journal of Financial Economics*, 126(3), 490-515.
- Armstrong, C. S., Balakrishnan, K., and Cohen, D. (2012). Corporate governance and the information environment: Evidence from state antitakeover laws. *Journal of Accounting and Economics*, 53(1-2), 185-204.
- Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593-1636.
- Beck, T., Clarke, G., Groff, A., Keefer, P., and Walsh, P. (2001). New tools in comparative political economy: The database of political institutions. *The World Bank Economic Review*, 15(1), 165-176.
- Beneish, M.D., Press, E. and Vargus, M.E. (2012), Insider Trading and Earnings Management in Distressed Firms. *Contemporary Accounting Research*, 29, 191-220.
- 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(3), 605-646.
- Ben- Nasr, H., Boubakri, N., and Cosset, J. C. (2015). Earnings quality in privatized firms: The role of state and foreign owners. *Journal of Accounting and Public Policy*, 34(4), 392-416.
- Ben-Nasr, H., and Cosset, J. C. (2014). State ownership, political institutions, and stock price informativeness: Evidence from privatization, 29, 179-199.
- Beuselinck, C., Cao, L., Deloof, M. and Xia, X. (2017). The value of government ownership during the global financial crisis. *Journal of Corporate Finance*, 42, 481-493.
- Biswas, A. K., Tortajada, C., & Boey, A. (2016). Corruption, economic development and poverty alleviation. *The Diplomat*, May 6.
- Borisova, G., and Yadav, P. K. (2015). Government ownership, informed trading, and private information. *Journal of Corporate Finance*, 33, 196-211.
- Borisova, G., Brockman, P., Salas, J. M., and Zagorchev, A. (2012). Government ownership and corporate governance: Evidence from the EU. *Journal of Banking & Finance*, 36(11), 2917-2934.

- Borisova, G., Salas, J.M., and Zagorchev, A (2019). CEO compensation and government ownership. *Corporate Governance: An International Review*, 27, 120– 143.
- Borisova, G., Fotak, V., Holland, K., and Megginson, W. L. (2015). Government ownership and the cost of debt: Evidence from government investments in publicly traded firms. *Journal of Financial Economics*, 118(1), 168-191.
- Bortolotti, B., and Pinotti, P. (2003). The Political Economy of Privatization. FEEM Working Paper No. 45.2003. Available at SSRN: <https://ssrn.com/abstract=418020>.
- Boubakri, N., Guedhami, O., Kwok, C. C., and Saffar, W. (2016). National culture and privatization: The relationship between collectivism and residual state ownership. *Journal of International Business Studies*, 47(2), 170-190.
- Boubakri, N., El Ghouli, S., Guedhami, O., and Megginson, L.M. (2018). The market value of government ownership. *Journal of Corporate Finance*, 44-65.
- Brochet, F. (2018). Aggregate insider trading and market returns: The role of transparency. *Journal of Business Finance & Accounting*, 46, 336-369.
- Bushman, R. M., Piotroski, J. D., and Smith, A. J. (2004). What determines corporate transparency?. *Journal of Accounting Research*, 42(2), 207-252.
- Chaney, P.K., Faccio, M., and Parsley, D. (2011). The quality of accounting information in politically connected firms. *Journal of Accounting and Economics*, 51(1-2), 58-76.
- Chen, R. R., El Ghouli, S., Guedhami, O., and Nash, R. (2018). State ownership and corporate cash holdings. *Journal of Financial and Quantitative Analysis*, 53(5), 2293-2334.
- Choi, D., Gao, Z. and Jiang, W., 2020. Attention to global warming. *The Review of Financial Studies*, 33(3), pp.1112-1145.
- Chowdhury, A., Mollah, S., and Farooque, O.A. (2018). Insider-trading, discretionary accruals, and information asymmetry, *The British Accounting Review*, 50(4), 341-363.
- Claessens, S., Feijen, E., and Laeven, L. (2008). Political connections and preferential access to finance: The role of campaign contributions. *Journal of Financial Economics*, 88(3), 554-580.
- Correia, M. M. (2014). Political connections and SEC enforcement. *Journal of Accounting and Economics*, 57(2-3), 241-262.
- De La Cruz, A., Medina, A., & Tang, Y. (2019). Owners of the World's Listed Companies, OECD Capital Market Series, Paris.

- DeWenter, Kathryn, L., and Paul H. Malatesta. 2001. "State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity." *American Economic Review*, 91(1), 320-334.
- Duchin, R., and Sosyura, D. (2012). The politics of government investment. *Journal of Financial Economics*, 106(1), 24-48.
- Ehrlich, I., Gallais-Hamanno, G., Liu, Z. and Lutter, R (1994). Productivity growth and firm ownership: an analytical and empirical investigation. *Journal of Political Economy*, 102(5), 1006-1038.
- Ellul, A. and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage?. *Journal of Financial and Quantitative Analysis*, 53(1), 203-241.
- Faccio, M. (2006). Politically connected firms. *American Economic Review*, 96(1), 369-386.
- Faccio, M., Masulis, R. W., and McConnell, J. J. (2006). Political connections and corporate bailouts. *The Journal of Finance*, 61(6), 2597-2635.
- Fidrmuc, J. P., Korczak, A., and Korczak, P. (2013). Why does shareholder protection matter for abnormal returns after reported insider purchases and sales? *Journal of Banking & Finance*, 37(6), 1915-1935.
- Fidrmuc, J., Goergen, M., and Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *The Journal of Finance*, 61, 2931-2973.
- Frankel, R. & X. Li, (2004). Characteristics of A firm's information environment and the information asymmetry between insiders and outsiders. *Journal of Accounting and Economics*, 37(2), 229-259.
- Gebka, B., Korczak, A., Korczak, P., and Traczykowski, J. (2017). Profitability of insider trading in Europe: A performance evaluation approach. *Journal of Empirical Finance*, 44, 66-90.
- 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(2-3), 151-171.
- Hail, L., and Leuz, C. (2006). International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research*, 44(3), 485-531.
- Hainmueller, J. (2012). Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political analysis*, 20(1), 25-46.
- Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47(1), 153-61.

- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. 2nd ed. Thousand Oaks, CA: Sage publications.
- Hope, KR. (2017). Fighting corruption in developing countries: Some aspects of policy from lessons from the field. *Journal of Public Affairs*, 17(e1683).
- Houston, J. F., Jiang, L., Lin, C., and Ma, Y. (2014). Political connections and the cost of bank loans. *Journal of Accounting Research*, 52(1), 193-243.
- Huang, S., Lin, T-C., and Zheng, W. (2019). Aggregate opportunistic insider trading and market return predictability, SSRN Working papers.
- Huang, Y. (2022). Government subsidies and corporate disclosure. *Journal of Accounting and Economics*, in press.
- Huddart, S. J. and Ke, B. (2007). Information asymmetry and cross- sectional variation in insider trading. *Contemporary Accounting Research*, 24(1), 195-232.
- Jagolinzer, A. D., Larcker, D. F., and Taylor, D. J. (2011). Corporate governance and the information content of insider trades. *Journal of Accounting Research*, 49(5), 1249-1274.
- Jagolinzer, A. D., Larcker, D. F., Ormazabal, G., and Taylor, D. J. (2020). Political connections and the informativeness of insider trades. *The Journal of Finance*, 75(4), 1833-1876.
- Jiang, X. and Zaman, M.A. (2010). Aggregate insider trading: Contrarian beliefs or superior information?. *Journal of Banking and Finance*, 34(6), 1225-1236.
- Johnson, S., and Mitton, T. (2003). Cronyism and capital controls: evidence from Malaysia. *Journal of Financial Economics*, 67(2), 351-382.
- Julio, B., and Yook, Y. (2012). Political uncertainty and corporate investment cycles. *The Journal of Finance*, 67(1), 45-83.
- Kong, G., Kong, T.D., and Lu, R. (2020). Political promotion incentives and within-firm pay gap: Evidence from China. *Journal of Accounting and Public Policy*, 39(2), 106715.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny (1999). The Quality of Government, *Journal of Law, Economics, and Organization*, 15, 222-279.
- La Porta, R., Lopez- de- Silanes, F., Shleifer, A., and Vishny, R. W. (2000). Agency problems and dividend policies around the world. *The Journal of Finance*, 55(1), 1-33.
- La Porta, R., Lopez- de- Silanes, F., Shleifer, A., and Vishny, R.W. (2002). Investor protection and corporate valuation. *The Journal of Finance*, 57(3), 1147-1170.

- Lakonishok, J. and Lee, I. (2001). Are insiders' trades informative? *Review of Financial Studies* 14, 79-111.
- Leuz, C. and Oberholzer-Gee, F. (2006). Political relationships, global financing, and corporate transparency: Evidence from Indonesia. *Journal of Financial Economics*, 81(2), 411-439.
- Leuz, C., Nanda, D., and Wysocki, P.D. (2003). Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69, 505-527.
- Lin, J. C., & Howe, J. S. (1990). Insider trading in the OTC market. *The Journal of Finance*, 45(4), 1273-1284
- Meggison, W.L, Nash, R.C. and Van Randenborgh, R. (1994), The financial and operating performance of newly privatized firms: An international empirical analysis. *The Journal of Finance*, 49, 403-452.
- Meggison, W.L. (2017). Privatization, state capitalism, and state ownership of business in the 21st century. *Foundations and Trends in Finance*, 11(1-2), 1-153.
- Meggison, W. L., and Netter, J. M. (2001). From state to market: A survey of empirical studies on privatization. *Journal of Economic Literature*, 39(2), 321-389.
- Mehta, M. N., Srinivasan, S., and Zhao, W. (2020). The politics of M&A antitrust. *Journal of Accounting Research*, 58(1), 5-53.
- Mills, J. P. (1926). Table of the ratio: area to bounding ordinate, for any portion of normal curve. *Biometrika*, 395-400.
- Ng, L., Wu, F., Yu, J. and Zhang, B., 2016. Foreign investor heterogeneity and stock liquidity around the world. *Review of Finance*, 20(5), pp.1867-1910.
- OECD (2020), The COVID-19 crisis and state ownership in the economy: Issues and policy considerations, <https://www.oecd.org/coronavirus/policy-responses/the-covid-19-crisis-and-state-ownership-in-the-economy-issues-and-policy-considerations-ce417c46/>.
- OECD. Building more effective, accountable, and inclusive institutions for all.
- Piotroski, J. D., and Roulstone, D. T. (2005). Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations?. *Journal of Accounting and Economics*, 39(1), 55-81.
- Piotroski, J. D., Wong, T. J., and Zhang, T. (2015). Political incentives to suppress negative information: Evidence from Chinese listed firms. *Journal of Accounting Research*, 53(2), 405-459.

