Internal Control Weaknesses and Acquisition Performance

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ABSTRACT: This study examines internal control weaknesses (ICWs) reported under Sarbanes-Oxley (SOX) Section 302 in the context of mergers and acquisitions. We predict that problems in an acquirer's internal control environment have adverse operational implications for acquisition performance. We argue that acquirers with low-quality *internal* information needed to select profitable acquisitions will make poorer acquisition decisions. We also argue that ICWs impede effective monitoring and are likely to hinder integration tasks that are important to acquisition profitability. We find that ICWs disclosed prior to an acquisition announcement predict significantly lower post-acquisition operating performance and abnormal stock returns. Poorer post-acquisition performance is concentrated in ICWs that are expected to impede acquisition activities (i.e., forecasting/valuation, monitoring, and integration). Our findings contribute to the literature linking ineffective internal control over financial reporting to negative operational outcomes. We also contribute to the SOX cost-benefit debate by documenting a previously unidentified benefit of ICW disclosures.

Keywords: internal controls; Sarbanes-Oxley; material weaknesses; mergers and acquisitions; acquirer returns; operating performance.

I. INTRODUCTION

The Sarbanes-Oxley Act of 2002 (hereafter, the Act or SOX) created substantial changes to the financial reporting and corporate governance processes of U.S. public firms. Although compliance is costly, research finds that the Act provides investors with mixed benefits.[1] We investigate SOX within the context of mergers and acquisitions (M&A), which represent significant, but often value-destructive, investments for the acquiring firm (e.g., Moeller, Schlingemann, and Stulz 2005). The objective of this paper is to understand the role that ineffective internal control plays in M&A transactions. Specifically, we examine how SOX internal control weaknesses at the acquiring firm affect the acquirer's fundamental performance and stock performance.

Sections 302 and 404 of SOX require management (and auditors under Section 404) to evaluate and disclose internal control weaknesses (hereafter, ICWs). Although ICWs reported under SOX pertain to the effectiveness of internal control over *external* financial reporting, recent research suggests that SOX ICWs are also indicators of low-quality *internal* financial information, which is used by management to direct operations and develop forecasts (Feng, Li, and McVay 2009; Cheng,

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[1] For example, Jain, Kim, and Rezaee (2008) find that market liquidity improved from pre-SOX to post-SOX. Cohen, Dey, and Lys (2008) find that accruals-based earnings management declined significantly post-SOX, but real earnings management increased significantly. Beneish, Billings, and Hodder (2008) find that only SOX Section 302 material weaknesses (but not the more costly audited Section 404 disclosures) are informative to the market.

Dhaliwal, and Zhang 2013; Feng, Li, McVay, and Skaife 2015).[2] We argue that high-quality *internal* information is crucial to selecting profitable acquisitions (e.g., this information is needed to make projections and value synergies). Therefore, we predict that acquirers with relatively low-quality internal financial reports (signaled by SOX ICW disclosures) will be more likely to make poorer acquisition decisions. Our predictions are consistent with Feng et al. (2009), who show that managerial forecasting ability is negatively impacted by ICWs, and Goodman, Neamtiu, Shroff, and White (2014), who document the influence of forecasting quality on acquisition performance.

We also posit that high-quality information at the acquiring firm is an important resource that can be used to monitor management and prevent an unprofitable acquisition decision. Acquisition plans presented for approval may contain unintentional strategic errors, valuation errors, and overly optimistic projections. Management may also include intentionally overstated claims of value in an attempt to use acquisitions to extract private benefits from shareholders (e.g., Jensen 1986). Low-quality internal and external information associated with ICWs is likely to reduce the board's ability to validate manager claims about an acquisition's strategic value, and reduce shareholders' ability to link managerial performance to financial outcomes (Feng et al. 2009; Doyle, Ge, and McVay 2007; Ashbaugh-Skaife, Collins, Kinney, and LaFond 2008). Therefore, ICWs may obstruct monitoring efforts that can prevent value-decreasing acquisitions.

Finally, we argue that ICWs may impede integration planning and execution tasks that must be performed effectively and efficiently to achieve acquisition profitability. Successful integration requires extensive knowledge of internal processes, IT systems, and management structures to develop a rigorous integration plan that prioritizes tasks based on projected financial impacts and synergies (Deloitte 2015; PricewaterhouseCoopers [PwC] 2013). We expect ICWs to hinder target integration because managers of ICW firms must use lower-quality internal information to make and execute integration plans.

In sum, we propose that ICWs impact acquisitions through at least one, or a combination, of three effects on acquirers (i.e., reduced forecasting/valuation abilities, reduced monitoring abilities, and reduced integration planning/execution abilities). We test our predictions using a sample of acquisitions from the Securities Data Corporation (SDC) U.S. Mergers and Acquisitions database in which a U.S. public firm purchased a U.S. target between 2002 and 2011. We match sample acquirers with non-acquiring control firms that are similar in their propensity to acquire (estimated as a function of agency problems) and pre-acquisition operating performance. We find that ineffective pre-acquisition internal control at the acquiring firm has a statistically and economically significant impact on post-acquisition operating performance and post-acquisition abnormal returns. We also report statistically significant negative announcement period abnormal returns for ICW acquirers. Our inferences are further validated by analyses showing that poorer acquisition performance is concentrated in firms with ICWs that are relevant to at least one of the three proposed ICW effects on acquisitions.

Our findings offer at least three contributions to the existing literature. First, we contribute to the recent line of research that links ineffective internal control over financial reporting (ICFR) to negative operational outcomes. As discussed in Feng et al. (2015), potential operational improvements that result from maintaining effective ICFR are not well recognized in practice. Our study informs research and practice on the value of maintaining effective ICFR for one of the most significant and complex investment decisions—M&A. We extend Cheng et al. (2013), who show that ICFR is related to investment efficiency, by examining the impact of ICWs on M&A operating performance and stock returns. Our results are also interesting in light of Cheng et al.'s (2013) finding that investment inefficiency improves after a SOX ICW is disclosed (e.g., due to enhanced monitoring that may occur after the initial ICW disclosure). ICW disclosures in our sample exist before an acquisition is announced; however, any additional scrutiny of M&A investment decisions does not appear to be strong enough to drive away the poorer post-acquisition performance of ICW acquirers in our sample.

Second, our study contributes to the ongoing debate regarding the costs and benefits of SOX internal control disclosures. The results of several studies call into question the benefits of making costly ICW disclosures to investors (e.g., Doyle et al. 2007; Ogneva, Subramanyam, and Raghunandan 2007; Beneish et al. 2008). Our results suggest that the existence of a SOX ICW prior to an acquisition announcement provides information that can be used by investors to anticipate future post-acquisition operating performance and long-run abnormal stock returns. We interpret our findings as an unanticipated benefit of SOX internal control disclosures, as they can be helpful to investors evaluating M&A decisions.

Finally, our findings contribute to the accounting and finance literatures investigating acquisitions. An acquisition represents a major decision within a firm and has significant consequences for investors. M&A transactions have typically been characterized as value-destructive for the acquiring firm's shareholders, although some acquirers are able to achieve value-enhancement for their shareholders (e.g., see Moeller et al. 2005). Our finding that the internal control environment is an important firm-specific characteristic that impacts an acquirer's post-acquisition performance adds to a growing stream of

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[2] Throughout the paper, "low-quality" financial information refers to that which is less relevant in terms of predictive value (e.g., Feng et al. 2009). Low-quality also refers to information with lower representational faithfulness and lower reliability (e.g., Ashbaugh-Skaife et al. 2008; Skaife and Wangerin 2013).

research investigating factors that influence acquisition outcomes (e.g., Moeller, Schlingemann, and Stulz 2004; Bhagat, Dong, Hirshleifer, and Noah 2005; Oler 2008).

In the next section, we provide a brief background on the SOX internal control literature. We then develop our hypotheses in Section III. Section IV follows with a discussion of our data-collection and research methods. Section V presents results, additional analyses, and sensitivity checks. Section VI concludes.

II. BACKGROUND ON SOX REQUIREMENTS AND LITERATURE REVIEW

The Sarbanes-Oxley Act of 2002 was signed into law on July 30, 2002 "to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes" (U.S. House of Representatives 2002, 1). Sections 302 and 404 both require disclosures to the public on the effectiveness of a company's internal controls.[3] As compliance with Sections 302 and 404 of SOX is costly, a debate exists on whether disclosures made in accordance with these sections are informative and offer sufficient benefits to warrant these costs. The SOX internal control literature finds that SOX ICW disclosures significantly impact investor decisions, as evidenced through abnormal negative returns, increases in cost of capital, and downward revisions in analyst forecasts (Beneish et al. 2008; Ashbaugh-Skaife, Collins, Kinney, and LaFond 2009; Costello and Wittenberg-Moerman 2011; Dhaliwal, Hogan, Trezevant, and Wilkins 2011; Kim, Song, and Zhang 2011). Further, the market penalizes firms with multiple years of ICWs and rewards remediation (Gordon and Wilford 2012). Research also suggests that firms with ineffective internal control have greater information uncertainty and less reliable external financial reporting that make it more difficult for analysts to forecast earnings.[4]

Although the objective of Sections 302 and 404 is to improve the reliability of *external* financial reporting, recent studies find that material weaknesses in ICFR also have adverse implications for the quality of *internal* reports and operational decisions made based on these reports. For example, Feng et al. (2009) find that management earnings guidance is less accurate for firms with ineffective ICFR because management relies on lower-quality internal information to make forecasts. Recent studies also suggest that inventory management and tax planning decisions are adversely affected by inventory-related ICWs and tax-related ICWs, respectively (Feng et al. 2015; Bauer 2016). Most related to the current study, Cheng et al. (2013) find that material weaknesses in internal control are related to investment inefficiency (where over- or under-investment is measured using the total level of research and development [R&D], capital, and acquisition expenditures). We extend Cheng et al.'s (2013) findings by examining whether ineffective internal control has implications for firm performance following an acquisition.

III. HYPOTHESES DEVELOPMENT

Prior research suggests that ICWs can lead to poor performance through a failure to prevent or detect some combination of unintentional and/or intentional mismanagement of firm resources. For example, Gao and Jia (2016) report that investors discount the value of cash holdings at ICW firms due to the market expectation that ICWs allow either (1) unintentional mismanagement of cash (e.g., due to poorer internal information used to make decisions), and/or (2) management's intentional exploitation of cash for private benefits (e.g., due to an internal control environment that produces noisy or biased information and lower monitoring capabilities). Similarly, we predict that ICWs impact acquisition performance through one (or more) of the three effects described in the following subsections. Appendix A also provides an illustrative example of the three ICW effects for a specific acquisition in our sample.

Internal Control Weaknesses as Impediments to Forecasting

Recent research finds that management's forecasting ability is a significant determinant of acquisition performance. Goodman et al. (2014, 335) explain that managerial forecasting is required for three primary acquisition tasks: (1) evaluating the target's stand-alone value; (2) evaluating the value of potential synergies; and (3) determining the maximum price the acquirer will pay. Superior managerial forecasting ability is beneficial because valuation approaches rely on accurate earnings forecasts, and valuing synergies requires extensive knowledge of costs, revenues, and economic environments of both firms (Goodman et al. 2014). Valuation errors can lead management to over-pay for a target. In addition, inferior knowledge about

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[3] Section 302 requires management to report material weaknesses discovered in its quarterly evaluation of disclosure controls. Section 404 requires accelerated filers to disclose material weaknesses discovered through an annual assessment of internal controls over financial reporting (ICFR). Section 404 also requires firms to obtain an audit opinion over the effectiveness of ICFR. We examine Section 302 ICWs and discuss this research design choice in Section IV.

[4] Beneish et al. (2008) show that ineffective internal control is associated with greater information uncertainty; Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008) show that ICW firms have less reliable financial reporting; and Clinton, Pinello, and Skaife (2014) document a link between ineffective internal control and analysts' forecast accuracy, dispersion, and coverage.

firm operations and poor forecasting ability can facilitate a faulty acquisition strategy (e.g., purchasing a target to extend into a business segment that is not profitable). Consistent with this argument, Goodman et al. (2014) find that acquirers with superior forecasting ability achieve better acquisition outcomes.

Feng et al. (2009, 190) find that firms with ICWs have inferior managerial forecasting ability and conclude that "internal control quality has an economically significant effect on internal management reports and thus decisions based on these figures." Consistent with this research, we expect internal control effectiveness to have a significant impact on acquisition decisions. Because ICW firms have relatively low-quality internal information (Feng et al. 2009) and this information is used to develop forecasts for completing the primary tasks of an acquisition (Goodman et al. 2014), we expect that acquiring firms with ineffective internal controls will make less profitable acquisition decisions.

Internal Control Weaknesses as Impediments to Effective Monitoring

In addition to value-enhancing reasons for performing an acquisition (e.g., extension into new business lines, achieving synergies), the M&A literature suggests that managers with large free cash flows, but few profitable investment options, may intentionally engage in value-destroying acquisitions to build empires that serve their personal interests at the expense of firm value (e.g., Jensen 1986; Hope and Thomas 2008). Many corporate governance mechanisms exist to prevent misuse of resources; for example, institutional investors can be powerful monitors of management as they have the incentives to monitor and the voting power to take corrective actions (e.g., Shleifer and Vishny 1986). Similarly, boards of directors, which often have access to more information than the public, can serve as effective monitors over management (e.g., Beasley 1996).

However, managers may still be able to intentionally (or unintentionally) misuse corporate resources and engage in value-destroying acquisitions if high-quality information needed to link managerial decisions to firm performance is not available (Hope and Thomas 2008; Gao and Jia 2016). Firms with ineffective internal controls have lower-quality financial reporting and greater information uncertainty (Doyle et al. 2007; Ashbaugh-Skaife et al. 2008; Beneish et al. 2008), which may make shareholder monitoring less effective for these firms. Likewise, board monitoring is more effective when the board is well informed, but the board depends on management to provide it with internal information necessary to evaluate plans and projects (Adams and Ferreira 2007; Hermalin and Weisbach 2007). Thus, high-quality internal information is an important resource that boards can use to rein in empire-building managers and detect unintentional strategic or valuation errors. Firms with ineffective internal controls have lower-quality internal management reports (Feng et al. 2009); therefore, monitoring may be more difficult for boards of firms with ICWs.

Managers promoting self-interested acquisitions can take advantage of inferior monitoring environments associated with ICWs. Depending on the acquisition purpose (e.g., obtaining operational synergies, financial synergies, tax benefits), managers seeking approval for acquisition plans may present various explanations to the board to convince them of the acquisition's value (e.g., inflating revenue projections and expected cost savings). Alternatively, management may not intentionally try to deceive the board, but a reliance on lower-quality internal information may mean that the acquisition strategy is faulty or the target's value to the acquirer is lower than management's estimate. Regardless of intent, a noisy information environment caused by ineffective internal controls will make it more difficult for monitoring agents to validate management projections and prevent imprudent M&A decisions.

Internal Control Weaknesses as Impediments to Integration

Most acquisitions involve a full-scale integration of resources, processes, and responsibilities (Reed, Lajoux, and Nesvold 2007). Integration may involve a variety of complex tasks, including "combining technological capabilities, improving customer access, onboarding skilled workers, and migrating critical systems" (PwC 2013, 9). A rigorous, detailed integration plan should be prepared before the deal closes, with an understanding of both firms' critical processes, IT systems, and management structures (PwC 2013; Deloitte 2015). After the deal closes, the company must maintain its current operations and execute the integration plan as quickly as possible to reduce costs and capture synergies. This is a major undertaking, yet "many companies drastically underestimate the complexity, resources, communication, and management focus needed to successfully integrate and realize expected synergies" (Deloitte 2015, 10).

We expect acquirers with ICWs to struggle with integration planning and execution tasks. Prior research suggests that ICWs "may be symptomatic of poor management controls in general" (Ogneva et al. 2007, 1256) and Moody's Investors Service warns that company-wide ICWs raise concerns over the management's "ability to control the business" (Doss and Jonas 2004, 1). Acquirers with ICWs may struggle with integration planning due to their reliance on poorer internal information as they make important plans that involve determining which integration tasks to prioritize based on their financial impact and ability to create value (PwC 2013). Further, because many ICWs stem from finance/accounting personnel inadequacies, acquirers may struggle to meet normal informational/operational needs *and* prepare/analyze additional information to facilitate effective and efficient integration.

Finally, ICWs may be detrimental to integration plan execution if upper management is distracted by internal control issues. Integration requires intense focus, but management's effort and attention could be divided between ICW remediation efforts and important integration planning/execution tasks. Engel, Hayes, and Wang (2007, 121) also warn that CEO and CFO certifications of financial statements required by SOX "may divert the attention of these decision-makers from other aspects of the business." The time-consuming certification process may be more difficult when ICWs exist due to a heightened risk of undetected material misstatements. In sum, acquirers with ineffective ICFR are likely to experience more problems carrying out their post-merger integration plans and achieving synergies with the target firm.

If at least one, or a combination, of the three proposed ICW effects (i.e., impediments to forecasting, monitoring, and integration) is significant within an acquirer, then we expect ICWs to be associated with lower post-acquisition operating performance, as stated in H1:

H1: Controlling for other factors, pre-announcement ICWs reported by an acquirer are negatively associated with post-acquisition return on net operating assets.

If ICWs signal lower-quality acquisition decisions as predicted in H1, then efficient markets will use internal control information available in public reports prior to the M&A announcement. The market reaction in the short window around the announcement date reflects investors' assessment of the deal and their expectations of future performance; thus, announcement period abnormal stock returns are an important and commonly used measure of acquisition performance (e.g., Morck, Shleifer, and Vishny 1990; Bhagat et al. 2005; Goodman et al. 2014). Assuming that the market anticipates poorer post-acquisition performance for acquirers with SOX internal control problems and quickly impounds this information into stock price, our next hypothesis follows:

H2: Controlling for other factors, pre-announcement ICWs reported by an acquirer are negatively associated with announcement period abnormal returns to acquirer shareholders.

The announcement period abnormal returns reflect the market's initial evaluation of the deal; however, investors may be uncertain about the long-term implications of the ICWs in the short window around the announcement date. Additional information (such as post-acquisition return on net operating assets [RNOA]) may be revealed after the deal closes that resolves their uncertainty about the impact of ICWs. Given the possibility that investors may be uncertain about the impact of ICWs until additional information reaches the market (i.e., post-acquisition operating results), we expect the following:

H3: Controlling for other factors, pre-announcement ICWs reported by an acquirer are negatively associated with post-acquisition abnormal returns to acquirer shareholders.

IV. RESEARCH METHOD

Research Design

Our study seeks to isolate and understand the effect of ICWs on acquisition performance. Feng et al. (2015) show that ICWs negatively affect operating performance, and acquisitions generally tend to be value-destroying for acquirers (e.g., Moeller et al. 2005). Therefore, we require a research design that allows us to examine the *interaction* of ICWs and acquisitions. To test H1, we use a sample of acquirers (matched with non-acquiring control firms) and regress changes in RNOA (from pre- to post-acquisition) on an indicator variable for ICW (*Any ICW*), a variable indicating whether the firm is an acquirer (*Acquirer*), an interaction variable for *Any ICW * Acquirer,* and a set of control variables. To test H2 (H3), we regress announcement period (post-acquisition period) abnormal returns on the same independent variables. Figure 1 provides an illustration of the time periods used in calculating returns, and Appendix B provides details on variable calculations. We perform ordinary least squares (OLS) regressions, reporting p-values that reflect clustered standard errors, as suggested in Petersen (2009) and Gow, Ormazabal, and Taylor (2010). We cluster by acquiring both firm and announcement date year, as residuals of a given acquirer may be correlated across years and residuals of a given year may be correlated across different acquiring firms.

Internal Control Weakness Measures

We measure ineffective internal control using SOX Section 302 material weakness disclosures available in Audit Analytics. Internal control research uses both Section 302 and Section 404 material weaknesses to measure ineffective internal control (e.g., Hammersley, Myers, and Shakespeare 2008; Cheng et al. 2013). We use Section 302 in the current study for three primary reasons. First, Section 302 reports allow us to examine more sample years of data (reports begin in 2002, versus 2004

FIGURE 1
Returns Measurement Windows
Adapted from Oler (2008)
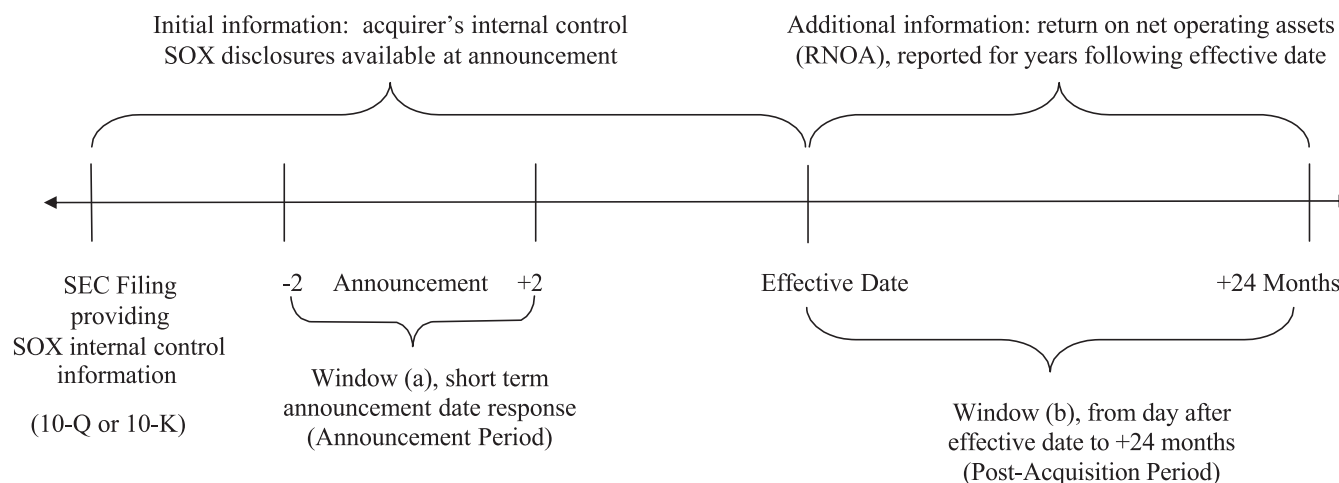
This figure presents the two measurement windows used in our analyses. SOX material weakness information is taken from the most recent SEC Form 10-Q or 10-K filing prior to the deal announcement. The announcement period window begins two trading days before the acquisition is announced and ends two trading days after the announcement. The post-acquisition period begins on the day following the transaction effective date and ends at the end of the month falling 24 months after the effective date. SOX internal control disclosures are part of the background information available for the acquirer when the acquisition is announced. Additional information, including return on net operating assets (RNOA), is reported in the years following the acquisition effective date.

for Section 404). They also allow for smaller public acquirers to remain in our sample, and the inclusion of smaller firms is of interest because ineffective internal control may be more important to smaller firms (Beneish et al. 2008). Finally, Section 302 reports are provided more frequently than Section 404 reports (quarterly versus annually), reducing the possibility that our measure of ICWs will be stale at the deal announcement date.[5]

We first measure ICWs using an indicator variable set to 1 if the acquirer reported at least one SOX Section 302 material weakness in the most recent SEC filing prior to the acquisition announcement date. We ensure that the disclosure was publically available prior to the announcement date, so investors are potentially aware of internal control problems that may impact acquisition performance. We also classify ICWs according to their nature because we expect only certain ICWs to have a significant impact on acquisition performance. Research in a variety of contexts finds that "company-wide" ICWs (but not "account-specific" ICWs) are more strongly associated with negative outcomes, such as lower accrual quality (Doyle et al. 2007), higher bank loan interest rates (Kim et al. 2011), investment inefficiency (Cheng et al. 2013), and a lower market value of cash holdings (Gao and Jia 2016). However, in other contexts, certain "account-specific" ICWs (e.g., inventory-related ICWs) drive poor performance in related areas (e.g., inventory management) (Feng et al. 2015).

To identify relevant ICWs in an M&A context, we examine each ICW reason code provided by Audit Analytics and consider its potential impact on our three proposed ICW effects on acquisitions (i.e., effects on forecasting/valuation abilities, monitoring abilities, and integration abilities). We categorize ICWs as "AQ-Relevant" if the nature of the ICW pertains to at least one of the three proposed effects and "Other" otherwise. Given the importance of revenue-related and cost of goods sold-related ICWs to forecasting abilities (Feng et al. 2009), we expect that these two "account-specific" ICWs will negatively impact management's ability to select and value profitable acquisitions. We also expect that "company-wide" ICWs (i.e., related to IT issues, personnel inadequacies, insufficient management review, and governance issues) with pervasive negative effects on the internal/external information environment will impede acquisition processes such as target selection, valuation, board oversight of acquisition decisions, and integration planning/execution.

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[5] The probability of non-accelerated filers reporting ineffective ICFR increased 14 percent in 2007, when non-accelerated filers also issued unaudited Section 404(a) ICFR reports for the first time (Kinney and Shepardson 2011). Section 302 ICWs may not be an accurate measure of ICWs for some firms in our sample (i.e., only non-accelerated filers announcing deals before 2007), which induces noise into our analyses and biases against finding results.

Additionally, ICWs related to senior management tone or self-dealing issues may indicate a firm that is more likely to attempt self-serving, unprofitable acquisitions. See Appendix B for a list of each Audit Analytics reason code classified as "AQ-Relevant" in our context.[6]

Control Variables

In testing the relation between ICWs and acquisition performance, we control for several factors that are likely to impact changes in RNOA and abnormal returns. Small acquirers have been shown to perform better than large acquirers in the announcement period (Moeller et al. 2004); thus, we control for size using the natural log of the acquirer's market capitalization. We control for the acquirer's book-to-market (BTM) ratio because prior research finds that acquirers with higher BTM ratios tend to perform better (Rau and Vermaelen 1998). We also control for momentum, sales growth, and total accruals, following Oler (2008).[7]

We control for determinants of ICWs identified in prior research (Ashbaugh-Skaife, Collins, and Kinney 2007), including firm age, inventory holdings, number of business segments, auditor resignation, foreign sales, restructuring charges, losses, and auditor quality. Including these controls helps rule out problems with correlated omitted variables in our testing.

Finally, we include measures of institutional holdings (both the percentage of stock held by institutional investors and institutional ownership concentration) to control for monitoring that is expected to positively impact performance (McConnell and Servaes 1990). We also include measures for free cash flow and leverage to control for firms that face fewer financial constraints and may be prone to over-invest in M&A (e.g., Jensen 1986; Cheng et al. 2013). All variables used in our analyses are more specifically defined in Appendix B.

Sample Selection

We draw our initial sample of acquisitions from the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database. We query SDC's database to include mergers and acquisitions of U.S. targets (excluding spinoffs, recapitalizations, self-tenders, exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatizations) announced between January 1, 2002 and December 31, 2011.[8] We retain only the first acquisition in a given year for acquirers that make multiple acquisitions in the same year.[9] We also require that a suitable non-acquiring control firm is available for matching (see discussion in the following subsection). We are left with a sample of 2,042 acquisitions to test the relationship between acquirer ICWs and acquisition performance. Additional details regarding sample selection are described in Table 1.

Control Firm Selection Procedures

We perform propensity score matching to select non-acquiring control firms that are similar in their propensity to acquire (based on agency problems) to help ensure that performance differences between an acquiring firm and control firm reflect the effects of the acquisition itself and not firm differences that existed before the acquisition. The independent variables in the propensity score model include measures of how financially unconstrained management is (*Natural Log Market Cap, Free Cash Flow,* and *Leverage*) and measures of the degree of monitoring/oversight (*Board Size, Board Independence, Institutional Ownership %,* and *Institutional Ownership Concentration*).

Table 2 presents the logistic regression analysis used for propensity score matching. Coefficients and significance levels suggest that less financially constrained firms (i.e., larger firms and firms with higher free cash flow) are more likely to acquire. Coefficient estimates for monitoring variables suggest that those with greater board independence ($p < 0.01$) and more

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[6] We are precluded from using ICW reason codes to disentangle which of the three effects (i.e., forecasting versus monitoring versus integration) is most responsible for acquisition performance problems because multiple effects may be caused by a single reason. However, a few reason codes may be more applicable to only one of the three effects. For example, management tone and board problem reason codes are more applicable to our explanation that ICWs may impede the ability of monitoring to prevent self-serving unprofitable acquisitions. In contrast, revenue/cost of goods sold reason codes are more applicable to effects on forecasting tasks relevant to acquisition decision-making. Unfortunately, in our sample, nearly every firm that has one of these specific reason codes also has at least one additional reason code that is expected to impact the other hypothesized effects.

[7] Controls for deal characteristics (such as diversifications) and target characteristics (such as the target's size relative to the acquirer) are considered in Section V.

[8] Some prior research has questioned the accuracy and completeness of M&A data provided by SDC; however, these concerns are primarily problematic for much older data than the sample years we collect (Barnes, Harp, and Oler 2014).

[9] We rerun stock returns regressions on samples that (1) include all acquisitions, (2) include a single randomly selected acquisition for each year where multiple deals are available, and (3) include only the last acquisition of the series. Results from these models are consistent with those reported in Tables 6 and 7; however, when we include all serial acquisitions made by the same firm in the same year, the effect of *AQ-Relevant ICW * Acquirer* on post-acquisition returns loses significance ($p = 0.16$).

TABLE 1

Sample Selection Procedure

	Attrition
Acquisitions reported by SDC from January 1, 2002 to December 31, 2011	83,744
Remove:	
Acquisitions where the announcement date is before August 29, 2002 (the effective date of SOX Section 302)	(4,574)
Acquisitions missing acquirer or target cusip information	(21)
Duplicate acquisitions	(77)
Acquisitions where the acquirer's permno (CIK) is not found on CRSP (Compustat) or delisted prior to announcement	(54,790)
Acquisitions where no effective or withdrawn date is reported	(2,145)
Acquisitions where post-percentage owned is less than 51%	(123)
Acquisitions of minority interest	(31)
Acquisitions where target or acquirer is an ADR, REIT, or closed-end fund	(2,089)
Acquisitions where acquirer SOX 302 information is not available	(1,492)
Acquisitions where acquisition effective date is missing	(389)
Acquisitions where the acquirer or target is in the financial services or utilities industries	(4,820)
Acquisitions where the acquirer is incorporated outside the U.S.	(457)
Acquisitions where acquirer is distressed (trading at less than $3 as of the month-end at least 30 days prior to acquisition)	(913)
Acquisitions where shareholder's equity is negative	(253)
Acquisitions where information needed to calculate RNOA or control variables is unavailable	(6,179)
Unable to find suitable non-acquiring firm match based on propensity score (1% caliper) and prior performance (90%–110% of acquirer RNOA)	(2,033)
Multiple acquisitions completed by the same firm in the same year (restricts sample to one acquisition per acquirer per year)	(1,316)
Final sample of acquisitions	2,042

Table 1 reports the number of observations from SDC's Mergers and Acquisitions (Domestic) database. The SDC query excludes spinoffs, recapitalizations, self-tenders, exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatizations. Duplicate observations removed represent deals where the same acquirer cusip, target cusip, and announcement date are listed multiple times. We use information from SDC Platinum, CRSP, Compustat, BoardEx, Audit Analytics, and the Thompson Financial 13F databases to calculate control variables. Thus, our sample for the primary regressions is composed of deals with the necessary acquirer information available in all data sources.

concentrated ownership (marginally significant at $p = 0.067$) are more likely to acquire. The model has a pseudo R^2 of 0.10 and the area under the ROC curve is 71 percent. Both metrics suggest reasonable fit and predictive power of the model given that our objective is not to predict acquisitions *per se,* but to find non-acquiring control firms with similar potential agency problems.

Using propensity scores generated from the model shown in Table 2, we select one control firm-year for each acquirer firm-year, with replacement.[10] Of the potential matching firms that have differences in propensity scores less than 0.01 from the acquirer, we remove potential matches in which the pre-acquisition operating performance (*Prior RNOA*) is outside of 90–110 percent of the acquirer's.[11] Of the remaining potential matches, we then select the control firm with the propensity score that is closest to the acquiring firm.

Our sample matching procedures attempt to find matches that are similar in relevant pre-acquisitions characteristics. Panel B of Table 2 provides evidence on the covariate balance between our acquirer and control samples. The differences in means for all variables that are significant predictors of an acquisition (see Panel A) are not significant, suggesting that the matching removed meaningful differences across acquiring and non-acquiring firms.[12] We also include all the variables from the propensity score model as controls in the regressions used to test our hypotheses.

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[10] Allowing replacement during the selection of a propensity score matched firm increases the average quality of matching and reduces bias (Caliendo and Kopeinig 2008, 41).

[11] A 1 percent caliper is consistent with prior research (Cheng et al. 2013; DeFond, Hung, S. Li, and Y. Li 2015). We apply a 90–110 percent screen on operating performance, following Barber and Lyon (1996).

[12] The only significant difference in means is for *Leverage* ($p = 0.019$), which is not a significant predictor of the acquisition decision, as shown in Panel A ($p = 0.942$). The means are similar in economic terms (0.235 versus 0.262), and we include *Leverage* as a control in all of our regression analyses.

TABLE 2

Propensity Score Matching Results

Panel A: Propensity to Acquire as a Function of Agency Variables

Variable	Coefficient	Standard Error	p-value
Intercept	−8.2556		
Natural Log Market Cap ($M)	0.293	0.01	<0.001
Free Cash Flow	2.382	0.16	<0.001
Leverage	0.003	0.04	0.942
Institutional Ownership %	0.099	0.08	0.238
Institutional Ownership Concentration	0.392	0.21	0.067
Board Size	−0.006	0.01	0.554
Board Independence	0.376	0.14	0.006

Additional model information:
  n = 20,889
  Pseudo R^2 = 0.101

Panel B: Comparing Means of Propensity Score Matched Control Firms (Non-Acquirers) to Acquirers

Variable	Means Non-Acquirers	Acquirers	p-value
Natural Log Market Cap ($M)	13.558	13.545	0.780
Free Cash Flow	0.051	0.052	0.444
Leverage	0.235	0.262	0.019
Institutional Ownership %	0.672	0.675	0.730
Institutional Ownership Concentration	0.093	0.090	0.245
Board Size	8.357	8.332	0.703
Board Independence	0.726	0.731	0.301

Panel A reports the logistic regression results for a propensity score model that predicts acquisitions as a function of variables that proxy for potential agency problems. Year indicators are also included in the propensity score model, but not reported. The resulting propensity score is used to match each acquiring firm-year to a non-acquiring control firm-year (closest propensity score, 1 percent caliper, with replacement). To assess the balance of the matched sample across acquirers and non-acquirers, Panel B reports the mean values for the propensity score variables by group.
See Appendix B for all variable definitions.

V. RESULTS

Descriptive Statistics

Table 3 presents descriptive statistics. ICW firms make up 3.0 percent of sample acquirers and 3.8 percent of non-acquirers. Acquirers in our sample, on average, start out with similar levels of operating performance prior to performing an acquisition (0.153 versus 0.159, p = 0.62). However, ICW acquirers underperform non-ICW acquirers in the post-acquisition period (0.058 versus 0.105, p = 0.005), consistent with our predictions that ICWs negatively impact acquisition performance. We note that the pre-acquisition RNOA of non-acquiring ICW firms is marginally lower than that of non-ICW firms (0.134 versus 0.154, p = 0.07). When comparing non-acquiring ICW firms to acquiring ICW firms, the pre-acquisition RNOA is also similar (0.134 versus 0.159, p = 0.153). However, post-acquisition period RNOA is higher for the peer firms than it is for acquiring firms regardless of ICW status, supporting the notion that M&A is value-destructive, on average, for acquirers.

Comparisons of average abnormal stock returns show that announcement period returns are lower (although not significantly) for ICW acquirers versus non-ICW acquirers. Post-acquisition long-run abnormal returns are significantly lower for ICW acquirers versus non-ICW acquirers. This is consistent with our prediction that ICW acquirers suffer significant long-term negative abnormal returns, along with their lower acquisition operating performance. Other significant differences between ICW acquirers and non-ICW acquirers are consistent with expectations based on prior research (e.g., Ashbaugh-Skaife et al. 2007). For example, ICW firms are significantly smaller and younger than non-ICW firms. They are less likely to have a

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TABLE 3

Descriptive Statistics

	Panel A: Acquirers without ICWs n = 1,980			Panel B: Acquirers with ICWs n = 62			Panel C: Non-Acquirers without ICWs n = 1,965			Panel D: Non-Acquirers with ICWs n = 77		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Performance Variables												
Prior RNOA	0.153	0.132	0.089	0.159	0.135	0.105	0.154	0.133	0.089	0.134	0.115	0.092
Post RNOA	0.105	0.105	0.132	0.058	0.053	0.165	0.140	0.130	0.154	0.125	0.126	0.168
Announcement Period BHARs	0.009	0.005	0.068	−0.004	0.001	0.055	0.000	−0.001	0.056	0.011	−0.004	0.069
Post-Acquisition Period BHARs	0.009	−0.060	0.586	−0.114	−0.150	0.561	0.059	−0.042	0.779	0.127	−0.089	1.024
Control Variables												
Natural Log Market Cap ($M)	13.569	13.550	1.454	12.795	12.699	1.189	13.584	13.572	1.476	12.899	12.982	1.103
Book-to-Market	0.546	0.472	0.316	0.541	0.486	0.318	0.513	0.450	0.305	0.506	0.434	0.347
Momentum	0.098	0.076	0.284	0.025	−0.043	0.313	0.101	0.073	0.292	0.094	0.022	0.382
Total Accruals	0.070	0.053	0.122	0.085	0.057	0.155	0.045	0.039	0.102	0.062	0.022	0.127
Sales Growth	0.147	0.117	0.146	0.187	0.142	0.160	0.102	0.080	0.123	0.156	0.134	0.162
Corporate Governance and Agency Proxies												
Free Cash Flow	0.052	0.058	0.057	0.042	0.047	0.059	0.052	0.054	0.062	0.020	0.032	0.079
Leverage	0.262	0.144	0.360	0.273	0.111	0.389	0.237	0.111	0.361	0.194	0.054	0.340
Institutional Ownership %	0.676	0.735	0.261	0.636	0.678	0.302	0.675	0.738	0.270	0.611	0.691	0.310
Institutional Ownership Concentration	0.089	0.052	0.099	0.099	0.070	0.081	0.093	0.053	0.103	0.106	0.072	0.102
Board Size	8.357	8.000	2.024	7.532	7.000	1.799	8.370	8.000	2.086	8.013	8.000	1.983
Board Independence	0.730	0.750	0.133	0.738	0.764	0.118	0.727	0.750	0.142	0.719	0.727	0.132
Determinants of Material Weakness												
Natural Log Firm Age	2.636	2.656	0.900	2.574	2.631	0.831	2.732	2.789	0.916	2.543	2.539	0.863
Inventory	0.127	0.102	0.129	0.129	0.107	0.121	0.169	0.143	0.154	0.141	0.121	0.119
Segments	3.033	3.000	1.892	2.742	2.000	1.933	2.354	1.000	1.700	2.571	2.000	1.634
Auditor Resignation	0.011	0.000	0.105	0.048	0.000	0.216	0.007	0.000	0.084	0.026	0.000	0.160
Foreign	0.258	0.000	0.438	0.323	0.000	0.471	0.289	0.000	0.453	0.364	0.000	0.484
Restructure	0.286	0.000	0.452	0.258	0.000	0.441	0.244	0.000	0.429	0.234	0.000	0.426
Losses	0.094	0.000	0.208	0.151	0.000	0.206	0.115	0.000	0.224	0.229	0.000	0.287
Big 6 Auditor	0.854	1.000	0.353	0.597	1.000	0.495	0.860	1.000	0.347	0.701	1.000	0.461

Panels A and B report descriptive statistics for acquirer firm-years, broken out by whether an ICW was reported in the SEC filing immediately preceding the acquisition announcement date. Panels C and D report descriptive statistics for the sample of propensity score matched non-acquirers, also separated by ICW status. All continuous variables have been winsorized at the 2 percent level with the exception of *RNOA* variables (4 percent, consistent with Oler [2008]) and stock returns (*Announcement Period BHAR*s and *Post-Acquisition Period BHAR*s are not winsorized). See Appendix B for all variable definitions.

larger auditor, and they have smaller boards. In addition, ICW firms tend to have higher sales growth, foreign sales, losses, and auditor resignations. Other control variables are similar between ICW and non-ICW acquirers.

Correlations (untabulated) indicate that the ICW indicator is strongly and negatively associated with post-acquisition RNOA. Post-acquisition acquirer buy-and-hold abnormal returns (BHARs) are significantly and positively correlated with post-acquisition operating performance, which is consistent with investors reacting positively to firms that report higher operating performance after a merger.

We focus on RNOA and stock returns as measures of acquisition performance in our multivariate analyses. Additionally, in Table 4, we present univariate tests of changes in other operating performance measures (variables defined in Appendix B). Panel A shows that acquirers tend to experience lower operating performance after an acquisition regardless of the measure, as indicated by negative average changes across all performance measures. However, consistent with our predictions, acquirers with ICWs experience significantly larger declines in either mean or median performance after an acquisition in each of the four measures. Panel B shows the matched non-acquiring firms, broken out by ICW as a point of reference. Because these firms do not engage in an acquisition, we do not expect to see significant changes in operating performance from the matched acquirer's pre-acquisition to post-acquisition period. As expected, there are no significant changes, with the exception of a decline in mean gross margin for ICW firms.

TABLE 4

Operating Performance Changes by Internal Control Status

Panel A: Acquirers

	No ICW n = 1,980		ICW n = 62		Differences in Means/Medians	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Change in RNOA	−0.048	−0.027	−0.101	−0.064	−0.053***	−0.038***
Change in Profitability	−0.012	−0.007	−0.027	−0.015	−0.015**	−0.008
Change in Gross Margin	−0.006	−0.003	−0.016	−0.017	−0.010	−0.014**
Change in Return on Equity	−0.054	−0.016	−0.123	−0.051	−0.069***	−0.036***

Panel B: Propensity Score Matched Non-Acquirers

	No ICW n = 1,965		ICW n = 77		Differences in Means/Medians	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Change in RNOA	−0.013	−0.005	−0.010	0.004	0.004	0.009
Change in Profitability	−0.012	−0.003	−0.009	0.004	0.004	0.007
Change in Gross Margin	−0.005	−0.003	−0.018	0.003	−0.013**	0.006
Change in Return on Equity	−0.029	−0.003	−0.030	−0.017	−0.002	−0.014

, * Denote two-tailed p-values less than 0.05 and 0.01, respectively, for tests of group mean and median differences.
Table 4 reports the mean and median changes in performance broken out by ICW status prior to the announcement date. Changes in performance are calculated by subtracting the average performance in the two years before the acquisition announcement date from the average performance in the two years after the effective date. Each performance variable is winsorized at the 2 percent level with the exception of *RNOA* (4 percent, consistent with Oler [2008]). The table shows changes in performance for acquirers in Panel A, while the performance changes of propensity score matched non-acquirers are presented in Panel B.
Additional detail on variable calculations can be found in Appendix B.

Table 5 presents ordinary least squares (OLS) regression results to test the hypothesized negative effects that ICWs have on acquisitions, as measured by changes in RNOA (H1). The first model in Table 5 includes an ICW indicator variable that measures any ICW reported at the acquirer (regardless of ICW type), and the second model tests whether certain "AQ-Relevant" types of ICWs (i.e., only ICW types relevant to forecasting, monitoring, or integration) are driving the changes in acquisition performance.

Our primary variable of interest in Table 5 is the interaction between *Any ICW* and *Acquirer,* as this variable allows us to test the effect that ICWs have on acquisitions. However, it is useful to first understand the general effect that acquisitions have on changes in RNOA for acquirers without ICWs (i.e., the *Acquirer* variable) and effects that pre-event ICWs have on changes in RNOA for non-acquirers (i.e., *Any ICW* variable). Results show that the *Acquirer* coefficient is negative and significant, suggesting that acquirers making an acquisition in an environment with effective internal controls experience negative RNOA changes from pre- to post-acquisition. This result is consistent with the M&A literature that suggests that acquisitions, in general, tend to underperform (e.g., Moeller et al. 2005). The *Any ICW* coefficient is positive and significant, suggesting that non-acquirers with ICWs perform better than non-acquirers without ICWs in terms of RNOA changes. This result may seem counterintuitive initially, given prior research showing that ICWs are detrimental to operating performance (Feng et al. 2015). However, prior research regresses contemporaneous RNOA on ICWs (Feng et al. 2015), while our dependent variable is changes in RNOA and we measure ICWs in the pre-acquisition period (i.e., before the corresponding acquirer firm announced a deal). We suspect that positive changes in RNOA for non-acquiring ICW firms are driven by those firms remediating problems; untabulated analysis of non-acquiring firms using controls for remediation confirms our expectations that the improvement in RNOA is related to remediation.[13]

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[13] Nearly half of the non-acquiring ICW firms remediate shortly after (within 90 days) our pre-acquisition measurement period. Untabulated analysis on non-acquirers (our control firms) regresses changes in RNOA on indicators for remediated ICW and unremediated ICW, along with the controls presented in Table 5. The indicator for remediation is positive and significant (0.054, $p = 0.018$), but the unremediated indicator is not significant ($p = 0.243$). Thus, remediations appear to be driving the positive coefficient on *Any ICW* in Table 5, as expected based on prior research (Feng et al. 2015).

TABLE 5

Change in RNOA Associated with ICWs and ICW Type

	Predicted Sign	Coefficient (p-value)	Coefficient (p-value)
Acquirer		−0.031***	−0.031***
		(<0.001)	(<0.001)
Any ICW		0.038***	
		(<0.001)	
*Any ICW * Acquirer*	−	−0.044***	
		(0.009)	
AQ-Relevant ICW			0.058***
			(<0.001)
Other ICW			−0.028
			(0.230)
*AQ-Relevant ICW * Acquirer*	−		−0.071***
			(0.004)
*Other ICW * Acquirer*			0.065
			(0.186)
Control Variables			
Prior RNOA		−0.666***	−0.664***
Ln Market Cap		0.011***	0.011***
Book-to-Market		−0.073***	−0.073***
Momentum		0.061***	0.060***
Total Accruals		−0.082***	−0.082***
Sales Growth		−0.068***	−0.069***
Corporate Governance and Agency Proxies			
Free Cash Flow		0.373***	0.374***
Leverage		−0.007	−0.007
Institutional Ownership %		−0.025**	−0.026**
Institutional Ownership Concentration		0.054**	0.055**
Board Size		−0.001	−0.001
Board Independence		−0.030**	−0.030**
Determinants of Material Weakness			
Ln Firm Age		0.007**	0.007**
Inventory		−0.008	−0.008
Segments		0.001	0.001
Auditor Resignation		0.008	0.007
Foreign		0.007	0.006
Restructure		0.007	0.007
Losses		−0.047***	−0.049***
Big 6 Auditor		0.020***	0.020***
Model Information			
Intercept		−0.030**	−0.028**
Year Indicators		Yes	Yes
Industry Indicators		Yes	Yes
Total Observations		4,084	4,084
ICW Observations		139	139
AQ-Relevant ICWs		112	112
Other ICWs		27	27
R^2		0.278	0.279

, * Indicate significance at the 0.05 and 0.01 levels, respectively. Probability levels are one-tailed for directional expectations as indicated in the table. All significance levels are based on p-values adjusted for clustered standard errors, clustered on acquiring firm and year.
This table reports the results of regressing changes in RNOA on (1) the existence of any Section 302 ICW disclosure prior to the announcement of an acquisition (left column), and (2) the existence of AQ-Relevant ICWs and Other ICW disclosures (right column). The *Change in RNOA* is calculated by subtracting *Prior RNOA* from *Post RNOA* as defined in Appendix B. The sample is composed of 2,042 acquiring firm-years and 2,042 control firm-years matched using the propensity score matching model shown in Table 2.
Additional details on all variables can be found in Appendix B.

The coefficient on our primary variable of interest, *Any ICW * Acquirer,* suggests that ICWs have a significant negative effect on acquirers' operating performance, as predicted. Our predictions are further validated by results from the second model in Table 5: we find that ICWs categorized as relevant to acquisitions drive the negative effect of ICWs on acquisition performance (*AQ-Relevant ICW * Acquirer* coefficient $= -0.071$, $p < 0.01$), but ICWs irrelevant to acquisitions are not significant ($p = 0.186$). Thus, we find support for H1 and note that the coefficient estimate (-0.071) represents an economically significant effect. Holding constant all other variables at their means, the predicted change in RNOA associated with the acquisition is -0.048 when there is no ICW at the acquirer. The predicted change in RNOA for ICW acquirers is -0.061, representing a 26 percent larger decline compared to acquirers without ICWs. The effect of ICWs on RNOA changes is economically meaningful given the pre-acquisition average RNOA level of about 0.15 in our sample. We conclude that ICWs (especially "AQ-Relevant" ICWs) have important implications for acquisition performance.

Analyses in Table 5 control for relevant firm characteristics, including proxies for agency problems and monitoring. *Free Cash Flow* and *Leverage* are measures of an acquirer's (or control firm's) available resources to engage in potentially unprofitable, self-serving investments (Cheng et al. 2013), including value-destroying acquisitions (Jensen 1986). However, higher *Free Cash Flow* could also proxy for better firm performance achieved by superior management, which is likely to make better investment decisions (Masulis, Wang, and Xie 2007). In our sample, fewer financial constraints appears to follow the pattern identified by Masulis et al. (2007), as those firms are associated with better acquisition operating performance, on average.[14] The institutional investor controls proxy for stronger monitoring over management. *Institutional Ownership Concentration* is positively related to acquisition performance, consistent with the notion that stronger monitoring of management improves acquisition performance (McConnell and Servaes 1990). *Institutional Ownership %* is negatively related to performance. This finding is not consistent with prior literature; however, the positive coefficient on *Institutional Ownership Concentration* is consistent with research suggesting that the monitoring benefits of institutional investors are more observable when few blockholders own large shares of companies (Bushee 1998; Demiralp, D'Mello, Schlingemann, and Subramaniam 2011). *Board Independence* is also negatively related to performance, contrary to expectations, but consistent with prior research showing that independence is not consistently associated with better performance (see Richardson 2006, 183).[15]

We did not have expectations for other control variables, but find that larger firms, older firms, and those with larger auditors achieve more positive changes in RNOA, whereas those with higher accruals, sales growth, BTM, and losses in pre-event years are associated with negative changes in RNOA. We also find that higher pre-acquisition RNOA levels at the acquirer predict underperformance, consistent with similar analyses of changes in operating performance in Wangerin (2016) and Feng et al. (2015).

Table 6 presents results testing whether investors anticipate poorer operating performance for ICW acquirers and impound that information into stock price in the short window around the announcement. The negative and significant coefficient on the interaction variable *Any ICW * Acquirer* supports our H2 prediction that investors anticipate poorer post-acquisition performance for acquirers with ICWs. Analysis by ICW type shows that the negative reaction is concentrated in acquirers with ICWs that are relevant to acquisitions (*AQ-Relevant ICW * Acquirer* coefficient $= -0.029$, $p = 0.005$), whereas the market response for acquirers with other ICWs is insignificant ($p = 0.431$). Thus, the market seems to recognize that the effect of an ICW on acquisition performance depends on the nature of the ICW; results support H2.

In contrast to the negative market reaction to ICW acquisition announcements, the market appears to expect positive performance, on average, for acquirers without ICWs (*Acquirer* coefficient $= 0.010$, $p < 0.001$). However, our results from Table 5 suggest that the market will be disappointed by lower than expected operating performance from these acquirers in the post-acquisition period. Non-acquirers with ICWs also experience slightly higher BHARs (*Any ICW* coefficient $= 0.008$, $p = 0.095$) around the acquiring firm's announcement period. Although these control firms with ICWs did not announce an acquisition in this period, it is possible that we are picking up some positive market reaction from remediation efforts occurring during the event window (e.g., Gordon and Wilford 2012).

Table 7 presents analyses evaluating long-window post-acquisition abnormal returns.[16] First, we note that acquirers without ICWs are negatively and significantly associated with lower post-acquisition abnormal returns (*Acquirer* coefficient $=$

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[14] Superior performance may also be related to stronger governance structures existing in firms with higher free cash flow (see Richardson 2006, 185).

[15] Variables used to find matches (i.e., *Prior RNOA* and predictors from the propensity-to-acquire model) are included as controls in our regression analyses shown in Table 5. Given that Table 5 presents pooled regression analyses, it is not surprising that many of these variables are significant, even though an acquirer is closely matched to its individual control firm on these variables. As recommended by Cram, Karan, and Stuart (2009), we add a dummy variable for each of the 2,042 pairings (untabulated). After controlling for the pair dummies, we find that none of the propensity score model variables or the *Prior RNOA* variable remain significant, demonstrating the strength of our matching technique. Results remain strong for our primary variables of interest (e.g., *AQ-Relevant ICW * Acquirer* coefficient $= -0.095$, $p = 0.002$).

[16] Post-acquisition (and announcement period) abnormal returns are calculated as described in Appendix B. Results in Table 7 (and Table 6) are robust to firm-specific measures of abnormal returns (calculated using Eventus).

TABLE 6

Announcement Returns Associated with ICWs and ICW Type
Dependent Variable = *Announcement Period BHARs*

	Predicted Sign	Coefficient (p-value)	Coefficient (p-value)
Acquirer		0.010***	0.010***
		(<0.001)	(<0.001)
Any ICW		0.008*	
		(0.095)	
*Any ICW * Acquirer*	−	−0.023**	
		(0.012)	
AQ-Relevant ICW			0.012**
			(0.047)
Other ICW			−0.003
			(0.428)
*AQ-Relevant ICW * Acquirer*	−		−0.029***
			(0.005)
*Other ICW * Acquirer*			0.005
			(0.431)
Control Variables			
Prior RNOA		0.004	0.005
Ln Market Cap		−0.002**	−0.002**
Book-to-Market		−0.003	−0.003
Momentum		0.004	0.004
Total Accruals		−0.004	−0.004
Sales Growth		0.003	0.003
Corporate Governance and Agency Proxies			
Free Cash Flow		−0.020	−0.020
Leverage		−0.001	−0.001
Institutional Ownership %		−0.007	−0.007
Institutional Ownership Concentration		0.009	0.009
Board Size		−0.001	0.000
Board Independence		0.007	0.007
Determinants of Material Weakness			
Ln Firm Age		0.000	0.000
Inventory		−0.001	−0.001
Segments		−0.001	−0.001
Auditor Resignation		−0.013*	−0.013*
Foreign		0.004***	0.004***
Restructure		0.004***	0.004***
Losses		−0.001	−0.001
Big 6 Auditor		0.001	0.001
Model Information			
Intercept		0.031**	0.031**
Year and Industry Indicators		Included	Included
Total Observations		4,084	4,084
ICW Observations		139	139
AQ-Relevant ICWs		112	112
Other ICWs		27	27
Adjusted R^2		0.007	0.007

*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. Probability levels are one-tailed for directional expectations as indicated in the table. All significance levels are based on p-values adjusted for clustered standard errors, clustered on acquiring firm and year.

This table reports the results of regressing announcement period BHARs on (1) the existence of any Section 302 ICW disclosure prior to the announcement of an acquisition (left column), and (2) the existence of *AQ-Relevant ICWs* and *Other ICW* disclosures (right column). The sample is composed of 2,042 acquiring firm-years and 2,042 control firm-years matched using the propensity score matching model shown in Table 2.

Additional information on all variable definitions can be found in Appendix B.

TABLE 7

Post-Acquisition Period Returns Associated with ICWs and ICW Type
Dependent Variable = *Post-Acquisition Period BHARs*

	Predicted Sign	Coefficient (p-value)	Coefficient (p-value)
Acquirer		−0.077***	−0.077***
		(<0.001)	(<0.001)
Any ICW		0.078	
		(0.223)	
Any ICW ∗ Acquirer	−	−0.153**	
		(0.028)	
AQ-Relevant ICW			0.093
			(0.165)
Other ICW			0.027
			(0.458)
AQ-Relevant ICW ∗ Acquirer	−		−0.138*
			(0.050)
Other ICW ∗ Acquirer			−0.285
			(0.191)
Control Variables			
Prior RNOA		−0.078	−0.083
Ln Market Cap		−0.009	−0.009
Book-to-Market		−0.017	−0.019
Momentum		−0.042	−0.042
Total Accruals		−0.178*	−0.178*
Sales Growth		0.013	0.010
Corporate Governance and Agency Proxies			
Free Cash Flow		0.059	0.057
Leverage		0.218***	0.218***
Institutional Ownership %		−0.156**	−0.156**
Institutional Ownership Concentration		0.033	0.037
Board Size		−0.001	−0.001
Board Independence		−0.059	−0.059
Determinants of Material Weakness			
Ln Firm Age		−0.021	−0.021
Inventory		−0.215*	−0.216*
Segments		0.017**	0.017**
Auditor Resignation		−0.085	−0.088
Foreign		0.085***	0.085***
Restructure		0.022*	0.022*
Losses		−0.132***	−0.133***
Big 6 Auditor		0.065**	0.066**
Model Information			
Intercept		0.014	0.019
Year and Industry Indicators		Included	Included
Total Observations		4,084	4,084
ICW Observations		139	139
AQ-Relevant ICWs		112	112
Other ICWs		27	27
Adjusted R^2		0.052	0.052

*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. Probability levels are one-tailed for directional expectations as indicated in the table. All significance levels are based on p-values adjusted for clustered standard errors, clustered on acquiring firm and year.

This table reports the results of regressing post-acquisition period BHARs on (1) the existence of any Section 302 ICW disclosure prior to the announcement of an acquisition (left column), and (2) the existence of *AQ-Relevant ICWs* and *Other ICW* disclosures (right column). The sample is composed of 2,042 acquiring firm-years and 2,042 control firm-years matched using the propensity score model shown in Table 2.

Additional information on all variable definitions can be found in Appendix B.

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−0.077, p < 0.001), in contrast to the positive abnormal returns from the announcement period (see Table 6), but consistent with lower than expected operating performance for these acquirers, as shown in Table 5. Post-acquisition returns are not significantly associated with non-acquiring ICW firms (*Any ICW* coefficient = 0.078, p = 0.223), which is to be expected given that these firms are not involved in acquisitions. Post-acquisition abnormal returns are significantly lower for ICW acquirers (*Any ICW* ∗ *Acquirer* coefficient = −0.153, p = 0.028). As with Tables 5 and 6, results from the second model in Table 7 show that the negative impact of ICWs on acquisitions is significant for *AQ-Relevant ICW*s (coefficient = −0.138, p = 0.05), but insignificant for unrelated ICWs (coefficient = −0.285, p = 0.191). The effect of ICWs on acquisitions is also economically significant; when all other variables are held constant at their mean, the model predicts long-run abnormal returns of −0.049 for ICW acquirers compared to −0.005 for non-ICW acquirers. Our results lend strong support to H3, which predicts that pre-announcement ICWs are negatively associated with post-acquisition abnormal returns. Negative abnormal stock returns two years after the acquisition closes are likely in response to lower than expected RNOA for ICW acquirers.

Additional Analyses

Alternate Measures of Acquisition Performance

Our primary measure of acquisition operating performance is changes in RNOA, but the accuracy and reliability of reported RNOA is dependent on accounting measures, such as accruals, which are negatively affected by ICWs (Doyle et al. 2007). Restructuring charges provide a measure that is not expected to be compromised by noise and/or bias in financial reporting. Post-acquisition restructuring charges could indicate that an ICW acquirer with poor integration planning or execution has incurred unanticipated costs in the post-acquisition period (i.e., costs that exceed any planned restructuring costs included in the liability recorded as part of the acquisition). Table 8 provides logistic regression results on the likelihood of an acquirer recording restructuring charges within the first two years after the deal closes, including control variables expected to impact the likelihood of restructuring charges, following Bens and Johnston (2009). We find that ICWs predict future restructuring charges (coefficient = 0.454, p = 0.017); as in primary results, only ICWs relevant to acquisitions are associated with a higher likelihood of a post-acquisition restructuring charge (coefficient = 0.488, p = 0.051), but not other ICWs (coefficient = 0.273, p = 0.637).[17] Results are consistent with predictions and our primary findings.

We also consider post-acquisition goodwill impairments as a measure that may indicate the subsequent realization that an acquirer overpaid for a target (Li, Shroff, Venkataraman, and Zhang 2011), perhaps due to an ICW acquirer's unintentional or intentional overvaluation of expected synergies. Untabulated logistic regression results, following Goodman et al.'s (2014) methodology, do not provide evidence that ICW acquirers are more likely to record subsequent goodwill impairments (coefficient = −0.124, p = 0.442). Although results are not consistent with our primary findings, we note that this measure may be problematic due to managerial discretion in applying impairment rules (Li et al. 2011; Ramanna and Watts 2012) and because we are unable to link impairments to specific acquisitions with data available in SDC and Compustat.[18]

Changes in Internal Control Effectiveness

Our primary analyses include controls for determinants of ICWs and include the use of control firms matched on the propensity to acquire and on pre-event operating performance. However, a concern of correlated omitted variables in our setting may still remain. A change analysis of internal control effectiveness is helpful in controlling for firm characteristics that do not change over time. Therefore, we next consider firms that undertake multiple acquisitions within our sample and examine whether operating performance is significantly lower for acquisitions undertaken in periods when ICWs exist just before an acquisition is announced. There are only 29 acquirers with information to perform this analysis (i.e., the acquirer must have at least two acquisitions in the sample: one must have occurred with an ICW and one must have occurred in a time without ICWs). Because a firm's performance is compared to itself, this analysis is helpful in alleviating concerns with correlated omitted variables. In untabulated analyses, we compare changes in RNOA (pre- to post-acquisition) within the same acquiring firm and find that changes in RNOA are generally worse in the deals where the acquirers had ICWs. The mean change in

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[17] To increase the generalizability of our primary results, we perform this restructuring analysis on an expanded sample of acquisitions that is not restricted to RNOA data availability or the availability of a suitable peer match. We remove acquisitions closing after December 31, 2008 from this sample due to new accounting guidance in Statement of Financial Accounting Standards (SFAS) No. 141R that changed requirements for recording restructuring costs associated with acquisitions (effective for deals closed January 1, 2009 or later). Results are robust to including 2009 through 2011 deals.

[18] Extensive hand-collection is required to determine the specific acquisition to which goodwill impairments relate. Hand-collection involves determining to which reporting unit or segment the acquisition-related goodwill was allocated and to which reporting unit or segment the goodwill impairment was charged (see Wangerin 2016). We also note that restructuring charges may suffer from a classification issue, as we do not have the data to categorize which post-acquisition restructuring charges recorded relate to the acquisition in question.

TABLE 8

Restructuring Analysis
Dependent Variable: *P*(Restructuring within two years after acquisition effective date)

	Predicted Sign	Coefficient (p-value)	Coefficient (p-value)
Any ICW	+	0.454** (0.017)	
AQ-Relevant ICW	+		0.488* (0.051)
Other ICW			0.273 (0.637)
AR Turnover		−0.035**	−0.035**
Inventory Turnover		−0.001	−0.001
PPE Turnover		0.017**	0.017**
SALE_EMP		−0.177	−0.177
Momentum		−0.313	−0.314
Losses		0.643***	0.643***
PROF_MG		−0.299	−0.298
ROE Change		−0.203***	−0.201***
GDP Growth		0.158	0.158
Ln Firm Age		0.149**	0.149**
Inventory		−1.139	−1.139
Segments		0.081*	0.081*
Auditor Resignation		0.062	0.058
Foreign		0.707***	0.706***
Big 6 Auditor		1.039***	1.039***
Target Public		0.404	0.405
Only Stock Offer		−0.094	−0.095
Different Industry		−0.023	−0.023
Model Information			
Intercept		−1.634***	−1.630***
Year and Industry Indicators		Included	Included
Total Observations		3,757	3,757
Pseudo R^2		0.09	0.09

*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. Probability levels are one-tailed for directional expectations as indicated in the table. All significance levels are based on p-values adjusted for clustered standard errors, clustered on industry and year.

This table reports the results of regressing the occurrence of restructuring charges (within two fiscal years after the effective date) on (1) the existence of any Section 302 ICW disclosure prior to the announcement of an acquisition (left column), and (2) the existence of *AQ-Relevant ICWs* and *Other ICW* disclosures (right column).

Additional information on all variable definitions can be found in Appendix B.

RNOA for acquisitions without ICWs is −0.5 percent, compared to a mean change in RNOA for acquisitions with ICWs of −6.7 percent. The difference in means is economically and statistically significant (p = 0.027). These results suggest that within the same acquiring firm, acquisition decisions made during periods with ineffective internal control are less profitable than acquisition decisions made during periods with effective internal control.[19]

Controls for Deal and Target Characteristics

Our primary analyses control for firm characteristics that may impact acquisition performance, including determinants of ICWs and proxies for agency problems and corporate governance characteristics. We do not include additional controls for relevant deal and target characteristics because these variables are not applicable for 50 percent of the sample (i.e., the non-acquiring control firms).[20] Our primary analyses predicting changes in operating performance for both acquirers and control

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[19] Note that the changes in internal control effectiveness measured for this analysis must have occurred *prior* to another deal being announced. About 45 percent of the changes occurred due to ICWs being remediated and 55 percent of the changes represent ICWs developing in later periods.

[20] Results from Tables 5–7 are robust to inclusion of deal and target characteristic controls (i.e., with values set to 0 for the non-acquiring firms).

firms in the sample allow the control variables to operate differentially on the acquirers and non-acquirers. However, to examine whether our results from Tables 5–7 are driven by deal and target characteristics that could be correlated with ICWs, we add deal and target controls (along with the original controls) and change the dependent variable used in Table 5 to peer-adjusted changes in RNOA.

Regression results (untabulated) including controls for stock deals (e.g., Travlos 1987; Rau and Vermaelen 1998), public targets (e.g., Fuller, Netter, and Stegemoller 2002), diversifications (e.g., Morck et al. 1990; Moeller et al. 2004), and relative size of the target (e.g., Goodman et al. 2014) remain consistent with our findings in Table 5. Despite the smaller sample (n = 1,062),[21] we find that peer-adjusted changes in RNOA are significantly lower for acquirers with ICWs (coefficient = −0.054, p = 0.018). As in our primary analyses, lower performance is driven by "*AQ-Relevant ICW*s" (coefficient = −0.062, p = 0.015) and not "*Other ICW*s" (coefficient = −0.013, p = 0.437). We also run the same model to test announcement period and post-acquisition acquirer BHARs. As in Tables 6 and 7, the ICW variable is negative and significant, with "*AQ-Relevant ICW*s" driving the effect. In our RNOA and returns regressions, deal and target characteristics are not significant, except for the stock deal indicator in the returns regressions (which is negative and significant) and the relative size variable (which is negative and significant, although the magnitude of the coefficient is not economically significant at −0.0007).

We acknowledge that prior research identifies a number of other target characteristics that are likely to impact acquisition performance. For example, a target's financial reporting quality impacts acquisition premiums (Skaife and Wangerin 2013), type of consideration paid (Raman, Shivakumar, and Tamayo 2012), and announcement period returns (McNichols and Stubben 2012). Target characteristics are also needed to estimate abnormally low due diligence, which impacts acquisition performance (Wangerin 2016).[22] Additionally, ICWs at the target firm are expected to influence acquisition outcomes through their impact on financial reporting quality (Skaife and Wangerin 2013). However, information needed to calculate target characteristics (and premiums paid to targets) would only be available for the 5 percent of our sample acquisitions involving public targets. Thus, a limitation of our study is the inability to control for additional relevant target characteristics that could present correlated omitted variables problems.[23]

VI. CONCLUSION

We investigate the impact of SOX within the context of mergers and acquisitions. We predict that an acquirer's pre-acquisition internal control environment (proxied by SOX Section 302 ICW disclosures) has implications for acquisition performance. We argue that ICWs disclosed in compliance with SOX Section 302 signal poor-quality *internal* financial information (e.g., projections, cost information, etc.) that management uses to perform key acquisition processes (such as forecasting revenues and expenses to value potential synergies). If ICWs reduce forecasting abilities and reduced forecasting ability impacts acquisition performance, then it follows that companies with poorer information will make poorer acquisition decisions. Poor-quality information associated with ICWs is also likely to impede board and investor monitoring that could prevent unintentional or intentional misuse of corporate resources for imprudent acquisitions. Poor-quality internal information is also likely to impede the development of a rigorous integration plan and the effective and efficient execution of the plan after the acquisition.

We find that Section 302 ICWs disclosed prior to the acquisition announcement predict significantly negative post-merger operating performance. Results are economically significant, with ICW acquirers experiencing a 26 percent larger decline in RNOA (−0.061 change) compared to acquirers without ICWs (−0.048 change). The RNOA pre-acquisition mean is 0.15 in our sample; thus, the 0.061 decline is economically meaningful. In additional analyses, we find that acquirers with ICWs are more likely to record post-acquisition restructuring charges, possibly due to unanticipated problems that are revealed during the integration process. Further, a comparison of multiple acquisitions made by the same acquirer suggests that the acquirer makes significantly less profitable acquisitions in periods where it has an ICW outstanding at the announcement date. Overall, we document that ineffective internal control over financial reporting has economically and statistically significant implications for acquisition performance.

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[21] The inclusion of deal and target control variables reduces our sample of acquisitions by about 50 percent (largely due to the scarcity of deal value information in SDC).

[22] We do not have the data to estimate abnormally low due diligence, but primary results are consistent and remain significant when we add a similar control variable measuring an acquisition's time to completion. The one exception is post-acquisition BHARs, which lose significance when we add the time-to-completion control variable. We suspect that this is due to a lack of power, given the much smaller sample size with available data.

[23] Although there is value in being able to control for additional target characteristics, there is also value in analyzing non-public targets, which make up a significant subset of M&A activity (see discussion of private targets in Rodrigues and Stegemoller [2007] and Netter, Stegemoller, and Wintoki [2011]). Further, restricting the sample to only public targets would also remove smaller public acquirers that are less likely to acquire public targets; ineffective internal control may be even more important to these firms (Beneish et al. 2008).

Our results also suggest that investors use SOX ICW disclosures to anticipate poorer post-merger operating performance, as indicated by a significant and negative announcement period response (although the economic impact is fairly small). We report economically and statistically significant negative abnormal stock returns (coefficient = −0.15, p =0.03) for ICW acquirers in the two-year post-acquisition period, consistent with investors reacting to lower than expected post-acquisition RNOA.

Our findings contribute to the literature exploring operational impacts of ineffective internal control over financial reporting, and inform research and practice on how ICWs can negatively influence acquisition performance. Our findings also suggest a previously unidentified benefit of SOX ICW disclosures: internal control information conveyed by these disclosures can be used by investors to help predict M&A performance. By documenting a previously unrecognized benefit of SOX disclosures, we contribute to the SOX cost-benefit debate. Finally, we contribute to the M&A literature by identifying a new firm-specific acquirer characteristic that impacts the value of an acquisition to acquirer shareholders.

Our findings are robust to controls for deal characteristics, agency problems (large free cash flow/low leverage), and a number of corporate governance measures. However, future research is needed to examine how ICWs at the acquirer potentially interact with target characteristics, as our sample of primarily private targets does not allow for these tests. We also acknowledge that more research is needed to disentangle which ICW effects (e.g., forecasting, monitoring, and integration) are most responsible for acquisition underperformance. Future research may also investigate whether other significant operational decisions are impacted by ineffective internal control over financial reporting.

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APPENDIX A

Illustrative Example

This appendix provides specific deal and ICW information for a sample acquisition to illustrate the three proposed negative effects that ICWs have on acquisitions, as described in Section III, "Hypotheses Development."

The following is an example of a Section 302 internal control weakness disclosure from IXYS Corporation's "Item 4—Controls and Procedures" within the company's June 30, 2003 Form 10-Q, filed on August 14, 2003:

- *Financial statement consolidations that place a great strain on the limited personnel resources of our finance organization, resulting in inadequate time for management to perform its financial review on a timely basis;*
- *Deficiencies in our inventory accounting, including the need to establish, compute and adequately update standard inventory costs, completely eliminate intercompany profits, track inventory variances and establish a formal policy to reconcile and review inventory balances, as well as inadequate monthly reconciliations of the general ledger with the inventory subsystem and insufficient review by management of such reconciliations;*
- *Problems with the monthly close at our subsidiaries, particularly in its timing, procedures and the content of the reports prepared, and limited personnel resources, resulting in inadequate time for review by our finance management and for adjustment prior to the audit; and*

> • *Several additional conditions relating to the Company's internal accounting and disclosure controls that, in the context of the overall control environment and the current lack of accounting personnel resources, are considered reportable conditions and that, when taken together, represent a material weakness in internal controls.*

According to SDC's M&A database, IXYS announced an acquisition of Microwave Technology, Inc. (MTI) on September 4, 2003. To better understand how the ICWs at IXYS may potentially impact its acquisition of MTI, we perform Lexis-Nexis searches for public announcements of the acquisition that describe management's rationale for the deal and objectives. In the acquisition announcement (*Business Wire* 2003), IXYS identifies several anticipated benefits of the acquisition, including:

1. expansion into a new radio frequency initiative,
2. additional penetration into new markets (defense and aerospace),
3. continued cost reductions, and
4. synergies in medical and telecommunication markets.

The acquirer's ICW problems that existed before the deal was announced suggest that IXYS likely struggled to perform the fundamental analyses required to make a profitable acquisition decision. For example, the limited and strained finance/accounting personnel, problems with getting timely information from its current subsidiaries, and problems with information on inventory costing should negatively impact the ability of IXYS to produce internal reports and forecasts needed to understand the value of expansion into the new radio frequency initiative, the value of entering the specific new markets, and the value of expected synergies in the medical and telecommunications markets.

Additionally, it would be difficult for IXYS's board of directors to validate management's claims about the benefits (i.e., value of entering these new markets, the benefits of cost savings, etc.) because its monitoring would rely on less accurate and timely external and internal reports and projections produced by limited and inadequate accounting/finance personnel and deficient information systems.

Finally, the strained accounting/finance staff may struggle to help produce a detailed, robust integration plan. It is unlikely that management will have the resources to quickly and effectively execute the plan (and monitor progress) once the deal closes. Given that cost reduction is listed as one of the anticipated benefits of the deal, it would be especially important to achieve quick and effective integration to capture cost savings.

APPENDIX B

Variable Definitions

Performance Variables and Internal Control Weakness

RNOA	Operating income (OI) divided by prior-year net operating assets (following Nissim and Penman [2001]). Below, we have reproduced a portion of Oler's (2008, Table 7) detailed instructions for recalculation of this variable:

OI = Net Financial Expense (NFE) + Comprehensive Net Income (CNI) + Minority Interest in Income (MII).

NFE = Core NFE + Unusual Financial Expense (UFE).

Core NFE = after-tax interest expense (#15 × (1 − MTR)) + preferred dividends (#19) − after-tax interest income (#62 × (1 − MTR)) (note that MTR = the marginal tax rate).

UFE = prior marketable securities adjustment (#238 for prior year) − marketable securities adjustment (#238).

CNI = net income (#172) − preferred dividends (#19) + clean surplus adjustment (CSA).

CSA = marketable securities adjustment (#238) − prior marketable securities adjustment (#238 for prior year) + cumulative translation adjustment (#230) − prior cumulative translation adjustment (#230 for prior year).

Simplifying, RNOA is calculated as #172 + #49 + #15(1 − MTR) − #62(1 − MTR) + (#230 − lag#230), scaled by the prior year's NOA. To avoid losing observations unnecessarily, we replace missing values for #15, #49, #62, and #230 with zeros.

Prior RNOA	The average of the first two full years of RNOA prior to the acquisition.
Post RNOA	The average of the first two full years of RNOA after the effective date of the acquisition.
Announcement Period BHARs	Buy-and-hold returns accumulated from two days prior to the acquisition announcement through two days after the acquisition announcement less the CRSP equal-weighted buy-and-hold returns accumulated over the same period.
Post-Acquisition Period BHARs	Buy-and-hold returns accumulated 24 months after the SDC-reported effective date less the CRSP equal-weighted buy-and-hold returns accumulated over the same period. We use daily returns from the day after the effective date until the first month-end after the effective date. We use monthly returns from the second month-end after the effective date through the 24th month-end after the effective date.
Profitability	Earnings before interest, taxes, depreciation, and amortization (Compustat: EBITDA) divided by total assets (Compustat: AT) (Kim et al. 2011).
Gross Margin	Gross profit (Compustat: GP) divided by Total Revenues (Compustat: REVT).
Return on Equity	Income before extraordinary items (Compustat: IB) divided by the book value of equity (Compustat: SEQ).
Restructuring (DV)	Indicator variable equal to 1 if acquirer recognizes restructuring charges within the first two full years following an acquisition (Compustat: RCA, RCD, RCEPS, RCP).
Any ICW	Indicator variable set to 1 if the firm reported one or more Section 302 material weaknesses in its most recent SEC filings prior to the announcement, and 0 otherwise.
AQ-Relevant ICW	Indicator variable set to 1 if the material weakness is categorized as one of the following "Reason Phrases" per Audit Analytics: "Board, Audit committee, Corp Governance issues"; "Company size, financial constraints, other limiting issues"; "Information technology, software, access/security issue"; "Insufficient management review, inadequate control procedures"; "Personnel inadequacies/ segregation of duty issues"; "Senior management tone and/or self-dealing issues"; "Inventory, vendor and cost of sales issues"; or "Revenue recognition issues."
Other ICW	Indicator variable set to 1 if material weakness "Reason Phrases" per Audit Analytics are not identified as acquisition-relevant (see *AQ-Relevant ICW*). If any of the firm's material weaknesses are acquisition-relevant, then *Other ICW* is set to 0.

Control Variables

Natural Log Market Cap ($M)	Natural log of market capitalization (CRSP: PRC ∗ SHROUT) in millions calculated as of the closest month-end that is at least 30 days before the announcement.
Book-to-Market	Book value of equity (Compustat: CEQ)/market capitalization (CRSP: PRC ∗ SHROUT).
Momentum	Buy-and-hold returns beginning six months prior to the announcement and accumulated through the closest month-end that is at least 30 days before the announcement date.

APPENDIX B (continued)

Total Accruals	Total Accruals are defined following Richardson, Sloan, Soliman, and Tuna (2005). Below, we have reproduced a portion of Oler's (2008, Table 7) detailed instructions for recalculation of this variable: TACC = ΔWC + ΔNCO + ΔFIN, where: Δ = change from prior year to current year; WC = working capital = current operating assets (COA) less current operating liabilities (COL); COA = current assets (#4) − cash and short-term investments (#1); COL = current liabilities (#5) − debt in current liabilities (#34); NCO = non-current operating assets (NCOA) − non-current operating liabilities (NCOL); NCOA = total assets (#6) − current assets (#4) − other investments and advances (#32); NCOL = total liabilities (#181) − current liabilities (#5) − long-term debt (#9); FIN = financial assets (FA) − financial liabilities (FL); FA = short-term investments (#193) + other investments and advances (#32); and FL = long-term debt (#9) + debt in current liabilities (#34) + preferred stock (#130). Simplifying, accruals are calculated as: Δ#6 − Δ#1 − Δ#181 + Δ193 − Δ130. To avoid losing observations unnecessarily, we replace missing values for #130, #181, and #230 with zeros.
Sales Growth	Three-year average of current-year sales (Compustat: SALE) less prior-year sales, divided by prior-year sales.
AR Turnover	Sales (Compustat: SALE)/trade receivables (Compustat: RECTR).
Inventory Turnover	Ratio of cost of goods sold expense (Compustat: COGS) to total inventory (Compustat: INVT) plus LIFO reserve (Compustat LIFR), where applicable.
PPE Turnover	Sales/PPE (Compustat: PPENT).
SALE_EMP	Sales/employees (Compustat: EMP).
PROF_MG	Net income before extraordinary items (Compustat: IB)/sales.
GDP Growth	Annual percentage change in U.S. GDP (per Federal Reserve Bank of St. Louis).
ROE Change	Change in ROE leading up to an acquisition (i.e., from $t-2$ to $t-1$).
Target Public	Indicator variable set to 1 if target is public.
Only Stock Offer	Indicator variable set to 1 if acquisition paid for entirely in stock.
Different Industry	Indicator variable set to 1 if the target's industry differs from the acquirer's (two-digit SIC).

Corporate Governance and Agency Proxies

Free Cash Flow	Operating income before depreciation less interest expense, income taxes, and capital expenditures, scaled by book value of assets. (Compustat: OIBDP − TIE − TXT − CAPX) (Masulis et al. 2007).
Leverage	Book value of debt (Compustat: DLC + DLTT)/market value of equity (CRSP: PRC ∗ SHROUT) (Cheng et al. 2013).
Institutional Ownership %	Institutional common stock ownership percentage as reported in the Thompson Reuters Institutional (13F) Holdings database (field name: INSTOWN_PERC).
Institutional Ownership Concentration	The Herfindahl-Hirschman Index for ownership concentration as reported in the Thompson Reuters Institutional (13F) Holdings database (field name: INSTOWN_HHI).
Board Size	Number of board members per BoardEx.
Board Independence	Independent board members (BoardEx: RoleName contains "Independent")/board size.

Determinants of Material Weakness

Natural Log Firm Age	The natural log of the number of years a firm has been available in CRSP.
Inventory	Average inventory of the three full years before the announcement date (Compustat: INVT/TA).
Segments	Total business segments as reported in the Compustat Segment file.
Auditor Resignation	Indicator variable equal to 1 if the firm auditor resigned in a −9/+3-month window around the fiscal year-end just prior to the announcement date (Audit Analytics: AUDITOR_RESIGNED) (Ashbaugh-Skaife et al. 2007).
Foreign	Set to 1 if the firm recorded foreign exchange income or loss in the year prior to the acquisition (Compustat: FCA).
Restructure	Indicator variable equal to 1 if any of the codes for restructuring costs (Compustat: RCA, RCD, RCEPS, RCP) are non-zero values (Ashbaugh-Skaife et al. 2007).
Losses	Percentage of the previous three years where the firm reported a loss (Skaife and Wangerin 2013; Ashbaugh-Skaife et al. 2007).
Big 6 Auditor	Indicator variable equal to 1 if auditor "Fkey" in Audit Analytics is less than 7 (identifies the largest six auditors) (Ashbaugh-Skaife et al. 2007; Feng et al. 2015).