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Article

Corporate governance, information asymmetry and firm performance: evidence from Thailand

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Corporate governance, information asymmetry and firm performance: evidence from Thailand

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ABSTRACT

This paper aims to examine the effect of corporate governance (CG) and information asymmetry (IA) on firm performance (FP). We applied 3SLS (Three-Stage Least Squares) regressions to examine the relationships among (1) internal CG mechanism and FP, (2) internal CG mechanism and IA, and (3) IA and FP. The data used in this study were obtained from secondary sources such as Bloomberg and SETSMART. The period of data collection was for nine years, from 2014 to 2022, with a sample size of 3,692 firm-year observations of companies listed on the Thailand Stock Exchange. Our study finds that internal CG mechanisms (board size, board independence, dividend policy, and financial leverage) are positively related to firm performance. Secondly, CG mechanisms are positively associated with analyst coverage (and hence inversely related to IA). This finding suggests that internal CG mechanisms augment corporate transparency and reduce agency costs and adverse selections. Thirdly, IA is inversely related to firm performance, ie more transparent firms with greater analyst coverage tend to deliver better firm performance as monitoring costs and adverse selection are reduced. We found that additional analyst coverage is associated with an increase of a firm's ROE by 0.52% and its ROA by 0.08%. Fourthly, we further conducted an interaction effect analysis of CG and IA on FP and found that IA also significantly moderates the relationship between CG and FP. Practical implications from our study are also discussed.

IMPACT STATEMENT

This paper aims to examine the effect of corporate governance (CG) and information asymmetry (IA) on firm performance (FP) in an emerging market of Thailand. Our study finds that internal CG mechanisms (board size, board independence, dividend policy, and financial leverage) are positively related to firm performance. Secondly, CG mechanisms are positively associated with analyst coverage (and hence inversely related to IA). This finding suggests that internal CG mechanisms augment corporate transparency and reduce agency costs and adverse selections. Thirdly, IA is inversely related to firm performance, i.e., more transparent firms with greater analyst coverage tend to deliver better firm performance as monitoring costs and adverse selection are reduced. We found that additional analyst coverage is associated with an increase of a firm's ROE by 0.52% and its ROA by 0.08%. Fourthly, we further conducted an interaction effect analysis of CG and IA on FP and found that IA also significantly moderates the relationship between CG and FP.

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1. Introduction

In the last decade, many corporate bankruptcies and scandals of global firms notably the collapses of Enron in 2001 (Vinten, 2002) and Lehman Brothers in 2008 (Ceil, 2019) have raised controversies, public concerns and underscored the significance of corporate governance. More recently, the COVID-19 pandemic has further highlighted its importance since the pandemic posed unforeseen challenges to provide value to stakeholders (FP). These challenges include supply chain disruption, employees working from home, loss of productivity, and the limited ability to monitor agents.

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These unexpected and adverse developments seem to point to the critical role of CG. The agency theory asserts that when one or more parties such as the principal(s) select another party (an agent) to perform specific tasks on their behalf; this leads to 2 primary issues in term of monitoring the agents (Eisenhardt, 1989). These are namely, (a) principal-agent conflict and (b) agency monitoring costs (also known as information asymmetry, or IA) incurred by the principal as a result of the separation of ownership and management (Eisenhardt, 1989; Jensen & Meckling, 1976; Schäuble, 2018).

Without sufficient monitoring and disclosures, IA would result in adverse selection, ie making erroneous decisions based on incorrect and insufficient information (Bar-Isaac et al., 2021). IA affects internal and external stakeholders, eg middle management may withhold critical information regarding an investment from upper management, which could impair the firm's overall performance. Information asymmetry increases a firm's risk premium. If this is pervasive, it could result in a less efficient functioning capital market, adversely affecting a broader number of stakeholders, eg shareholders.

The methods by which finance providers (principals) would profit, control the agent, and safeguard their investment are known as CG mechanisms/corporate policies. These mechanisms/corporate policies include board composition, ownership classes, dividend policy, and leverage (Shleifer & Vishny, 1996). Such CG mechanisms and external participants, such as analysts, can supplement monitoring management to reduce IA and facilitate firm performance (Bradley et al., 2017; Warren, 2022). Analyst coverage has been used to represent IA in several studies (Doukas et al., 2000; Ferrer et al., 2019; Hamrouni et al., 2017; Martinez, 2011; Sun & Liu, 2011; Yu & Wang, 2018; Safdar et al., 2018) and found to have a significant relationship with CG and FP.

While there is extensive literature covering the relationship between CG and FP, whether and how IA influences the integrative and simultaneous relationships between CG and FP remains underexplored. Thus, to fill in this research gap, we examine the effect of corporate governance (CG) and information asymmetry (IA) on firm performance (FP). More specifically, we endeavor to assess how the three constructs, ie CG, IA, and FP, are related to each other.

Thailand presents an intriguing case study for this corporate governance research. In the past, it was an economy with inadequate corporate governance and the center of the 1997 Asian financial crisis (Silpachai, 2023). Researchers (Johnson et al., 2000; Mitton, 2002) asserted that the financial crisis was due to the deficient protection for minority shareholders. After the 1997 financial crisis, Thailand embarked on key milestones toward better CG. In 1998, the Stock Exchange of Thailand (SET) required listed companies to set up audit committees and a code of best practices for board members. In 2002, the SET launched a CG code for listed companies, similar to developed economies. In 2003, another requirement was issued by the SET for firm information disclosures to help reduce information inequality among different classes of stakeholders, as Thailand has an inefficient capital market (Lerskullawat & Ungphakorn, 2018; Sutheebanjard & Premchaiswadi, 2010). In 2006, the SET's CG code was updated (Kouwenberg, 2010). The latest SET Group CG Policy and Code of Conduct version was issued in February 2020. Still, the recent default and fraud by a Thai wire and cable manufacturer (Moir, 2023) has resulted in investors losing confidence in capital markets. This incident again highlights the importance of corporate governance and the perils of information asymmetry.

With the above evolvement of setting, this study aims to investigate the impact of internal CG mechanism/corporate policies and IA on FP in Thailand, an emerging market.

The following sections present the literature review and hypothesis development, research methodology, results and discussion of findings, and finally, implications and conclusions.

2. Literature review and hypothesis development

2.1. Corporate governance, information asymmetry, and firm performance

2.1.1. Corporate governance (CG)

Corporate failures and scandals are symptomatic of insufficient CG, be it Enron (Vinten, 2002), or Lehman Brothers (Ceil, 2019) among many others. As a result, stakeholders and society bore the loss, and investors' confidence in capitalism eroded while the importance of CG increases. But what is CG? A well-known definition of CG was posed as a question of how financing providers (principals) would profit, manage the agents, and safeguard their investments (Shleifer & Vishny, 1996). This definition

suggests that the purpose of CG is to help build an environment of trust, transparency, and accountability necessary for fostering long-term investment, financial stability, and business integrity, thereby supporting more robust growth and more inclusive societies (Gurria, 2015).

Agency theory, one of the prominent CG theories, asserts that the division of a company's ownership and management creates conflict since the agent, or management, is self-serving if not sufficiently observed and administered (Abid et al., 2014; Panda & Leepsa, 2017). This theory focuses on the reciprocity of self-interest between the principal and agent. At the same time, the main objective of governance is cost minimization of monitoring the agent, eg by the board (to ensure that the agent's undertaking contributes to the goals of the principal). Studies have found that the quality of the board composition is more important than its quantity (board size and board independence), as shown by a curvilinear relationship with FP (Merendino & Melville, 2019).

However, Donaldson and Davis (1991) and Keay (2017) argue that agents act ethically and professionally as they focus on their fiduciary duty towards the principal. They have found supporting evidence of stewardship theory in that returns to shareholders (ROE) are superior when there is CEO duality, ie the CEO is also the chairman of the board (Donaldson & Davis, 1991). Paramount to this, governance focuses on the roles and objectives of the agent, which must be clearly defined (eg in the contract) to ensure alignment between the objectives of the agent and principal. The goal of stewardship theory is to build cooperative long-term relationships.

Some researchers take a broader CG perspective to consider other stakeholders in addition to the principal and agent, such as employees, creditors, and customers (Freudenreich et al., 2019; Harrison & Wicks, 2013). Hence, the stakeholder theory is proposed to broaden CG's perspective to consider the value proposition of other internal and external stakeholders so that CG builds long-term relationships. In contrast, agency theory primarily focuses on the benefit of the principal and self-interests. Conversely, stakeholder theory is founded more on stakeholders' cooperation (mutualism) rather than conflict (Harrison & Wicks, 2013). Furthermore, the stakeholder theory advocates reciprocity assumption among firm participants to create value and firm performance (Bosse et al., 2009). The reciprocity assumption implies that individuals want to increase their utility while adhering to the reciprocity norm. Stated differently, reciprocity occurs when both participants in a transaction voluntarily forego personal gain to uphold their joint benefits. Studies have found that gender diversity/women on boards are positively related to FP (Reguera-Alvarado et al., 2017). Other studies on stakeholder theory find that industries with a high concentration in market share, eg oligopolies, are related to a capital structure with high leverage (more funding from creditors than from shareholders) (Istaitieh & Rodríguez Fernández, 2014).

Transactional cost economics theory proposes that governance focuses on transaction costs with regard to managing resources, comparing which is more efficient, the firm or the market, eg other firms/competition (Verbeke & Kano, 2012; Williamson, 1987). It also makes two behavioral assumptions regarding governance: (1) bounded rationality, ie contracts to control the agent cannot be written to cover all potential outcomes, and (2) opportunism, ie stakeholders do act on their own self-interests, similar to agency theory. Here, governance also emphasizes that the choice of capital (eg debt, preferred stock, or equity) provides the means to control and monitor the agent and other stakeholders. Studies on transactional cost economics find that asset specificity and supply chain integration are related to FP (Patil et al., 2023). High asset specificity is related to firms with low financial leverage, as creditors do not have the expertise to operate such assets in the event of liquidation (Williamson, 1987).

The resource dependency theory emphasizes that the firm's prosperity is very dependent on externalities, eg labor resources, customers, raw material supply, environmental conditions, regulations, etc. The theory emphasizes how governance enhances the firm's ability to acquire and utilize resources. Therefore, the board of directors especially independent directors (as the key CG mechanism), plays a pivotal role in the firm's interdependency with such externalities (Lückerath-Rovers, 2013; Reguera-Alvarado et al., 2017). Some studies found that large boards and audit committees improve FP, reinforcing boards' views of effective resources for life insurance firms to interface with externalities (Alhassan et al., 2021).

Based on the relevant literature, we propose the following hypothesis:

H1: *There is a positive relationship between CG and FP*

2.1.2. Board size and independence

In addition to acting as stakeholders' legal representatives, boards of directors have fiduciary duties to oversee management with the ultimate goal of boosting FP (Kumar & Zattoni, 2013; Silpachai, 2023; Silpachai & Siengthai, 2023). Greater board independence and size are supported by agency theory and resource dependency theory, which can help oversee management more effectively and ensure they carry out their responsibilities in a way that serves various stakeholders' interests.

Various studies conducted in developed markets (DM) have supported the idea that higher board sizes are positively correlated with better transparency levels, stronger business performance, and outperforming benchmarks (Shank et al., 2013). Studies in South Africa (Alareeni & Hamdan, 2020) found that board size was positively related to FP, ie additional members on the board would increase ROA by between 0.022% and 0.156% and increase ROE by 0.027% to 0.368%. Studies in Pakistan (Yasser et al., 2017) found that board size was positively and significantly related to FP (measured by ROA, Tobin's Q, and EVA [economic value added]). Some studies in Thailand (Petchsakulwong & Jansakul, 2018) discovered a positive correlation between the board size and the profitability ratios of non-life insurance firms ie the natural log of board size would be associated with ROA by 0.115%, ROE by 0.16% and returns on net premium by 0.272%.

Board independence and size were found to be positively correlated with company performance as determined by ROA, ROE, or Tobin's Q in several emerging markets (EM) research. These include China (Bhabra and Li, 2011), Bahrain (Ahmed & Hamdan, 2015), India (Goel, 2018). Studies in Nigeria and Ghana (Agyemang Badu & Appiah, 2017) found that additional board members are positively and significantly related to ROA (by 0.172%) and Tobin's Q (by 0.110 times). Independent directors help firms perform by bringing in beneficial experiences and expertise, ie one independent director would be positively and significantly associated with an increase of 0.0235 X in a firm's Tobin's Q, a 0.445% increase in its ROA and a 0.675% increase of its stock return (Malik & Makhdoom, 2016). Studies in China (Liu et al., 2015) found that additional independent directors would increase ROA by 29 basis points and ROE by 138 basis points.

Nevertheless, other research revealed a curved rather than a linear link between board size/independence and FP (Yammeesri & Herath, 2010; Yeung, 2018). The curvilinear relationship between board size/independence and FP shows how the stewardship theory (which supports smaller board size/independence) and the resource dependency theory (which supports greater board size/independence) interact (Potharla & Amirishetty, 2021).