- Rose-Ackerman, S. (1999). *Corruption and Government: Causes, Consequences, and Reform*. Cambridge: *Cambridge University Press*.
- Rozeff, M., and Zaman, M. (1998). Overreaction and insider trading: Evidence from growth and value portfolios. *The Journal of Finance* 53, 706-716.
- Schoenherr, D. (2019). Political Connections and Allocative Distortions. *The Journal of Finance*, 74, 543-586.
- Seyhun, H. N. (1992). The effectiveness of the insider-trading sanctions. *The Journal of Law and Economics*, 35(1), 149-182.
- Seyhun, H. N., and Bradley M. (1997). Corporate Bankruptcy and Insider Trading. *The Journal of Business*, 70(2), 189-216.
- Shleifer, A. (1998). State versus private ownership. *Journal of Economic Perspectives*, 12(4), 133-150.
- Shleifer, A., and Vishny, R. W. (1994). Politicians and firms. *The Quarterly Journal of Economics*, 109(4), 995-1025.
- Shleifer, A., and Wolfenzon, D. (2002). Investor protection and equity markets. *Journal of Financial Economics*, 66(1), 3-27.
- Sun, H., Ye, K., and Zeng, C. C. (2022). Do insiders trade on government subsidies? *Journal of Accounting and Public Policy*, 41(2), 106946.
- Yip, R. W. Y., and Young, D. (2012). Does Mandatory IFRS Adoption Improve Information Comparability? *The Accounting Review*, 87(5), 1767-1789.

Table 1. Summary statistics

Table 1 presents descriptive statistics for the variables used in our analyses. Our sample contains 112,169 firm-year observations in 28 countries from 2003 to 2016. All continuous variables are winsorized at the 1% level in both distribution tails. Variable definitions and sources are provided in the Appendix. Panel A reports the number of government-owned firms and the average proportion of corporate equity held by governments over the years. Panel B presents the descriptive statistics of the variables used in our baseline Eq. (1). Panel C presents pairwise correlation coefficients between the variables used in our analyses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Panel A: State ownership, by year

<i>Year</i>	<i>No. of Firms</i>	<i>GovtOwnership</i>
	(State presence)	(Proportion of ownership)
2003	205	0.370
2004	212	0.264
2005	253	0.302
2006	311	0.269
2007	475	0.241
2008	424	0.251
2009	429	0.278
2010	819	0.253
2011	1,178	0.213
2012	1,540	0.179
2013	1,441	0.177
2014	1,275	0.188
2015	1,441	0.181
2016	1,258	0.198
Overall	11,261	0.211

Panel B: Firm-level variables

Variables	Obs.	Mean	SD	25th pct	Median	75th pct
Alpha	112,169	0.020	0.160	-0.058	0.018	0.099
GovtOwnership	112,169	0.022	0.089	0.000	0.000	0.000
GovtDummy	112,169	0.100	0.300	0.000	0.000	0.000
GovtControl	112,169	0.015	0.123	0.000	0.000	0.000
Size	112,169	7.465	2.029	5.993	7.543	8.975
BTM	112,169	0.788	0.649	0.366	0.598	0.980
Turnover	112,169	0.844	1.006	0.219	0.525	1.064
Volatility	112,169	0.019	0.009	0.012	0.016	0.022
PastReturn	112,169	0.068	0.321	-0.101	0.051	0.221

Panel C: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Alpha	1							
(2) GovtOwnership	0.017***	1						
(3) GovtDummy	0.019***	0.741***	1					
(4) GovtControl	0.010***	0.804***	0.376***	1				
(5) Size	-0.143***	0.107***	0.081***	0.063***	1			
(6) BTM	0.073***	0.057***	0.043***	0.064***	-0.361***	1		
(7) Turnover	-0.037***	-0.067***	-0.055***	-0.058***	0.105***	-0.051***	1	
(8) Volatility	0.111***	-0.040***	-0.038***	-0.024***	-0.507***	0.317***	0.205***	1
(9) PastReturn	0.083***	-0.017***	-0.004	-0.020***	-0.124***	0.014***	0.091***	0.182***

Table 2: Univariate test

Panel A of this table presents the univariate tests of the mean insider trading profitability between government-owned and non-government-owned firms. Panel B is the mean comparison test based on two subgroups of government-controlled and non-government-controlled firms.

Panel A: Mean comparison test with state shareholders

Variable	Mean		Diff.	Mean Comparison Test
	GovtDummy =1	GovtDummy =0		
Alpha	0.029	0.019	-0.010	-6.503***

Panel B: Mean comparison test with state controlling shareholders

Variable	Mean		Diff.	Mean Comparison Test
	GovtDummy =1	GovtDummy =0		
Alpha	0.033	0.020	-0.013	-3.411***

