Accounting Frauds and Main-Bank Monitoring in Japanese Corporations

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Abstract
This study examines whether the delegated monitoring of main banks effectively decreases severe agency problems. For example, this includes accounting fraud in bank-dominated corporate governance. In this context, the fraud triangle specifies the three main factors of opportunity, incentive, and rationalization. Main banks may reduce the factor of opportunity through actions such as monitoring, which plays a moderating role by reducing the potential for managerial misconduct, whereas, the incentive factor may be enhanced through the subsequent pressure that influences managers to force turnover when they do not repay debts. The potential influence that the main banks have on the fraud rationalization factor may be stronger in firms that are more dependent on main-bank borrowing. This study analyzed data from publicly listed firms in Japan for the period between 2008 and 2016 to determine how main-bank relationships affected accounting fraud, thus allowing an assessment of delegated monitoring practices. Findings showed that main-bank relationships were helpful for reducing accounting fraud, suggesting its overall effectiveness in delegated monitoring. Results also showed that large audit firms did not necessarily prevent accounting fraud, which implies that main banks can employ their own monitoring as a substitute for the roles typically played by these firms. Here, the main policy implication is that main-bank relationships may strengthen business ethics in the context of bank-dominated corporate governance. In conclusion, the continued analysis of bank monitoring may benefit stakeholders while strengthening business ethics in bank-centered economies.

Keywords Accounting frauds · Fraud triangle · Main bank

Introduction

Corporate accounting fraud can generate serious negative consequences for stakeholders (Davidson & Worrell, 1988) and employees (Zahra et al., 2005). In fact, there are many real-world examples of this. For instance, infamous corporate accounting scandals occurred at the Enron and Worldcom corporations in the Unites States during the early 2000s, while in Europe, there were the Parmalat, Royal Ahold, and Vivendi Universal scandals. Many similarities exist between these events, especially the common lack of an efficient corporate governance mechanism (Soltani, 2014). More recent examples of accounting fraud can be found among large Japanese corporations, including those at Olympus and Toshiba, which the Western media criticized as examples of poor corporate governance (Financial Times, 2011, 2015). This study focused on the relationship between main-bank monitoring and accounting fraud in Japan, with an additional focus on the consequences of the fraud.

Main-bank systems are regarded as “a particular intense and close form of relationship banking” in bank-dominated corporate governance (Patrick, 1994). Main-bank monitoring is a function of the client firms that are connected by bank relations (Aoki and Patrick, 1994).1 Japanese banks can gather private information on client firms through ‘relational debt’ (David et al., 2008; O’Brien et al., 2014). The relationship lending techniques enable banks to gather detailed information of their client firms (Boot, 2000). Relationship banking is aimed to solve information asymmetry problems by lender monitoring. Relationship lending enables lenders to gather private information through repeated lending and through a close relationship with the borrower (Boot, 2000).
In a bank-dominated system, bank-appointed directors or auditors are expected to monitor their clients’ firms to prevent them from falling in severe financial distress, including accounting fraud (Aoki, 1990). In fact, firms with bank-appointed directors tend to cut executive bonus in firms with financial distress (Colpan & Yoshikawa, 2012). In addition, forced executive turnover is likely to occur in firms with bank tie-ups (Kang & Shivdasani, 1995). Especially, the monitoring of bank-appointed auditors is effective in improving the quality of the financial reports (Sakawa & Watanabel, 2021a). In the Olympus case, corporate board members were appointed by the main bank of Olympus, Sumitomo Mitsui Banking Corporation, to strengthen its corporate governance (Wall Street Journal, 2011). Thus, the client firms tend to be secured under the strengthened monitoring of main banks.

This study contextualized the role of main banks through the conceptual framework of the fraud triangle (Cressey, 1953). The fraud triangle theory predicts the likelihood of fraud within a given organization by considering the opportunities, incentives/pressures, and rationalizations for fraud engagement (Albrecht, 1991). In this context, main banks may be able to reduce the opportunities for accounting fraud by focusing on problems at the managerial level. Specifically, main banks may have greater influences on whether managers at larger firms can rationalize fraud behaviors, especially among firms that are more dependent on financing through bank–client relationships. Japan, particularly, provides an opportune setting to examine this assertion for two reasons. First, the Japanese financial system is bank-centered (Aoki, 1990). In this regard, bank–client relationships are often more important in Japan than in many market-oriented countries. Second, main banks are averse to risk-taking activities within their client firms (Sakawa & Watanabel, 2021b; Weinstein & Yafeh, 1998), implying that the client firms also tend to have risk-averse attitudes. This tends to result in fewer instances of fraud. However, there is a lack of scholarly focus on corporate fraud in Japan. This study, therefore, contributes to the business ethics literature by providing empirical evidence on the role of main-bank monitoring from the perspective of the fraud triangle.

Main banks may mitigate the factor of opportunity in the fraud triangle because they can effectively monitor managers (Morck et al., 2000), thereby reducing the agency problem (Jensen & Meckling, 1976). Theoretically, main banks are defined as the delegated monitors of client firms (Sheard, 1989, 1994), but they also play information production roles, thus mitigating informational asymmetries between borrowers and lenders. The most substantial motivator for Japanese firms is the ability to receive support from main banks, particularly, their ability to rescue client firms (Yoshimori, 1995). In fact, poorly performing client firms do not tend to commit fraud specifically because they are reliant on such support from the main banks.

However, main banks may also increase the factor of incentive in the fraud triangle. Specifically, this can occur when their monitoring activities pressure managers to enhance performance, motivating them to manipulate financial statements. Several studies have implied that interventions by the main bank may have similar effects to external takeovers in Japanese corporations (Sheard, 1989; Yoshimori, 1995). In fact, financial distress can catalyze turnover among top executives in firms that hold relationships with main banks (Kang & Shivdasani, 1995).

Finally, main banks can influence the factor of rationalization in the fraud triangle. In this context, managers of firms are more sensitive to the influences of their relationships with main banks when they are dependent on thusly borrowed funds. Previous studies have shown that managers face tradeoffs in costs and benefits when rationalizing the decision to commit corporate fraud (Hannan et al., 2006; Tsang, 2002). For example, the cost of fraud is greater for firms that hold relationships with main banks due to the enhanced possibility of forced turnovers among top executives. However, the benefits of fraud may also be greater for these firms, as their executives tend to have higher incentives (Sakawa et al., 2012). The benefits can also increase when higher profits result in increased share prices.

In bank-dominated economies, outside investors are expected to desire monitoring roles of main banks (Aoki et al., 1994). Japanese corporations depend more on bank debt than the U.S.-based corporations do. One important feature of the Japanese corporate governance system is keiretsu based on main-bank system (Hoshi et al., 1990, 1991). Bank-centered business groups construct horizontal keiretsu (Brouthers et al., 2014; Sakawa & Watanabel, 2018b). The network of companies is formed by horizontal keiretsu which has the main bank at its center (Brouthers et al., 2014; Morck & Nakamura, 2005). Unlike the market-oriented systems (e.g., the United States), bank-dominated economies also entail that main banks are responsible for monitoring their client firms (Aoki, 1990; Macey & Miller, 1997). Here, the literature suggests that main-bank monitoring from the perspective of the fraud triangle.