Thus, we further hypothesize that:

H1a: *Board independence is positively related to FP,*

H1b: *Board size is positively related to FP.*

2.1.3. Institutional ownership

The literature proposes that institutional ownership plays three potential roles that affect CG and FP: (1) active monitoring, which improves CG and FP (2) passive monitoring, which is neutral for CG and FP; and (3) colluding with the management to take advantage of less sophisticated minority shareholders, which is negative for CG and FP (Elyasiani & Jingyi, 2010). A number of studies have discovered that institutional ownership increases company value through active agent monitoring that promotes greater efficiency and transparency (Liu et al., 2018; Thomsen & Pedersen, 2000; Thanatawee, 2014). Some studies (Knyazeva, 2007) that found a 1.7% increase in industry-adjusted return on assets (ROA) for every 10% increase in the value of institutional ownership. In Thailand (Thanatawee, 2014) studies found that a 1% increase in institutional ownership is associated with a 0.0098 times increase in Tobin's Q. Increased institutional ownership drives up the need for analyst coverage to act as a mediator for information, increasing transparency and boosting shareholder value by cutting down on insider ownership-related inefficiencies (Lin & Fu, 2017). Thus, we further hypothesize that:

H1c: *Institutional ownership is positively related to FP.*

2.1.4. Dividends

According to the agency cost of free cash flow hypothesis, the manager's power and discretion are lessened as dividend pay-out diminishes the resources under the manager's control (Jensen, 1986). As a result, management is forced to rely more on outside funding, which has monitoring requirements such as financial covenants. According to studies, dividend policy and FP have a positive relationship supporting the free cashflow theory—dividend policy is a monitoring tool (Jiang & Kim, 2015; Farrukh et al., 2017). In Pakistan (Farrukh et al., 2017), studies found that with each unit increase in dividend per share, the share price will increase by 0.04 unit; for each unit increase in dividend per share, the earning per share will increase by 0.18 unit; one unit increase in dividend per share brings 0.006 unit increase in ROE.

Taleb (2019) asserts that managers can inform external stakeholders about a company's financial health by paying dividends, as suggested by the signaling theory. According to some research, common law nations often observe better corporate governance (CG) procedures than civil law nations, and companies operating in greater CG environments are anticipated to provide larger dividends (La Porta et al., 2000). Research conducted by Fairchild et al. (2014) on Thai companies' dividend practices revealed that raising dividends helps to lessen principal-principal disputes by reducing the possibility of major shareholders expropriating minority shareholders.

Thus, we further hypothesize that:

H1d: *Dividend policy is positively related to FP.*

2.1.5. Leverage

Capital structure or leverage is the proportional interest in the firm's assets and FP between its creditors and shareholders. In the UK (Florackis & Ozkan, 2009), it was found that leverage can reduce the costs associated with the manager-shareholder agency conflict by functioning as a self-disciplining internal governance mechanism. Financial leverage limits management's ability to control resources by enforcing a schedule of cash disbursements and lowers the likelihood that the agent would expropriate assets (Jensen & Smith, 2000; Utama et al., 2017). These features are similar to dividend policies (Jensen & Smith, 1985). Debt serves as a monitor (via creditors) and may raise the possibility of bankruptcy in the event of poor FP, as well as jeopardize the agent's job security. As a result, debt and management ownership are negatively correlated. This finding suggests that debt lowers IA and serves as a tool for monitoring to reduce agency costs via covenants (Joher et al., 2006; Mustapha & Che Ahmad, 2011). Long-serving CEOs/entrenched management are less likely to take on debt financing or financial leverage (Berger et al., 1997). Some studies suggest that CG helps improve FP, giving firms better access to financial resources (eg by lowering the cost of capital) and the ability to increase their financial leverage (Morales et al., 2012). In the US (Gill & Obradovich, 2012), studies found a positive and significant relationship between financial leverage (defined as total liabilities/total assets) and Tobin's Q.

Thus, we hypothesize that:

H1e: *Financial leverage is positively related to FP.*

2.1.6. Information asymmetry (IA)

IA, or the lack of transparency, is a situation where one party in a relationship has more or better information than another within the firm as well as between firms and the external environment (Cui et al., 2018; Bergh et al., 2019). Lowered IA facilitates the monitoring of agents, helps to decrease principal-agency conflicts, reduces adverse selection, and improves FP. Researchers (Di Maggio & Pagano, 2018) asserted that financial disclosures should reduce adverse selection between firms raising capital and investors. There was evidence of significant and positive interactions between investment opportunities, board independence, and FP (Hutchinson & Gul, 2004).

Some research emphasizes that the role of CG is to mitigate IA and thus make information more transparent and available for internal and external stakeholders (Wahab et al., 2014). Analysts augment CG by reducing agency costs as an indirect monitor of management, alerting the board of directors, external auditors, and investors (Doukas et al., 2000; Frankel & Li, 2004). Past studies (Flaherty et al.,

2007) found that board size is negatively related to IA ie larger board size are positively associated with larger analyst coverage. Companies with greater analyst coverage have lower earnings management, which is positively and significantly related to the conservativeness of a firm's accounting practices. They also report greater voluntary information disclosure, better transparency, and lower IA (Hamrouni et al., 2017). Analysts' earnings forecasts are more accurate for firms with higher CG ratings (Yu, 2010), underscoring their positive relationship. Another study (Goh et al., 2016), found greater board independence leads to greater management forecast frequency and broader analyst coverage, that is, the coefficient of board independence related to analyst coverage was 0.01908, significant at the 99% level, indicating that a 52% change in board independence would be associated with one analyst coverage. In China, studies (Liu et al., 2018) found that when IA is higher, dividend payout will be lower.

In light of the relevant literature, we further propose that:

H2: *There is a negative relationship between CG and IA*

2.1.6.1. Analysts. Previous CG theories underscore the issues of IA (eg agency and stakeholder theory). Studies find that lower IA promotes FP via (1) enhancing a firm's drive for innovation and efficiency (Zhong, 2018); (2) improved accountability to align the objectives of the agent with that of the principal (Tarus & Omandi, 2013); (3) lowering the cost of capital (Barth et al., 2013).

Analysts help to reduce IA. Some studies (Jiraporn et al., 2012) stressed that analysts play a crucial function in the financial markets as information intermediaries and as monitors of corporate performance. Other studies have found a positive and significant relationship between analyst coverage, FP, and CEO pay-for-performance sensitivity (Shiah-Hou, 2016). More recently, researchers (Silpachai, 2023; Silpachai & Siengthai, 2023) found a significant and inverse relationship between IA and FP. Some studies (Barth et al., 2013) discovered a negative correlation between earnings transparency and the cost of capital. Other studies also found that IA is negatively related to FP and that financial leverage moderates IA (Fosu et al., 2016). Some studies (Hsu et al., 2021) found that information cost (agency) adversely affects FP.

Thus, we further propose that:

H3: *There is a negative relationship between IA and FP.*

Andersson et al. (2014) have observed that interaction occurs when the effect of an independent variable (X) on a dependent variable (Y) varies across levels of a moderating variable (Z). Analysts augment CG by reducing agency costs as an indirect monitor of management, alerting the board of directors, external auditors, and investors (Doukas et al., 2000; Frankel & Li, 2004; Safdar et al., 2018). Researchers (Goh et al., 2016) found that more frequent management projections and larger analyst coverage are related to higher board independence, which shows that board independence promotes greater transparency in the firm's information environment. They estimated that analyst coverage accounts for between 55.5% and 96.9% of the mediated route effect from board independence to information asymmetry.

Given the above literature, we further hypothesize that:

H4: *There is an interaction effect between CG mechanisms and analyst coverage (IA), which is positively related to FP.*

2.2. Conceptual framework

Based on the literature above, our conceptual framework is derived (see Figure 1).

Figure 1 shows the theoretical framework of this study, which investigates the relationships of the three constructs of CG, IA, and FP. The variables of CG internal mechanisms/corporate policies consist of (1) independent directors, (2) board size, (3) institutional ownership, (4) dividends, and (5) financial leverage. Variables of IA include analyst coverage, while firm performance variables comprise (1) ROE and (2) ROA. The study hypothesizes that (1) There is a positive relationship between CG and FP, (2) There is a negative relationship between CG and IA, and 3) There is a negative relationship between IA and FP. IA mediates the relationship between CG and FP; and fourth, IA moderates the relationship between CG and FP.

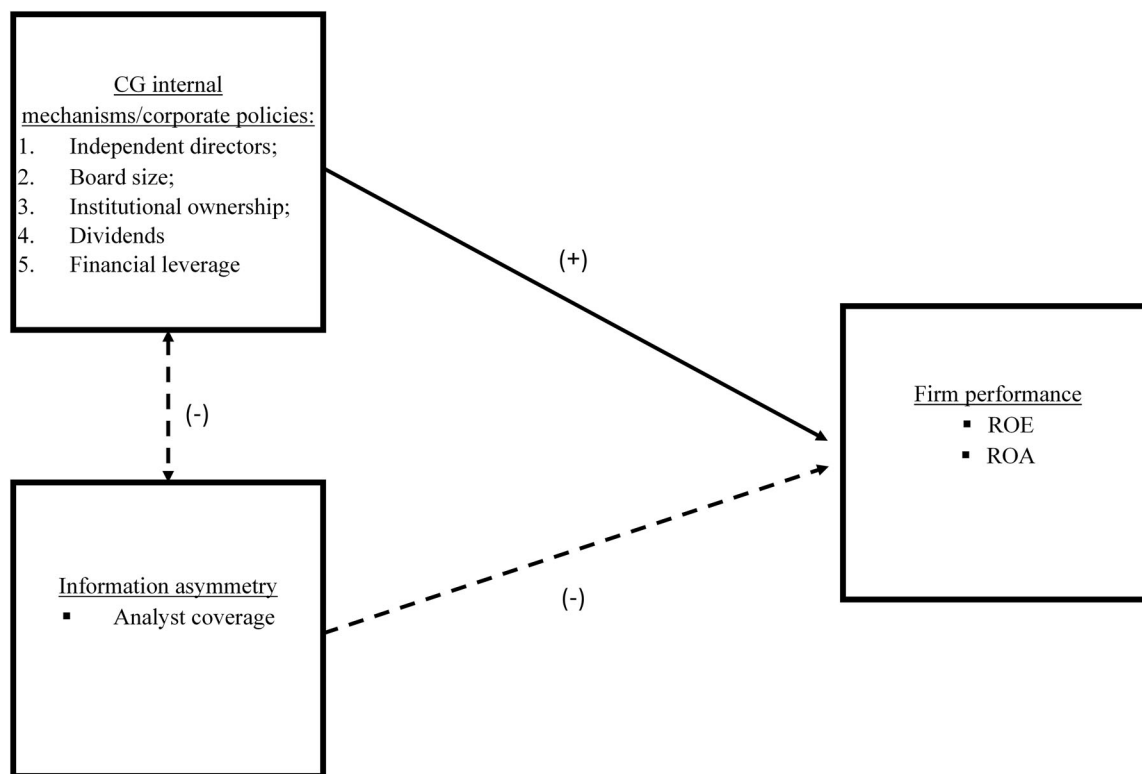


Figure 1. Research Framework, Analysis of the Relationships among CG, IA, and FP. This figure shows the research framework. The study hypothesizes that (1) There is a positive relationship between CG and FP; (2) There is a negative relationship between CG and IA; and (3) There is a negative relationship between IA and FP. IA mediates the relationship between CG and FP.

3. Methodology

This section describes and discusses the data collection and sample procedures, statistical tools used, and the operational definitions of the concerned variables in this study.

3.1. Data and sample

The data were collected from secondary sources, primarily Bloomberg and SETSMART. The dataset is based on companies listed on the Stock Exchange of Thailand (SET). Data for variables such as analyst coverage, dividend pay-outs, institutional ownership, and financial leverage were obtained from Bloomberg. SETSMART is an internet-based information system of SET and the Thailand Future Exchange database system. The system provides historical stock and futures trading prices and indices, listed companies' information, news, and key statistics information. However, no information on the audit committee is provided. CG indicators like board size and independent directors were obtained from SETSMART. The unit of analysis selected for the study is companies within the SET index based on data availability.

The data collection was conducted for a period of 9 years, from 2014 to 2022. The initial sample size was 5396 observations. Table 1 provides firm-year observations of the dependent, independent, and control variables before screening to synchronize the data:

Due to data availability issues, the sample size was culled to 3692 to accommodate all the fields of the dependent, independent, and control variables in equations #1, #2, #3, and #4.

3.2. Statistical tools

Endogeneity can become an issue because our study is based on a system of equations to analyze simultaneous relationships. Endogeneity occurs when an independent variable correlates with the unexplained residuals of the dependent variable (Hill et al., 2021). Endogeneity generates coefficients that

Table 1. Firm-year observations of the dependent, independent, and control variables.