Table 3. Government ownership and insider trading profitability

This table presents the regression results of insider trading profitability on the extent of government ownership. The dependent variable is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. *GovtDummy* is an indicator variable for firms where state ownership is greater than zero and otherwise zero. *GovtControl* is an indicator variable that takes the value of one if the government is a controlling shareholder (i.e., *GovtOwnership* > 50%) in the firm and zero otherwise. *Size* is the natural logarithm of the market value of equity in the previous fiscal year. *BTM* is the ratio of the book value of equity to market capitalization in the previous fiscal year. *Turnover* is the daily stock turnover, scaled by the number of shares outstanding, in a window [-240, -1] prior to the transaction. *Volatility* is the standard deviation of daily stock returns in a window [-240, -1] prior to the transaction. *PastReturn* is the market-adjusted stock returns in a window [-240, -1] prior to the transaction. Regressions in columns (1) to (3) do not include any controls or fixed effects, while those in columns (4) to (6) include firm-level controls and industry and year fixed effects. Our main regressions are displayed in columns (7) to (9), including all controls, industry, country, and year-fixed effects. Standard errors are clustered at transaction date and firm unless otherwise stated. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Variables	Dependent Variable = <i>Alpha</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
GovtOwnership	0.049*** (10.60)			0.048*** (9.78)		
GovtDummy		0.013*** (9.05)			0.013*** (8.17)	
GovtControl			0.018*** (5.78)			0.018*** (5.39)
Size	-0.006*** (-19.42)	-0.006*** (-19.25)	-0.006*** (-18.70)	-0.006*** (-15.53)	-0.006*** (-15.45)	-0.006*** (-14.78)
BTM	0.006*** (5.34)	0.006*** (5.47)	0.006*** (5.60)	0.011*** (9.25)	0.011*** (9.36)	0.011*** (9.37)
Turnover	-0.006*** (-9.06)	-0.006*** (-9.26)	-0.006*** (-9.45)	-0.006*** (-8.50)	-0.007*** (-8.66)	-0.007*** (-8.69)
Volatility	0.865*** (8.85)	0.871*** (8.92)	0.883*** (9.02)	0.681*** (6.77)	0.68*** (6.75)	0.707*** (7.03)
PastReturn	0.024*** (10.65)	0.024*** (10.62)	0.024*** (10.68)	0.019*** (8.32)	0.018*** (8.28)	0.019*** (8.32)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.0501	0.0500	0.0496	0.0582	0.0581	0.0577
Obs	112,169	112,169	112,169	112,169	112,169	112,169

Table 4. Robustness tests

This table presents a battery of robustness tests for your baseline results. The dependent variable in columns (1) to (6) is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. In columns (7) and (8), we employ shorter estimation windows of 30 and 60 days to calculate alternative insider trading profitability measures. *GovtOwnership* is the proportion of a firm's shares held by the government. In columns (1) and (2), we use two alternative samples restricted to only state-owned firms and a sample period from 2011 to 2016. Columns (3) and (4) are model specifications with firm and multiplicative fixed effects, respectively. Columns (5) and (6) are extended regressions with additional controls for firm-level governance attributes, country-level economic performance, and political institutions. *Board independence* is the number of independent directors on the board. *Board size* is the number of board members. *CEO duality* is a dummy variable that equals one if the CEO is also the board chairman and zero otherwise. *GDPG* is the gross domestic product growth. *GDP per capita* is the value of GDP per capita. *MV/GDP* is the stock market capitalization scaled by GDP. Other control variables are defined in Appendix 1. Across all regressions, the standard errors are clustered by transaction date and firm unless otherwise stated. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Variable	Dependent variable = <i>Alpha</i>						<i>Alpha</i> 30	<i>Alpha</i> 60
	Restricted Sample	Firm FE	Multiplicative	Additional				
	2011 - 2016		FEs	Controls				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
GovtOwnership	0.081*** (12.34)	0.115*** (6.97)	0.056*** (12.20)	0.057*** (7.08)	0.048*** (9.90)	0.023** (2.12)	0.021*** (2.75)	
Size	-0.011*** (-22.42)	-0.058*** (-37.43)	-0.009*** (-27.05)	-0.006*** (-7.67)	-0.006*** (-15.55)	-0.011*** (-13.69)	-0.007*** (-12.79)	
BTM	0.002 (1.35)	0.011*** (5.25)	0.004*** (3.36)	-0.019*** (-7.53)	0.011*** (9.57)	0.013*** (5.20)	0.014*** (7.86)	
Turnover	-0.013*** (-10.72)	-0.004*** (-3.29)	-0.005*** (-7.41)	-0.015*** (-11.82)	-0.006*** (-8.35)	-0.003* (-1.73)	-0.006*** (-4.61)	
Volatility	-0.404*** (-2.59)	0.648*** (4.83)	0.759*** (8.24)	1.715*** (8.35)	0.699*** (6.95)	1.099*** (5.15)	0.624*** (4.02)	
PastReturn	0.031*** (9.91)	-0.040*** (-17.36)	0.031*** (14.01)	0.017*** (4.36)	0.018*** (8.18)	0.003* (1.79)	0.010*** (4.73)	
Board independence				-0.000 (-0.66)				
Board size				-0.000 (-0.97)				
CEO duality				0.001 (0.42)				
GDPG					-0.001*** (-3.68)			
GDP per capita					0.018*** (3.86)			
MV/GDP					-0.000*** (-6.97)			
Industry FE	Yes	No	No	Yes	Yes	Yes	Yes	
Country FE	Yes	Yes	No	Yes	Yes	Yes	Yes	
Year FE	Yes	No	No	Yes	Yes	Yes	Yes	
Firm FE	No	Yes	No	No	No	No	No	
Industry*Year FE	No	No	Yes	No	No	No	No	
Country*Year FE	No	No	Yes	No	No	No	No	
Adj. R ²	0.069	0.250	0.030	0.065	0.059	0.022	0.030	
Obs.	58,580	112,169	112,169	43,654	112,169	112,169	112,169	