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2 In an un-tabulated table, the average of the leverage is 50% and the average leverage of firms with main-bank relationships reaches to 57%. Thus, Japanese corporations were bank-dominated during our sample period.

3 Because of the main banks being in the center of the horizontal keiretsu, the main banks exercise more control over the group than the non-control shareholders in Japan do. Being the central of horizontal keiretsu, banks stress more on reducing the risks (Sakawa & Watanabel, 2021b; Weinstein & Yafeh, 1998). In fact, the stability of client firms is stressed on firms in horizontal keiretsu group (Brouthers et al., 2014).
relationships can mitigate informational asymmetries among investors in Japanese financial markets (Sakawa et al., 2014). Further, bank tie-ups mitigate underpricing in IPO firms, which implies that commercial banks take monitoring roles in Japanese IPO markets (Sakawa & Watanabel, 2020b).

In Japan, large audit firms are expected to monitor the clients by enhancing the accounting quality (Sakawa & Watanabel, 2021a; Sembha & Kato, 2019). This may explain the lower incidences of accounting fraud in Japanese corporations. Similarly, in the United States, high-quality external audit firms are considered essential for preventing fraud and/or material errors because they ensure the adequate function of financial reporting systems (Khurana & Raman, 2004; Legoria et al., 2018; Lennox & Pittman, 2010). Due to the higher litigation risk of auditors, large audit firms also tend to be helpful in mitigating accounting frauds in the U.S.-based corporations (Khurana & Raman, 2004; Lennox & Pittman, 2010). In the United Kingdom, audit quality has been enhanced after the names of the lead audit were disclosed in 2009 (Reid & Youngman, 2017). Thus, we predict that large audit firms in Japan identify fraud that they notice while auditing the financial statements, similar to the expectation in the United States. Thus, this study examined both auditing quality and accounting fraud among Japanese corporations.

This study investigated whether accounting fraud was mitigated due to the monitoring activities of main banks. This first step was crucial, as no previous studies have examined the linkage between accounting fraud and main-bank relationships in Japan. The second step was to examine the monitoring roles of large audit firms (Big N) following the J-SOX (Japanese version of the Sarbanes–Oxley Act) period, including their influence on the prevention of accounting fraud. All findings were verified for robustness via the instrumental variable probit (IVP) approach.

Therefore, this study makes clear contributions to the literature on corporate governance and accounting fraud in three main regards. First, it provides empirical evidence concerning the associations between main-bank relationships and accounting fraud in the context of bank-dominated corporate governance; the results showed that main-bank relationships mitigate the potential for accounting fraud. Second, it provides empirical evidence related to relationship banking. Third, it also provides empirical evidence that shows that accounting frauds are less likely in clients of large audit firms following the introduction of J-SOX. As such, this study also contributes to the literature on auditing quality.

We also refer to the limitation of our analysis’s model of Cressey’s triangle, which does not include the sociological, psychological, and situational factors (Lokanan, 2015). From the theoretical framework of ‘Critical Discourse analyses (CDA),’ fraud is multi-faceted and might not fit into one model (Lokanan, 2015). Therefore, the fraud triangle may not be a conclusive or reliable model to detect and deter fraud.

The remainder of this paper is organized as follows: “Theoretical and Empirical Hypotheses” section introduces the institutional background and discusses our hypotheses, while “Sample and Methodology” section provides details on the study sample and estimation method. Next, “Empirical Results” section presents the empirical results and details the additional analyses. Finally, a discussion and conclusion are provided in “Discussion” and “Conclusions” sections.

**Theoretical and Empirical Hypotheses**

**Theoretical Framework**

The fraud triangle framework is widely used to analyze the occurrence of corporate fraud (Morales et al., 2014; Trompeter et al., 2014). More specifically, it consists of three interacting factors that determine the likelihood of corporate fraud, including opportunity, incentive, and rationalization (Cressey, 1953). The factor of opportunity is linked to situations that influence managers to enact fraud without considering the risks associated with discovery (Murphy & Dacin, 2011). Managers tend to commit financial manipulation under weaker internal governance or external scrutiny. Next, the factor of incentive emerges through greed or the perceived pressure to commit fraudulent behavior (Wilks & Zimbelman, 2004). There are several sources for this pressure, including financial/professional interest and self-esteem. Finally, the factor of rationalization is used to justify fraud, and is affected by attitude, character, values, and/or reasoning (Cohen et al., 2010). Managers may rationalize self-serving gains based on factors of opportunity and incentive. In this context, accounting fraud is committed at the expense of the stakeholders.

Agency theory predicts that problems such as accounting fraud are mitigated through effective monitoring mechanisms, including those related to both internal and ownership monitoring (Fama & Jensen, 1983; Jensen & Meckling, 1976). Corporate governance mechanisms help align the interests of managers and shareholders, thereby enhancing the reliability of the financial information (Watts & Zimmerman, 1986). In other words, well-established corporate governance mechanisms are important for preventing accounting scandals.

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4 The official term, ‘J-SOX,’ refers to Japan’s Financial Instruments and Exchange Law, and the guidelines that followed.
Several studies have analyzed whether internal and ownership governance methods are effective for mitigating accounting fraud. The studies that focused on internal governance have examined structures such as board independence (Beasley, 1996; Dunn, 2004), while those focused on external governance have mainly investigated factors such as the monitoring roles of big audit firms (Wilks & Zimbelman, 2004), institutional shareholders (Sharma, 2004; Shi et al., 2017), and analyst forecasting (Chen et al., 2016). However, there is a lack of scholarly evidence on whether the Japanese ownership governance system ensures effective monitoring for the detection and reduction of accounting fraud. First, several studies have regarded main banks as ‘delegated monitors’ (Aoki et al., 1994; Weinstein & Yafeh, 1998), whose results have shown that main banks can mitigate accounting fraud by adopting the monitoring role. Agency theory presumes the existence of severe conflict between managers and shareholders, where the ownership and management are separate. In this context, agency conflicts arise based on informational asymmetries between managers and shareholders. Aoki (1990) and Aoki et al. (1994) discussed the monitoring roles of main banks in bank-centered economies such as Japan and Germany, while Sakawa et al. (2014) showed that main-bank relationships further moderate informational asymmetries in Japanese financial markets.

Contrarily, main banks that place severe pressure on managers may influence them to commit financial accounting fraud to satisfy performance requirements. As Sheard (1989) and Aoki (1990) discussed, main banks provide a disciplinary mechanism for client firms. Kang and Shivdasani (1995) showed evidence for external governance mechanisms being related to the non-routine turnover of top executives in Japan. In addition, outsider top executive succession is more likely in firms that hold relationships with main banks. Kang and Shivdasani (1995) suggested that main banks play important roles in appointing new top executives from outside firms. As such, the main-bank system provides external governance mechanisms while incentivizing top executives.