No	Variable	Firm-year observations
1	ROE	5164
2	ROA	5172
3	Analyst coverage	5396
4	Board independence	4704
5	Board size	4704
6	Institutional ownership	5351
7	Dividends	4061
8	Financial leverage	5167
9	Firm size	5278
10	Time	5396
11	Industry	5234
12	Nominal GDP	5396
13	Dummy Variable, COVID-19	5396

This table provides the firm-year observations of the dependent, independent, and control variables collected prior to screening for regression analysis. The data collection was conducted for a period of 9 years, from 2014 to 2022. The initial sample size was 5396 observations. Due to data availability issues, the sample size was culled to 3692 to accommodate all the fields of the dependent, independent, and control variables in equations #1, #2, #3, and #4.

may be overestimated as well as underestimated. There are four cases of endogeneity: (1) omitted variables, (2) simultaneity, (3) measurement error, and (4) selection (of treatment and/or into sample). Several statistical tools have been recommended for instrumental variable estimators, such as two-stage least squares (2SLS), three-stage least squares (3SLS), maximum likelihood (ML), and generalized method of moments (GMM) to help control endogeneity.

Researchers (Udumoh et al., 2016) also underscored the challenges of endogeneity, noting that explanatory variables are presumed to be fully exogenous when the method of least squares is applied to a single equation. If a function has a two-way relationship, it should be viewed as a larger system of equations that may accurately depict the relationships among all variables. In a study of CG and equity liquidity, researchers (Chen et al., 2007) employed the 3SLS method, citing that if simultaneity exists among the constructs, employing the OLS estimation procedure will generate inconsistent estimates, rendering the inferences invalid.

In some circumstances, Three-Stage Least Square (3SLS) is a more accurate estimation technique than OLS and 2SLS. When endogeneity—that is, when the independent variables and the error term are correlated—exists in the model, 3SLS is more efficient. It works especially well with simultaneous equation models with several dependent variables and connected equations. By accounting for the correlation between the error terms, 3SLS makes estimating the parameters in a system of equations possible. This strategy is quite helpful when there are feedback effects between the equations. Furthermore, 3SLS can handle scenarios where instrumental variables are provided to resolve endogeneity.

Given the above discussion, our study employed the 3SLS panel data regression analysis to help control endogeneity, particularly from ‘omitted variables’ and ‘simultaneity,’ as our analysis is based on a system of structural equations to examine the simultaneous relationships: (1) between internal CG mechanism and FP; (2) between internal CG mechanism and IA, and (3) between IA and FP.

3.3. Variables, operational definitions, and data analyses

Our study utilized five independent variables, five control variables, and three dependent variables. For example,

Board Independence (code: BD_IND) was defined as ‘The ratio of independent directors to board size. An independent director is a director holding not more than 1% of voting shares, including relatives, who have never been or are the company’s executive director, worker, employee, and consultant.’. Theories that entail the utilization of board independence are agency, stakeholders, transactional cost economics, stewardship, and resource dependency theory. The literature that has applied **board independence** as a study variable includes: (Abid et al., 2014; Alves et al., 2015; Ajina et al., 2013; Alareeni & Hamdan, 2020; Alhassan et al., 2021; Cormier et al., 2009; Donaldson & Davis, 1991; Eisenhardt, 1989; Freudenreich et al., 2019; Goh et al., 2016; Harrison & Wicks, 2013; Jensen & Meckling, 1976; Keay, 2017; Kumar & Zattoni, 2013; Liu et al., 2018; Lückerath-Rovers, 2013; Panda & Leepsa, 2017; Reguera-Alvarado

et al., 2017; Silpachai, 2023; Silpachai & Siengthai, 2023; Williamson, 1987; Yammesri & Herath, 2010; Yasser et al., 2017).

Board size (code: BD_SIZE) was operationally defined as 'Number of Directors on the company's board. One-third of the board must be independent directors and have at least three persons. The board must include at least three audit committee members.' Theories involving board size are agency, stakeholders, transactional cost economics, stewardship, and resource dependency theory.

The literature that has applied **board size** as a study variable includes (Alareeni & Hamdan, 2020; Alhassan et al., 2021; Abid et al., 2014; Alves et al., 2015; Ajina et al., 2013; Cormier et al., 2009; Donaldson & Davis, 1991; Freudenreich et al., 2019; Goh et al., 2016; Harrison & Wicks, 2013; Keay, 2017; Kumar & Zattoni, 2013; Liu et al., 2018; Lückerrath-Rovers, 2013; Panda & Leepsa, 2017; Reguera-Alvarado et al., 2017; Silpachai, 2023; Silpachai & Siengthai, 2023; Verbeke & Kano, 2012; Williamson, 1987; Yammesri & Herath, 2010; Yasser et al., 2017).

The details regarding the definitions of the selected independent variables, dependent variables, and equation formulations were based on the literature review and can be found in Table 2.

The study utilizes panel data of companies of the SET index for nine years between 2014 and 2022. The analysis is based on panel data regression. The panel data method is based on the technique specified by De Jager (2008). The model setup is based on the following equation format:

$$y_{it} = \beta_0 + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + \varepsilon_{its}$$

Whereby: y , is the dependent variable. 'i' denotes the number of firms, and 't' denotes the time (year) ' $x_1, x_2 \dots x_k$ ', are independent and control variables. ' β_0 ' is the intercept. ' $\beta_1, \beta_2 \dots \beta_k$ ' are coefficients representing the effects of the independent variable, x relative to the dependent variable, y . ε_{it} , is the residual.

With **equations #1.1 and #1.2**, the analysis will be conducted on the relationship between CG and FP to test:

H1: *There is a positive relationship between CG and FP,*

H1a: *Board independence is positively related to FP,*

H1b: *Board size is positively related to FP,*

H1c: *Institutional ownership is positively related to FP,*

H1d: *Dividend policy is positively related to FP,*

H1e: *Financial leverage is positively related to FP.*

In this study, FP is represented by accounting-based measures of return on equity (ROE) to gauge financial performance and return on assets (ROA) to gauge operational performance. Hence,

$$\begin{aligned} ROE_{it} = & \beta_0 + \beta_1 BD_IND_{it} + \beta_2 BD_SIZE_{it} + \beta_3 INS_OWN_{it} \\ & + \beta_4 \ln DIV_PAY_{it} + \beta_5 LEVERAGE_{it} \\ & + \beta_6 \ln FIRMSIZE_{it} + \beta_7 TIME_{it} + \beta_8 INDUSTRY_{it} \\ & + \beta_9 NOM_GDP_{it} + \beta_{10} COVID + \varepsilon_{it} \end{aligned} \quad (1.1)$$

$$\begin{aligned} ROA_{it} = & \beta_0 + \beta_1 BD_IND_{it} + \beta_2 BD_SIZE_{it} + \beta_3 INS_OWN_{it} \\ & + \beta_4 \ln DIV_PAY_{it} + \beta_5 LEVERAGE_{it} \\ & + \beta_6 \ln FIRMSIZE_{it} + \beta_7 TIME_{it} + \beta_8 INDUSTRY_{it} \\ & + \beta_9 NOM_GDP_{it} + \beta_{10} COVID + \varepsilon_{it} \end{aligned} \quad (1.2)$$

Independent variables measuring CG mechanisms include board independence (BD_IND), board size (BD_SIZE), institutional ownership (INS_OWN), dividend pay-out (DIV_PAY), and financial leverage (LEVERAGE). Several control variables were used as follows: firm size (FIRMSIZE, to control for economies of scale); time (TIME, to control for time-fixed effects); industry (INDUSTRY, to control for microeconomic effects, industry regulations, and industry attributes that may affect CG, IA, and/or FP) and nominal GDP

Table 2. Variables, their codes, operational definitions, and theoretical support/references.

Variables	Code	Operational definition	Theoretical support /literature reference
Board independence	BD_IND	The ratio of independent directors to board size. An independent director is a director holding not more than 1% of voting shares including relatives, who have never been or are the company's executive director, worker, employee, and consultant. Source: SETSMART, authors' calculation.	Agency theory, stakeholders' theory, transactional cost economics, stewardship theory, and resource dependency theory. Literature references: (Abid et al., 2014; Ajina et al., 2013; Alareeni & Hamdan, 2020; Alhassan et al., 2021; Alves et al., 2015; Cormier et al., 2009; Donaldson & Davis, 1991; Eisenhardt, 1989; Freudenreich et al., 2019; Goh et al., 2016; Harrison & Wicks, 2013; Jensen & Meckling, 1976; Keay, 2017; Kumar & Zattoni, 2013; Liu et al., 2018; Lücknerath-Rovers, 2013; Panda & Leepsa, 2017; Reguera-Alvarado et al., 2017; Silpachai & Siengthai, 2023; Silpachai, 2023; Verbeke & Kano, 2012; Williamson, 1987; Yammeesri & Herath, 2010; Yasser et al., 2017)
Board size	BD_SIZE	Number of Directors on the company's board. One-third of the board must be independent directors and have at least 3 persons. The board must include at least 3 audit committee members. Source: SETSMART.	Agency theory, stakeholders' theory, transactional cost economics, stewardship theory, and resource dependency theory. Literature references: (Abid et al., 2014; Ajina et al., 2013; Alareeni & Hamdan, 2020; Alhassan et al., 2021; Alves et al., 2015; Cormier et al., 2009; Donaldson & Davis, 1991; Freudenreich et al., 2019; Goh et al., 2016; Harrison & Wicks, 2013; Keay, 2017; Kumar & Zattoni, 2013; Liu et al., 2018; Lücknerath-Rovers, 2013; Panda & Leepsa, 2017; Reguera-Alvarado et al., 2017; Silpachai & Siengthai, 2023; Silpachai, 2023; Verbeke & Kano, 2012; Williamson, 1987; Yammeesri & Herath, 2010; Yasser et al., 2017)
Institutional ownership	INS_OWN	Percentage of shares outstanding held by institutions. Source: Bloomberg.	Agency theory, stakeholders' theory, and stewardship theory. Literature references: (Doukas et al., 2000; Joher et al., 2006; Knyazeva, 2007; Kumar & Zattoni, 2013; Silpachai, 2023; Thanatawee, 2014; Thomsen & Pedersen, 2000)
Dividend payout	DIV_PAY	This includes dividends paid out as cash disbursements for both common shareholders and preferred shareholders. It includes dividends paid to minority interests and dividends paid by subsidiaries if they are not disclosed separately. The natural log of dividend payments was applied. Source: Bloomberg.	Agency cost of free cashflow hypothesis, stakeholders' theory, stewardship theory, and signaling theory. Literature references: (Doukas et al., 2000; Fairchild et al., 2014; Jensen, 1986; Jiang & Kim, 2015; Joher et al., 2006; Knyazeva, 2007; Kumar & Zattoni, 2013; La Porta et al., 2000; Silpachai, 2023; Taleb, 2019; Thanatawee, 2014; Thomsen & Pedersen, 2000)
Financial leverage	LEVERAGE	Measures the average assets to average equity. Source: Bloomberg.	Agency theory stakeholders' theory. Literature references: (Jensen, 1986; Williamson, 1987; La Porta et al., 2000; Thomsen & Pedersen, 2000; Doukas et al., 2000; Jensen & Smith, 2000; Joher et al., 2006; Chen et al., 2007; Knyazeva, 2007; Cormier et al., 2009; Yammeesri & Herath, 2010; Mustapha & Che Ahmad, 2011; Kumar & Zattoni, 2013; Fairchild et al., 2014; Thanatawee, 2014; Alves et al., 2015; Jiang & Kim, 2015; Ilyukhin, 2015; Fosu et al., 2016; Utama et al., 2017; Yasser et al., 2017; Farrukh et al., 2017; Liu et al., 2018; Taleb, 2019; Alareeni & Hamdan, 2020; Alhassan et al., 2021; Silpachai, 2023)
Firm size	FIRMSIZE	The total of all short and long-term assets, as reported on the balance sheet. The natural log of firm size was applied as a control variable. Source: Bloomberg.	Literature references: (Alareeni & Hamdan, 2020; Alhassan et al., 2021; Alves et al., 2015; Chen et al., 2007; Jiang & Kim, 2015; Joher et al., 2006; Liu et al., 2018; Mustapha & Che Ahmad, 2011; Silpachai, 2023; Thanatawee, 2014; Yammeesri & Herath, 2010; Yasser et al., 2017)

(continued)

Table 2. Continued.

Variables	Code	Operational definition	Theoretical support /literature reference
Time	TIME	Control variable for time. Unit is the calendar year of the data available. Source: Bloomberg.	Literature references: (Alves et al., 2015; Liu et al., 2018; Silpachai, 2023; Thanatawee, 2014)
Industry	INDUSTRY	Dummy control variable ranging from 10 to 60 in our sample. This is based on the Global Industry Classification Standard (GICS) consists of 11 sectors, 24 industry groups, 62 industries, and 132 sub-industries. GICS is an industry classification standard developed by MSCI in collaboration with Standard & Poors (S&P). Source: Bloomberg.	Literature references: (Alves et al., 2015; Liu et al., 2018; Reguera-Alvarado et al., 2017; Silpachai, 2023; Thanatawee, 2014; Thomsen & Pedersen, 2000; Yammeesri & Herath, 2010)
Nominal GDP	NOM_GDP	Gross domestic product (GDP) measures the final market value of all goods and services produced within a country. Nominal GDP is not adjusted for inflation. The GDP growth rate was applied as a control variable. Source: Bloomberg.	Literature references: (Alves et al., 2015; Alvarado et al., 2017; Reguera-Silpachai, 2023)
COVID Dummy	COVID	COVID dummy variable to control effects of COVID (0 = Pre-Covid, 1 = Post-COVID)	Literature references: (Zamfir & Iordach, 2022)
Return on equity	ROE	A measure of a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested, in percentage, calculated as (net income available for common shareholders / average total common equity) x 100 Source: Bloomberg.	Agency theory, stakeholders' theory, transactional cost economics, stewardship theory, and resource dependency theory. Literature references: (Alareeni & Hamdan, 2020; Alhassan et al., 2021; Farrukh et al., 2017; Hutchinson & Gul, 2004; Ilyukhin, 2015; Silpachai, 2023; Thomsen & Pedersen, 2000)
Return on assets	ROA	Indicator of how profitable a company is relative to its total assets, in percentage. Return on assets gives an idea of how efficient management is at using its assets to generate earnings. Source: Bloomberg.	Agency theory, stakeholders' theory, transactional cost economics, stewardship theory, and resource dependency theory. Literature references: (Alareeni & Hamdan, 2020; Alhassan et al., 2021; Alves et al., 2015; Fairchild et al., 2014; Goh et al., 2016; Hsu et al., 2021; Ilyukhin, 2015; Jiang & Kim, 2015; Knyazeva, 2007; Liu et al., 2018; Mustapha & Che Ahmad, 2011; Silpachai, 2023; Thanatawee, 2014; Thomsen & Pedersen, 2000; Yammeesri & Herath, 2010)
Analyst coverage	ANALYST	The total number of analysts making recommendations for the securities. Source: Bloomberg.	Agency theory, stakeholders' theory, and stewardship theory. Literature references: (Barth et al., 2013; Bergh et al., 2019; Cormier et al., 2009; Cui et al., 2018; Di Maggio & Pagano, 2018; Doukas et al., 2000; Frankel & Li, 2004; Hamrouni et al., 2017; Knyazeva, 2007; Silpachai, 2023; Yu, 2010)

This table provides information on the variables used in the study, their codes, operational definitions, and theoretical references.

(NOM_GDP, to control for macroeconomic effects); COVID dummy variables, to control the effects of COVID (0 = Pre-Covid, 1 = Post-COVID)

Equation #2.0 examines the relationship between CG and IA constructs to test:

H2: *There is a negative relationship between CG and IA*

$$\text{ANALYST}_{it} = \beta_0 + \beta_1 \text{BD_IND}_{it} + \beta_2 \text{BD_SIZE}_{it} + \beta_3 \text{INS_OWN}_{it} + \beta_4 \ln \text{DIV_PAY}_{it} + \beta_5 \text{LEVERAGE}_{it} + \varepsilon_{it} \quad (2.0)$$

ANALYST is used to represent IA, in which higher ANALYST equates to lower IA and vice versa. Therefore, a positive coefficient of CG mechanism relative to ANALYST signifies lower IA. Independent

variables measuring CG mechanisms include board independence (BD_IND), board size (BD_SIZE), institutional ownership (INS_OWN), dividend pay-out (DIV_PAY), and financial leverage (LEVERAGE).

Equations #3.1 and #3.2 examine the relationship between IA and FP constructs to test:

H3: *There is a negative relationship between IA and FP*

$$ROE_{it} = \beta_0 + \beta_1 ANALYST_{it} + \varepsilon_{it} \quad (3.1)$$

$$ROA_{it} = \beta_0 + \beta_1 ANALYST_{it} + \varepsilon_{it} \quad (3.2)$$

Where FP variables will be represented by ROE and ROA. ANALYST is used to represent IA, in which higher ANALYST equates to lower IA and vice versa. Therefore, a positive coefficient of CG mechanism relative to ANALYST signifies lower IA.

Equation #4.1 and #4.2 was formulated to test this hypothesis:

H4: *There is an interaction effect between CG mechanisms and analyst coverage (IA) which is positively related to FP.*

$$ROE_{it} = \beta_0 + \beta_1 (ANALYST_{it} \times CG_{it}) + \beta_2 \ln FIRM SIZE_{it} + \beta_3 TIME_{it} + \beta_4 INDUSTRY_{it} + \beta_5 NOM_GDP_{it} + \beta_6 COVID + \varepsilon_{it} \quad (4.1)$$

$$ROA_{it} = \beta_0 + \beta_1 (ANALYST_{it} \times CG_{it}) + \beta_2 \ln FIRM SIZE_{it} + \beta_3 TIME_{it} + \beta_4 INDUSTRY_{it} + \beta_5 NOM_GDP_{it} + \beta_6 COVID + e_{it} \quad (4.2)$$

The interaction variable '(ANALYST_{it} × CG_{it})' is specifically created to test if there are interactions between the CG variable and analyst coverage that are significantly related to FP. Note that CG_{it} would be represented by BD_IND, BD_SIZE, INS_OWN, DIV_PAY, and LEVERAGE. The literature has suggested including the independent variables, ie CG and ANALYST, in the above equation (Andersson et al., 2014). However, our study has found that the inclusion of these two variables in equation #4 would result in multicollinearity (the variables generated variance inflation factors, VIF of greater than a value of 5) with the interaction variable '(ANALYST_{it} × CG_{it})' and hence were omitted.

3.4. Regression analysis methodology

Our study utilized the Statistics/Data Analysis program – STATA. The study first calculated descriptive statistics and the pairwise correlations of the variables, see Table 3. COVID and INDUSTRY were excluded from descriptive statistics and pairwise correlation as they were assigned as a dummy variable/numerical identifier.

Subsequently, 3SLS regressions were performed for equations #1.1, #1.2, #2.0, #3.1, and #3.2 to assess their simultaneous relationships. Our study involves the relationship between ANALYST and FP. It could lead to potential endogeneity and reverse causality issues whereby ANALYST is motivated to cover firms with better FP rather than ANALYST facilitating firms to generate higher FP. Hence, we applied the 3SLS method to obtain more efficient estimates and robust test results (Chen et al., 2007).

Variables of FP (ie ROE and ROA) were endogenous. CG variables (ie BD_IND, BD_SIZE, INS_OWN, DIV_PAY, and LEVERAGE) and control variables (ie FIRM SIZE, TIME, NOM_GDP, COVID and INDUSTRY) were exogenous. IA variable, ANALYST, was endogenous for equation #2 and exogenous for equation #3.

The following command was used to generate the 3SLS regression results:

```
reg3 (ROE = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE FIRM SIZE TIME INDUSTRY COVID NOM_GDP)
      (ROA = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE FIRM SIZE TIME INDUSTRY COVID NOM_GDP)
      (ANALYST = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE)
      (ROE = ANALYST)(ROA = ANALYST)
```

4. Findings and discussion

This section discusses the descriptive statistics (Table 3) and the 3SLS results of the panel data analysis (see Table 4) for H1, H2, and H3.

Table 3. Descriptive statistics and correlation matrix of data collected.

Descriptive Statistics					
Variable	Obs	Mean	Std. Dev	Min	Max
BD_IND	3,692	36.33	16.15	0.00	100.00
BD_SIZE	3,692	9.34	3.99	0.00	21.00
INS_OWN	3,692	13.73	19.06	0.00	99.11
DIV_PAY	3,692	5.29	1.92	0.00	11.36
LEVERAGE	3,692	2.33	1.77	1.00	21.03
FIRMSIZE	3,692	9.12	1.70	5.83	15.30
INDUSTRY	3,692	34.76	16.13	10.00	60.00
TIME	3,692	2,017.74	2.49	2,014.00	2,022.00
COVID	3,692	0.28	0.45	0.00	1.00
NOM_GDP	3,692	3.56	3.96	−7.30	7.40
ROE	3,692	10.10	13.50	−116.08	113.16
ROA	3,692	5.48	6.99	−81.43	63.39
ANALYST	3,692	4.65	7.69	0.00	34.00

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) BD_IND	1										
(2) BD_SIZE	0.541*	1									
(3) INS_OWN	0.133*	0.205*	1								
(4) DIV_PAY	0.071*	0.220*	0.255*	1							
(5) LEVERAGE	0.133*	0.225*	0.153*	0.181*	1						
(6) FIRMSIZE	0.192*	0.375*	0.328*	0.706*	0.554*	1					
(7) TIME	0.081*	0.034*	−0.011	0.046*	−0.012	0.109*	1				
(8) NOM_GDP	−0.021	−0.015	−0.003	0.003	−0.011	−0.019	−0.159*	1			
(9) ROE	0.016	0.049*	0.067*	0.370*	−0.013	0.082*	−0.080*	0.057*	1		
(10) ROA	−0.023	−0.014	0.023	0.290*	−0.254*	−0.086*	−0.075*	0.069*	0.843*	1	
(11) ANALYST	0.174*	0.305*	0.198*	0.635*	0.322*	0.714*	−0.011	0.005	0.219*	0.096*	1

BD_SIZE is board size. BD_IND is board independence. INS_OWN is institutional ownership. DIV_PAY is a dividend payment. LEVERAGE is financial leverage. ANALYST is analyst coverage. ROA is the return on assets. ROE is the return on equity. FIRMSIZE is firm size. TIME is the year of the data points. NOM_GDP is nominal GDP. The sample period is between 2014 and 2022 and was selected based on data availability. * is significant at 90% level or higher. INDUSTRY and COVID were excluded as the variables were assigned as a numerical identifier ie dummy variables and not as a numerical value.

The descriptive statistics in Table 3 show some interesting observations. DIV_PAY and FIRMSIZE have a correlation of 0.706. This could indicate that larger firms could pay larger dividends. FIRMSIZE and LEVERAGE have a correlation of 0.554; this could suggest that larger firms are more able to access debt capital markets. ANALYST and FIRMSIZE have a correlation of 0.714; this could indicate that larger firms have larger market capitalization and generate greater commissions for analyst coverage by stock brokerages. ANALYST and DIV_PAY have a correlation of 0.635; this could indicate analyst coverage preference for firms that pay larger dividends.

4.1. H1: CG is positively related to FP

In Panel A of Table 4, we provide the regression results to test the formulated hypotheses: H1, H1a, H1b, H1c, H1d, and H1e. The Chi-squared values of the regression for the dependent variable ROE and ROA were 1,096.62 and 603.68, respectively, indicating the 3SLS regression results of equations #1.1 and #1.2 were all significant at the 99% level. The following discusses the results of the specific independent variables relative to FP.

4.1.1. Board independence (BD_IND) and board size (BD_SIZE)

The results show that the BD_IND independent variable was positively and significantly related to FP. The unit of BD_IND is the percentage of board independence. The coefficient of BD_IND relative to ROE was 0.0137%, significant at the 95% level (therefore, a 1% change in board independence equates to a 0.0137% change in ROE). The coefficient of BD_IND relative to ROA was 0.0028% but was not significant at the 90% level. These findings partially support H1a: Board independence is positively related to FP. The unit for the independent variable, BD_SIZE is the number of directors on the board. The regression-generated coefficient of BD_SIZE relative to ROE was 0.1356%, significant at the 99% level (implying that

Table 4. 3SLS Regression Results.

Equation	Panel A. to test H1, H1a,b,c,d,e		Panel B to test H2 #2.0	Panel C to test H3	
	#1.1	#1.2		#3.1	#3.2
DEPENDENT	ROE	ROA	ANALYST	ROE	ROA
VARIABLES					
EXPLANATORY	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/
VARIABLES	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)
BD_IND	0.0137** (2.000)	0.0028 (0.740)	0.0231*** (3.490)		
BD_SIZE	0.1356*** (4.580)	0.0415** (2.460)	0.1916*** (6.880)		
INS_OWN	0.0052 (1.010)	0.0045 (1.560)	−0.0032 (−0.660)		
DIV_PAY	2.2062*** (31.410)	0.9049*** (21.470)	2.342*** (46.390)		
LEVERAGE	0.4772*** (7.620)	−0.0024 (−0.070)	0.9225*** (17.450)		
ANALYST				0.5157*** (13.740)	0.0757*** (3.810)
FIRMSIZE	−1.1557*** (−9.970)	−0.8022*** (−11.920)			
TIME	−0.1112** (−2.170)	−0.0773** (−2.190)			
INDUSTRY	−0.0038 (−0.790)	−0.0047 (−1.400)			
NOM_GDP	0.0615*** (2.880)	0.0446*** (3.030)			
COVID	0.8478*** (2.720)	0.5955*** (2.770)			
INTERCEPT	230.1307** (2.230)	163.1996** (2.290)	−12.4669*** (−36.600)	7.7005*** (27.670)	5.132*** (34.890)
Adjusted R2	0.152	0.150	0.466	0.043	0.009
Chi2	1096.620	603.680	3398.540	188.690	14.530
N	3,692	3,692	3,692	3,692	3,692

***, **, * significant at 99%, 95%, 90% level, respectively. This table shows the results of the 3SLS panel regression on the system of three equations. ROE is the return on equity, a dependent variable. ROA is the return on asset, a dependent variable. ANALYST is the total number of analysts making recommendations for the security, a dependent variable. The following are independent variables: (1) BD_IND is board independence (2) BD_SIZE is board size (3) INS_OWN is institutional ownership (4) DIV_PAY is dividend payment (5) LEVERAGE is financial leverage (6) TIME is a control variable, the calendar year of the data point (7) INDUSTRY is a dummy control variable based on Global Industry Classification Standard (GICS) (8) NOM_GDP is a control variable, nominal economic growth (9) COVID dummy variable to control effects of COVID (0 = Pre-Covid, 1 = Post-COVID). The STATA command to generate the regression is as follows: reg3 (ROE = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE FIRMSIZE TIME INDUSTRY COVID NOM_GDP) (ROA = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE FIRMSIZE TIME INDUSTRY COVID NOM_GDP) (ANALYST = BD_IND BD_SIZE INS_OWN DIV_PAY LEVERAGE) (ROE = ANALYST) (ROA = ANALYST).

a one-member change in the board size would equate to a 0.1356% change in ROE). Meanwhile, the coefficient of BD_SIZE relative to ROA was 0.0415%, significant at the 95% level (ie a one-member change in the board size would equal a 0.0415% increase in ROA). Overall, these results support the following hypotheses: *H1a: Board independence is positively related to FP; and H1b: Board size is positively related to FP.*

Our empirical results are similar to studies in South Africa (Alareeni & Hamdan, 2020) which found that board size was positively related to FP, ie additional members on the board would increase ROA by between 0.022% and 0.156% and increase ROE by 0.027% to 0.368%. Studies in Pakistan (Yasser et al., 2017) discovered a positive and significant relationship between board size and FP (measured by ROA, Tobin's Q, and EVA [economic value added]).

The findings are consistent with previous studies (Alareeni & Hamdan, 2020; Alves et al., 2015; Detthamrong et al., 2017; Kumar & Zattoni, 2013; Silpachai, 2023; Silpachai & Siengthai, 2023; Yasser et al., 2017). These results support the resource dependency theory and agency theory.

4.1.1.1. Institutional ownership (INS_OWN). The generated coefficient of INS_OWN relative to FP was positive relative to ROE and ROA but was not significant at the 90% level. These results did not support *H1c: Institutional ownership is positively related to FP.* Prior studies of Thai institutional ownership can help explain such results. Studies in Thailand (Thanatawee, 2014) found that equity ownership by domestic institutional investors increases firm value, whereas higher foreign institutional ownership decreases corporate value. Other studies (Suehiro & Wailerdsak, 2004) found that a majority of Thai

family business groups utilize pyramid structures (eg institutional ownership) to retain control of both ownership and management. However, our results differed from some studies (Knyazeva, 2007) that found a 1.7 percent increase in industry-adjusted return on assets (ROA) for every 10% increase in the value of institutional ownership.

4.1.1.2. Dividends (DIV_PAY). The generated positive coefficients of DIV_PAY relative to FP were all significant at the 99% level. The natural log of DIV_PAY equates to 2.2062% for ROE and 0.9049% for ROA. This finding supports *H1d: Dividend policy is positively related to FP*. Our findings are similar to a study in Pakistan (Farrukh et al., 2017), which found that dividends are positively associated with a firm's expected performance ie ROE increases by 0.006 units for every unit increase in dividend per share. Furthermore, our results are consistent with that of studies (Fairchild et al., 2014; Jensen, 1986; Taleb, 2019), which support the agency cost of free cash flow hypothesis and signaling theory.

4.1.1.3. Leverage (LEVERAGE). The generated coefficients of LEVERAGE relative to ROE were positive and significant at the 99% level. A 1X increase in financial leverage would increase ROE by 0.4772%. Conversely, the coefficient of LEVERAGE to ROA was negative but was not significant at the 90% level. This finding partially supports *H1e: Financial leverage is positively related to FP*, consistent with past studies (Jensen & Smith, 2000; Joher et al., 2006; Mustapha & Che Ahmad, 2011; Utama et al., 2017). In the US (Gill & Obradovich, 2012), studies found a positive (coefficient of 6.834) and significant relationship between financial leverage (defined as total liabilities/total assets) and Tobin's Q.

FIRMSIZE generated coefficients relative to FP, which were all negative (−1.1557% for ROE and −0.8022% for ROA) and were all significant at the 99% level. This finding indicates that smaller firms outperformed larger firms in generating FP.

4.1.1.4. Time. The control variable, TIME, generated negative coefficients (−0.1112% for ROE and −0.0773% for ROA) and were significant at the 95% level, indicating a downtrend of Thai firms in producing FP. Bloomberg data indicated that the broader Thai stock market generated a peak ROA of 3.4% in 2018 and declined to 2.5% by 2019, while ROE peaked at 12.8% in 2014 and declined to 9.2% by 2019.

4.1.1.5. Industry. The control dummy variable – INDUSTRY- is a dummy value based on the Global Industry Classification Standard: GICS, ranging from 10 to 60). ROE and ROA were not found to be significantly associated with INDUSTRY, ie firm performance was not specific to industry characteristics.

4.1.1.6. Nominal GDP. The variable NOM_GDP was used to control for macroeconomic effects and was significantly related to ROE and ROA at the 99% level.

4.1.1.7. COVID. The COVID variable was used as a dummy variable to control for the effects of the COVID-19 pandemic, ie 0 = Pre-Covid data (before 2020) and 1 = Post-Covid data (2020 thereafter). Our results find that COVID was significantly related to FP at the 99% level.

4.2. H2: CG is negatively related to IA

Equation #2.0 (IA is the dependent variable while CG mechanisms and controls were the independent variables) was used to test the following hypotheses:

H2: *There is a negative relationship between CG and IA*

To test these hypotheses, we provide the regression results in Panel B of Table 4. The Chi-squared value of equation #2.0 was 3398.54 and is significant at the 99% level. The following discusses the results of the specific independent variables relative to IA (analyst coverage).

BD_IND (board independence) generated positive coefficients of about 0.02310 with ANALYST. The coefficients indicate that board independence of 43.29% (the reciprocal of 0.231) would be associated with one analyst coverage of the firm/stock. This result supports H2: *There is a negative relationship between CG and IA*, and it

is consistent with past studies (Goh et al., 2016), which found greater board independence leads to increased management forecast frequency and broader analyst coverage. The study found that the coefficient of board independence related to analyst coverage was 0.01908, significant at the 99% level. This finding would indicate that a 52% change in board independence would be associated with one analyst coverage.

Our finding is also similar to studies in Estonia, Poland, Hungary and Romania (Mateescu, 2015) which found that board independence is related to higher levels of disclosure to all stakeholders (eg General Meeting's resolutions) that ensures continuous care is applied for the firm's sustainable growth. Also, they discovered that firms with larger audit committees disclose more financial and non-financial information.

BD_SIZE (board size) was found to be significantly related to ANALYST at the 99% level, supporting H2: *There is a negative relationship between CG and IA*. The generated coefficient was 0.1916, indicating that a 5.22-member change in the board size would be associated with a one-analyst increase in the firm's coverage. These results are similar to past studies (Flaherty et al., 2007) which found that board size is negatively related to IA ie larger board size are positively associated with larger analyst coverage. Our finding is comparable to studies in Canada (Cormier et al., 2009) and in France (Ajina et al., 2013), which found that board size is negatively related to IA (measured by share price volatility).

INS_OWN (institutional ownership) generated negative coefficients with respect to ANALYST but was significant at the 90% level. This finding did not support H2 and could be attributed to the fact that the vast majority of Thai family business groups utilize pyramid structures (eg institutional ownership) to retain control of both ownership and management via institutional ownerships/cross holdings, as discussed by some previous studies (Suehiro & Wailersak, 2004; Thanatawee, 2014) Such pyramid structures might have discouraged analyst coverage due to opacity issues.

Our results are comparable to studies in other countries, such as in the UK (Wang, 2014) and China (Lin & Fu, 2017), where positive relationships between higher institutional ownership and firm performance were found as greater institutional ownership creates demand for analyst coverage for their holdings to serve as information intermediaries, enhancing transparency and also enhancing shareholder value by reducing inefficiencies related to insider ownership.

DIV_PAY (dividends) generated a positive coefficient for ANALYST and were 99% significantly associated with ANALYST. These results support H2. The natural log of DIV_PAY equates to a 2.342 change in analyst coverage. This positive relationship between ANALYST and DIV_PAY is consistent with the study by past studies (Basiddiq & Hussainey, 2012; Fairchild et al., 2014), which found evidence of the 'free cash flow hypothesis,' ie higher dividend payments are positively linked to greater analyst coverage which enhances transparency. This result is consistent with findings from other past studies (Lin & Fu, 2017). In China, studies (Liu et al., 2018) when IA is higher, dividend payout will be lower.

LEVERAGE generated a positive coefficient relative to ANALYST, which was significant at the 99% level. These results support H2 as LEVERAGE reflects its role as a monitoring tool. This result is consistent with past studies (Joher et al., 2006; Mustapha & Che Ahmad, 2011). For example, leverage had a negative coefficient of -0.502 for insider shareholding (Mustapha & Che Ahmad, 2011).

4.3. H3: IA is negatively related to FP

In Panel C of Table 4, we provide the regression results for the H3 hypothesis, which states a negative relationship between IA and FP. The Chi-squared values of the regression for the dependent variable ROE and ROA were 188.690 and 14.530, respectively, indicating the 3SLS regression results of equations #3.1 and #3.2 were all significant at the 99% level. The following discusses the regression results of ANALYST and control variables relative to FP.

The relationship between **ANALYST** and FP was all positive and significant at the 99% level, supporting H3.

The coefficients for ANALYST relative to ROE and ROA were 0.5157% and 0.0757%, respectively. This finding indicates that an additional analyst coverage would be associated with an increase in a firm's ROE by 0.5157% and its ROA by 0.0757%. These results are similar to a past study (Knyazeva, 2007), which found that the number of analysts is significantly related to FP, ie ten additional analysts increase industry-adjusted accounting ROA of up to 3.0%. Meanwhile, another study (Shiah-Hou, 2016) found a positive and significant relationship between analyst coverage, firms' ROA, and CEO pay-for-performance sensitivity, whereby the coefficient between a firm's lagged ROA and analyst coverage was a positive

2.08%, significant at the 90% level. Furthermore, our finding is consistent with other studies (Hsu et al., 2021) that IA adversely affects FP.

4.4. H4: There is an interaction effect between CG mechanisms and analyst coverage (IA), which is positively related to FP

Table 5 shows the coefficients of the interaction variables, t-statistics, and significance levels of equation #4. The dependent variables for this test were the two metrics of FP: ROE to measure financial performance and ROA to measure operational performance. The primary independent variable of interest is the interaction effects between IA and CG on FP:

1. ANALYST $\times$ BD_SIZE,
2. ANALYST $\times$ BD_IND,
3. ANALYST $\times$ INS_OWN,
4. ANALYST $\times$ DIV_PAY, and
5. ANALYST $\times$ LEVERAGE

The column with the coefficients and t-statistics shows that the relationships between IA and CG on FP were positive and significant at the 99% level. This finding provides evidence that analyst coverage both mediates and moderates the relationship between CG mechanisms and firm performance. Such findings support H4: *There is an interaction effect between CG mechanisms and analyst coverage (IA) which is positively related to FP*. The only exception was the interaction effects of ANALYST $\times$ LEVERAGE on ROA, which gave a negative coefficient but was not significant at the 90% level.

4.5. Comparison of 3SLS to other estimators

To assess the robustness of our 3SLS results with other estimators, eg Ordinary Least Square (OLS) and 2SLS (Two-Stage Least Squares), we have provided a comparison in Table 6 with some key observations:

- For equation #1.1, where the dependent variable is ROE, and the independent variable is BD_IND, the 3SLS results show that BD_IND is positively and significantly related to ROE, supporting H1a. Conversely, the OLS and 2SLS results were not significantly related.
- For equation #1.2, the 3SLS results show that BD_IND is positively and significantly related to ROA, supporting H1a. Meanwhile, the results of OLS and 2SLS were not significant at the 90% level.
- For equation #1.2, the 3SLS results showed that INS_OWN was not significantly related to ROA and does not support H1c. Meanwhile, the results of OLS and 2SLS were positively and significantly associated with ROA and supported H1c.
- For equation #2.0, the 3SLS found that INS_OWN was negatively and significantly related to ANALYST, not supporting H3. Meanwhile, the OLS and 2SLS results were negative but not significant.

Table 5. Regression to test interaction effects.

Dependent FP variable	Interaction variable	Coefficient	t-statistics	Significance level
ROE	ANALYST $\times$ BD_SIZE	0.0310***	9.6400	99%
ROA	ANALYST $\times$ BD_SIZE	0.0170***	10.0600	99%
ROE	ANALYST $\times$ BD_IND	0.0090***	10.6500	99%
ROA	ANALYST $\times$ BD_IND	0.0050***	10.7600	99%
ROE	ANALYST $\times$ INS_OWN	0.0140***	11.3200	99%
ROA	ANALYST $\times$ INS_OWN	0.0060***	9.7200	99%
ROE	ANALYST $\times$ DIV_PAY	0.0720***	14.7000	99%
ROA	ANALYST $\times$ DIV_PAY	0.0350***	13.7800	99%
ROE	ANALYST $\times$ LEVERAGE	0.0340***	4.4600	99%
ROA	ANALYST $\times$ LEVERAGE	-0.0020	-0.4000	

This table is part of the regression results to test H4: There is an interaction effect between CG mechanisms and analyst coverage (IA) which is positively related to FP. The interaction variable '(ANALYST_{it} $\times$ CG_{it})' is specifically to test if there are interactions between the CG variable and analyst coverage that are significantly related to FP. Note that the variable CG_{it} would be represented by: BD_IND, BD_SIZE, INS_OWN, DIV_PAY, and LEVERAGE.

Table 6. Comparison of results of different estimators.

Estimator	OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS
Equation	#1.1	#1.1	#1.1	#1.2	#1.2	#1.2	#2.0	#2.0	#2.0	#3.1	#3.1	#3.1	#3.2	#3.2	#3.2
DEPENDENT	ROE	ROE	ROE	ROA	ROA	ROA	ANALYST	ANALYST	ANALYST	ROE	ROE	ROE	ROA	ROA	ROA
VARIABLES															
EXPLANATORY	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/	Coefficients/
VARIABLES	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)	(t-statistics)
BD_IND	0.0237	0.0237	0.0140**	0.0063	0.0063	0.0070*	0.0235***	0.0235***	0.0235***	0.0210***	0.0210***	0.0210***			
BD_SIZE	1.61	1.61	2.08	0.85	0.85	1.76	3.44	3.44	3.44	3.41	3.41	3.41			
INS_OWN	0.1292**	0.1292**	0.0530*	0.053	0.053	0.0250	0.2134***	0.2134***	0.2134***	0.0550**	0.0550**	0.0550**			
DIV_PAY	2.00	2.00	1.78	1.64	1.64	1.53	7.43	7.43	7.43	1.99	1.99	1.99			
LEVERAGE	0.0159	0.0159	-0.0080	0.0095*	0.0095*	-0.0040	-0.0025	-0.0025	-0.0025	-0.0230***	-0.0230***	-0.0230***			
ANALYST	1.44	1.44	-1.63	1.74	1.74	-1.34	-0.48	-0.48	-0.48	-4.94	-4.94	-4.94			
	4.7355***	4.7355***	1.4960***	2.4062***	2.4062***	0.8160***	2.3105***	2.3105***	2.3105***	1.1920***	1.1920***	1.1920***			
	30.35	30.35	20.69	30.85	30.85	20.18	45.09	45.09	45.09	18.01	18.01	18.01			
	0.8497***	0.8497***	-0.1250*	-0.4141***	-0.4141***	-0.1690***	0.8139***	0.8139***	0.8139***	-0.2390***	-0.2390***	-0.2390***			
	5.92	5.92	-1.91	-5.77	-5.77	-4.62	14.97	14.97	14.97	-3.93	-3.93	-3.93			
										0.3852***	0.4493***	0.5157***	0.0872***	0.0611***	0.0757***
										13.66	11.93	13.74	5.86	3.08	3.81
FIRMSIZE	-3.7946***	-3.7946***	-0.4670***	-2.0926***	-2.0926***	-0.8970***									
TIME	-17.06	-17.06	-3.21	-18.82	-18.82	-11.82									
	-0.814***	-0.814***	-0.2630***	-0.406***	-0.406***	-0.1310***									
INDUSTRY	-5.72	-5.72	-3.99	-5.71	-5.71	-2.75									
	0.0075	0.0075	0.0010	-0.016**	-0.016**	-0.0160**									
NOM_GDP	0.55	0.55	0.07	-2.37	-2.37	-2.56									
	0.2793***	0.2793***	0.1800***	0.164***	0.164***	0.1230***									
COVID	4.69	4.69	3.21	5.51	5.51	4.3									
	3.8195***	3.8195***	0.2980	2.0693***	2.0693***	0.4700									
	4.4	4.4	0.5	4.77	4.77	1.37									
INTERCEPT	1655.5216***	1655.5216***	535.9540***	830.5077***	830.5077***	274.3660***	-12.2769***	-12.2769***	-12.2769***	395.5580***	8.3065***	7.7005***	5.079***	5.1998***	5.132***
Adjusted R2	5.77	5.77	4.03	5.79	5.79	2.85	-35.69	-35.69	-35.69	3.24	32.79	28.73	37.97	35.34	34.89
Chi2/F value	0.2223	0.2223	0.1249	0.2742	0.2742	0.1605	0.4669	0.4669	0.4669	0.5594	0.0482	0.0468	0.0092	0.0084	0.009
N	105.2	105.2	591	139.06	139.06	636.22	645.76	645.76	645.76	4853.29	186.73	142.31	34.29	9.46	14.53
	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692	3.692

This table provides a comparison of different types of estimators ie OLS, 2SLS and 3SLS with some key observations. For equation #1.1, where the dependent variable is ROE, and the independent variable is BD_IND, the 3SLS results show that BD_IND is positively and significantly related to ROE, supporting H1a. Conversely, the OLS and 2SLS results were not significantly related. For equation #1.2, the 3SLS results show that BD_IND is positively and significantly related to ROA, supporting H1a. Meanwhile, the results of OLS and 2SLS were not significant at the 90% level. For equation #1.2, the 3SLS results showed that INS_OWN was not significantly related to ROA and does not support H1c. Meanwhile, the results of OLS and 2SLS were positively and significantly associated with ROA and supported H1c. For equation #2.0, the 3SLS found that INS_OWN was negatively and significantly related to ANALYST, not supporting H3. Meanwhile, the OLS and 2SLS results were negative but not significant. Overall, the results of the OLS are very similar to 2SLS. Because it makes greater use of information than the OLS and 2SLS approaches, the 3SLS is more effective. Using just the variables that are included in the model, the OLS and 2SLS single equation technique estimates coefficients. Conversely, 3SLS considers the model's overall structure and the limitations placed on its parameters. Since OLS and 2SLS estimate a single equation at a time, the correlations between the error terms of many model equations are not considered. In simultaneous equation models, it is typical for the error terms of many equations to be correlated because of economic phenomena and their interactions. This result usually happens because each equation contains related variables. This means that the impacts of other, less significant factors will not be included in the error terms. The correlation between the error terms of various equations is not surprising, as economic factors are linked in an intricate manner. Single equation methods cannot account for this information, eg systems of equations. 3SLS is more appropriate as it can capture the relationships and correlations of error terms across different equations. 3SLS is an extension of the 2SLS technique, and the first two stages of 3SLS are similar to that of 2SLS. If the error terms of different equations are not correlated, then the 3SLS is reduced to the 2SLS, which is not the case of our results.

Overall, the results of the OLS are very similar to 2SLS. However, as the 3SLS makes greater use of information than the OLS and 2SLS approaches, it is therefore more effective. Using just the variables that are included in the model, the OLS and 2SLS single equation technique estimates coefficients. Conversely, 3SLS considers the model's overall structure and the limitations placed on its parameters. Since OLS and 2SLS estimate a single equation at a time, the correlations between the error terms of many model equations are not considered.

In simultaneous equation models, it is typical for the error terms of many equations to be correlated because of economic phenomena and their interactions. This result usually happens because each equation contains related variables. This means that the impacts of other, less significant factors will not be included in the error terms. The correlation between the error terms of various equations is not surprising, as economic factors are linked in an intricate manner.

Single equation methods cannot account for this information, eg systems of equations. 3SLS is more appropriate as it can capture the relationships and correlations of error terms across different equations. 3SLS is an extension of the 2SLS technique, and the first two stages of 3SLS are similar to that of 2SLS. If the error terms of different equations are not correlated, then the 3SLS is reduced to the 2SLS, which is not the case in our results.

5. Conclusion and implications

This study aims to investigate the effects of corporate governance (CG) and information asymmetry (IA) on firm performance (FP). The sample under study included Thai-listed firms within the SET Index between 2014 and 2022. The 3SLS regression analysis was applied to the panel data. Our empirical findings reveal that among 4 main hypotheses, H1 and its sub-hypotheses on board size, dividend policy, and leverage are supported. However, its sub-hypothesis on board independence is only partially supported and its sub-hypothesis on institutional ownership is not supported. H2 which states that there is a negative relationship between CG and IA is supported. H3 which states that there is a negative relationship between IA and FP is supported. Furthermore, H4 which tests the interaction effect between CG mechanisms and analyst coverage (IA) is *also* supported. (Please also see conclusions presented in [Table 7](#)).

5.1. Theoretical implications

In terms of theoretical contribution, first, our study results confirm that internal CG mechanisms (board size, board independence, dividend policy, and financial leverage) are positively related to firm performance. Institutional ownership was found to be positively related to firm performance but not significant, possibly due to the use of pyramid structures (eg institutional ownership) to retain control of both ownership and management. Secondly, CG mechanisms are positively related to analyst coverage (ANALYST and hence inversely related to IA). This result suggests that internal CG mechanisms augment corporate transparency and reduce agency costs and adverse selections. Thirdly, IA is inversely related to firm performance, ie more transparent firms with greater analyst coverage (ANALYST) tend to deliver better firm performance as monitoring costs and adverse selection are reduced. Our study suggests that IA both mediates and moderates the relationship between CG and firm performance as per agency theory. Our study confirms that there is an interaction effect between CG mechanisms and analyst coverage, which is positively related to firm performance. This is another original contribution to the existing literature. We found that additional analyst coverage is associated with an increase of a firm's ROE by 0.5157% and its ROA by 0.0757%.

5.2. Practical implications

This study provides several practical implications for stakeholders to implement policies to improve firm performance and value. From a practical perspective, our findings recommend the following. First, modifications of board size and board independence to manage principal-agent conflicts better, principal-principal conflicts, and adverse selections by stakeholders. Increasing the board size and board independence would help to improve the monitoring of management to reduce principal-agent as well as principal-principal conflicts in addition to adverse selections by stakeholders. 3) increase the dividend

Table 7. Summary of hypothesis testing results.

Hypotheses	Evidence/Comments
H1: There is a positive relationship between CG and FP	H1 is supported by: H1a: Board independence is positively related to FP. H1b: Board size is positively related to FP. H1d: Dividend policy is positively related to FP. H1e: Financial leverage is positively related to FP
H1a: Board independence is positively related to FP	The coefficient of BD_IND relative to ROE was 0.0137%, significant at the 95% level (therefore, a 1% change in board independence equates to a 0.0137% change in ROE). The coefficient of BD_IND relative to ROA was 0.0028% but was not significant at the 90% level. These findings partially support H1a: Board independence is positively related to FP.
H1b: Board size is positively related to FP	The positive coefficient of BD_SIZE relative to ROE was 0.1356%, significant at the 99% level (implying that a one-member change in the board size would equate to a 0.1356% change in ROE). Meanwhile, the coefficient of BD_SIZE relative to ROA was 0.0415%, significant at the 95% level (ie a one-member change in the board size would equal a 0.0415% increase in ROA). H1b: Board size is positively related to FP.
H1c: Institutional ownership is positively related to FP	The generated coefficient of INS_OWN relative to FP was positive relative to ROE and ROA but was not significant at the 90% level. These results did not support H1c.
H1d: Dividend policy is positively related to FP	The generated positive coefficients of DIV_PAY relative to FP were all significant at the 99% level. The natural log of DIV_PAY equates to 2.2062% for ROE and 0.9049% for ROA. These findings support H1d.
H1e: Financial leverage is positively related to FP	LEVERAGE's generated coefficients relative to ROE were positive and significant at the 99% level. A 1X increase in financial leverage would increase ROE by 0.4772%. Conversely, the coefficient of LEVERAGE to ROA was negative but was not significant at the 90% level. This finding partially supports H1e: Financial leverage is positively related to FP.
H2: There is a negative relationship between CG and IA	Analyst coverage is positively related to board independence, board size, dividend policy and financial leverage at the 99% significance level. H2 is supported.
H3: There is a negative relationship between IA and FP	Analyst coverage is positively related to ROE and ROA at the 99% significance level. H3 is supported.
H4: There is an interaction effect between CG mechanisms and analyst coverage (IA), which is positively related to FP.	Results show that the coefficients regarding the relationships of the interactions between IA and CG on FP were all positive and significant at the 99% level. The only exception was the interaction effects of ANALYST x LEVERAGE on ROA, which gave a negative coefficient but was not significant at the 90% level. The findings support H4.

The above table compares the results of the hypotheses testing of the data.

payout ratio and/or increase dividend payment frequency as supported by the agency cost of free cash flow hypothesis and signaling theory. However, it should be noted that some studies found that the relationship between board size/independence and FP was curvilinear rather than linear (Yammeesri & Herath, 2010; Yeung, 2018). Other studies (Potharla & Amirishetty, 2021) observed that such curvilinear relationships between board size/independence and FP reflect the interaction between the resource dependence theory (which advocates for larger board size/independence) and the stewardship theory (which advocates for smaller board size/independence). Secondly, establish/increase the role of investor relations to encourage greater analyst coverage to facilitate transparency and reduce agency costs. This initiative would encourage greater analyst coverage to facilitate transparency and reduce agency costs and would be a worthy endeavor. As estimated in some studies (Silpachai, 2023), only about 45% of SET-listed securities currently have analyst coverage (See also Bloomberg data, several years). Thirdly, increase the dividend payout ratio and/or increase dividend payment frequency as supported by the agency cost of free cash flow hypothesis and signaling theory. Among the internal CG mechanisms, dividends were shown to be particularly significant and positively related to firm performance and negatively related to information asymmetry. This finding suggests that the board of directors places greater

emphasis on dividend policy. This initiative would help reduce the agency's cost of monitoring the management and increase their accountability to deliver better firm performance. Furthermore, management tends to have more information than external stakeholder about the company's cash flow, and therefore, it is in their interest to communicate the true value of the firm via dividend cues. However, firms should be careful with dividend policy as this may enhance more short-term behaviors of investors.

For investors, their primary goal remains the optimization of the value of their investment portfolios. Together with the VUCA environment, firm performance sustainability becomes the greatest challenges for corporate governance where ethical conduct is also expected to adhere to principles of fairness and justice (Khatib, 2023). To integrate their strategy and financial planning with triple-bottom-line-based objectives (Khatib, 2023) firms may therefore educate and communicate their customers and shareholders about their sustainability goals to enhance firm long-term sustainability.

6. Limitations and direction for future research

First, this study employed a regression on panel data for nine years, ie 2014–2022, due to the limited data availability. New regulations and appropriate enforcement for increased disclosure would facilitate future studies to produce new insights and implications for the betterment of CG in Thailand. Secondly, during this era of a volatile, uncertain, complex, and agile (VUCA) environment, there may be a survivorship bias as firms that do not meet the standards of the SET are excluded from the index. Thirdly, a cross-sectional survey study might add insight into these issues. Fourthly, with the availability of data, comparative studies among emerging economies are suggested for further knowledge-building and insight.

Authors contributions

Conception and design, or analysis and interpretation of the data:

The drafting of the paper, revising it critically for intellectual content:

Final approval of the version to be published

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Data availability statement

The data that support the findings of this study are available from the corresponding author, [K.S.], upon reasonable request.

References

- Abid, G., Khan, B., Rafiq, Z., & Ahmed, A. (2014). Theoretical perspectives of corporate governance. *Bulletin for Business and Economics*, 3(4), 166–175.
- Agyemang Badu, E., & Appiah, K. (2017). The impact of corporate board size on firm performance: evidence from Ghana and Nigeria. *Research in Business and Management*, 4(2), 1–12. <https://doi.org/10.5296/rbm.v4i2.11721>
- Ahmed, E., & Hamdan, A. (2015). The impact of corporate governance on firm performance: Evidence from Bahrain Stock Exchange. *European Journal of Business and Innovation Research*, 3, 25–48. <http://americanscholarspress.us/journals/IMR/pdf/IMR-2-2015/IMR-v11n2art2.pdf>
- Ajina, A., Sougne, D., & Laouiti, M. (2013). Do board characteristics affect information asymmetry? *International Journal of Academic Research in Business and Social Sciences*, 3(12), 660–675. <https://doi.org/10.6007/IJARBS/v3-i12/483>
- Alareeni, B., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance*, 20(7), 1409–1428. <https://doi.org/10.1108/CG-06-2020-0258>
- Alhassan, A., Zyambo, K., & Afua Boakyie, M. (2021). Welcome on board': resource dependency and agency theoretic evidence from the South African life insurance market. *Corporate Governance*, 21(4), 626–644. <https://doi.org/10.1108/CG-12-2019-0375>
- Alves, P., Couto, E., & Francisco, P. (2015). Board of directors' composition and capital structure. *Research in International Business and Finance*, 35, 1–32. <https://doi.org/10.1016/j.ribaf.2015.03.005>
- Andersson, U., Cuervo-Cazurra, A., & Nielsen, B. (2014). From the Editors: Explaining interaction effects within and across levels of analysis. *Journal of International Business Studies*, 45(9), 1063–1071. <https://doi.org/10.1057/jibs.2014.50>
- Bar-Isaac, H., Jewitt, I., & Leaver, C. (2021). Adverse selection, efficiency and the structure of information. *Economic Theory*, 72(2), 579–614. <https://doi.org/10.1007/s00199-020-01300-1>
- Barth, M., Konchitchki, Y., & Landsman, W. (2013). Cost of capital and earnings transparency. *Journal of Accounting and Economics*, 55(2–3), 206–224. <https://doi.org/10.1016/j.jacceco.2013.01.004>
- Basiddiq, H., & Hussainey, K. (2012). Does asymmetric information drive UK dividends propensity? *Journal of Applied Accounting Research*, 13(3), 284–297. <https://doi.org/10.1108/09675421211281344>
- Berger, P., Ofek, E., & Yermack, D. (1997). Managerial entrenchment and capital structure decisions. *The Journal of Finance*, 52(4), 1411–1438. <https://doi.org/10.1111/j.1540-6261.1997.tb01115.x>
- Bergh, D. D., Ketchen, D. J., Orlandi, I., Heugens, P. P. M. A. R., & Boyd, B. K. (2019). Information asymmetry in management research: past accomplishments and future opportunities. *Journal of Management*, 45(1), 122–158. <https://doi.org/10.1177/0149206318798026>
- Bhabra, H., & Li, T. (2011). Independent directors and corporate performance: Evidence from listed firms in China. *Corporate Ownership and Control*, 8(3), 145–169. <https://doi.org/10.22495/cocv8i3p11>
- Bosse, D. A., Phillips, R. A., & Harrison, J. S. (2009). Stakeholders, reciprocity, and firm performance. *Strategic Management Journal*, 30(4), 447–456. <https://doi.org/10.1002/smj.743>
- Bradley, D., Gokkaya, S., Liu, X., & Xie, F. (2017). Are all analysts created equal? Industry expertise and monitoring effectiveness of financial analysts. *Journal of Accounting and Economics*, 63(2–3), 179–206. <https://doi.org/10.1016/j.jacceco.2017.01.003>
- Ceill, C. (2019). Corporate governance at Lehman brothers. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.3521073>
- Chen, W., Chung, H., Lee, C., & Liao, W. (2007). Corporate governance and equity liquidity: analysis of S&P transparency and disclosure rankings. *Corporate Governance: An International Review*, 15(4), 644–660. <https://doi.org/10.1111/j.1467-8683.2007.00594.x>
- Cormier, D., Ledoux, M., Magnan, M., & Aerts, W. (2009). Corporate governance and information asymmetry between managers and investors. *Corporate Governance*, 10(5), 574–589. <https://doi.org/10.1108/14720701011085553>

- Cui, J., Jo, H., & Na, H. (2018). Does corporate social responsibility affect information asymmetry? *Journal of Business Ethics*, 148(3), 549–572. <https://doi.org/10.1007/s10551-015-3003-8>
- De Jager, P. (2008). Panel data techniques and accounting research. *Meditari Accountancy Research*, 16(2), 53–68. <https://doi.org/10.1108/1022529200800012>
- Detthamrong, U., Chancharat, N., & Vithessonthi, C. (2017). Corporate governance, capital structure and firm performance: Evidence from Thailand. *Research in International Business and Finance*, 42, 689–709. <https://doi.org/10.1016/j.ribaf.2017.07.011>
- Di Maggio, M., & Pagano, M. (2018). Financial disclosure and market transparency with costly information processing. *Review of Finance*, 22(1), 117–153. <https://doi.org/10.1093/rof/rfx009>
- Donaldson, L., & Davis, J. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1), 49–64. <https://doi.org/10.1177/031289629101600103>
- Doukas, J., Kim, C., & Pantzalis, C. (2000). Security analysis, agency costs, and company characteristics. *Financial Analysts Journal*, 56(6), 54–63. <https://doi.org/10.2469/faj.v56.n6.2403>
- Eisenhardt, K. (1989). Agency theory: An assessment and review. *The Academy of Management Review*, 14(1), 57–74. <https://doi.org/10.5465/amr.1989.4279003>
- Elyasiani, E., & Jingyi, J. (2010). Distribution of institutional ownership and corporate firm performance. *Journal of Banking & Finance*, 34(3), 606–620. <https://doi.org/10.1016/j.jbankfin.2009.08.018>
- Fairchild, R., Guney, Y., & Thanatawee, Y. (2014). Corporate dividend policy in Thailand: Theory and evidence. *International Review of Financial Analysis*, 31, 129–151. <https://doi.org/10.1016/j.irfa.2013.10.006>
- Farrukh, K., Irshad, S., Shams Khakwani, M., Ishaque, S., & Ansari, N. Y. (2017). Impact of dividend policy on shareholders wealth and firm performance in Pakistan. *Cogent Business & Management*, 4(1), 1408208. <https://doi.org/10.1080/23311975.2017.1408208>
- Ferrer, E., Santamaría, R., & Suárez, N. (2019). Does analyst information influence the cost of debt? Some international evidence. *International Review of Economics & Finance*, 64, 323–342. <https://doi.org/10.1016/j.iref.2019.07.005>
- Flaherty, S., Li, J., & Small, K. (2007). Evidence on board size and information asymmetry: A capital markets perspective. *Corporate Ownership and Control*, 4(2), 248–256. <https://doi.org/10.22495/cocv4i2c2p1>
- Florackis, C., & Ozkan, A. (2009). Managerial incentives and corporate leverage: evidence from the United Kingdom. *Accounting & Finance*, 49(3), 531–553. <https://doi.org/10.1111/j.1467-629X.2009.00296.x>
- Fosu, S., Danso, A., Ahmad, W., & Coffie, W. (2016). Information asymmetry, leverage and firm value, Do crisis and growth matter. *International Review of Financial Analysis*, 46, 140–150. <https://doi.org/10.1016/j.irfa.2016.05.002>
- Frankel, R., & Li, X. (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. <https://doi.org/10.1016/j.jacc-eco.2003.09.004>
- Freudenreich, B., Lüdeke-Freund, F., & Schaltegge, S. (2019). A stakeholder theory perspective on business models: Value creation for sustainability. *Journal of Business Ethics*, 166(1), 3–18. <https://doi.org/10.1007/s10551-019-04112-z>
- Gill, A., & Obradovich, J. D. (2012). The impact of corporate governance and financial leverage on the value of American firms. *International Research Journal of Finance and Economics*, 91, 1–14.
- Goel, P. (2018). Implications of corporate governance on financial performance: an analytical review of governance and social reporting reforms in India. *Asian Journal of Sustainability and Social Responsibility*, 3(1), 1–21. <https://doi.org/10.1186/s41180-018-0020-4>
- Goh, B., Lee, J., Ng, J., & Ow Yong, K. (2016). The effect of board independence on information asymmetry. *European Accounting Review*, 25(1), 155–182. <https://doi.org/10.1080/09638180.2014.990477>
- Gurria, A. (2015). G20/OECD principles of corporate governance. <https://doi.org/10.1787/9789264236882-en>
- Hamrouni, A., Benkraiem, R., & Karmani, M. (2017). Voluntary information disclosure and sellside analyst coverage intensity. *Review of Accounting and Finance*, 16(2), 260–280. <https://doi.org/10.1108/RAF-02-2015-0024>
- Harrison, J. S., & Wicks, A. C. (2013). Stakeholder theory, value, and firm performance. *Business Ethics Quarterly*, 23(1), 97–124. <https://doi.org/10.5840/beq20132314>
- Hill, A. D., Johnson, S. G., Greco, L. M., O'Boyle, E. H., & Walter, S. L. (2021). Endogeneity: A review and agenda for the methodology-practice divide affecting micro and macro research. *Journal of Management*, 47(1), 105–143. <https://doi.org/10.1177/0149206320960533>
- Hsu, S., Lin, S., Chen, W., & Huang, J. (2021). CEO duality, information costs, and firm performance. *North American Journal of Economics and Finance*, 55.
- Hutchinson, M., & Gul, F. (2004). Investment opportunity set, corporate governance practices and firm performance. *Journal of Corporate Finance*, 10(4), 595–614. [https://doi.org/10.1016/S0929-1199\(03\)00022-1](https://doi.org/10.1016/S0929-1199(03)00022-1)
- Ilyukhin, E. (2015). The impact of financial leverage on firm performance: Evidence from Russia. *SSRN Electronic Journal*, 9(2), 24–36. <https://doi.org/10.2139/ssrn.2589013>
- Istaitieh, A., & Rodríguez Fernández, J. (2014). Stakeholder theory, market structure and the firm's capital structure: An empirical evidence. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.413661>
- Jensen, M. (1986). Costs of free cash flow, corporate finance and takeovers. *American Economic Review*, 76, 323–329.
- Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)

- Jensen, M., & Smith, C. (2000). *Stockholder, manager, and creditor interests: Applications of agency theory*. Social Science Research Network.
- Jensen, M., & Smith, C. W. (1985). *Stockholder, manager and creditor interests: Applications of Agency Theory*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=173461
- Jiang, F., & Kim, K. (2015). Corporate governance in China: A modern perspective. *Journal of Corporate Finance*, 32, 190–216. <https://doi.org/10.1016/j.jcorpfin.2014.10.010>
- Jiraporn, P., Kim, J., Kim, Y., & Kitsabunnarat, P. (2012). Capital structure and corporate governance quality: Evidence from the Institutional Shareholder Services (ISS). *International Review of Economics & Finance*, 22(1), 208–221. <https://doi.org/10.1016/j.iref.2011.10.014>
- Joher, H., Ali, M., & Nazrul, M. (2006). The impact of ownership structure on corporate debt policy: Two stage least square simultaneous model approach for post crisis period: Evidence from Kuala Lumpur Stock Exchange. *International Business & Economics Research Journal*, 5, 51–64.
- Johnson, S., Boone, P., Breach, A., & Friedman, E. (2000). Corporate governance in the Asian financial crisis. *Journal of Financial Economics*, 58(1-2), 141–186. [https://doi.org/10.1016/S0304-405X\(00\)00069-6](https://doi.org/10.1016/S0304-405X(00)00069-6)
- Keay, A. (2017). Stewardship theory: is board accountability necessary? *International Journal of Law and Management*, 59(6), 1292–1314. <https://doi.org/10.1108/IJLMA-11-2016-0118>
- Khatib, S. (2023). The role of share repurchases for firms' social and environmental sustainability. *Social and Environmental Accountability Journal*, 44, 1–3. <https://doi.org/10.1080/0969160X.2023.2281904>
- Knyazeva, D. (2007). *Corporate governance, analyst following, and firm behavior*. SSRN.
- Kouwenberg, R. (2010). An investigation of the corporate governance of Thai listed firms during the period 2000–2008. *Capital Market Research Institute Working Paper*, 2, 1–51.
- Kumar, P., & Zattoni, A. (2013). Corporate governance, board of directors, and firm performance. *Corporate Governance*, 21(4), 311–313. <https://doi.org/10.1111/corg.12032>
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics*, 58(1-2), 3–27. [https://doi.org/10.1016/S0304-405X\(00\)00065-9](https://doi.org/10.1016/S0304-405X(00)00065-9)
- Lerskullawat, P., & Ungphakorn, T. (2018). Does overreaction still exist in Thailand? *Kasetsart Journal of Social Sciences*, 40, 689–694. <https://doi.org/10.1016/j.kjss.2018.02.001>
- Lin, Y., & Fu, X. (2017). Does institutional ownership influence firm performance? Evidence from China. *International Review of Economics & Finance*, 49, 17–57. <https://doi.org/10.1016/j.iref.2017.01.021>
- Liu, N., Laing, E., Cao, Y., & Zhang, X. (2018). Institutional ownership and corporate transparency in China. *Finance Research Letters*, 24, 328–336. <https://doi.org/10.1016/j.frl.2017.12.001>
- Liu, Y., Miletkov, M., Wei, Z., & Yang, T. (2015). Board independence and firm performance in China. *Journal of Corporate Finance*, 30, 223–244. <https://doi.org/10.1016/j.jcorpfin.2014.12.004>
- Lückerath-Rovers, M. (2013). Women on boards and firm performance. *Journal of Management & Governance*, 17(2), 491–509. <https://doi.org/10.1007/s10997-011-9186-1>
- Malik, M., & Makhdoom, D. (2016). Does corporate governance beget firm performance in Fortune Global 500 companies? *Corporate Governance*, 16(4), 747–764. <https://doi.org/10.1108/CG-12-2015-0156>
- Martinez, A. (2011). The role of analysts as gatekeepers: Enhancing transparency and curbing earnings management in Brazil. *Journal of Contemporary Administration*, 15, 712–730.
- Mateescu, R. (2015). Corporate governance transparency and board independence: the case of four European emerging countries. *Accounting and Management Information Systems*, 14(4), 770–790.
- Merendino, A., & Melville, R. (2019). The board of directors and firm performance: empirical evidence from listed companies. *Corporate Governance*, 19(3), 508–551.
- Mitton, T. (2002). A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis. *Journal of Financial Economics*, 64(2), 215–241. [https://doi.org/10.1016/S0304-405X\(02\)00076-4](https://doi.org/10.1016/S0304-405X(02)00076-4)
- Moir, J. (2023). Asian Corporate Governance Association. <https://www.acga-asia.org/blog-detail.php?id=72>
- Morales, A. R., Mahendra, E., & Widyastuti, W. (2012). Corporate governance and leverage trends. In *Indonesia sustaining growth during global volatility* (Chap 6, pp. 81–92). International Monetary Fund. <https://doi.org/10.5089/9781616352028.071>
- Mustapha, M., & Che Ahmad, A. (2011). Agency theory and managerial ownership: evidence from Malaysia. *Managerial Auditing Journal*, 26(5), 419–436. <https://doi.org/10.1108/02686901111129571>
- Panda, B., & Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance*, 10(1), 74–95. <https://doi.org/10.1177/0974686217701467>
- Patil, K., Garg, V., Gabaldon, J., Patil, H., Niranjana, S., & Hawkins, T. (2023). Firm performance in digitally integrated supply chains: a combined perspective of transaction cost economics and relational exchange theory. *Journal of Enterprise Information Management*, 37(2), 381–413. <https://doi.org/10.1108/JEIM-09-2022-0335>
- Petchsakulwong, P., & Jansakul, N. (2018). Board of directors and profitability ratio of Thai non-life insurers. *Kasetsart Journal of Social Sciences*, 39(1), 122–128. <https://doi.org/10.1016/j.kjss.2017.11.005>
- Potharla, S., & Amirishetty, B. (2021). Non-linear relationship of board size and board independence with firm performance – Evidence from India. *Journal of Indian Business Research*, 13(4), 503–532. <https://doi.org/10.1108/JIBR-06-2020-0180>

- Reguera-Alvarado, N., De Fuentes, P., & Laffarga, J. (2017). Does board gender diversity influence financial performance? Evidence from Spain. *Journal of Business Ethics*, 141(2), 337–350. <https://doi.org/10.1007/s10551-015-2735-9>
- Safdar, R., Chaudhry, N. I., Mirza, S. S., & Yu, Y. (2018). Principal-principal agency conflict and information quality in China. *Journal of Financial Reporting and Accounting*, 17(1), 42–59. <https://doi.org/10.1108/JFRA-07-2017-0052>
- Schäuble, J. (2018). The impact of external and internal corporate governance mechanisms on agency costs. *Corporate Governance*, 19(1), 1–22. <https://doi.org/10.1108/CG-02-2018-0053>
- Shank, T., Hill, R., & Stang, J. (2013). Do investors benefit from good corporate governance? *Corporate Governance*, 13(4), 384–396. <https://doi.org/10.1108/CG-03-2010-0027>
- Shiah-Hou, S. (2016). The effect of analyst coverage on CEO compensation structure: evidence from the S&P500. *Managerial Finance*, 42(3), 191–211. <https://doi.org/10.1108/MF-10-2014-0273>
- Shleifer, A., & Vishny, R. (1996). A survey on corporate governance. NBER Working Paper Series, w, 5554.
- Silpachai, K. (2023). Internal corporate governance mechanisms and firm performance: 3SLS empirical evidence from Thailand. *International Journal of Business Ecosystem & Strategy*, 5(1), 23–36. <https://doi.org/10.36096/ijbes.v5i1.382>
- Silpachai, K., & Siengthai, S. (2023). Do corporate governance mechanisms and analyst–Board independence interactions enhance firm performance? 3sls Empirical Evidence from Thailand. SSRN.
- Suehiro, A., & Wailersak, N. (2004). Family business in Thailand: Its management, governance, and future challenges. *ASEAN Economic Bulletin*, 21(1), 81–93. <https://doi.org/10.1355/AE21-1E>
- Sun, J., & Liu, G. (2011). The effect of analyst coverage on accounting conservatism. *Managerial Finance*, 37(1), 5–20. <https://doi.org/10.1108/03074351111092111>
- Sutheebanjard, P., & Premchaiswadi, W. (2010). Forecasting the Thailand stock market using evolution strategies. *Asian Academy of Management Journal of Accounting & Finance*, 6(2), 85–114.
- Taleb, L. (2019). *Dividend policy, signaling theory: A literature review*. SSRN.
- Tarus, D., & Omandi, E. (2013). Business case for corporate transparency: Evidence from Kenya. *European Journal of Business and Management*, 5(3), 113–125.
- Thanatawee, Y. (2014). Institutional ownership and firm value in Thailand. *Asian Journal of Business and Accounting*, 7(2), 1–22.
- Thomsen, S., & Pedersen, T. (2000). Ownership structure and economic performance in the largest European companies. *Strategic Management Journal*, 21(6), 689–705. [https://doi.org/10.1002/\(SICI\)1097-0266\(200006\)21:6<689::AID-SMJ115>3.0.CO;2-Y](https://doi.org/10.1002/(SICI)1097-0266(200006)21:6<689::AID-SMJ115>3.0.CO;2-Y)
- Udumoh, E., Ohioma, B., & Subeno, T. (2016). Comparative analysis of three-stage least squares and multivariate regression method of estimating parameters of simultaneous equation models. *Journal of Basic and Applied Scientific Research*, 6(7), 7–14.
- Utama, C., Utama, S., & Amarullah, F. (2017). Corporate governance and ownership structure: Indonesia evidence. *Corporate Governance*, 17(2), 165–191. <https://doi.org/10.1108/CG-12-2015-0171>
- Verbeke, A., & Kano, L. (2012). The transaction cost economics theory of the family firm: Family-based human asset specificity and the bifurcation bias. *Entrepreneurship Theory and Practice*, 36(6), 1183–1205. <https://doi.org/10.1111/j.1540-6520.2012.00545.x>
- Vinten, G. (2002). The corporate governance lessons of Enron. *Corporate Governance*, 2(4), 4–9. <https://doi.org/10.1108/14720700210447632>
- Wahab, E., Pitchay, A., & Ali, R. (2014). Culture, corporate governance and analysts forecast in Malaysia. *Asian Review of Accounting*, 23(3), 232–255. <https://doi.org/10.1108/ARA-03-2014-0033>
- Wang, M. (2014). Which types of institutional investors constrain abnormal accruals. *Corporate Governance: An International Review*, 22(1), 43–67. <https://doi.org/10.1111/corg.12044> [InsertedFromOnline]
- Warren, J. (2022). Do analysts monitor management forecast quality? SSRN.
- Williamson, O. (1987). Corporate finance and corporate governance. *The Journal of Finance*, 43(3), 567–591. <https://doi.org/10.1111/j.1540-6261.1988.tb04592.x>
- Yammeesri, J., & Herath, S. (2010). Board characteristics and corporate value: evidence from Thailand. *Corporate Governance*, 10(3), 279–292. <https://doi.org/10.1108/14720701011051910>
- Yasser, Q., Mamun, A., & Rodrgis, M. (2017). Impact of board structure on firm performance: evidence from an emerging economy. *Journal of Asia Business Studies*, 11(2), 210–228. <https://doi.org/10.1108/JABS-06-2015-0067>
- Yeung, J. (2018). Nonlinear effect of board size on corporate performance: Impact of the cultural backgrounds of directors in Hong Kong. *Asia-Pacific Journal of Financial Studies*, 47(1), 107–131. <https://doi.org/10.1111/ajfs.12205>
- Yu, M. (2010). Analyst following and corporate governance: Emerging-market evidence. *Accounting Research Journal*, 23(1), 69–93. <https://doi.org/10.1108/10309611011060533>
- Yu, M., & Wang, Y. (2018). Firm-specific corporate governance and analysts' earnings forecast characteristics, evidence from Asian stock markets. *International Journal of Accounting & Information Management*, 26(3), 335–361. <https://doi.org/10.1108/IJAIM-03-2017-0040>
- Zamfir, I. C., & Iordache, A. M. M. (2022). The influences of covid-19 pandemic on macroeconomic indexes for European countries. *Applied Economics*, 54(39), 4519–4531. <https://doi.org/10.1080/00036846.2022.2031858>
- Zhong, R. (2018). Transparency and firm innovation. *Journal of Accounting and Economics*, 66(1), 67–93. <https://doi.org/10.1016/j.jacceco.2018.02.001>