Table 5. Endogeneity tests

This table presents our endogeneity tests, including (1) entropy balancing, (2) Mahalanobis's matching, and (3) IV estimator. Panel A compares the mean values of the covariates for the treatment and control subsamples. The last column of Panel A reports the *t*-statistics of the mean difference tests between two subsamples. Column (1) of Panel B displays the estimation results using a matched sample derived from the entropy balancing method, whereas column (2) is the regression results based on the Mahalanobis-matched sample. The last two columns (3) and (4) are the first and second-stage regression estimates for the IV approach. The dependent variable in all models in Panel B is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. The instrument in the first-stage regression reported in column (3) is *Collectivism*, which equals 100 minus the value of Hofstede's (2001) individualism index. Except for the last two columns, the regressions include industry, country, and year fixed effects. Standard errors are clustered by transaction date and firm. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Panel A: Mean Comparison tests

Variables	Treatment	Control	Diff	<i>t</i> -statistics
Size	7.958	7.922	0.036	1.38
BTM	0.872	0.861	0.011	1.38
Turnover	0.679	0.678	0.001	0.10
Volatility	0.018	0.0181	0.000	0.15
PastReturn	0.065	0.064	0.001	0.08

Panel B: Identification strategies

Variables	Dependent Variable = <i>Alpha</i>			
	Entropy	Mahalanobis	Instrumental Variable: 2SLS	
	Balancing	matching	1 st Stage	2 nd Stage
	(1)	(2)	(3)	(4)
GovtOwnership	0.058*** (11.44)	0.063*** (10.71)		0.051*** (10.87)
Collectivism			0.001*** (29.66)	
Size	-0.008*** (-16.79)	-0.009*** (-12.26)	0.008*** (43.32)	-0.005*** (-9.79)
BTM	0.008*** (5.30)	0.010*** (4.71)	0.009*** (16.80)	0.008*** (6.19)
Turnover	-0.013*** (-8.29)	-0.008*** (-3.85)	-0.007*** (-32.62)	-0.007*** (-8.94)
Volatility	1.148*** (7.21)	1.069*** (5.14)	0.485*** (13.87)	0.929*** (9.04)
PastReturn	0.026*** (8.06)	0.025*** (5.54)	0.001 (1.17)	0.024*** (10.82)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes
Adj. R ²	0.0852	0.0831	0.0719	0.0852
Partial <i>F</i> -statistic			879.72	
Hausman <i>p</i> -value			0.002	
Obs.	112,169	27,210	112,169	112,169

Table 6. Government ownership and insider trading profitability during market uncertainties

This table presents the effects of government ownership on insider trading profitability conditional on the extent of market uncertainty. The dependent variable is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. *Election* is an indicator variable that equals one for years a country experienced national elections and zero otherwise. *EPU* is Baker, Bloom, and Davis's (2016) composite economic policy uncertainty index. *WUI* stands for the World Uncertainty Index developed by Ahir, Bloom, and Furceri (2022), which is estimated by counting the percent of the word "uncertain" (or its variant) in the Economist Intelligence Unit country report. *Mkt Volatility* is the standard deviation of daily market return over a given year. *Financial Crisis* is an indicator variable that takes the value of one for 2007 and 2008 and zero for other years. All models include industry, country, and year fixed effects. Standard errors are clustered by transaction date and firm. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Variables	Dependent Variable = <i>Alpha</i>				
	(1)	(2)	(3)	(4)	(5)
GovtOwnership	0.037*** (6.63)	0.042*** (8.58)	-0.042*** (-2.77)	-0.002 (-0.14)	0.030*** (4.70)
GovtOwnership × Election	0.043*** (4.32)				
Election	-0.013*** (-10.35)				
GovtOwnership × EPU		0.001*** (4.03)			
EPU		0.000*** (8.07)			
GovtOwnership × WUI			0.111*** (4.30)		
WUI			-0.033*** (-8.84)		
GovtOwnership × Mkt Volatility				3.539*** (5.71)	
Mkt Volatility				0.055 (0.47)	
GovtOwnership × Financial Crisis					0.044** (2.53)
Financial Crisis					-0.019*** (-3.76)
Size	-0.006*** (-15.50)	-0.006*** (-15.48)	-0.006*** (-15.43)	-0.005*** (-10.34)	-0.006*** (-15.53)
BTM	0.011*** (9.22)	0.011*** (9.28)	0.011*** (9.26)	0.001 (0.51)	0.011*** (9.12)
Turnover	-0.007*** (-8.75)	-0.006*** (-8.50)	-0.006*** (-8.49)	-0.006*** (-6.42)	-0.006*** (-8.35)
Volatility	0.692*** (6.88)	0.681*** (6.77)	0.670*** (6.62)	0.921*** (7.97)	0.684*** (6.81)
PastReturn	0.019*** (8.32)	0.019*** (8.32)	0.019*** (8.32)	0.018*** (6.57)	0.019*** (8.33)
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.0592	0.0583	0.0585	0.0584	0.0589
Obs.	112,169	112,169	112,169	82,209	112,169

Table 7. Government ownership and market-level information content of insider trades