Institutional Setting

The Japanese financial system is bank-centered, meaning that main banks are expected to monitor client firms (Aoki, 1990). As such, the Japanese main-bank system is characterized by close relationships between main banks and client firms (Morck et al., 2000). Main banks are not only the largest lenders, but also have large shareholdings to maintain long-term relationships with their client firms (Aoki et al., 1994). In other words, bank-client relationships are much more important in Japan when compared to the market-oriented countries. Under bank-dominated corporate governance, main banks and their client firms mutually own shares and maintain trading relationships (Berglof & Perotti, 1994).

Several studies have suggested that main-bank monitoring is important for ensuring ethical adherence in Japanese corporations, especially under the influence of the strong bank–client relationships. For example, there is a tendency for turnover among top executives in firms that hold relationships with main banks; this is considered a disciplinary mechanism (Kang & Shivdasani, 1995). Further, main banks do not bear the impacts of severe conflicts that occur between shareholders and lenders. Debt holders experience asymmetric payoffs related to net assets, which are problematic when borrowers face distress. Main banks are not only the largest lenders for client firms, but also are included in top 10 largest equity owners (Morck et al., 2000). They may, therefore, acquire additional payments (e.g., dividends) when borrowing firms produce higher earnings. In this context, main banks are not incentivized to transfer wealth from lenders to shareholders because they are the major shareholders in the client firms (Prowse, 1990).

However, alternative views cast doubt on the monitoring roles of main banks. For example, mergers and acquisitions (M&A) in the banking industry may also have important influences on these roles. According to Hoshi and Kashyap (2010), the Japanese corporate ownership structure gradually changed through bank mergers during the mid-2000s. Specifically, the 13 main city banks merged in 2005, which resulted in the creation of three mega-banks, including Mitsubishi UFJ, Sumitomo Mitsui Banking Corporation, and Mizuho Financial Group. Misdirected bank lending has also led to macroeconomic stagnation since the early 1990s (Caballero et al., 2008). As such, it is possible that the monitoring roles of main bank have weakened since the mid-2000s.

Several studies have also suggested that main-bank monitoring activities effectively mitigate severe agency problems and/or informational asymmetries following these bank mergers. Higgins (2018) implied that bank–client relationships have remained strong despite tenuous industrial ties and instances in which corporations revert to group behaviors. Main banks still have large stakes in client firms despite the M&A activities in the Japanese banking industry (Sakawa et al., 2014). If main banks fail in their monitoring roles, then they must bear economic losses in the event that their clients do not meet contractual obligations. Firms with greater bank ownership tend to provide incentive compensation (Sakawa et al., 2012). Further, main-bank relationships can reduce informational asymmetries between investors in Japanese markets (Sakawa et al., 2014). In fact, Sakawa and Watanabel (2021a) showed that earnings quality was enhanced for client firms through main-bank monitoring.
Large audit firms are also expected to engage in monitoring activities to prevent instances of corporate fraud enacted through their professional auditing services. For instance, legislative and regulatory changes such as the Sarbanes–Oxley Act (SOX) of 2002 were enacted to improve the quality of audited financial statements (Dyck et al., 2010). In the United States, firms audited by big audit firms are likely to have low rates of accounting fraud following the implementation of SOX (Lennox & Pittman, 2010; Shi et al., 2017). However, it is not clear whether large audit firms provide high-quality auditing services in Japan. In this regard, their legal liability is essentially non-existent (Skinner & Srinivasan, 2012). As in the fraud case of Waste Management Inc. audited by Andersen in the United States, the large Japanese audit firm Chuo Aoyama was involved in the accounting frauds of Kanebo in 2006. Skinner and Srinivasan (2012) also found that large audit firms have reputational effects in Japanese corporations. In addition, the J-SOX was introduced in 2007, which implies that the quality of Japanese big audit firms has improved since 2008. Similar to SOX, the purpose of J-SOX is to reinforce the corporate governance of financial reporting. In fact, J-SOX requires a manager’s confirmation of the financial statement’s accuracy, a manager’s assessment of the internal control and the preparation of internal control reports, and an external auditors’ audit of the internal control reports (Enomoto & Yamaguchi, 2017). In addition, it imposes penalties on managers for misstatement of internal control reports.

Hypotheses Development

We construct empirical hypotheses using a theoretical framework and institutional setting. The theoretical framework was based on the fraud triangle proposed by Cressey (1953), which implies some potential roles for the main banks in Japan. As previously discussed, many past studies focused on the relationship between internal governance and accounting fraud. As for the institutional setting, we used the literature on main banks and the transition of the banking industry during the M&A activity period. In this section, we discuss the relationship between accounting fraud and the main banks in Japan.

There are two reasons that main banks may help mitigate the factor of opportunity in the fraud triangle. First, they play important roles in monitoring their client firms, which mitigates principal agent problems (Aoki, 1990). As such, main banks do not face severe problems, particularly because of mitigating informational asymmetries between themselves and their client firms. The Olympus case to the contrary, bank–client relationships can also mitigate opportunistic earnings management in Japanese corporations (Sakawa & Watanabel, 2021a). Second, main banks are regarded as ‘delegated monitors’ (Diamond, 1984; Fama, 1985) and perform monitoring activities at lower costs (Aoki et al., 1994). The banks have informational advantages related to their client firms and do not face higher degree of information asymmetry. In addition, client firms that engage in opportunistic activities (e.g., accounting fraud) directly worsen the bank’s financial health. In this regard, one of the most distinctive and important activities for banks is the practice of monitoring client firms (Freixas & Rochet, 1997). Therefore, the potential for accounting fraud is expected to prevent banks from neglecting their monitoring roles.

Main banks may increase the factor of incentive in the fraud triangle for two reasons. First, they place excessive pressures on managers to repay the debts of client firms. Kang and Shivdasani (1995) suggested that top executives in firms with bank relationships tend to be replaced when the firms face financial distress. Such an intervention by the main bank is expected to function as a disciplinary mechanism in Japanese corporations (Sheard, 1989). In this context, the manager may manipulate financial statements to continue the bank lending. Second, conflicts may occur between lenders and shareholders because lenders are saddled with asymmetric payoffs related to net assets. The pursuit of long-term firm value may, therefore, be beneficial for shareholders. Moreover, main banks are the largest lenders for their client firms, and tend to be more risk-averse than other shareholders due to this linkage (Sakawa & Watanabel, 2021b; Weinstein & Yafeh, 1998).

Main-bank relationships are also expected to influence the rationalization factor in the fraud triangle. Managerial rationalizations—such as engagement in corporate fraud—are also likely influenced by the potential economic costs and benefits incurred by the firm, which affects the corporate performance (Hannan et al., 2006; Tsang, 2002). Therefore, when main-bank relationships mitigate the incentive of accounting frauds, client firms with greater demands for funding from the main banks are likely to be more concerned about receiving their support. However, main-bank relationships may also increase fraud opportunities. Due to the reinforcement effects of managerial rationalizations against accounting fraud, executives of such firms are more likely to be cautious of the costs of accounting fraud. When main-bank relationships enhance fraud incentives, we would expect the reinforcement effects of managerial rationalizations to strengthen this concern. Managers of such firms tend to weigh more on the cost of accounting fraud by anticipating main-bank monitoring and their subsequent interventions, which result in their forced turnover.

Japan constitutes a unique setting for analyzing bank-firm relations from the perspective of the fraud triangle. Indeed, Japanese main-bank relationships are regarded as close and intense forms of relationship banking (Patrick, 1994). On the one hand, a bank-centered economy entails that main
banks act as delegated monitors from the perspectives of both the lenders and shareholders; this is unlike the situation for commercial banks without stakes (Aoki et al., 1994). Main banks are, therefore, expected to mitigate accounting fraud. Further, main banks place excessive pressures on firm managers, which may increase the agency problems. In this case, main banks may increase the likelihood of accounting fraud. Therefore, we constructed the following empirical hypotheses concerning the relationship between accounting fraud and main banks:

**Hypothesis 1a (H1a)** Companies with main-bank relationships are less likely to engage in financial statement fraud.

**Hypothesis 1b (H1b)** Companies with main-bank relationships are more likely to engage in financial statement fraud.

Companies with main-bank relationships are more likely to engage in financial statement fraud.

Based on these two empirical hypotheses, we analyzed two cases related to accounting fraud. **H1a** entails that the main banks deter fraud in Japan through their monitoring activities. In this case, alternative external governance is predicted to be influential in firms without main-bank relationships. Whereas, **H1b** entails that the main banks enhance the potential for fraud in Japan because of the excessive pressure placed on the client firm’s managers. For this reason, we also analyzed whether alternative external governance prevented accounting fraud.

In this context of alternative external governance, auditors are expected to deter corporate fraud through their professional auditing services. Here, auditing quality can be measured as audit firm size (DeAngelo, 1981). For example, the five largest public accounting firms in the United States are associated with higher quality financial statements (Francis, 2004). In addition, the rate of accounting fraud is lower among firms that are audited by large audit firms, which are referred to as **Big N** (Lennox & Pitman, 2010). Following **H1a**, we conjecture that auditing quality can be measured based on the size of the audit firm, with larger firms more effectively mitigating the rate of accounting fraud among firms that do not have main-bank relationships (**Hypothesis 2a** below). Following **Hypothesis 1b**, however, we conjecture that auditing quality is measured based on whether large audit firms decrease the rate of accounting fraud (**Hypothesis 2b** below). Therefore, we constructed the following secondary hypotheses:

**Hypothesis 2a (H2a)** Companies with higher auditing quality (measured as **Big N** audit firms without main-bank relationships) are less likely to engage in financial statement fraud.

**Hypothesis 2b (H2b)** Companies with higher auditing quality (measured as **Big N** audit firms) are less likely to engage in financial statement fraud.

### Sample and Methodology

#### Sample

This study assessed annual observations of accounting fraud based on the data from Japanese firms compiled by Tokyo Shoko Research (TSR), which first collected this type of data in 2008. This study sampled data from the years 2008 to 2016. The TSR report investigates the corporate accounting fraud data based on the materials of corporate voluntary disclosure, Financial Service Agency (FSA), and Japanese Stock Exchanges. Therefore, the TSR report provides reliable information on the accounting frauds in Japanese corporations. Further, the financial accounting and corporate governance data (including those from main banks) were collected from the Astra Manager. Our sample of accounting fraud data thus consisted of 289 firm-year observations. Following the accounting fraud literature (Conyon & He, 2016; Liao et al., 2019; Liu, 2016), we first constructed an accounting fraud dummy variable (**Fraud**), which equals 1 if a given firm has conducted an accounting violation within the observation year, and 0 otherwise. Next, main-bank relationships were measured as main-bank dummy (**MBD**) and main-bank shareholding (**MBS**). This was done to analyze whether a given main bank mitigated fraud among their client firms. Following previous research, **MBD** equals 1 if the largest lending bank holds the client firm’s shares, and 0 otherwise (Sakawa & Watanabel, 2020a, 2021b). **MBS** was used as an alternative measure of main-bank relationships (Morck et al., 2000; Sakawa and Watanabel, 2020a, b).

#### Empirical Models

We adopted the following probit model to investigate our hypotheses:

\[ \text{Prob}(\text{Fraud} = 1 | \text{MBD}, \text{MBS}, \text{Big N firms}) = \Phi(\beta_0 + \beta_1 \text{MBD} + \beta_2 \text{MBS} + \beta_3 \text{Big N firms}) \]

5 The Japanese SOX act (J-SOX) was introduced in 2007. We conjecture that the quality of Japanese big audit firms improved thereafter.

6 The TSR report is a set of comprehensive credit information collected through site visit, direct interview, and investigation by the professional reporters of TSR employed in 81 branch offices throughout Japan. We can provide the anonymized list of our data upon request.

7 Quick corporation provides corporate and financial data by Astra Manager service. It is a reliable commercial data vendor in Japan.
Log \( \frac{P_{it}}{1 - P_{it}} = \alpha_i + \beta_1 \text{MBD}_{it} + \beta_2 \text{MBS}_{it} + \beta_3 \text{Big N}_{it} + \sum \delta_j \text{Control}_{it} + \epsilon_{it} \) (1)

The left-hand side of Eq. (1) is the probit formation of Fraud, where \( P_{it} \) is the probability of firm \( i \) committing accounting fraud in year \( t \). \( \text{MBD}_{it} \) equals 1 if the proportion of shareholdings owned by the largest lenders is positive, and 0 otherwise (Sakawa & Watanabel, 2020a, 2021b). \( \text{MBS}_{it} \) is the main bank’s shareholdings of their borrowing firms (Morck et al., 2000; Sheard, 1994). \( \text{Big N}_{it} \) equals 1 if a firm is audited by the Big 4 or Big 5 audit firms, and 0 otherwise (Skinner & Srinivasan, 2012). In this estimation, we controlled for both the yearly and industry effects, while standard errors were clustered at the firm level.

We then included several control variables related to the rate of accounting fraud, including management shareholdings, analyst coverage, ROA, leverage, and market-to-book ratio. Management shareholdings are controlled as a proxy of managerial power and measured as sum of top management team (TMT)’s ownership (Grabke-Rundell & Gomez-Mejia, 2002; Koch-Bayram & Wernicke, 2018). We adopted analyst coverage to control for their contribution to mitigating both information asymmetry (Ness et al., 2001) and investor protection (Chen et al., 2016; Lang et al., 2004). In this context, firms with lower degrees of informational asymmetries and higher degrees of investor protection are not likely to commit accounting fraud. However, firms with lower profitability and higher leverage tend to commit accounting fraud (Lisic et al., 2015). We, therefore, controlled for ROA and financial leverage. Finally, we adopted market-to-book ratio to control for the growth opportunities presented to firms, following Lisic et al. (2015). This is because firms with rapid growth opportunities are likely to commit fraud (Loebbecke et al., 1989).

Empirical Results

Descriptive Statistics

Tables 1 and 2 show the descriptive statistics for our sample. Here, accounting fraud accounted for 0.9% on average, while

Table 1: Descriptive statistics

| Variable (1) | Mean | SD  | Q1  | Median | Q3  |
|--------------|------|-----|-----|--------|-----|
| Fraud        | 0.009| 0.096| 0.000| 0.000  | 0.000|
| MBD          | 0.311| 0.463| 0.000| 0.000  | 1.000|
| MBS          | 0.968| 1.645| 0.000| 0.000  | 1.650|
| Management share | 0.489| 0.834| 0.000| 0.000  | 0.693|
| Ownership concentration | 5.142| 16.833| 38.721| 50.666 | 63.884|
| ROA          | 5.291| 10.038| 1.855| 4.449  | 8.230|
| Leverage     | 49.445| 20.993| 33.010| 49.950 | 65.745|
| Firm size    | 9.476| 1.789| 8.179| 9.219  | 10.531|
| Market to book | 1.515| 7.379| 0.586| 0.888  | 1.455|
| Big N        | 0.728| 0.445| 0.000| 1.000  | 1.000|

Panel B: correlation matrix

| Variable (1) | (2) | (3) | (4) | (5) |
|--------------|-----|-----|-----|-----|
| Fraud        |     |     |     |     |
| MBD          | 0.17*|    |     |     |
| MBS          | 0.22*| 0.06*|    |     |
| Management share | 0.16*| 0.08*| -0.06*|    |
| Ownership concentration | 0.12*| 0.23*| 0.06*| -0.03*|
| ROA          | -0.06*| -0.08*| -0.05*| -0.03*|
| Leverage     | 0.02*| 0.06*| 0.12*| 0.01*|
| Firm size    | 0.02*| 0.04*| 0.00*|     |
| Market to book | 0.01*| 0.04*| 0.01*|     |
| Big N        |     |     |     |     |

8 Large Japanese audit firms were restructured after Kanebo’s earnings fraud was revealed in 2005. Since 2008, Japan’s large audit firms have consisted of the Big 4, excluding Chuo Aoyama. A detailed summary of the transition period for big audit firms in Japan can be found in Skinner & Srinivasan (2012).
Table 2 Mean difference tests

| Variable                  | Non-fraud sample | Fraud sample | Difference | t-Statistic |
|---------------------------|------------------|--------------|------------|------------|
|                           | Obs   | Mean | Obs   | Mean |          |      |
| Panel A: fraud versus non-fraud samples |       |      |       |      |          |      |
| MBD                       | 29,978| 0.311| 282  | 0.241| 0.070*  | (2.53)|
| Management share          | 29,978| 9.071| 282  | 9.767| −0.696  | (−0.84)|
| Ownership concentration   | 29,978| 51.156| 282  | 49.668| 1.488   | (1.48)|
| Analyst                   | 29,978| 0.489| 282  | 0.497| −0.009  | (−0.17)|
| ROA                       | 29,978| 5.329| 282  | 1.237| 4.092***| (6.82)|
| Leverage                  | 29,978| 49.368| 282  | 57.656| −8.288***| (−6.60)|
| Firm size                 | 29,978| 9.475| 282  | 9.486| −0.011  | (−0.10)|
| Market to book            | 29,978| 1.502| 282  | 2.889| −1.387**| (−3.14)|
| Big N                     | 29,978| 0.728| 282  | 0.670| 0.058*  | (2.18)|
| Variable                  | MBD = 0 | MBD = 1 | Difference | t-Statistic |
|                           | Obs   | Mean | Obs   | Mean |          |      |
| Panel B. Firms without main bank versus firms with main bank |       |      |       |      |          |      |
| Fraud                     | 20,861| 0.010| 9399 | 0.007| 0.003*  | (2.53)|
| Management share          | 20,861| 10.015| 9399 | 6.997| 3.018***| (17.62)|
| Ownership concentration   | 20,861| 52.307| 9399 | 48.557| 3.750***| (18.03)|
| Analyst                   | 20,861| 0.563| 9399 | 0.323| 0.240***| (23.36)|
| ROA                       | 20,861| 5.845| 9399 | 4.060| 1.786***| (14.37)|
| Leverage                  | 20,861| 45.833| 9399 | 57.463| −11.630***| (−46.14)|
| Firm size                 | 20,861| 9.600| 9399 | 9.199| 0.401***| (18.15)|
| Market to book            | 20,861| 1.686| 9399 | 1.135| 0.551***| (6.01)|
| Big N                     | 20,861| 0.734| 9399 | 0.714| 0.020***| (3.58)|

See Appendix A in Table 7 for all variable descriptions. The t-statistic tests for whether there is a difference in means across the two samples.

*, **, and *** represent statistical significance at the 5%, 1%, and 0.1% levels, respectively.
the average MBD was 31.0%, implying that the main-bank relationships were maintained for about 31% of our sample. In addition, the average MBS was 0.966%, suggesting that the main banks held 1% of their client shares. Management shareholdings accounted for 9%, while analyst coverage (measured as the number of analysts) was 0.489. Further, the average ROA was 5.275, financial leverage was 49.486%, and firm size was about 100 billion JPY on average. Further, the mean of MTB was 1.535, with Big N occupying 72.7% of the sample. As for the pairwise correlation among variables, accounting frauds were negatively correlated with MBS, MBD, and Big N. This indicates that both the main banks and large audit firms play effective roles, thus supporting H1a and H2a/b.

Panel A in Table 2 shows a comparison of the descriptive statistics between firms that did and did not commit accounting fraud. It is first evident that MBD and MBS were significantly lower in firms that committed accounting fraud, which is consistent with H1a. It is also clear that the Big N indicated significantly lower figures in firms that committed accounting fraud, which is consistent with H2a.

Panel B in Table 2 shows the differences between firms with and without main-bank relationships. As discussed, accounting fraud was significantly lower in firms with main-bank relationships, which also supports H1a.

**Testing Hypotheses H1a and H1b**

This study investigated the rate of accounting fraud committed by Japanese publicly listed corporations, which may be monitored through main-bank relationships. Table 3 shows the estimates of the logistic regression from Eq. (1), which was used to test H1a/b and H2a/b. We included industry and year-fixed effects in all four models. Further, both the coefficients and marginal effects of the coefficient (d/dx) were reported in these models. To avoid multi-collinearity for MBD and MBS, we included MBD in model (3), while MBS was included in model (4). In model (3), we found that the coefficient for MBD was significantly negative at the 5% level, while that for MBS was also significantly negative at the 5% level in model (4). This supports H1a. As for Big N, we gained a significant coefficient for all eight models at the 10% level.

The regression results of the control variables can be summarized as follows: firms with less profitability were more likely to commit accounting fraud (Cumming et al., 2015). Similarly, firms with higher financial leverage were also likely to commit accounting fraud. Finally, firms with higher leverage were found to be inclined to commit accounting fraud (Erickson et al., 2006).

**Testing Hypothesis H2a and 2b**

We additionally estimated the logistic regression from Eq. (1) to divide our sample into two groups, including firms with main-bank relationships and firms without main-bank relationships (in other words, MBD = 1 and MBD = 0, respectively) (Table 4). Using this estimation, we analyzed whether Big N had different effects between groups. In Table 4, the estimated results of firms without and with main-bank relationships are reported in models (1) and (2), and (3) and (4), respectively. We found that Big N was only negative and significant at the 5% level for models (1) and (2), thus supporting H2a. This suggests that Big N was only effective for firms without main-bank relationships. In other words, the monitoring roles of main banks work as substitutes for Big N monitoring.

**Robustness of the Results**

To provide better identified results, we used several methods to address potential endogeneity problems. First, we adopted the IVP model. In this regard, the instrumental variables were set as stock return volatility during the past three years, the square of stock return volatility, the logarithm of total assets, and free cash flows (defined as cash flows from operating and investing activities divided by total assets). Stock return volatility and the square of stock return volatility were used as proxies of corporate risk-taking. These two instrumental variables are relevant because corporate risk-taking is mitigated in firms with main-bank relationship (Sakawa & Watanabel, 2021b; Weinstein & Yafeh, 1998). The logarithm of total assets was adopted as a proxy for firm size. This is relevant because MBD firms tend to be smaller than non-MBD firms (Sakawa & Watanabel, 2020a). Finally, managerial free cash flows were adopted because they tend to be reduced in firms with main-bank relationships (Sakawa & Watanabel, 2020a). Table 5 shows the estimated results of the IVP models. As shown, the estimated results of all samples are reported in model (1), while those for manufacturing and non-manufacturing firms are reported in models (2) and (3), respectively. As also shown, MBD was significantly negative at the 1% level in all three models, which is consistent with H1a. However, there were no significant results for Big N. In summary, our findings related to H1a were robust based on these additional tests.

The effectiveness of the corporate governance mechanisms is considered stable during the post-global financial crisis (GFC) periods (Sakawa & Watanabel, 2018a, 2019).
Table 3: Regression analysis

| (1)       | Coefficient | dy/dx | (2)       | Coefficient | dy/dx | (3)       | Coefficient | dy/dx | (4)       | Coefficient | dy/dx |
|-----------|-------------|-------|-----------|-------------|-------|-----------|-------------|-------|-----------|-------------|-------|
| MBD       |             |       |           |             |       |           |             |       |           |             |       |
|           |             |       |           |             |       |           |             |       |           |             |       |
| MBS       |             |       |           |             |       |           |             |       |           |             |       |
|           |             |       |           |             |       |           |             |       |           |             |       |
| Management| 0.004       | 0.003 |           | 0.004       | 0.003 |           | 0.004       | 0.003 |           | 0.004       | 0.003 |
|           | (1.76)      | (1.58)|           | (1.76)      | (1.58)|           | (1.76)      | (1.58)|           | (1.76)      | (1.58)|
| Ownership | − 0.001     | 0.003 |           | − 0.001     | 0.003 |           | − 0.001     | 0.003 |           | − 0.001     | 0.003 |
|           | (− 0.87)    | (− 1.03)|          | (− 0.87)    | (− 1.03)|          | (− 0.87)    | (− 1.03)|          | (− 0.87)    | (− 1.03)|
| Concentration| 0.016     | 0.005 |           | 0.016       | 0.005 |           | 0.016       | 0.005 |           | 0.016       | 0.005 |
|           | (0.35)      | (0.10)|           | (0.35)      | (0.10)|           | (0.35)      | (0.10)|           | (0.35)      | (0.10)|
| Analyst   | − 0.012     | 0.000 |           | − 0.012     | 0.000 |           | − 0.012     | 0.000 |           | − 0.012     | 0.000 |
|           | (− 5.67)    | (− 5.61)|          | (− 5.67)    | (− 5.61)|          | (− 5.67)    | (− 5.61)|          | (− 5.67)    | (− 5.61)|
| Leverage  | 0.007**     | 0.000 |           | 0.007**     | 0.000 |           | 0.007**     | 0.000 |           | 0.007**     | 0.000 |
|           | (5.46)      | (5.85)|           | (5.46)      | (5.85)|           | (5.46)      | (5.85)|           | (5.46)      | (5.85)|
| Firm size | 0.041**     | 0.001 |           | 0.041**     | 0.001 |           | 0.041**     | 0.001 |           | 0.041**     | 0.001 |
|           | (2.73)      | (1.61)|           | (2.73)      | (1.61)|           | (2.73)      | (1.61)|           | (2.73)      | (1.61)|
| Market to book| 0.001   | 0.000 |           | 0.001       | 0.000 |           | 0.001       | 0.000 |           | 0.001       | 0.000 |
|           | (0.96)      | (0.93)|           | (0.96)      | (0.93)|           | (0.96)      | (0.93)|           | (0.96)      | (0.93)|
| Big N     | − 0.069     | − 0.067|           | − 0.066     | − 0.064|           | − 0.066     | − 0.064|           | − 0.066     | − 0.064|
|           | (− 1.36)    | (− 1.32)|          | (− 1.25)    | (− 1.25)|          | (− 1.25)    | (− 1.25)|          | (− 1.29)    | (− 1.29)|
| Constant  | − 2.940**   | − 2.894**|          | − 2.861**   | − 2.855**|          | − 2.861**   | − 2.855**|          | − 2.861**   | − 2.855**|
|           | (− 13.97)   | (− 9.73)|          | (− 9.68)    | (− 9.63)|          | (− 9.68)    | (− 9.63)|          | (− 9.68)    | (− 9.63)|
| Log likelihood| − 1514.7 | − 1512.5|           | − 1509.8    | − 1510.4|           | − 1509.8    | − 1510.4|           | − 1509.8    | − 1510.4|
|           | 179.1**     | 181.3**|           | 188.2**     | 185.8**|           | 188.2**     | 185.8**|           | 188.2**     | 185.8**|

This table reports the results of probit regressions. The dependent variable is Fraud, which equals 1 if the firm committed financial statement fraud in year $t$ and 0 otherwise. See Appendix A in Table 7 for all other variable descriptions. We use 17 industrial sectors (following the TSE industry classification). T-statistics clustered by firm are presented in parentheses. + , *, and ** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Table 4  Regression analysis (divide regression, MBD)

|               | MBD = 0                        | Coefficient | dy/dx | MBD = 1                        | Coefficient | dy/dx |
|---------------|--------------------------------|-------------|-------|--------------------------------|-------------|-------|
| Management    |                                | 0.003       | 0.000 |                                | 0.006       | 0.000 |
| Share         |                                | (1.19)      | (1.19)|                                | (1.18)      | (1.18)|
| Ownership     |                                | − 0.002     | 0.000 |                                | − 0.001     | 0.000 |
| Concentration |                                | (− 1.00)    | (− 1.00)|                               | (− 0.36)    | (− 0.36)|
| Analyst       |                                | 0.023       | 0.001 |                                | − 0.049     | − 0.001|
|               |                                | (0.44)      | (0.44)|                                | (− 0.49)    | (− 0.49)|
| ROA           | − 0.011**                      | 0.000       | 0.000 | − 0.011**                      | 0.000       | 0.000 |
|               | (− 5.19)                       | (− 4.94)    | (− 5.16)| (− 4.92)|                                 | (− 1.34)    | (− 1.33)| (− 1.50)    | (− 1.48)|
| Leverage      | 0.007**                        | 0.000       | 0.000 | 0.008**                        | 0.000       | 0.000 |
|               | (5.21)                         | (4.96)      | (5.18)    | (4.94)|                                | (2.63)      | (2.54)    | (2.70)      | (2.60)|
| Firm size     | 0.034*                         | 0.001       | 0.028    | 0.001 | 0.080**                        | 0.002       | 0.107*    | 0.002 |
|               | (1.97)                         | (1.95)      | (1.01)    | (1.01)|                                | (2.75)      | (2.63)    | (2.06)      | (2.01)|
| Market to book| 0.001                          | 0.000       | 0.000    | 0.000 | 0.000                          | 0.000       | 0.000    | 0.000 |
|               | (0.59)                         | (0.59)      | (0.57)    | (0.57)|                                | (− 0.09)    | (− 0.09)| (− 0.03)    | (− 0.03)|
| Big N         | − 0.134*                       | − 0.003     | − 0.133*  | − 0.003 | 0.158                          | 0.003       | 0.160    | 0.003 |
|               | (− 2.26)                       | (− 2.24)    | (− 2.21)  | (− 2.19)|                                | (1.60)      | (1.58)    | (1.64)      | (1.61)|
| Constant      | − 2.896**                      | − 2.777**   | − 2.777**  | − 2.19 |                                | − 3.56**    | − 3.798** | − 6.55** |
|               | (− 11.04)                      | (− 7.94)    | (− 7.94)  | (− 7.94)|                                | (− 10.04)   | (− 10.04)| (− 6.55)    | (− 6.55)|
| Observations  | 20,861                         | 20,861      | 9111     | 9111 |
| Log likelihood| − 1119.3                       | − 1117.9    | − 382.0   | − 381.3 |
| $\chi^2$      | 151.7**                        | 154.0**     | 64.6      | 70.7** |

This table reports the results of probit regressions. The dependent variable is Fraud, which equals 1 if the firm committed financial statement fraud in year t and 0 otherwise. See Appendix A in Table 7 for all other variable descriptions. We use 17 industrial sectors (following the TSE industry classification). T-statistics clustered by firm are presented in parentheses. +, *, and ** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Table 5  Instrumental variable regression

|                | All         | Manufacture | Non-manufacture |
|----------------|-------------|-------------|-----------------|
| MBD            | −1.307**    | −1.631**    | −1.209**        |
|                | (−6.17)     | (−4.90)     | (−4.99)         |
| Management     | 0.000       | 0.000       | 0.001           |
| Share          | (0.21)      | (0.07)      | (0.41)          |
| Ownership      | −0.004**    | −0.006**    | −0.003+         |
| Concentration  | (−3.19)     | (−2.87)     | (−1.94)         |
| Analyst        | −0.071      | −0.101      | −0.080          |
|                | (−1.58)     | (−1.57)     | (−1.38)         |
| ROA            | −0.006*     | −0.005      | −0.006*         |
|                | (−2.34)     | (−1.12)     | (−2.17)         |
| Leverage       | 0.014**     | 0.020**     | 0.010**         |
|                | (10.32)     | (11.96)     | (5.89)          |
| Firm size      | 0.014       | 0.016       | 0.019           |
|                | (0.62)      | (0.43)      | (0.66)          |
| Market to book | −0.001      | −0.014+     | 0.000           |
|                | (−0.51)     | (−1.73)     | (−0.06)         |
| Big N          | −0.015      | 0.038       | −0.057          |
|                | (−0.31)     | (0.53)      | (−0.88)         |
| Observations   | 28,716      | 13,415      | 15,301          |
| Log likelihood | −17,671.1   | −8469.8     | −8960.3         |
| Chi²           | 349.6**     | 444.4**     | 134.7**         |

The dependent variable is Fraud, which equals 1 if the firm committed financial statement fraud in year t and 0 otherwise. See Appendix A in Table 7 for all other variable descriptions. Instrument Variables include stock volatility (Volatility) during 3 years, square of stock volatility (Volatility), logarithm of total assets, cash flows from operating activities, and investing activities divided by total assets. We use 17 industrial sectors (following the TSE industry classification). T-statistics clustered by firm are presented in parentheses. +, *, and ** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Therefore, we performed the robustness checks using the data corresponding to the post-GFC periods from 2010 to 2016. Table 6 shows the estimated results of the post-GFC periods (2010–2016). As shown in Table 6, we confirmed that both MBD and MBS were significantly negative, consistent with H1a. However, there were no significant results for Big N. We conclude that our findings related to H1a were robust based on these additional tests.

We explore further considerations to verify the robustness of our results. Individuals’ morality is considered as a key to understand fraud risk factors (Morales et al., 2014). Lack of Individuals’ morality is likely to occur ‘theft.’ To except for the individuals’ morality, we excluded ‘theft’ from accounting frauds. After excluding ‘theft,’ we confirm the robustness of our H1a in the un-tabulated results.

Table 6 Regression analysis (post-GFC periods:2010–2016)

|       | (1) Coefficient dy/dx | (2) Coefficient dy/dx | (3) Coefficient dy/dx | (4) Coefficient dy/dx |
|-------|-----------------------|-----------------------|-----------------------|-----------------------|
| MBD   | −0.156*               | −0.004                |                       |                       |
| MBS   | −0.037*               | −0.001                |                       |                       |
|       | (−2.51)               | (−2.49)               |                       |                       |
| Management | 0.002 (0.70)         | 0.001 (0.55)          | 0.001 (0.54)          | 0.001 (0.54)          |
| Share | −0.001 (−0.98)        | −0.001 (−0.97)        | −0.001 (−0.97)        | −0.001 (−0.97)        |
| Ownership | (−0.52) (−0.52)     | (−0.69) (−0.69)       | (−0.68) (−0.68)       | (−0.68) (−0.68)       |
| Analyst | 0.016 (0.32)          | 0.003 (0.07)          | 0.002 (0.03)          | 0.002 (0.03)          |
| ROA   | −0.011**              | 0.000                 | −0.011**              | 0.000                 |
|       | (−4.80)               | (−4.62)               | (−4.63)               | (−4.61)               |
|       | (−4.74)               | (−4.58)               | (−4.63)               | (−4.61)               |
| Leverage | 0.007** (5.20)      | 0.000                 | 0.007** (5.18)        | 0.000                 |
|       | (4.97)                | (4.96)                | (5.18)                | (5.60)                |
|       | (5.44)                | (5.18)                | (5.18)                | (5.18)                |
|       | (5.60)                | (5.32)                | (5.18)                | (5.18)                |
| Firm size | 0.026 (1.59)       | 0.021                 | 0.021                 | 0.021                 |
|       | (1.58)                | (0.81)                | (0.81)                | (0.81)                |
|       | (0.81)                | (0.81)                | (0.81)                | (0.81)                |
| Market to book | 0.002 (1.00)    | 0.002                 | 0.002                 | 0.002                 |
|       | (1.00)                | (0.97)                | (0.97)                | (0.97)                |
|       | (0.97)                | (0.97)                | (0.97)                | (0.97)                |
| Big N | −0.070 (−1.26)        | −0.068 (−1.22)        | −0.065 (−1.17)        | −0.063 (−1.12)        |
|       | (−1.25)               | (−1.22)               | (−1.17)               | (−1.12)               |
| Constant | −2.740 (−12.42)     | −2.669 (−8.33)        | −2.629 (−8.23)        | −2.633 (−8.28)        |
|       | (−12.42)              | (−8.33)               | (−8.23)               | (−8.28)               |
| Observations | 22.994        | 22.994                | 22.994                | 22.994                |
| Log likelihood | −1265.0        | −1264.5               | −1262.4               | −1261.3               |
| χ² | 137.8** | 143.2** | 146.3** | 148.9** |

This table reports the results of probit regressions. The dependent variable is Fraud, which equals 1 if the firm committed financial statement fraud in year t and 0 otherwise. See Appendix A in Table 7 for all other variable descriptions. We use 17 industrial sectors (following the TSE industry classification). T-statistics clustered by firm are presented in parentheses. +, *, and ** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Therefore, we performed the robustness checks using the data corresponding to the post-GFC periods from 2010 to 2016. Table 6 shows the estimated results of the post-GFC periods (2010–2016). As shown in Table 6, we confirmed that both MBD and MBS were significantly negative, consistent with H1a. However, there were no significant results for Big N. We conclude that our findings related to H1a were robust based on these additional tests.

To investigate if some of the main banks are more effective in monitoring than the others, we checked the difference in the likelihood of accounting frauds among the main banks of three horizontal keiretsu. The alliances of keiretsu via bank merger occurred during the early 2000s in Japan and the main banks of the three horizontal keiretsu are Mitsubishi UFJ, Mizuho Financial Group, and Sumitomo Mitsui group (Higgins, 2018). We find that the likelihood of accounting frauds between these three main banks and other banks are almost identical.
bank-dominated corporate governance (Diamond, 1984; Fama, 1985). In this regard, main banks work as effective monitoring activities to mitigate accounting frauds.

Our research has several theoretical implications for the governance substitution perspective (Rediker & Seth, 1995). First, we focused on the delegated monitoring roles of main banks (Aoki et al., 1994). Unlike in market-oriented corporate governance countries, bank-centered economies entail that main banks work as delegated monitors for mitigating agency problems, including instances of accounting fraud, thus playing a partial substitute role for external monitors such as institutional shareholders, which is also the system prevalent in Japan (Sakawa & Watanabel, 2020c; Sakawa et al., 2021). Second, in the context of Japanese bank-dominated corporate governance, main-bank monitoring is a partially effective substitute for the monitoring roles of Big N to prevent accounting frauds.

This study also had some limitations. First, we did not focus on monitoring from the perspective of internal control mechanisms. Since 2015, the corporate governance code has required Japanese corporations to appoint independent directors. Future research is, therefore, needed to investigate the roles of these directors in mitigating accounting fraud. Second, corporate governance codes now encourage board diversity (e.g., gender inclusivity) (Japan Times 2016). Such diversity is known to be helpful for reducing accounting frauds in male-dominated industries (Cumming et al., 2015). Further, future research should investigate the relationship between gender diversity and accounting fraud among male-dominated corporations in Japan and elsewhere. Third, our analysis is based on the model of Cressey’s triangle, which does not include the sociological, psychological, and situational factors (Lokanan, 2015). Further case studies based on CDA approach may also be future research avenue. Finally, there may be another possibility in the main banks’ response to the accounting frauds. Given the main banks have major shareholdings, they may be willing to settle frauds through insurance or removing the perpetrators, rather than disclosing the frauds publicly and risking the loss of share value caused by the disgrace to the network of companies involved. This possibility may be an important research avenue for future studies.

Conclusions

This study investigated the association between the rate of accounting fraud and main-bank relationships between 2008 and 2016, i.e., after implementation of the J-SOX act. We first found that the rate of accounting fraud was largely mitigated in firms with main-bank relationships. Second, we found that the monitoring activities of large audit firms were not necessarily effective for preventing accounting fraud in Japanese corporations. In the context of Japanese bank-dominated corporate governance, this suggests that main banks work as substitutes for the monitoring roles played by Big N.

The Japanese corporate governance system is clearly bank-dominated. Japanese main-bank relationships have remained steadfast since financial deregulations and bank mergers that occurred during the 2000s, through the “alliance of Keiretsu and merger of banks.” However, the Western media have criticized recent examples of accounting fraud in large Japanese corporations (e.g., Olympus and Toshiba) as problems resulting from the lack of corporate governance. In this study, we specifically investigated whether the rate of accounting fraud was mitigated through main-bank monitoring in the context of bank-dominated corporate governance following the Japanese era of bank mergers. Here, the main policy implication is that main-bank relationships may strengthen business ethics by effectively deterring fraud in bank-dominated corporate governance.11 As its main contribution to the literature, this study found that the continued analysis of bank-monitoring activities might benefit stakeholders while strengthening business ethics in bank-centered economies.

Appendix

See Table 7.

11 The effectiveness of main banks is not found to be different among industries. Considering the breakdown by industry, where the average of accounting fraud and MBD is 0.009 and 0.311, respectively, there seems to be less difference among industries.
### Table 7 Variable definitions

| Variable       | Definition                                                                 |
|----------------|---------------------------------------------------------------------------|
| Fraud          | A dummy variable that is valued as 1 if the firm committed financial-reporting-related fraud at least once in the given year, but is otherwise valued as 0 |
| MBD            | MBD is valued as 1 if the proportion of main-bank shareholdings are positive, but is otherwise valued as 0 |
| MBS            | The proportion of main-bank shareholdings                                  |
| Management share | The percentage of stocks that the management team, including of CEO, holds in the firm (in percentage of total shares outstanding) |
| Ownership concentration | The sum of the percentage of shares owned by the top 10 shareholders |
| Analyst        | The natural logarithm of the number of analysts following a firm          |
| ROA            | Return on assets is defined as net income scaled by total assets          |
| Leverage       | The total long-term debt scaled by total assets                            |
| Firm size      | The logarithm of the total market value                                   |
| Market to book | Market value of common stock scaled by its book value                     |
| Big N          | Big N audit firms, consisting of either the Big 4 or Big 5                |

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### Declarations

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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