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Misstatements and Internal Control Over Operations and Compliance

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ABSTRACT: This study examines whether the effectiveness of internal control over *operations* and *compliance* is associated with the likelihood of financial misstatements. Using a unique dataset from Taiwan, we find that the more deficiencies a company has in internal control over compliance, the greater the likelihood that the company's financial statements will be restated in the future; indeed, severe misstatements are more likely for firms with more internal control deficiencies in compliance. However, we do not find a similar impact involving internal control over operations. As the literature contains little about internal control over operations and compliance, our study contributes by shedding light on the importance of control activities in operations and compliance in regard to the quality of financial reporting.

Keywords: internal control deficiencies; operations; compliance; misstatements.

I. INTRODUCTION

Internal control is a process designed to assure achievement of three organizational objectives: effectiveness and efficiency of operations, reliability of reporting, and compliance with applicable laws and regulations (Committee of Sponsoring Organizations of the Treadway Commission [COSO] 2013). Numerous studies examine the association between internal control over financial reporting (ICFR) and financial reporting quality (e.g., Abbott, Daugherty, Parker, and Peters 2016; Ege 2015; Lin, Pizzini, Vargus, and Bardhan 2011; Prawitt, Smith, and Wood 2009), but, due to data constraints, little empirical research assesses whether and how internal control over operations (ICO) and compliance (ICC) influences financial reporting quality. Our understanding of the function of internal control must thus be considered limited, because the control activities aimed at each of the three objectives should support or overlap each other (COSO 2011). For instance, internal control deficiencies (ICDs) in safeguarding assets against unauthorized use and loss (i.e., operations objectives) could lead to a misstated financial statement (i.e., reporting objectives) if management does not perform a periodic inventory count but merely relies on perpetual inventory records. As the internal control components interact with each other (Pickett 2010), control deficiencies in operations and compliance can be informative of control risk in financial reporting. Using proprietary data

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obtained from the Financial Supervisory Commission (FSC) in Taiwan, this paper examines whether the occurrence of ICDs in *operation*s and *compliance* is associated with the likelihood of misstatements.[1]

Several factors motivate this study. First, a review of the literature on internal control suggests that most studies examine the effectiveness of ICFR. For example, studies find an association between deficiencies in ICFR and stock price (Beneish, Billings, and Hodder 2008; Hammersley, Myers, and Shakespeare 2008), accruals quality (Doyle, Ge, and McVay 2007a), and cost of equity (Ashbaugh-Skaife, Collins, Kinney, and LaFond 2009). As the function of internal control is a multi-dimensional construct, focusing on ICFR does not provide a complete picture of internal control activities. To our knowledge, the study by Chang, Chen, Cheng, and Chi (2019) is among the first to investigate control activities related to operations and compliance. Although this paper examines the determinants of the effectiveness of ICO and ICC, given the lack of empirical evidence regarding the consequences of ICO and ICC, our understanding of internal control as a whole nevertheless remains limited. Second, archive-based papers on internal auditing depend largely on the Global Auditing Information Network (GAIN) Database, which may suffer from a small sample size constraint (Lin et al. 2011; Prawitt et al. 2009) and a potential self-selection bias, because the data are collected from chief audit executives who voluntarily respond to questionnaires conducted by the Institute of Internal Auditors (IIA). For example, large firms with relatively sophisticated internal audit function (IAF) are more likely to be included in the GAIN survey. Our data provided by the regulator include most, if not all, publicly traded companies in Taiwan and is thus not subject to a non-random sample problem. Third, firms might shop for a clean opinion on internal control. Such opinion shopping could inject noise into the findings of studies that rely on disclosures of material internal control weaknesses. In our sample, while companies self-report their ICDs, we presume that those companies are not incentivized to falsify such disclosures because their reports are not made public. To sum up, this study takes advantage of the availability of a less biased and more complete set of data to examine the association between ICDs in operations and compliance and misstatements.

Our results suggest that the more ICDs that a company reports in operations and compliance, the higher the likelihood of financial misstatements. We also note that the breadth of deficiencies in *compliance* is the driving factor explaining the occurrence of eventual restatements. Furthermore, the results of additional analyses suggest that firms with more ICDs in compliance are more likely to issue material misstatements that report inflated income or that are subsequently required by the regulator to be restated. The study contributes to the literature in the following ways. First, the literature on internal control focuses mainly on disclosures mandated by SOX 302 and SOX 404. Using a unique dataset, we investigate internal control activities related to operations and compliance. In contrast to prior studies, our multifaceted measurements of control risks are developed directly based on several types of ICDs in operations and compliance. Second, we expand the scope of research and fill a gap in the literature on internal control by investigating the associations between the effectiveness of ICO and ICC and the likelihood of misstatements. The findings provide indirect evidence that supports the argument for the interdependence of the objectives. Third, this study presents implications for corporate governance environment. Our results suggest that ICDs in compliance, which could indicate weak control environments or noncompliant cultures (Kedia, Luo, and Rajgopal 2017), is associated with low financial reporting quality. From a policy perspective, this finding suggests that a company's disclosures of ICDs in compliance could be informative to stakeholders. Last, our results provide insights into the relative importance of ICO and ICC. We propose that deficiencies in ICC are more material because the related controls are anchored around explicit laws and regulations, as opposed to those in ICO, which are determined at the discretion of management. Additionally, noncompliance incidents possibly involve higher-level management, while operational defects are more likely to involve rank-and-file employees and thus are less material to stakeholders. As a result, the effectiveness of ICC could influence financial reporting on a larger scale.

This paper proceeds as follows. Section II provides the institutional background and internal control regulations in Taiwan. We review the related literature and develop our hypotheses in Section III. Section IV describes the research design and the regression model, and Section V reports descriptive statistics, the main empirical results, and the supplementary tests. We conclude the study in Section VI.

II. INSTITUTIONAL BACKGROUND

Internal Control Reporting Requirements

In Taiwan, the government regulation of IAF was initially established in 1986 through the standard, *Requirements for the Establishment of Internal Control Systems by Public Companies*, issued by the Ministry of Finance (MOF), which required public companies to establish internal control systems. However, the requirement for maintaining full-time internal auditors

[1] The FSC, acting as the Taiwan counterpart to the SEC, has been responsible for regulating principal securities markets in Taiwan since July 1, 2004. In this paper, the terms "regulator" and "FSC" are used interchangeably unless otherwise noted.

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was not enforced until 1992.[2] Based on the COSO internal control framework (COSO 1992), the FSC issued the *Regulations Governing Establishment of Internal Control Systems by Public Companies* (hereafter, IC Regulations) in 2002. The IC Regulations define an internal control system as a process affected by a public company's board of directors, management, and other personnel, and designed to promote sound operations of the company. The regulations also specify that internal control should provide reasonable assurance regarding the achievement of three objectives: (1) effectiveness and efficiency of operations, (2) reliability, timeliness, transparency, and regulatory compliance of reporting, and (3) compliance with applicable laws, regulations, and bylaws.[3] Operations objectives typically focus on the achievement of a firm's basic mission (i.e., enhancing quality and innovation, and reducing production costs and time). Reporting objectives relate to the preparation of reliable financial and non-financial reports for internal and external users. Compliance objectives pertain to the adherence to laws and regulations in the course of a firm's business operations.