This table shows the regressions of future market returns on the insider net purchasing ratio (NPR). The dependent variable is *Market Returns*, the country-level buy-and-hold return compounded over a calendar quarter adjusted by the MSCI world index. $NPR_{j,q}^A$ is calculated as the number of insider purchases minus the number of insider sales transactions, scaled by the summation of purchases and sales transactions for both state-owned and non-state-owned firms for each country-quarter pair. $NPR_{j,q}^{Govt}$ is the net purchase ratio estimated for state-owned firms only for each country-quarter pair. $NPR_{j,q}^{NonGovt}$ is the net purchase ratio among non-state-owned firms only for each country-quarter pair. All other control variables are defined in Appendix 1. The regressions include country and year fixed effects. Standard deviations are clustered at country and quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Variables	Dependent variable = $Market\ Return_{j,q+1}$			
	Raw (1)	Market-adjusted (2)	Raw (3)	Market-adjusted (4)
$NPR_{j,q}^A$	0.017** (2.48)	0.013*** (3.10)		
$NPR_{j,q}^{Govt}$			0.009** (2.04)	0.006** (2.00)
$NPR_{j,q}^{NonGovt}$			0.006 (0.87)	0.003 (0.70)
Market Return _{j,q}	-0.128*** (-4.74)	0.489*** (28.63)	-0.127*** (-3.82)	0.432*** (20.24)
Market Return _{j,q-1}	-0.232*** (-9.61)	-0.027* (-1.81)	0.007 (0.18)	-0.040** (-2.06)
Size	0.006 (0.51)d	0.019** (2.53)	0.008 (0.45)	0.013 (1.14)
BTM	0.000 (0.48)	0.000 (0.60)	0.000 (0.66)	0.000 (0.75)
Turnover	0.000 (1.10)	0.000 (0.65)	-0.002 (-0.87)	-0.000 (-0.63)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Adj. R ²	0.3472	0.4333	0.2821	0.3480
Obs.	1,306	1,306	951	951

Table 8. Government ownership and insider trading conditional on legal institutions

This table shows the effects of government ownership on insider trading profitability across different legal institutions. The dependent variable is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. *Shareholder rights* represents the revised anti-director right index. *Common law* is an indicator variable that equals one for countries with common law and zero otherwise. *Governance* is the country-level governance score. *Anti-corruption* is a proxy for anti-corruption measures in a given country. Other control variables are defined in Appendix 1. All models include industry, country, and year fixed effects. Standard errors are clustered by transaction date and firm. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The sample period is from 2003 to 2016.

Variables	Dependent Variable = <i>Alpha</i>			
	(1)	(2)	(3)	(4)
GovtOwnership	0.157*** (8.46)	0.071*** (11.06)	0.088*** (7.89)	0.586*** (9.51)
GovtOwnership × Shareholder rights	-0.027*** (-6.13)			
Shareholder rights	0.010** (2.07)			
GovtOwnership × Common law		-0.058*** (-6.06)		
Common law		0.002 (0.32)		
GovtOwnership × Governance			-0.010*** (-4.44)	
Governance			-0.006* (-1.77)	
GovtOwnership × Anti-corruption				-0.012*** (-2.81)
Anti-corruption				0.0396*** (9.96)
Size	-0.006*** (-15.28)	-0.006*** (-15.32)	-0.006*** (-14.48)	-0.006*** (-15.42)
BTM	0.011*** (9.45)	0.011*** (9.08)	0.014*** (10.63)	0.012*** (9.79)
Turnover	-0.006*** (-8.52)	-0.006*** (-8.48)	-0.006*** (-8.41)	-0.006*** (-8.14)
Volatility	0.679*** (6.76)	0.689*** (6.85)	0.786*** (7.62)	0.688*** (6.85)
PastReturn	0.018*** (8.28)	0.018*** (8.29)	0.019*** (8.00)	0.018*** (8.08)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R ²	0.058	0.058	0.061	0.059
Obs.	112,169	112,075	102,129	112,169

Table 9. Government ownership and insider trading conditional on the corporate information environment

This table shows the impacts of government ownership on insider trading profitability, controlling for the information environment proxies. The dependent variable is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. *Analyst* is the natural logarithm of the number of analysts following a firm in a given year. *AFErrors* is the analyst forecast error measured as actual minus the mean of forecasted earnings per share, scaled by the closing price at the previous year-end. *Synchronicity* is the natural logarithm of the ratio of $(1 - R^2)/R^2$, where R^2 is the coefficient of determination from the market model estimated using the daily stock returns over a given year. *Disclosure* is the country-level disclosure requirement index from Hail and Leuz (2006). *AcctStandards* is the accounting standard quality index from La Porta et al. (1998). Other control variables are defined in Appendix 1. All models include industry, country, and year fixed effects. Standard errors are clustered by transaction date and firm. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Obs is the number of observations. The sample period is from 2003 to 2016.

Variables	Dependent Variable = <i>Alpha</i>				
	(1)	(2)	(3)	(4)	(5)
GovtOwnership	0.106*** (7.53)	0.036*** (7.11)	0.024*** (4.30)	0.103*** (6.73)	0.187*** (4.81)
GovtOwnership × Analyst	-0.026*** (-4.69)				
Analyst	-0.008*** (-10.68)				
GovtOwnership × AFEErrors		0.133* (1.89)			
AFEErrors		0.001 (0.03)			
GovtOwnership × Synchronicity			-0.021*** (-5.95)		
Synchronicity			0.000 (0.22)		
GovtOwnership × Disclosure				-0.084*** (-4.19)	
Disclosure				-0.042** (-2.15)	
GovtOwnership × AcctStandards					-0.002*** (-3.84)
AcctStandards					0.003** (2.15)
Size	-0.003*** (-4.90)	-0.007*** (-16.76)	-0.006*** (-13.59)	-0.006*** (-15.71)	-0.006*** (-15.04)
BTM	0.011*** (9.12)	-0.007*** (-4.51)	0.011*** (9.46)	0.012*** (9.42)	0.012*** (9.77)
Turnover	-0.005*** (-7.29)	-0.001 (-1.53)	-0.006*** (-8.36)	-0.006*** (-7.99)	-0.007*** (-8.43)
Volatility	0.665*** (6.62)	-0.082 (-0.59)	0.667*** (6.58)	0.649*** (6.37)	0.697*** (6.82)
PastReturn	0.017*** (7.73)	0.011*** (4.38)	0.019*** (8.40)	0.017*** (7.27)	0.017*** (7.47)
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.060	0.041	0.059	0.058	0.058
Obs.	112,169	90,389	112,132	108,103	107,385

Appendix 1: Variable definition

Variable name	Definition	Data Source
<i>Insider Trading Measures</i>		
Alpha	The risk-adjusted abnormal stock returns from the market model that is estimated over the 180-day window following the transaction dates. For sales transactions, this variable is multiplied by -1.	2iQ Research, CRSP & Refinitiv's Datastream
Alpha30	The risk-adjusted abnormal stock returns from the market model that is estimated over the 30-day window following the transaction dates. For sales transactions, this variable is multiplied by -1.	2iQ Research, CRSP & Refinitiv's Datastream
Alpha60	The risk-adjusted abnormal stock returns from the market model that is estimated over the 60-day window following the transaction dates. For sales transactions, this variable is multiplied by -1.	2iQ Research, CRSP & Refinitiv's Datastream
$NPR_{j,q}^A$	The aggregate net purchase ratio for both state-owned and non-state-owned firms. The net purchase ratio is calculated as the number of insider purchases minus the number of insider sales, scaled by the sum of purchases and sales during each quarter in a given country.	2iQ Research
$NPR_{j,q}^G$	The net purchase ratio of insiders in state-owned firms.	2iQ Research
$NPR_{j,q}^{NG}$	The net purchase ratio of insiders in non-state-owned firms.	2iQ Research
<i>Government Ownership Measures</i>		
GovtOwnership	The proportion of a firm's shares held by the government	Refinitiv's Datastream.
GovtDummy	A dummy variable that is equal to one for state-owned firms and zero otherwise.	Refinitiv's Datastream.
GovtControl	A dummy variable that is equal to one if the government holds more than 50% of a firm's equity and zero otherwise.	Refinitiv's Datastream.
<i>Firm-level Control Variables</i>		
Size	The natural log of the market value of equity at the year-end prior to the first transaction of the current year t .	Worldscope
BTM	The book-to-market value of equity at the prior year-end.	Worldscope

Turnover	The daily share turnover, scaled by the number of shares outstanding, over a 240-day window ending one day before the first insider transaction of the current year.	Worldscope
Volatility	The standard deviation of daily stock returns over a 240-day window ending one day before the first insider transaction of the current year.	Worldscope
PastReturn	The market-adjusted stock returns over a 240-day window ending one day before the first insider transaction of the current year.	Worldscope
<i>Market Return Proxies</i>		
Market returns	The buy-and-hold return of a country's MSCI index (a firm's stock) compounded over a calendar quarter. The return is also adjusted for the MSCI World index (a country's MSCI index) for robustness checks in the manuscript	Refinitiv's Datastream.
<i>Market Uncertainty Proxies</i>		
Election	An indicator variable for years a country experienced a national election.	Polity IV & Election Resources from www.electionresources.org
EPU	Baker, Bloom, and Davis's (2016) composite economic policy uncertainty index	https://www.policyuncertainty.com/
WUI	The World Uncertainty Index is a measure that reflects global uncertainty by text mining the country reports of the Economist Intelligence Unit.	World Uncertainty Index
Mkt Volatility	The standard deviation of daily market return over a given year.	Worldscope
FC	A dummy variable equals one for 2007 and 2008 and zero otherwise.	
<i>Legal institution variables</i>		
Shareholder rights	A country's revised anti-director right index.	Djankov et al. (2008).
Common law	A dummy variable equals one if a country has a common-law origin and zero otherwise.	La Porta et al. (1998).
Governance	The sum of the quartile ranks of Anti-Self-Dealing Index, Insider Trading Restriction and Blackout Period, and Class Action.	Brochet (2018).
Anti-corruption	A measure for perceptions of the extent to which public power is exercised for private gain and "capture" of the state by elites and private interests.	Djankov et al. (2010)
<i>Firm-level information transparency proxies</i>		
Analyst	The natural logarithm of one plus the number of analysts [$\ln(1 + \text{Analyst Coverage})$] following a firm in a given year.	I/B/E/S

AFEErrors	The absolute value of actual minus the mean forecast value of earnings per share, scaled by the previous year's closing price.	I/B/E/S
Synchronicity	The natural logarithm of $R^2/(1-R^2)$, where R^2 is estimated from the market model as per Morck et al. (2000) and Chen et al. (2007).	Worldscope
Disclosure	A country's disclosure requirement index that reflects disclosure rules at the country's largest stock market	Hail and Leuz (2006)
AcctStandards	A numerical rating of a country's accounting standard. A higher value indicates better accounting practices.	La Porta et al. (1998).
<i>Other variables</i>		
Collectivism	100 minus the value of Hofstede's (2001) individualism index	Hofstede's (2001).
Board independence	The number of independent directors on the board	Refinitiv's ESG database
Board size	The number of board members	Refinitiv's ESG database
CEO duality	A dummy variable that equals one if a firm's CEO concurrently holds the position of board chairman	Refinitiv's ESG database
GDPG	A country's gross domestic product growth rate each year	World Bank
GDP per capita	The natural logarithm of GDP per capita for a country j	World Bank
MV/GDP	The total value of stock market capitalization scaled by GDP	World Bank

Appendix 2: Insider trading and government ownership across countries

This table presents the distribution of insider trades and government ownership across 28 countries in our sample. We report the number of insider transactions for the full sample in Column (1), whereas descriptive statistics in Columns (2) and (3) are based on the subsample of government-owned firms only.