For reporting requirements, the IC Regulations mandate that, on an annual basis, publicly traded companies shall evaluate and monitor their internal control system and report any defects to the FSC. The information submitted to the FSC should contain three reports including an audit plan for the next year, execution results of the previous year's audit plan, and a remediation plan for defects and irregularities discovered in the execution report.[4] Furthermore, the company shall report any ICDs related to ten audit items, as listed in Appendix A.[5] The first seven control activities are explicitly regulated by law, including acquisition or disposal of assets, engagement of derivatives transactions, extension of loans, endorsements or guarantees for others, management of related party transactions, supervision and management of subsidiaries, and procedures governing board meetings. That is, a company is required to evaluate these seven activities against applicable rules and report any deficiencies or irregularities accordingly (i.e., ICC). In contrast, there are no specific rules regulating the remaining three control activities: inspection of information and communications security, sales and receipts cycles, and purchase and payment cycles. It is worth noting that the IC Regulations did not regulate the assessment of ICFR until an amendment issued on July 17, 2007.[6] In other words, Taiwanese companies were not required to report the effectiveness of ICFR prior to the 2007 amendment.

The IC Regulations are similar to the internal control reporting requirements in the U.S. in several respects. For example, the IC Regulations adopt the COSO internal control framework. Moreover, the IC Regulations require the public company to include in its annual report signed assertions obtained from the chair of the board of directors, the chief executive officer, and the chief internal auditor, which is similar to the requirement of Section 302 of the Sarbanes-Oxley Act of 2002. Regardless, there are some dissimilarities. The IC Regulations, for example, require the company to disclose its defects in ICO and ICC to the authorities, which is not mandated in the U.S. Additionally, while SOX Section 404 requires external auditors to issue an opinion on a company's ICFR (but not on ICO or ICC) for its annual report, the IC Regulations require the auditors to issue an opinion on internal control over all three objectives (i.e., ICFR, ICO, and ICC), but only as part of the company's filings for IPO application.

Misstatements in Taiwan

In Taiwan, an accounting restatement can be initiated by a firm, its external auditor, or the Securities and Futures Bureau (SFB) under the FSC. The SFB has the authority to require a firm to restate financial statements when its misstatement meets a stipulated materiality threshold. Specifically, Article 6 of the *Securities and Exchange Act Enforcement Rules* requires that the

[2] The MOF was the regulating agency of Taiwanese securities markets from 1981 to 2004. It published "Guidelines for Establishment of Internal Control Systems and Internal Audits by Public Companies" in 1992, which can be treated as a revision of the 1986 requirements.

[3] See Article 3 of the IC Regulations. An English version of the current IC Regulations is accessible at the FSC website: https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=G0400045

[4] A public company shall submit to the FSC the next year's audit plan by the end of each fiscal year, the execution result report by the end of the second month of the next fiscal year, and the correction report within the first five months from the end of the prior fiscal year. Refer to the IC Regulations (i.e., Articles 18, 19, and 20) for the relevant requirements. The two reports are provided to the company's external auditor, but most of the information mentioned above is not made available to the public.

[5] The IC Regulations have been amended several times since 2005. To be consistent with the sample period, we adopted the regulations applicable to public companies in 2005–2007, which can be found at Law Source Retrieving System of Taiwan (http://eng.selaw.com.tw/LawArticleHistory.aspx?LawID=FL021141&ModifyDate=1030922#0941219). The current version of Article 13 of the *Regulations Governing Establishment of Internal Control Systems by Public Companies* was amended in 2014 and slightly different from the one we adopted. The current version can also be found at: https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=G0400045

[6] The 2007 amendment of the IC Regulations requires public companies to include controls for management of the procedures for preparation of financial statements (i.e., Article 8). The latest amendment in 2014 further specifies that such controls should also include management of application of International Financial Reporting Standards, procedures for professional accounting judgments, and processes for making changes in accounting policies and estimates. The Securities and Futures Bureau (2019, 8) suggests that a company should consider the following activities while designing its internal controls over financial reporting: (1) the establishment and maintenance of accounts; (2) procedures including journalizing transactions, posting, and closing the books; (3) the maintenance of the general ledger; (4) assessments and recognition of accruals and estimates; (5) procedures for preparation of financial statements; (6) procedures for the selection and application of accounting policies; and (7) preservation of accounting information.

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individual financial report (consolidated financial report) be restated and then publicly disclosed if (1) the corrected amount of the comprehensive income is NT$10 million ($15 million) or more, and is also 1 percent (1.5 percent) or more of the originally audited operating revenue, or (2) the corrected amount of any of the asset line items included in the balance sheet is NT$15 million ($30 million) or more, and is also 1.5 percent (3 percent) or more of the originally stated amount of total assets after final accounting.[7] Once a misstatement meets the threshold, the firm needs to file and publicly disclose amended financial statements to replace the original reports within the period prescribed by the regulator. Thus, an SFB-initiated misstatement is considered more severe than one initiated by the firm or an auditor. In contrast, if the corrections do not reach the threshold, the firm, instead of restating its financial report, shall present the new amounts as corrections to specified accounts (i.e., retained earnings, other comprehensive income, or individual asset line item) and disclose such information on a website determined by the regulator. In the current study, we determine the incidences of misstatement based on misstatement disclosures, which mainly involve corrections of financial statements that failed to comply with the Taiwan GAAP at the time they were filed but exclude corrections due to changes in accounting principles or policies, discontinued operations, mergers and acquisitions, and changes to the accounting period.

III. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Research on internal control has mostly focused on material weaknesses relating to ICFR. A number of studies examine how economic factors and firm characteristics affect the ICFR of a firm (e.g., Ashbaugh-Skaife, Collins, Kinney, and LaFond 2008; Bronson, Carcello, and Raghunandan 2006; Doyle et al. 2007a; Ge and McVay 2005; Lin et al. 2011; Naiker and Sharma 2009; Rice and Weber 2012). In addition, the economic consequences of material weaknesses in ICFR are a critical issue. For example, the Public Company Accounting Oversight Board (PCAOB 2004, 2007) classified three levels of ICDs based on the likelihood of a financial misstatement and the significance of that potential misstatement. Many empirical studies support the contention that weaknesses in ICFR indicate lower-quality accounting information. Collectively, they provide evidence that material weaknesses in ICFR adversely influence reporting quality (Ashbaugh-Skaife et al. 2008; Bedard, R. Hoitash, U. Hoitash, and Westermann 2012; Doyle et al. 2007a), market reactions to earnings announcements (Ashbaugh-Skaife et al. 2009; Hammersley et al. 2008), accuracy of analysts' forecasts (Feng, Li, and McVay 2009), cost of capital (Beneish et al. 2008; Ogneva, Subramanyam, and Raghunandan 2007), and audit pricing and report lags (R. Hoitash, U. Hoitash, and Bedard 2008; Munsif, Raghunandan, and Rama 2012). More relevant to our study, Myllymäki (2014) finds that companies with material weaknesses in ICFR are more likely to provide misstated financial information in the future. This result suggests a persistent association between disclosures of internal control material weaknesses and financial reporting quality. Nevertheless, none of these studies examines ICO or ICC.

Expanding our knowledge of the dimensions of operations and compliance is important, for it is desirable to achieve all the objectives of control. In an interview commending the advantages of the internal control framework, former COSO chairman David Landsittel refers to "an opportunity to use this framework . . . to achieve not just financial reporting objectives, but objectives relating to the operations of the business and compliance with laws and regulations as well" (Tysiac 2012). While prior studies do not directly examine the effectiveness of ICO and ICC, researchers generally suggest an interdependent relationship among the three internal control objectives. Boritz and Lim (2008) suggest that IT-related controls in ICFR are positively associated with financial performance (i.e., improved performance from enhanced operations and lower regulatory compliance costs). Feng, Li, McVay, and Skaife (2015) find that companies with material weaknesses in inventory control are likely to have lower inventory turnover ratios and to report more inventory impairments than those without such material weaknesses. The positive association between the effectiveness of ICFR and a company's operations supports the argument for the interdependence of the internal control objectives. Similarly, Cheng, Goh, and Kim (2018) provide empirical evidence on the relation between firm operational efficiency and effective ICFR. Specifically, they find that firms with material weaknesses in ICFR have significantly lower operational efficiency than do firms without them. Overall, the relevant research supports the argument that some controls influence the achievement of multiple control objectives.

There are three recent studies relevant to ours. First, Lawrence, Minutti-Meza, and Vyas (2018) provide evidence that operational control risk indicates potential financial reporting control weaknesses. Specifically, the authors use data breaches (i.e., cybersecurity attacks) and a control risk index developed through textual analysis of Form 10-Ks to proxy for operational control risk. Their results suggest that a company with a higher operational control risk is more likely to report financial reporting deficiencies, issue misstatements, receive SEC comment letters, and pay higher audit fees. Second, concerning compliance control risks, Kedia et al. (2017) find that a firm with violations over a wide range of activities (a proxy for a weak compliance culture) is more likely to misreport its financial statements. Third, Chang et al. (2019) investigate the association

[7] The enforcement rule is available at: http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL007010&ModifyDate=1011123&Hit=1

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between the characteristics of internal audit function and the effectiveness of ICO and ICC. Their results suggest that internal audit resources (internal auditor competence) can improve internal audit performance for both operations and compliance (for compliance, but not for operations).

The current study complements and differs from the above studies in several ways. First, Lawrence et al. (2018) acknowledge that one of their operational risk proxies is based on the realization of one type of operational control weakness, and the other is a multifaceted measure that arguably suffers from measurement errors. In our study, we investigate ICDs in operations, which can be directly linked to several dimensions of internal control activities over operations. Moreover, our measurement of deficiencies is obtained from management disclosures (i.e., direct and realized outcomes), which positively mitigates the concern about errors in indirect measurement. Second, the measurement of compliance in Kedia et al. (2017) relies on a comprehensive list of enforcement actions and compliance reports. Those noncompliance records most likely reflect incidents that are limited to severe violations and sanctions. That is, their proxy is based on the realization of compliance risk and may not be able to capture compliance deficiencies that do not lead to enforcement actions but cumulatively influence corporate culture. Our measurement, on the other hand, captures any defects or irregularities disclosed by the company in its annual execution report, regardless of their degree of materiality. The implication is that an accumulation of deficiencies in compliance, not necessary material weaknesses that lead to formal enforcement actions, could indicate a weak ethical climate and culture in an organization. We further note that the occurrence of ICDs is relatively high in our sample (i.e., over 50 percent of firm-year observations compared to less than 2 percent in Lawrence et al. [2018] and 22 percent in Kedia et al. [2017]), suggesting that self-selection bias and reporting bias could be lower in our sample. Finally, the current study examines the consequences of, rather than the determinants of, the effectiveness of ICO and ICC.[8]

Hypothesis Development

An effective IAF can assist management in improving internal controls and ensuring quality corporate governance (Chartered Institute of Internal Auditors 2015). Given that the control objectives are interdependent of each other, the occurrence of any kind of ICDs may indicate an ineffective IAF and a generally poor control environment, which essentially influences firm performance and reporting quality (Gramling, Maletta, Schneider, and Church 2004). Researchers have provided empirical evidence that ICO and ICC are intertwined with internal controls over financial reporting. Lawrence et al. (2018) suggest that operating and financial reporting activities rely on shared underlying systems and procedures (i.e., shared controls). Given that weaknesses in ICFR are associated with lower financial reporting quality (e.g., Ashbaugh-Skaife et al. 2008; Doyle, Ge, and McVay 2007b), Lawrence et al. (2018) predict and find that operational control risk is associated with financial reporting quality. In the same vein, we propose that a company with operational control deficiencies is likely to have lower financial reporting quality. For example, an ineffective credit control in sales operations (audit item #9) may lead to poor management of accounts receivable, an increase in the risk of bad debts, and problematic cash flow. Based on the argument above, we state our first hypothesis as follows:

H1: Disclosures of internal control deficiencies in operations are positively associated with the likelihood of misstatements.

Prior studies suggest that a poor compliance record reflects a culture of noncompliance and a weak corporate governance system, which likely lead to lower financial reporting quality. Kedia et al. (2017) posit that a firm's past record of violations is predictive of financial misreporting. They argue that a weak ethical climate is likely to be associated with greater occurrence of violations, regardless of types of noncompliance (e.g., environmental violations, product violations, employee safety violations, and financial misreporting). Ji, Rozenbaum, and Welch (2017) also find that a negative corporate climate is associated with an increased likelihood of earnings management (i.e., meeting or beating market earnings expectations). Similarly, Raghunandan (2019) suggests that non-financial violations are more indicative of financial misconduct when governance worsens. Therefore, we expect that ICDs in compliance are indicative of lower financial reporting quality. For example, given the nature of related-party transactions, failure to disclose such transactions (i.e., audit item #5) may give rise to higher risks of material misstatement or omission in financial reporting (e.g., AU-C Section 550.03). Kohlbeck and Mayhew (2017) provide empirical evidence supporting the association between related-party transactions and future misstatements. They further argue that this association is concentrated among transactions that appear to capture "tone at the top" rather than arguably more necessary business transactions. Based on the argument above, our second hypothesis is stated as follows:

H2: Disclosures of internal control deficiencies in compliance are positively associated with the likelihood of misstatements.

[8] We acknowledge and document in the conclusion some concerns about and weaknesses of using the dataset obtained from the FSC and the measurements of ICDs in operations and compliance.

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TABLE 1

Sample Selection

Firm-year observations between 2005 and 2007	3,658
Less: Observations in financial industry	(157)
Less: Observations missing data for internal control weakness	(142)
Less: Observations missing data for control variables	(22)
Final Sample	3,337

IV. DATA AND RESEARCH DESIGN

Data Description

We use a dataset comprised of execution result reports obtained from the FSC in Taiwan for the 2005–2007 period.[9] In the execution result reports, management reports ICDs identified in operations and/or in compliance for the prior year. We utilize the Taiwan Economic Journal (TEJ) database to obtain all necessary financial statement data for our analysis. Table 1 presents the sample selection procedure. We begin with 3,658 firm-year observations from 2005 to 2007. We first exclude 157 observations from the financial industry, as they are subject to different internal control regulations. After excluding observations with missing data for internal audit performance (142 observations) and for control variables (22), the final sample consists of 3,337 firm-year observations. Firms in the electronics industry account for the majority of the sample (56.6 percent), followed by the chemical industry and the electric machinery industry (6.1 and 6 percent, respectively). The industry distribution of our sample is comparable to those reported in prior studies using data from Taiwan (e.g., Sue, Chin, and Chan 2013).

Empirical Model and Measurement of Variables

We use the following probit regression model to test the relationship between financial reporting quality and ICDs in operations and compliance. Φ is a cumulative density function that describes a standard normal distribution, and we omit the subscripts that indicate firm and year to simplify the model.

$$PR(MISSTATE = 1) = \Phi(\alpha_0 + \alpha_1 ICD + \alpha_2 SIZE + \alpha_3 ROA + \alpha_4 LEV + \alpha_5 MB + \alpha_6 ABNACC + \alpha_7 BOARDSIZE + \alpha_8 BIGN + Year\ Effect + Industry\ Effect)$$

The dependent variable, *MISSTATE*, is a dummy variable equal to 1 if a firm issued a misstatement that was eventually restated, and 0 otherwise.[10] Using the misstatement disclosure data, we concentrate on the misstated periods (i.e., the periods that include misstatements) to proxy for poor financial reporting quality. The independent variable, *ICD*, measures the incidence of ICDs disclosed in a company's execution result report. As discussed earlier, a public company evaluates and reports its ICDs in response to ten control activities as required by the regulations. Based on relevant regulatory requirements and the nature of the activities, we classify reported deficiencies into two categories: operations and compliance. Following Chang et al. (2019), we classify a deficiency as a compliance defect (i.e., *ICD_ LAW)* if it relates to an activity explicitly regulated by a particular set of rules imposed by the FSC. Otherwise, it will be classified as an operations defect (i.e., *ICD_OP*). Accordingly, we classify a deficiency related to the activity category (1) to (7) as a defect in compliance, and (8) to (10) as a defect in operations.[11] We operationalize the independent variables using two approaches. First, we use a dummy approach and define *ICD_D* as an indicator equal to 1 if a company discloses at least one ICD in either operations or compliance. Likewise, *ICD_OP_D* (*ICD_ LAW_D*) equals 1 if a company reports at least one ICD in operations (compliance). As using dummy variables may raise a concern about potential loss of information, we adopt a second approach that takes into account the number of ICDs disclosed in the execution result report. Specifically, we measure *ICD_C* as the number of deficiencies in either

[9] As mentioned above, the execution result reports are proprietary data and not made available to the public. While one of our authors was granted access to the reports, the regulator reserved the rights to determine the sample period and the length of the period (i.e., three years from 2005 to 2007) to be granted due to the sensitive and confidential information disclosed in those reports. The IC Regulations became effective in 2002, and because the data might not be complete in the first couple of years, it appears reasonable that the data granted to us starts from 2005.

[10] To identify existing misstatements in the sample period, we examine financial restatements that were issued during and after the sample period.

[11] See Appendix A for the list of the control activities, their corresponding laws, and our classification. Since we use the same criteria developed by Chang et al. (2019), our classification is identical to theirs.

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operations or compliance disclosed by a company. Likewise, *ICD_OP_C* (*ICD_ LAW_C*) is measured as the number of deficiencies in operations (compliance) disclosed by a company. Using these variables to proxy for the breadth of internal control problems, we expect that a company reporting more deficiencies has a weaker internal control system.[12]

Prior studies have found that company characteristics influence financial information quality (e.g., Ashbaugh-Skaife et al. 2008; Bedard et al. 2012; Chen, C. J. Lin, and Y. C. Lin 2008; DeFond and Jiambalvo 1991; Doyle et al. 2007a; Myllymäki 2014; Nagy 2010). As a result, we control for several company characteristics, such as complexity, financial health, corporate governance, and auditor. Specifically, we include the logarithm of the total assets (*SIZE*) of a firm in the model to control for business complexity in operations. Since companies with poor financial performance are more likely to have low financial reporting quality, we control for return on assets (*ROA*), measured as net income divided by total assets. Further, to control for the effect of indebtedness on financial reporting quality, we include leverage (*LEV*), computed as debt divided by total assets, in the model. Financial risks associated with high growth and aggressive accounting are controlled for by including market-to-book ratio (*MB*) and abnormal accruals (*ABNACC*), respectively, in the model. A larger board size could indicate more complex operations or greater agency costs (Boone, Field, Karpoff, and Raheja 2007), both of which may lead to a greater likelihood of misstatements. To control for such effects, we include *BOARDSIZE,* measured as the number of board members, in the model. In addition, as research indicates the effect of audit firm size on client companies' financial reporting quality, we include an indicator variable, *BIGN,* which equals 1 when the company's external auditor is a Big 4 firm. Finally, the year- and industry-fixed effects are included in the model. All continuous variables discussed above are winsorized at 1 percent and 99 percent.

V. EMPIRICAL RESULTS

Descriptive Statistics

Table 2 reports the descriptive statistics for the variables examined in the study. Of the sample observed, 1.7 percent are associated with a misstatement during the sample period. For the *ICD* dummy variables, the mean value of *ICD_D* reveals that about 55 percent of observations report at least one control deficiency in either operations or compliance. As indicated by the means of *ICD_OP_D* and *ICD_LAW_D,* 32 percent and 42 percent of firms report at least one control deficiency in operations and compliance, respectively. The average count of ICDs reported (either in compliance or operations), *ICD_C,* is 1.178, and the mean values of *ICD_OP_C* and *ICD_ LAW_C* are 0.375 and 0.803, respectively. On average, the *ICD* observations reported in the current study are relatively high compared to those reported in the U.S. studies, in which only a few companies report internal control weaknesses. The following incentives could result in the high incidence of ICDs we observed in the study. First, a Taiwan company is required to report any discovered defects, regardless of the degree of materiality, in its annual execution report. Thus, the nature and severity of the deficiencies reported by a company in Taiwan could be different from those reported in the U.S., where the regulator requires companies to report only material weaknesses or significant deficiencies in internal control. The high mean value of *ICD* reported herein thus may reflect a greater likelihood that companies disclose deficiencies of any level of severity. Second, when a company discloses its ICDs by the specified deadline, the FSC usually does not impose a penalty against it, as the regulator hopes to encourage the company to fully disclose its ICDs. Last, the deficiency report is not available to the public, which eliminates concerns about the negative effect of ICD disclosure on the company's reputation. The remaining variables complete the picture as follows. The average firm size (*SIZE*) is 15.106; the average return on assets (*ROA*), leverage (*LEV*), and market-to-book ratio (*MB*) are 0.056, 0.386, and 1.883, respectively. The average abnormal accruals (*ABNACC*) is 0.001, and the board (*BOARDSIZE*) has seven members on average. Last, Big 4 audit firms (*BIG4*) audit about 83 percent of the observations.

A further investigation of the data reveals that in 2005 the most frequently reported deficiencies in order are management of related party transactions (audit item #5), supervision and management of subsidiaries (#6), and engagement of derivatives transactions (#2). Taking item #5, for example, there were 312 firms that reported a related deficiency in 2005. Among those firms, 180 (58 percent) of them rectified the deficiency in 2006, and an additional 50 firms (a cumulative 74 percent) rectified the deficiency in 2007. Similarly, for item #6 (#2), there were 258 (239) firms reporting a related deficiency in 2005; of which 54 (41) percent rectified the related deficiency in 2006 and 68 (62) percent rectified the related deficiency in 2007. We also noted that the rectification rate for all control items was greater than 50 percent and 65 percent in 2006 and 2007, respectively, except the one for control item #2 (41 percent in 2006 and 62 percent in 2007). The highest rectification rate for control item

[12] In the current study, we are not able to measure the materiality of the reported internal control weaknesses. Instead, we measure the number of ICDs. A higher number suggests that a firm has (perhaps minor) deviations from the norm in more areas (i.e., a wide breadth of ICDs), but each deficiency might or might not be material.

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TABLE 2

Descriptive Statistics

	Mean	SD	Q1	Median	Q3
MISSTATE	0.017	0.129	0.000	0.000	0.000
ICD_D	0.546	0.498	0.000	1.000	1.000
ICD_OP_D	0.319	0.466	0.000	0.000	1.000
ICD_LAW_D	0.416	0.493	0.000	0.000	1.000
ICD_C	1.178	1.563	0.000	1.000	2.000
ICD_OP_C	0.375	0.614	0.000	0.000	1.000
ICD_LAW_C	0.803	1.257	0.000	0.000	1.000
SIZE	15.106	1.317	14.166	14.956	15.820
ROA	0.056	0.108	0.014	0.058	0.111
LEV	0.386	0.174	0.252	0.378	0.500
MB	1.883	1.500	0.950	1.430	2.260
ABNACC	0.001	0.102	−0.054	−0.001	0.048
BOARDSIZE	6.783	2.107	5.000	7.000	7.000
BIGN	0.829	0.376	1.000	1.000	1.000

All continuous variables are winsorized at 1 percent and 99 percent.

Variable Definitions:
MISSTATE = 1 if a firm issues a misstatement that is eventually restated, and 0 otherwise;
ICD_D = 1 if a company reports at least one internal control deficiency either in compliance or operations, and 0 otherwise;
ICD_OP_D = 1 if a company reports at least one internal control deficiency in operations, and 0 otherwise;
ICD_LAW_D = 1 if a company reports at least one internal control deficiency in compliance, and 0 otherwise;
ICD_C = the number of deficiencies either in operations or compliance disclosed by a company;
ICD_OP_C = the number of deficiencies in operations disclosed by a company;
ICD_LAW_C = the number of deficiencies in compliance disclosed by a company;
SIZE = the logarithm of the total assets of a firm in thousands of NT dollars;
ROA = net income divided by total assets;
LEV = total debt divided by total assets;
MB = market-to-book ratio;
ABNACC = abnormal accruals, which are calculated using the modified Jones model of discretionary accruals with control for contemporaneous performance (Kothari, Leone, and Wasley 2005);
BOARDSIZE = the number of board members; and
BIGN = 1 if the company is audited by a Big4 firm.

#1, acquisition or disposal of assets, (64 percent in 2006 and 85 percent in 2007) suggests that its related deficiency could be more easily rectified than others.

In addition, we note that for firms (n = 609) that reported at least one deficiency in 2005, about half (n = 296) improve internal control as shown by reporting fewer deficiencies in 2006. The average rectification rate at the firm level (calculated according to the difference in the number of deficiencies from 2005 to 2006 and the number of deficiencies in 2005) is 80 percent, suggesting that the majority of the deficiencies were rectified within a year. We next explore whether a firm with a misstatement is less likely to rectify its ICDs in prior years. In 2006, only 25 percent of such firms rectified their ICDs from 2005. Similarly, in 2007, only 33 percent of such firms rectified their ICDs from 2005 and 2006. These low percentages could imply that the majority of firms with misstatements do not improve their internal control by rectifying their prior year's ICDs.

Correlation Analysis

Table 3 presents the Pearson correlation matrix, with the bold numbers indicating correlations significant at 10 percent or less. We note that our variable of interest, *MISSTATE*, is significantly positively correlated with two *ICD* count variables (i.e., *ICD_C and ICD_LAW_C*), but not with the *ICD* dummy variables. The positive correlations reported here suggest that a company that discloses more deficiencies, especially in compliance, is more likely to have a misstated financial statement (when other factors are not considered). With regard to control variables, *MISSTATE*, as expected, is negatively correlated with *ROA* (r = −0.069) and *BIGN* (r = −0.069) and positively correlated with *LEV* (r = 0.049). The results are consistent with those of prior studies, suggesting that a company is less likely to misstate financial statements if it is audited by a Big 4 audit firm, performs better, or incurs a lower financial risk. We further note that several control variables are significantly correlated with our predictor variables. For example, *SIZE, LEV, BOARDSIZE,* and *BIGN* are significantly correlated with the majority of the

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TABLE 3

Pearson Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	*MISSTATE*													
(2)	*ICD_D*	−0.005												
(3)	*ICD_OP_D*	0.019	**0.626**											
(4)	*ICD_LAW_D*	0.020	**0.768**	**0.245**										
(5)	*ICD_C*	**0.043**	**0.687**	**0.586**	**0.703**									
(6)	*ICD_OP_C*	0.021	**0.559**	**0.894**	**0.240**	**0.648**								
(7)	*ICD_LAW_C*	**0.043**	**0.582**	**0.292**	**0.758**	**0.928**	**0.316**							
(8)	*SIZE*	0.023	**−0.045**	0.013	**−0.081**	**−0.060**	0.015	**−0.082**						
(9)	*ROA*	**−0.069**	−0.013	−0.022	−0.012	**−0.054**	**−0.032**	**−0.051**	**0.214**					
(10)	*LEV*	**0.049**	**0.029**	0.011	**0.045**	**0.035**	0.022	**0.033**	**0.069**	**−0.365**				
(11)	*MB*	−0.013	0.000	−0.022	0.007	**−0.035**	**−0.040**	−0.024	−0.002	**0.488**	**−0.108**			
(12)	*ABNACC*	0.026	−0.009	−0.016	−0.014	−0.024	−0.011	−0.024	−0.017	**0.200**	**0.074**	**0.097**		
(13)	*BOARDSIZE*	0.015	0.019	**0.032**	0.015	**0.060**	**0.031**	**0.059**	**0.342**	**0.029**	**−0.064**	**−0.036**	**−0.052**	
(14)	*BIGN*	**−0.069**	**−0.066**	**−0.047**	**−0.060**	**−0.068**	−0.021	**−0.074**	**0.091**	**0.122**	**−0.123**	**0.096**	**−0.032**	0.004

Bold denotes significance level at the 0.10 levels or better.
All variables are defined in Table 2.

ICD variables. We also perform a collinearity test; untabulated results suggest that our findings are not driven by multicollinearity, since the variance inflation factors (VIFs) for all variables range from 1.03 to 1.77.[13]

Probit Analysis

Table 4 presents the probit regression results for estimating the likelihood of a misstatement. Columns (1) to (3) present the models regressing *MISSTATE* on the *ICD* dummy variables, and Columns (4) to (6) on the *ICD* count variables. We note that significant results are reported only when the *ICD* count measures are used as predictor variables. Specifically, the results in Column (4) show that the coefficient on *ICD_C* is significantly positive ($\beta = 0.176$, $p < 0.05$), suggesting that a company with more deficiencies reported either in operations or compliance is likely to misstate its financial statements. Columns (5) and (6) report the results based on operations-related and compliance-related deficiencies, respectively. The results indicate that the coefficient on *ICD_LAW_C,* but not on *ICD_OP_C,* is significantly positive ($\beta = 0.233$, $p < 0.05$), suggesting that the result for *ICD_C* as shown in Column (4) is driven mainly by the number of deficiencies in compliance. The inconsistent results between the dummy and count *ICD* variables suggest that the breadth, not the occurrence, of ICDs reflects poor financial reporting quality.[14] This explanation appears justified, given that the companies in our sample are required to disclose any discovered defects or irregularities in the execution report. Collectively, our findings suggest that the more ICDs in compliance that are reported by a company, the greater the likelihood that its financial statements will be restated in the future.[15] In sum, the breadth of ICDs in compliance has predictive value for financial reporting quality. Our results support H2 but not H1. A plausible explanation for our findings is that deficiencies in ICC could be relatively more material because the relevant controls are anchored in explicit laws and regulations. It is also possible that noncompliance incidents are more likely to involve higher-level management and thus be material. In contrast, ICD over operations is determined at the discretion of management. We

[13] VIF greater than 10 indicates harmful multicollinearity (Kennedy 1998, 190).

[14] In a further analysis, we replace the *ICD* dummy variables with an indicator variable that equals 1 if the number of ICDs reported by a company is equal to or greater than the 75th (90th) percentile of *ICD* in our sample. The untabulated results indicate that the new ICD dummy variables, *ICD_P75* and *ICD_P90,* are significantly and positively associated with the likelihood of misstatements. Using the operations-related and compliance-related ICD variables that are measured with this alternative dummy approach, we note that ICD in compliance is significantly associated with misstatements when the 90th percentile threshold is used. The results are consistent with our presumption that a wide breadth of ICDs leads to poor financial reporting quality.

[15] We further perform a univariate analysis to investigate whether firms that are less compliant differ from those that are more compliant in terms of firm characteristics and financial performance. A firm is identified as a less (more) compliant firm if its count of compliance deficiencies is equal to or greater (less) than the third quartile of *ICD_LAW_C* in our sample. Untabulated results suggest that less compliant firms are more likely to have misstatements (mean difference = 0.012, $p < 0.05$), smaller in size (mean difference = −0.135, $p < 0.00$), poor in financial performance (mean difference = −0.011, $p < 0.00$), higher in leverage (mean difference = 0.014, $p < 0.05$), and less likely to be audited by a Big 4 firm (mean difference = −0.045, $p < 0.00$).

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TABLE 4

The Association Between Misstatement and Internal Control Deficiency in Operations and Compliance

	DV = *MISSTATE*					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ICD_D	−0.136					
	(−0.497)					
ICD_OP_D		0.241				
		(0.850)				
ICD_LAW_D			0.345			
			(1.259)			
ICD_C				0.176**		
				(2.374)		
ICD_OP_C					0.187	
					(0.914)	
ICD_LAW_C						0.233**
						(2.529)
SIZE	0.272**	0.274**	0.284**	0.302***	0.278**	0.309***
	(2.430)	(2.455)	(2.491)	(2.579)	(2.402)	(2.623)
ROA	−5.721***	−5.712***	−5.811***	−5.722***	−5.697***	−5.765***
	(−4.925)	(−4.891)	(−4.928)	(−4.259)	(−4.239)	(−4.277)
LEV	0.703	0.713	0.623	0.621	0.714	0.595
	(0.763)	(0.782)	(0.670)	(0.716)	(0.824)	(0.684)
MB	0.089	0.083	0.077	0.076	0.082	0.075
	(0.775)	(0.726)	(0.662)	(0.746)	(0.811)	(0.741)
ABNACC	3.059**	3.094**	3.164**	3.190**	3.092**	3.218***
	(2.111)	(2.136)	(2.162)	(2.569)	(2.496)	(2.585)
BOARDSIZE	0.035	0.031	0.031	0.009	0.024	0.009
	(0.711)	(0.628)	(0.621)	(0.139)	(0.369)	(0.138)
BIGN	−0.877***	−0.874***	−0.851***	−0.835***	−0.859***	−0.811***
	(−3.023)	(−3.014)	(−2.914)	(−2.701)	(−2.782)	(−2.617)
Constant	−9.511***	−9.673***	−9.876***	−23.664	−23.217	−23.525
	(−5.252)	(−5.364)	(−5.441)	(−0.017)	(−0.015)	(−0.024)
Year Effect	Included	Included	Included	Included	Included	Included
Industry Effect	Included	Included	Included	Included	Included	Included
Pseudo R^2	0.121	0.122	0.124	0.138	0.131	0.139

*, **, *** Represent the estimated coefficients significance at 10 percent, 5 percent, and 1 percent, respectively.
Numbers in the parentheses are z-statistics.
All variables are defined in Table 2.

speculate that operational defects are more likely to involve rank-and-file employees and thus are less material. Notwithstanding the foregoing argument, the non-result for ICO (H1) should be interpreted with caution. A possible reason that we do not find evidence for the impact of operational deficiencies is that the measurement we used is possibly ineffective. There should be considerable differences among control activities in operations in different companies and industries; therefore, the achievement of control activities in operations may not be effectively measured using the same criteria across different companies. In our setting, the regulator requires companies to evaluate their operations activities in terms of only three audit items, which might be inadequate and thus fail to provide a comprehensive evaluation of a company's ICO. A marginal effect analysis indicates that the likelihood of misstatements increases by 0.5 percent when the independent variable of interest, *ICD,* moves from the first to third quartile. Given that the occurrence of misstatements in our sample is 1.7 percent of the total observations, ICDs in either operations or compliance have a considerable economic effect on misstatements.

With regard to the control variables, we note that *SIZE* and *ABNACC* are positively associated with *MISSTATE* in all models. These results are consistent with the prediction that a large company with more complex business or a company reporting more abnormal accruals has a higher likelihood of misstating its financial statement. In addition, *ROA* and *BIGN* are negatively associated with *MISSTATE* in all models. The results are consistent with the expectation that a company that enjoys

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better financial performance or is audited by a Big 4 auditor is likely to have higher financial reporting quality and thus fewer misstatements.[16]

Additional Analyses

Factor Analysis and Stepwise Regression

In the main analysis, we classify a deficiency based on whether or not its corresponding control activity is explicitly regulated by a set of rules imposed by the FSC. To mitigate the concern that an ineffective classification could result in measurement error, we conduct a factor analysis on the ten control items. The factor analysis yields two factors with an eigenvalue of 2.81 and 1.56, respectively. The factor loadings (untabulated) are mainly consistent with our expectation: five control items (#2, #3, #4, #5, and #7) load on the first factor, and two control items (#9 and #10) load on the second factor.[17] With these two factors as alternative deficiency measures in the regression, our results reported in Table 5 show that the coefficients on *FAC_LAW* are significant in Columns (2) and (3) ($\beta = 0.295$, $p < 0.01$; $\beta = 0.287$, $p < 0.05$, respectively). These results are consistent with those of our main analysis, suggesting a positive association between compliance deficiencies and the likelihood of misstatements.

In addition to examining the underlying factors, we adopt a stepwise approach (the forward selection method) to explore which individual control item is most statistically significant in our model. Results (untabulated) indicate that control items #2, engagement of derivatives transactions, and #1, acquisition or disposal of assets, are significant predictors at the 0.05 and 0.10 level, respectively. For control item #2, the regulator specifies that a public company shall comply with specific provisions when establishing procedures to manage its derivatives trading. For example, a company engaging in derivatives trading must adopt several risk management measures, conduct periodical evaluation by authorized management personnel, and report immediately any irregular circumstances to the board of directors. Our finding is consistent with the argument that a company is susceptible to material misstatements in the absence of controls over derivatives trading (Munter and Ratcliffe 2001). In fact, numerous companies utilize derivatives to manage their reported earnings (e.g., Barton 2001; Dodd 2008), and the use of derivatives has been involved with large-scale financial failures in some infamous cases (Grima and Thalassinos 2020). Based on the arguments above, it appears reasonable that control deficiencies involving derivatives trading predict future misstatements. Similarly, control risk related to the acquisition and disposal of assets (control item #1) is likely to affect a firm's operations in subsequent years, which could consequently lead to poor financial performance and misstatements.

Propensity Score Matching Analysis

To mitigate the concern of confounding bias, we perform a propensity score matching (PSM) analysis as a robustness test. To create a matched-pair sample for each of the *ICD* variables, we assign a firm to a high- (low-) deficiency firm group if the firm's total reported deficiencies are equal to or greater (less) than the 75th percentile value of *ICD* in the sample. In the first stage of matching each high-deficiency firm with a low-deficiency firm of similar characteristics, we estimate a propensity score from a binary choice model with all the covariates used in Table 4. To create matched samples, we adopt a one-to-one matching algorithm without replacement within a caliper distance of 0.03. It appears reasonable that the sample size is smaller for the PSM analysis as the matching process results in sample attrition. Mean comparison tests of matched pairs indicate a successful matching procedure with balanced covariates (i.e., small t-values of the mean differences for all covariates). We re-run the models with the matched samples and find that the PSM results, as reported in Table 6, are consistent with those of the main analysis. Specifically, the coefficients on *ICD* and *ICD_LAW* are positive at the 10 percent and 5 percent level of significance, respectively. Overall, the results are robust against the PSM test.[18]

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[16] Following Dechow, Ge, Larson, and Sloan (2011), we further include three additional financial statement variables (change in ROA, change in inventory, and percent of soft assets) and one nonfinancial variable (abnormal change in employees) in our model. The results remain substantially unchanged, except that the effect of *SIZE* becomes weaker. We further note that change in ROA (percent of soft assets) is significantly negatively (positively) associated with misstatements, consistent with the results of Dechow et al. (2011).

[17] Five out of seven internal control items that we classified as compliance controls load on the first factor (*FAC_LAW*), three of them with a factor loading value greater than 0.7, and the remaining two having a higher loading value on the first factor than the second factor (i.e., the cross-loadings differ by more than 0.2; cf. Cudeck and O'Dell 1994). Two out of three control items that we classified as operational controls load on the second factor (*FAC_OP*), with all factor loadings greater than 0.7. We determine that three items (#1, #6, and #8) do not load, as they involve either small factor loadings on both factors (< 0.2) or cross-loadings less than 0.2 difference.

[18] We also attend to the potential endogeneity issue in our study by taking a two-stage least squares (2SLS) approach. We develop a couple of instrumental variables (IVs), the compliance rate at the industry-year level and the industry-year median of the compliance deficiency count, but note that they have a low correlation with the compliance deficiency variable. Due to the lack of efficient IV estimators, we cannot completely rule out the possibility that endogeneity problems may affect our results.

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TABLE 5

Additional Analyses: Regression of Misstatement on Deficiency Factor Variables

	DV = *MISSTATE*		
Variables	**(1)**	**(2)**	**(3)**
FAC_OP	0.108		0.063
	(0.766)		(0.562)
FAC_LAW		0.295***	0.287***
		(2.727)	(2.629)
SIZE	0.270**	0.302***	0.299***
	(2.436)	(2.644)	(2.644)
ROA	−5.690***	−5.679***	−5.652***
	(−4.868)	(−4.787)	(−4.742)
LEV	0.672	0.624	0.606
	(0.738)	(0.677)	(0.658)
MB	0.084	0.079	0.078
	(0.734)	(0.676)	(0.667)
ABNACC	3.105**	3.159**	3.169**
	(2.122)	(2.197)	(2.189)
BOARDSIZE	0.033	0.013	0.011
	(0.667)	(0.251)	(0.221)
BIGN	−0.898***	−0.864***	−0.886***
	(−3.144)	(−2.951)	(−3.053)
Constant	−9.497***	−10.006***	−9.914***
	(−5.355)	(−5.547)	(−5.576)
Year Effect	Included	Included	Included
Industry Effect	Included	Included	Included
Observations	3,337	3,337	3,337
Pseudo R^2	0.122	0.132	0.132

*, **, *** Represent the estimated coefficients significance at 10 percent, 5 percent, and 1 percent, respectively.
Numbers in the parentheses are z-statistics. *FAC_OP* and *FAC_LAW* are factor variables extracted from a factor analysis based on the data of the ten internal control items.
All other variables are defined in Table 2.

Severity of Misstatements

To examine the severity of misstatements, we perform two additional analyses. First, we investigate whether ICDs are associated with severe accounting misstatements. As previously mentioned, a misstatement initiated by the regulator is considered more serious (i.e., materially misstated). Thus, by identifying the parties who initiate a restatement, we create a dummy dependent variable, *MISSTATE_SFB,* which is equal to 1 if a firm's restatement is initiated by the SFB, and 0 if a firm does not issue a restatement. Table 7, Column (1) reports the results, which suggest that firms with more ICDs reported are more likely to issue a misstatement required by the authority (i.e., coefficient on $ICD = 0.171$, $p < 0.1$).[19] Column (2) further indicates that this positive association is driven mainly by compliance-related ICDs (i.e., coefficient on $ICD_LAW = 0.297$, $p < 0.05$).[20] Second, we further examine whether ICDs are associated with the directional effect of the misstatements of reported income. Income-increasing misstatements are generally considered material, as firms are motivated to carry out accounting practices that intentionally mislead "to impart a sense of increased earnings power" (Maremont and Weil 2003). Therefore, we identify whether a misstatement is income-increasing to create a dummy dependent variable, *MISSTATE_IncreaseNI,* which is equal to 1 if a firm reports a lower income in the restated financial reports, and 0 if a firm does not issue a misstatement. Columns (3) and (4) in Table 7 report the results on the association

[19] As the results from Table 4 suggest that the occurrence of *ICD* does not predict the likelihood of misstatements, we use only the count variables (i.e., breadth proxies) in the additional analysis.

[20] We also run an ordered logit model, in which *MISSTATE* equals 0 if there is no restatement, 1 if a restatement is initiated by the firm, and 2 if a restatement is required by the regulator. The results are mainly unchanged.

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TABLE 6

Additional Analyses: Propensity Score Matching Approach

	DV = *MISSTATE*		
Variables	**(1)**	**(2)**	**(3)**
ICD	0.157*		
	(1.819)		
ICD_OP		0.056	
		(0.249)	
ICD_LAW			0.231**
			(2.437)
SIZE	0.315**	0.245*	0.336**
	(2.163)	(1.890)	(2.540)
ROA	−6.097***	−4.139***	−5.644***
	(−4.702)	(−3.021)	(−4.725)
LEV	−0.000	0.826	0.383
	(−0.000)	(0.743)	(0.382)
MB	0.078	0.026	0.047
	(0.515)	(0.192)	(0.347)
ABNACC	2.696	2.794	2.907*
	(1.549)	(1.596)	(1.771)
BOARDSIZE	−0.005	0.018	−0.011
	(−0.083)	(0.322)	(−0.209)
BIGN	−1.002***	−0.441	−0.613**
	(−2.758)	(−1.305)	(−1.966)
Constant	−10.406***	−9.206***	−10.336***
	(−3.999)	(−4.264)	(−5.043)
Year Effect	Included	Included	Included
Industry Effect	Included	Included	Included
Observations	1,862	2,138	2,768
Pseudo R^2	0.154	0.090	0.121

*, **, *** Represent the estimated coefficients significance at 10 percent, 5 percent, and 1 percent, respectively.
Numbers in the parentheses are z-statistics.
All variables are defined in Table 2.

between ICDs and misstatements that increase reported income. While the coefficient on *ICD* is not significant, as shown in Column (3), the coefficient on *ICD_LAW,* as reported in Column (4), is significant ($\beta = 0.317$, $p < 0.05$). Taken together, our findings support the contention that firms with more ICDs related to compliance issues are more likely to make income-increasing misstatements.

Alternative Proxies for Reporting Quality and Other Dependent Variables

We also use discretionary accruals as a proxy for financial reporting quality. The untabulated results, consistent with those shown in Table 4, suggest that the occurrence of ICDs is positively associated with absolute abnormal accruals ($\beta = 0.002$, $t = 1.857$) and that this effect is driven mainly by deficiencies in compliance ($\beta = 0.003$, $t = 1.657$). The result is robust against an alternative accruals quality measure (i.e., discretionary accruals estimated using Dechow and Dichev's [2002] approach). Nevertheless, caution in the interpretation of our findings on accrual quality is warranted because those results are marginally significant (i.e., at the 10 percent level of significance) and we do not find significant results when we divide the sample into the positive and negative abnormal accrual groups. We also explore the effect of ICDs in operations and compliance on perceived accounting quality. Following prior research (e.g., Chi, Huang, Liao, and Xie 2009; Ghosh and Moon 2005), we use the earnings response coefficient (ERC) estimated in concurrent returns–earnings regressions as a market-based proxy for investor perceptions of accounting quality. Results (untabulated) do not support an association between the perception of accounting quality and ICDs. A possible interpretation of these results is that the ICD disclosures are not available to the public and thus do not have an impact on ERC.

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TABLE 7

Additional Analyses
Regression of Severe Misstatement on Internal Control Deficiency

	DV = *MISSTATE_SFB*		DV = *MISSTATE_IncreaseNI*	
Variables	**(1)**	**(2)**	**(3)**	**(4)**
ICD_C	0.171*		0.160	
	(1.760)		(1.570)	
ICD_OP_C		−0.224		−0.370
		(−0.798)		(−1.121)
ICD_LAW_C		0.297**		0.317**
		(2.325)		(2.494)
SIZE	0.117	0.126	0.375**	0.393**
	(0.725)	(0.759)	(2.206)	(2.290)
ROA	−6.981***	−6.967***	−6.903***	−6.922***
	(−4.770)	(−4.615)	(−4.955)	(−4.847)
LEV	−0.781	−0.781	−0.849	−0.826
	(−0.556)	(−0.556)	(−0.710)	(−0.700)
MB	0.059	0.052	0.268**	0.268**
	(0.320)	(0.277)	(2.389)	(2.401)
ABNACC	1.069	1.084	2.021	2.094
	(0.393)	(0.385)	(1.059)	(1.108)
BOARDSIZE	0.098	0.102	0.034	0.038
	(1.591)	(1.619)	(0.521)	(0.561)
BIGN	−1.214***	−1.162***	−0.933**	−0.862**
	(−2.875)	(−2.692)	(−2.248)	(−2.053)
Constant	−21.335***	−21.528***	−12.332***	−12.758***
	(−10.343)	(−10.064)	(−4.589)	(−4.737)
Year Effect	Included	Included	Included	Included
Industry Effect	Included	Included	Included	Included
Pseudo R^2	0.234	0.239	0.134	0.143

*, **, *** Represent the estimated coefficients are significant at 10 percent, 5 percent, and 1 percent, respectively.
Numbers in the parentheses are z-statistics.
MISSTATE_SFB is equal to 1 if a firm's misstatement is initiated by the SFB, and 0 if a firm does not issue a misstatement. *MISSTATE_IncreaseNI* is equal to 1 if a firm reports a lower income in the restated financial reports (i.e., income-increasing misstatement), and 0 if a firm does not issue a misstatement. All other variables are defined in Table 2.

Last, we examine whether non-reporting ICDs are associated with analyst forecast accuracy and dispersion. While financial analysts do not have direct access to a company's ICD disclosures, we speculate that they are resourceful professionals and thus may be able to observe or evaluate the company's internal control system through other channels. Therefore, if ICDs adversely affect financial analysts' forecast (i.e., reducing accuracy and increasing dispersion), we would expect to see a negative (positive) coefficient on forecast accuracy (dispersion). Results (untabulated) suggest that, while the signs of the ICD coefficients are consistent with this expectation, the ICD variables are not significantly associated with the dependent variables. While this non-result is likely attributable to the inaccessibility of ICD disclosures to analysts, another possible explanation is the low statistical power in our test (i.e., n = 507 due to missing data on analysts' forecasts).

VI. CONCLUSION

This study examines the association between financial reporting quality and the achievement of internal control objectives related to compliance and operations. Specifically, we find that a company with more ICDs in *compliance* has a higher likelihood of issuing misstatements. Further analysis results indicate that such misstatements are likely to report increased income and lead to a restatement initiated by the regulator due to its severity. We do not, however, find evidence that ICDs in *operations* are associated with the likelihood of financial misstatements. To address a potential concern of measurement error, we further perform a factor analysis to create an *ICD* variable. Our findings remain unchanged when the alternative *ICD* measure is used.

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Our results are subject to several caveats. First, our access to the companies' execution result reports is limited to those issued from 2005 to 2007. A concern about the data is that the regulator could provide us reports for this specific period for some political reasons (e.g., low incidence of ICDs showing the efficacy of the regulator). While we cannot completely rule out the possibility of sampling bias, the high mean value of ICDs reported in our study could alleviate this concern. In addition, since the regulatory environment in Taiwan has not dramatically changed since 2005, we have no reason to suspect that the conclusions drawn from the data are no longer valid or relevant. Second, given that management might have incentives not to report certain ICDs or any deficiencies at all, it is possible that our results suffer from a self-reporting bias. However, the high reporting rate of deficiencies suggests that most companies in our sample report under the IC Regulations. One possible reason for the high rate is that the regulator encourages companies to disclose ICDs and usually does not impose a penalty on a company unless it fails to meet the reporting deadline or to provide a remediation plan. In addition, such deficiency disclosures are not available to the public, so they are unlikely to lead to a negative market reaction for the reporting companies. Due to the possibility of unobservable management misconduct in misreporting ICDs, however, we cannot completely rule out that endogeneity problems may affect our results. Third, our classification of control activities is inevitably imperfect because, as previously discussed, the three internal control objectives are mutually dependent. The achievement of these objectives arguably relies on shared underlying systems and procedures. As a result, it is difficult to clearly delineate control activities over operations and compliance. To alleviate this concern, we perform a factor analysis and a stepwise regression analysis. The former test validates the classification of our measurement; moreover, we note that results are substantially unchanged when using factor proxies as alternative deficiency measures. The latter test identifies two compliance control items that are the most influential variables in predicting misstatements. Nevertheless, we acknowledged that our method of classification in the main test can be problematic and that caution is warranted when interpreting our results. Fourth, while we propose an interdependent relationship of the control objectives, we are not able to examine their association directly due to limitations in the data (i.e., the ICFR data are not available until 2007). We further note that there is a relatively low reporting rate of material weaknesses. According to Lin (2010), only 23 companies had self-disclosed material weaknesses between 2004 and 2010. In addition, we are not able to investigate the association between the presence of compliance deficiencies and the actual realizations of compliance control risk deficiencies because the records of enforcement actions or regulatory sanctions are not availably commercialized. Future research could investigate these issues if the relevant data become available. Last, our findings may not be generalizable to other countries, where the operational and compliance issues are different from those in Taiwan.

Despite the foregoing caveats, we believe this study contributes to the literature by providing multidimensional measures of operational and compliance risks. The empirical evidence indicates that operational and compliance control risk cues can be informative of a company's overall internal control environment. Our findings should provide implications for management and stakeholders concerning financial reporting quality and the achievement of internal control objectives.

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APPENDIX A

Control Activities and Related Regulations

Audit Items	Regulations	Classification
#1 Acquisition or disposal of assets	Regulations Governing the Acquisition and Disposal of Assets by Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL021987&ModifyDate=1060209) Articles 9 to 12	Compliance
#2 Engagement of derivatives transactions	Regulations Governing the Acquisition and Disposal of Assets by Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL021987&ModifyDate=1060209) Articles 18 to 21	Compliance
#3 Extension of loans	Regulations Governing Loaning of Funds and Making of Endorsements/Guarantees by Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL021986&ModifyDate=1010706) Articles 8 to 10	Compliance
#4 Endorsements or guarantees for others	Regulations Governing Loaning of Funds and Making of Endorsements/Guarantees by Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL021986&ModifyDate=1010706) Articles 11 to 13	Compliance
#5 Management of related party transactions	Regulations Governing the Preparation of Financial Reports by Securities Issuers (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL007203&ModifyDate=1051219) Article 18	Compliance
#6 Supervision and management of subsidiaries	Regulations Governing Establishment of Internal Control Systems by Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL021141&ModifyDate=1030922) Article 39	Compliance
#7 Procedures governing board meetings	Regulations Governing Procedure for Board of Directors Meetings of Public Companies (http://eng.selaw.com.tw/LawArticle.aspx?LawID=FL038789&ModifyDate=1010822)	Compliance
#8 Inspection of information and communications security	NA	Operations
#9 Sales and receipts cycle	NA	Operations
#10 Purchase and payment cycle	NA	Operations

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