Country	# Insider Trades	# Insider Trades in state-owned firms	Mean of government ownership
	(1)	(2)	(3)
Australia	1,822	69	0.118
Belgium	1,116	79	0.305
Brazil	7,376	1,015	0.292
Canada	10,341	543	0.165
China	746	14	0.07
Denmark	559	43	0.097
Finland	25	3	0.073
France	7,580	581	0.143
Germany	1,632	213	0.129
Hungary	94	37	0.050
India	6,729	172	0.381
Indonesia	718	114	0.640
Italy	6,995	891	0.346
Malaysia	12,595	2,281	0.141
Norway	958	272	0.450
Poland	1,399	125	0.280
Portugal	162	121	0.201
Romania	1,827	282	0.259
Singapore	2,951	738	0.345
South Africa	3,488	1,294	0.129
South Korea	5,062	110	0.331
Spain	8,158	454	0.089
Sweden	22	17	0.535
Switzerland	3,891	468	0.369
Thailand	3,069	210	0.308
Turkey	1,116	37	0.213
United Kingdom	5,330	441	0.177
United States	16,408	637	0.136
Total	112,169	11,261	0.220

Appendix 3: Comparison of covariates under PSM

This table reports the *t*-tests for the mean values of the treatment and control subgroups' covariates. In columns (1) – (2), we present the mean values of each variable. Column (3) denotes the difference between the values in columns (1) and (2). In column (5), we present the overall *F*-statistics for the mean difference test across all covariates. *Size* is the logarithm of the market value of equity. *BTM* is the book-to-market value of equity. *Turnover* represents the daily stock turnover, scaled by the number of outstanding shares. *Volatility* is the daily stock return volatility. *** indicates statistical significance at the 1% level.

Variables	Treatment	Control	Difference	<i>t</i> -stats	Overall <i>F</i> -stat
	(1)	(2)	(3)	(4)	(5)
Size	8.139	7.578	0.561***	3.666	
B/M	0.987	0.937	0.050	0.931	
Turnover	0.478	1.060	-0.582	-0.934	0.91
Volatility	0.027	0.027	-0.000	-0.322	
PastReturn	0.161	0.084	0.077	0.488	

Appendix 4. Insider trades by top executives versus other insiders

This table shows the standardized regression results of the effect of state ownership on insider trading profitability of top executive insiders versus that of non-executive and subordinate insiders. The dependent variable is *Alpha*, which represents the intercept (α) of the market model in a window [1,180] following the transaction dates. *GovtOwnership* is the proportion of a firm's shares held by the government. *GovtDummy* is an indicator variable for firms where state ownership is greater than zero and otherwise zero. *GovtControl* is an indicator variable that takes the value of one if the government is a controlling shareholder (i.e., *GovtOwnership* > 50%) in the firm and zero otherwise. Columns (1) to (3) are the regression results for the subsample of trades made by insiders who hold top positions in the executive teams of their firms. Columns (4) to (6) are the estimation results for subordinate executive insiders. Other control variables are defined in Appendix 1. All models include industry, country, and year fixed effects. Standard errors are clustered by transaction date and firm. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The sample period is from 2003 to 2016.

Variable	Top executive insiders			Non-Executive & Subordinate insiders		
	(1)	(2)	(3)	(4)	(5)	(6)
GovtOwnership	0.048*** (5.80)			0.015 (1.32)		
GovtDummy		0.009*** (3.62)			0.001 (0.29)	
GovtControl			0.013** (2.20)			0.009 (0.95)
Size	-0.005*** (-10.30)	-0.005*** (-10.07)	-0.005*** (-9.73)	-0.007*** (-11.12)	-0.007*** (-10.96)	-0.007*** (-11.08)
BTM	0.024*** (17.51)	0.024*** (17.61)	0.024*** (17.66)	0.017*** (9.89)	0.017*** (9.95)	0.017*** (9.88)
Turnover	-0.009*** (-10.94)	-0.009*** (-11.10)	-0.009*** (-11.04)	0.002* (1.79)	0.002* (1.73)	0.002* (1.75)
Volatility	1.036*** (10.11)	1.045*** (10.19)	1.059*** (10.35)	0.058 (0.52)	0.061 (0.56)	0.065 (0.59)
PastReturn	0.014*** (6.14)	0.014*** (6.09)	0.014*** (6.13)	0.018*** (6.70)	0.018*** (6.71)	0.018 (6.71)
X ² -statistic [(1) – (4)]	8.06***					
X ² -statistic [(2) – (5)]	4.60**					
X ² -statistic [(3) – (6)]	0.29					
Adj R ²	0.059	0.058	0.058	0.055	0.055	0.055
Obs.	49,886	49,886	49,886	34,347	34,347	34,347
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes