

# The effect of internal control regulation on earnings quality: Evidence from Germany<sup>†</sup>

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## Abstract

Prior studies of internal control disclosures under the 2002 Sarbanes-Oxley Act (SOX) provide limited evidence on the impact of internal control regulation on reporting quality. Moreover, there is no empirical evidence on the reporting quality effects of mandatory internal control reforms in non-U.S. environments. Thus, it is still an open question whether internal control regulation leads to systematic improvements in reporting quality. We examine this issue, with specific focus on the 1998 German legislation on control and transparency (KTG). In particular, we examine whether German firms experience an increase in earnings quality following the 1998 internal control reform. Using both differences and difference-in-differences research designs, our results suggest that after the KTG reform, German firms experience an increase in timely loss recognition and a decrease in earnings management as indicated by various measures of earnings smoothing and managing toward small positive earnings. These results are robust to various sensitivity analyses. Taken together, our results are consistent with the achievement of one of the main goals of internal control regulation—increased earnings quality through effective internal controls.

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## 1. Introduction

The implementation, assessment, and monitoring of effective internal control systems is a key determinant of financial reporting quality. Specifically, high-quality internal controls curtail the intentional manipulation of information reported to outsiders, reduce the risk of random procedural and estimation errors in reporting, and mitigate the inherent risks of business operations and strategies that may affect the quality of reported information. While the demand for internal control quality exists in the absence of regulation, compliance with regulatory requirements can force managers to increase and/or maintain internal control quality (Kinney, 2000). Accordingly, internal control reforms such as the 1998 German legislation on control and transparency (*Gesetz zur Kontrolle und Transparenz im Unternehmensbereich*; KTG<sup>1</sup>) and Sections 302 and 404 of the 2002 Sarbanes-Oxley Act (SOX) have been promulgated with the goal of improving the quality and transparency of financial information (Deutscher Bundestag, 1998; Donaldson, 2005).<sup>2</sup>

Recent studies of internal control disclosures pursuant to SOX 302 and 404 document that firms reporting internal control weaknesses have *ex ante* poor earnings (or accruals) quality. However, there is limited empirical evidence on whether internal control regulation leads to systematic improvements in earnings or financial reporting quality (e.g., Ashbaugh-Skaife et al., 2008; Bédard, 2006).<sup>3</sup> Moreover, despite the recent global adoption of internal control mandates, there is no empirical evidence on the financial-reporting effects of internal control reform in non-U.S. environments. Hence, in this study, we investigate these issues by focusing on the 1998

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<sup>1</sup> The legislation is widely referred to as KonTraG. We abbreviate this term to KTG for ease of readability.

<sup>2</sup> SOX 302, which requires that managers evaluate and certify the effectiveness of internal controls, became effective for fiscal years ending on or after August 29, 2002 for all SEC registrants. The reporting and audit of management's internal controls assessment as mandated by SOX 404 became effective for large domestic and foreign firms (i.e., accelerated filers) with fiscal years ending on or after November 15, 2004. For non-accelerated filers (both domestic and foreign), the report of management's assessment of internal controls became effective as of December 15, 2007; while, the auditor's attestation report is effective as of December 15, 2008. The SEC recently proposed a further delay of the auditor's report for non-accelerated filers until December 15, 2009.

<sup>3</sup> This evidence is also limited by the short time period since the passage of SOX and is confined to firms that detect and disclose internal control weaknesses.

German KTG legislation. In particular, we examine whether German firms experience an increase in the quality of reported earnings following the KTG internal control reform.

The German regulation provides several advantages for examining the impact of internal control reform. First, requirements for the implementation, assessment, and audit of internal controls under KTG became effective in 1998, thereby providing a long post-regulation period over which to analyze subsequent changes in earnings quality. Second, internal control requirements as prescribed by KTG became effective for all firms—both large and small public companies—on the same date, i.e., there was no phase-in period for certain subsets of the German market. Thus, unlike prior studies of the SOX 404 regime, we are able to provide large-sample evidence on post-reform changes in reporting quality. Third, several studies document that earnings quality under the German stakeholder accounting system is low relative to the level observed in shareholder systems such as the U.S. (see, e.g., Ball et al., 2000; Hung, 2000; Leuz et al., 2003). Prior studies also suggest that the German accounting system provides greater incentives and opportunities for insiders to intentionally smooth earnings (or hide losses) using accruals and “cookie-jar” reserves (e.g., Ball, 2004; Bartov et al., 2005). Given these two factors, the German context provides a setting in which aggregate improvements in earnings quality following internal control reform could be more observable.

We examine changes in earnings quality for German firms after the KTG reform using two widely-used natural experiment designs. Our first research design is a “differences” approach based solely on a broad sample of German firms. Our second design is a “difference-in-differences” (DID) approach, which tests for changes in the German sample *relative* to a group of firms not subject to the KTG mandates. This approach attempts to control for potential time trends in earnings quality as well as confounding macroeconomic shocks. Because the KTG reform affects all publicly listed firms in Germany, we face the challenge of identifying a suitable control group against which to gauge the earnings-quality effects of the KTG reform.

We address this issue empirically by selecting all firms domiciled in several comparative European countries as our benchmark group, namely, Austria, France, Switzerland, and the United Kingdom. We select Austria and Switzerland given the impact of German civil law tradition on their stakeholder-oriented economies. France is selected as another comparative stakeholder economy; the U.K. is included because it has the largest capital market in Europe, with Germany being the second largest. Finally, in all our tests, we control for unobserved effects that are unrelated to the KTG reform by including several firm-specific and country-level control variables, fixed time- and industry-effects as well as clustering by firm.<sup>4</sup>

We operationalize earnings quality using multiple empirical measures that have been shown to capture the concept of reporting quality (see Dechow and Schrand, 2004). We also focus on accounting characteristics that prior research suggests are important in evaluating the quality and transparency of international financial reporting (e.g., Barth et al., 2007; Bhattacharya et al., 2003; Lang et al., 2003, 2006; Leuz et al., 2003; Wysocki, 2006). These characteristics are the timeliness of loss recognition and the level of earnings management as indicated by various measures of earnings smoothing and the frequency of small positive earnings. We use multiple measures to ensure that our results are not driven by any one measure and to mitigate the potential effects of correlated omitted variables.

Based on a sample of 13,395 firm-years (2,563 for German firms and 10,832 for the control group) over the period 1994 – 2002, our results suggest a positive effect of internal control regulation on earnings quality. Specifically, in the post-regulation period, we find that German firms experience an increase in timely loss recognition, and a decrease in earnings smoothing and the tendency to report small positive earnings, consistent with a decrease in earnings management. A series of sensitivity analyses indicate that our results are robust to

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<sup>4</sup> Clustering by firm allows us to be agnostic about whether unobserved firm effects are fixed or time-varying in nature (Petersen, 2007).

additional controls and alternative sample construction. Overall, our results are consistent with the achievement of one of the main goals of internal control regulation—increased earnings quality through efficient and effective internal controls.

This study makes several important contributions to the extant literature. To our knowledge, this study is the first to provide empirical evidence of the impact of rules-based internal control regulation on financial reporting quality in an international setting. Such evidence is especially timely and relevant given the widespread global adoption of internal control mandates in the post-SOX era (Cox, 2007; Tafara, 2006).<sup>5</sup> In fact, the KTG reform has served as a leading benchmark for establishing internal control requirements for all European Union member states (effective in 2005). Moreover, as noted by SEC Chairman Cox (2007), recent guidance regarding SOX 404 has “benefited greatly from [observations] in other jurisdictions that have implemented issuer internal control standards.”

Our study also contributes to the growing literature on the association between internal controls and accounting quality as well as the literature on international differences in financial reporting quality. First, our findings suggest a positive link between internal control regulation and earnings quality, and thus, complement recent studies that examine earnings (or accrual) quality around internal control disclosures under SOX 302 and 404 (e.g., Ashbaugh-Skaife et al., 2008; Bédard, 2006; Doyle et al., 2007a). Second, we document the role of internal control regulation in improving earnings quality in an institutional setting with well-documented deficiencies in the quality of information reported to outsiders (Ball et al., 2000; Bhattacharya et al., 2003; Leuz et al., 2003). Hence, our findings shed further light on the impact of major institutional reforms on financial reporting quality.

This paper proceeds as follows: Section II provides background information on the KTG

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<sup>5</sup>A number of jurisdictions, including Australia, Brazil, Canada, China, France, Hong Kong, Japan, and Mexico, have recently passed or are in the process of passing major internal control reforms.

regulation and motivates our study. Section III outlines the research design and our measures of earnings quality. Section IV describes the sample, and Section V discusses the empirical results and presents robustness tests. Section VI concludes and discusses the implications of our results.

## **2. Background, Related Literature, and Motivation**

### *2.1 Internal control regulation in Germany*

In this section, we briefly discuss the KTG legislation and, where relevant, compare its requirements with those of SOX 302 and 404. We focus our comparisons on SOX because (1) it is a basis for recent internal control reforms in other countries and (2) prior research on internal controls focuses largely on the U.S. context. Figure 1 presents a comparative summary of internal control requirements under KTG and SOX.

**[Insert Figure 1 here]**

In Germany, the KTG legislation represents the main regulation specifying internal controls as an integral component of corporate governance. Similar to SOX, KTG was enacted after several bankruptcies and corporate scandals exposed German firms' ineffective internal control mechanisms (Enriques and Volpin, 2007). The main goals of the legislation, which primarily amends the HGB (*Handelsgesetzbuch* – Commercial Code) and AktG (*Aktiengesetz* – Stock Corporations Act), are (1) to increase the effectiveness of internal controls and (2) enhance the quality and transparency of information disclosed to stakeholders.

The scope of internal controls under KTG is broader than that of SOX. While SOX 302 and 404 relate specifically to disclosure and financial reporting controls (SEC, 2003), KTG extends its focus to business risk (or going concern) controls and risk management. This expanded scope relates to all types of risks affecting the company, including financial reporting, compliance, and operational and strategic risks.

The KTG amendment of § 91 II AktG (effective May 1998) requires the board of directors to implement an internal control or monitoring system that is able to detect developments endangering the company's existence (termed "risk early recognition system"). Further, § 315 I HGB now requires management to disclose in the financial report (1) their compliance with § 91 II AktG and (2) specific risks affecting the company, including financial reporting, compliance, and operational risks.<sup>6</sup> This disclosure requirement (termed "risk reporting") differs from SOX 302 in that managers are not required to publish an explicit conclusion on internal control effectiveness. However, management's declaration of compliance provides an implicit (but limited) conclusion on effectiveness (FEE, 2005).

KTG's internal control requirements are further complemented by its amendments to the control and monitoring mechanisms of the supervisory board.<sup>7</sup> The AktG explicitly requires the supervisory board, with the support of independent external auditors, to monitor and control the management board. KTG now extends this requirement to the consolidated financial statements and the management report, including management's disclosure of business risk and internal controls (§ 171 I AktG). Moreover, the supervisory board has to report the extent and results of its monitoring activities to the annual shareholders' meeting.

KTG also modifies the auditing of internal controls. As of December 1998, external auditors must (1) assess management's implementation of a suitable internal control system (§ 317 IV HGB) and (2) audit and report on the system's effectiveness (§ 321 IV HGB). Specifically, the auditor's long-form report (addressed only to the supervisory board) must detail the findings of the internal control audit and state whether measures are required to improve or correct control deficiencies. In addition, the auditor must issue an opinion on the completeness of

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<sup>6</sup> § 315 I HGB was extended in 2004 to include the disclosure of risk management objectives and control processes, and the disclosure of price, liquidity, cash flow, and credit risks.

<sup>7</sup> KTG also made amendments to the control mechanisms of banks as major stakeholders and corporate insiders. These amendments are also aimed at improving firms' control environments or "tone at the top" as defined by the Committee of Sponsoring Organizations of the Treadway Commission's (COSO) internal controls framework..

management's disclosure of potential risks in the financial report (§ 317 II HGB). In contrast to SOX 404, the auditor's attestation of internal control effectiveness is stated only in their report to the supervisory board and is not disclosed publicly in the financial report. This regulatory difference is reflective of Germany's two-tier board system and its insider-oriented framework.

Although KTG details the criteria and scope of internal controls, it does not specify procedures for the implementation, assessment, and audit of internal controls, nor does it provide guidelines for risk reporting. To fill this gap, from 1998 the German Institute of Public Accountants (*Institut der Wirtschaftsprüfer – IDW*) has issued a series of standards for risk reporting and the implementation, assessment, and audit of internal controls. Since these standards have quasi-legal authority,<sup>8</sup> they have provided guidance for managers and the auditing profession throughout the post-KTG period (Dobler, 2005).<sup>9</sup> Under SOX 404, guidance for management's assessment and review of internal controls was absent until recently. Without such guidance, the 2004 PCAOB standard for the audit of internal controls (AS-2; revised to AS-5)<sup>10</sup> was the de facto benchmark (SEC, 2006; CCMR, 2006). Since AS-2 referred only to internal controls over financial reporting, management's assessments have largely focused on financial reporting controls rather than broad internal controls (Langevoort, 2006; SEC, 2006).

Finally, neither KTG nor SOX prescribe a specific framework for the assessment and audit of internal controls. However, the German IDW standards are based on COSO framework, thereby making COSO quasi-binding. The PCAOB AS-5 standard identifies COSO as a suitable framework for management's assessment, and thus the audit, of internal controls. The SEC (2003) also identifies the Canadian Control Board Guidance on Assessing Control (CoCo), the

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<sup>8</sup> In a general decision, the local court of Duisburg decided that IDW standards can have specific legal authority, but they cannot substitute the legal interpretations of the court (see Amtsgericht Duisburg, 1994. Beschluß v. 31.12.1993, 23 HR B 3193. Der Betrieb 47, 466-467.)

<sup>9</sup> In subsequent years, detailed and more binding standards have been issued by both the IDW and the German Accounting Standards Board (GASB; established by the KTG bill).

<sup>10</sup> The revised AS-5 was approved by the SEC on July 25, 2007 and is effective for audits of fiscal years ending on or after November 15, 2007.

U.K. Turnbull Report, and other within-country standards (including IDW) as suitable frameworks.

## 2.2 *Related literature and motivation*

Several U.S. studies of internal control disclosures under the SOX regime document that firms reporting internal control weaknesses have *ex ante* poor earnings (or accruals) quality.<sup>11</sup> Focusing on larger public companies (i.e., accelerated filers), Chan et al. (2008) provide weak evidence that firms reporting internal control weaknesses under SOX 404 have more income-increasing discretionary accruals during the prior two years. Further, Doyle et al. (2007a) find that disclosures of internal control weaknesses under SOX 302 are associated with poor accruals quality during the years prior to disclosure. However, they find no association for weaknesses disclosed under SOX 404, perhaps because weaknesses identified by external auditors have a lower threshold, and therefore, lack real consequences for reporting quality (Doyle et al., 2007a). While the above studies suggest that firms reporting internal control weaknesses have poor reporting quality *prior to* disclosure, they provide few insights into an intended outcome of internal control regulation—improvements in financial reporting quality.

A few concurrent studies attempt to address this issue, but provide inconclusive evidence on post-regulatory changes in reporting quality. For instance, Ashbaugh-Skaife et al. (2008) examine the one-year change in accruals quality for firms that remediate previously disclosed internal control weaknesses under SOX 404. They find that these firms experience only a marginal increase in accruals quality upon remediation. Bédard (2006) documents an increase in the absolute value of abnormal accruals in the disclosure year for firms reporting internal control weaknesses under SOX 302, but not under the SOX 404 external-audit regime. Bédard argues that this increase reflects a reversal of prior income-increasing accruals, and thus suggests an

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<sup>11</sup> Given that capital market effects are functions of financial reporting quality, this paper is indirectly related to studies of the market reaction and/or cost of capital effects of internal control disclosures under SOX 302 and 404 (e.g., Hammersley et al., 2008; Ogneva et al., 2007).

increase in earnings quality.<sup>12</sup>

Although these two studies provide some evidence suggesting an increase in reporting quality following internal control reforms, the evidence is limited for several reasons. First, in these studies, the post-regulation period under investigation spans a relatively short time frame. Thus, it is possible that these documented effects are short-lived in nature. Second, these findings are limited to firms that detect and report internal control weaknesses. As Doyle et al. (2007b) argue, firms that detect and disclose deficiencies may be systematically different from other firms; therefore, results may not be generalizable to all firms subject to the regulation. Moreover, evidence of subsequent improvements in earnings quality could be masked because the thresholds for determining and reporting material weaknesses vary across firms.<sup>13</sup> Our study extends this line of research by examining, across a broad sample of publicly listed firms and over a relatively long post-regulation period, whether internal control reform is associated with an increase in earnings quality—particularly within an international setting. The KTG legislation provides a key advantage in this respect since Germany is one of the first jurisdictions to establish a legislative, rules-based approach to internal controls that pre-dates SOX and that affects all listed firms.<sup>14</sup>

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<sup>12</sup> More generally, Cohen, Dey and Lys (2007) find a reduction in accruals-based earnings management following the enactment of SOX, but an increase in the use of real earnings management methods after SOX. However, the authors are unable to attribute these changes in earnings management to the internal control provisions of SOX.

<sup>13</sup> A recent study by Ernst & Young (2005) document that, in many instances, there are internal control weaknesses that may impact overall earnings quality, but do not lead to an automatic disclosure or a correction.

<sup>14</sup> Studies such as Krishnan (2005) and Altamuro and Beatty (2007) provide evidence on internal controls and earnings quality under U.S. regulatory requirements that preceded SOX. Krishnan (2005) studies the association between audit committees and internal control quality using disclosures of internal control issues pursuant to the Foreign Corrupt Practices Act (FCPA) of 1977. Under FCPA, managers were not required to evaluate or certify the effectiveness of internal controls. Furthermore, firms were only required to disclose significant internal control deficiencies in Form 8-K when there was an auditor change (SEC, 1988). As Krishnan (2005, p. 672) notes, her results may not be generalizable since auditor change firms are systematically different from the general population. Altamuro and Beatty (2007) investigate improvements in earnings quality following internal control reforms under the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991. The FDICIA requirements were limited to large banks (assets greater than \$500M), and thus, their findings are confined to the banking industry. In our setting, the evaluation, audit, and reporting on internal controls are mandated by a single legislation and are applicable to the entire population of publicly listed firms.

This paper also relates to studies of international differences in financial reporting quality. Germany is a stakeholder-oriented economy with a less-developed stock market, concentrated ownership, weak investor protection, but strong legal enforcement (La Porta et al. 1997, 1998; Leuz et al. 2003). German accounting standards (GGAAP) are codified in the HGB, wherein applicable financial reporting, auditing, and disclosure rules depend on legal form rather than listing status. In addition, individual (or parent-only) financial statements are prepared using historical cost only and serve as a basis for tax accounting and dividend distributions. Finally, GGAAP rules for creating and estimating accruals and reserves are more liberal and provide managers with greater discretion in manipulating and smoothing reported income (Ball, 2004; Bartov et al., 2005)

Given these institutional factors, a number of studies document poor reporting quality for German firms relative to firms in shareholder-oriented environments such as the U.S. For example, Ball et al. (2000) find that earnings in stakeholder countries, such as Germany, are less timely and less sensitive to the recognition of economic losses. Further, Bhattacharya et al. (2003) and Leuz et al. (2003) document relatively high levels of earnings smoothing and earnings management for German firms. Finally, Hung (2000) finds that accrual accounting in stakeholder countries is less value relevant, consistent with higher levels of accrual manipulation.

There are several ways in which compliance with regulatory internal control requirements can improve earnings quality. First, the implementation and monitoring of effective internal controls can curb insiders' opportunities and incentives to intentionally misstate or misrepresent reported income. Second, effective controls can reduce the effects of random, unintentional omissions and procedural errors on reported information. Finally, effective controls serve to mitigate the inherent risks of firms' business activities and the impact of these risks on firms' reporting choices and the transparency of financial reports. While we conjecture that German firms in the KTG regime will experience an increase in earnings quality, it is possible that poor

legal and market enforcement as well as weak compliance by firms could diminish the intended outcome of the reform. Also, given the monitoring role of public disclosures (Ball, 2004), it is possible that the lack of disclosure of the overall effectiveness of internal control may provide less incentive for managers to adequately comply with the KTG requirements. Moreover, regulatory internal control requirements could cause managers to engage in earnings manipulation activities that adversely reporting quality, but are harder to detect by auditors and regulators. Thus, whether the KTG regulation had a positive impact on earnings quality is largely an empirical question.

### 3. Research Design and Measures of Earnings Quality

#### 3.1 Research Design

We use two natural-experiment research designs commonly used in the economics literature to investigate whether German firms' earnings quality has increased following the 1998 KTG reform.<sup>15</sup> Our first approach is a “differences” test using only German firms (this test is also termed a one group before-and-after design). We use the following general model to test for changes in earnings quality after the KTG reform:

$$Y = \beta_0 + \beta_1 KTG + \sum_{k=2}^K [\beta_k (Controls + T + I)] + \varepsilon, \quad (1)$$

where  $Y$  denotes various accounting- and market-based measures of performance as detailed below and  $KTG$  is an indicator variable that equals one for all fiscal years ending after December 1998, and zero otherwise. Although the mandatory implementation of internal control systems became effective in May 1998, we use the effective date of the internal control audit requirements, i.e., December 1998, to define the pre- and post-KTG periods. Using December

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<sup>15</sup> See Meyer (1995) for an extensive review of natural-experiment research designs. These approaches are widely used in the economics literature to study the effects of specific interventions or events such as policy changes, the passage of laws, and government randomization.

1998 as the cut-off ensures that German firms in the post-KTG period are subject to *all* the legislation’s requirements.<sup>16</sup> We control for the relation between our performance measures and several firm-specific factors (denoted *Controls*) in all our regressions. Also, to control for unobserved time-, industry-, and firm-specific factors that are unrelated to the KTG reform, we include fixed effects for each fiscal year (*T*) and 2-digit SIC industry (*I*) as well as report standard errors clustered by firm (Petersen, 2007).

The Germany-only differences design does not control for time trends in earnings quality or the effects of concurrent macroeconomic shocks (Ball et al., 2000; Land and Lang, 2002). Therefore, to control for these potentially confounding factors, we use a “difference-in-differences” (DID) design to examine the change in earnings quality for German firms (treatment group) after KTG *relative* to a group of firms not subject to the regulation (control group).

The general specification of our DID model is as follows:

$$Y = \alpha_0 + \alpha_1 KTG + \alpha_2 GER + \alpha_3 (KTG \times GER) + \sum_{k=4}^K [\alpha_k (Controls + LegalEnvironment + T + I)] + \varepsilon, \quad (2)$$

where *GER* equals one for German firms and zero for firms in the control group. The interaction term ( $KTG \times GER$ ) is the DID estimator and indicates the change in earnings quality for German firms after the KTG reform *relative* to the control group. Consistent with prior research (e.g., Leuz et al. 2003), we control for the relation between our variables of interest and several country-level measures of legal institutions (denoted *LegalEnvironment*). Our legal environment measures are taken from La Porta et al. (1997, 1998) and include the following: (1) the level of legal enforcement (*LEGAL\_ENF*), measured as the average score across three country indices—the rule of law, the level of corruption, and the efficiency of the country’s legal system; (2) the importance of equity markets (*IMP\_EQMKT*), constructed by Leuz et al. (2003) as the country’s average rank across three measures used in La Porta et al. (1997)—the aggregate stock market

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<sup>16</sup> Our results do not change when we use May 1998 as the cut-off date for the pre- and post-KTG periods.

held by minority shareholders, the number of listed domestic stocks, and the number of IPOs; and (3) outside investor rights (*INVESTOR\_RIGHTS*), which is an anti-director rights index that captures minority shareholder rights.<sup>17</sup> Finally, we again include firm-specific controls (*Controls*) as well as fixed effects for fiscal years (*T*) and 2-digit SIC industry (*I*).

Since the KTG reform affects all publicly listed firms in Germany, we face the challenge of identifying a suitable control group for benchmarking the effect of the KTG reform on accounting quality. We address this issue empirically by selecting all firms domiciled in several comparative European countries as our control group. We first focus on European countries with sizable capital markets (based on the market capitalization of listed domestic firms) to ensure that all relevant macroeconomic shocks commonly affect German firms and the control group. Next, to cleanly isolate the effect of the KTG reform, we identify countries that did not implement mandatory internal control reforms during our test period (1994–2002). Based on this procedure, we select all listed firms domiciled in Austria, France, Switzerland, and the U.K. as our control group.

We select Austria and Switzerland given the impact of German civil law traditions on their stakeholder-oriented economies. France is selected as another European stakeholder economy. Although the U.K. is a shareholder-oriented economy, we include it as a control country because it has the largest capital market in Europe, with Germany being the second largest. Figure 2 presents a timeline of internal control reforms in Germany and the control countries for the period 1994–2002. The U.K. is the only control country that has enacted internal control requirements during this period; however, compliance is not mandatory.<sup>18</sup> To the

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<sup>17</sup> We do not include an indicator variable for countries with civil versus common law traditions (*CIV\_COM*), since this variable is highly collinear with our *GER* indicator variable and the other legal environment variables. We find that *CIV\_COM* is automatically dropped from all of our regressions due to collinearity.

<sup>18</sup> The 1998 U.K. Combined Code on Corporate Governance states that corporate boards should maintain “sound” internal control systems. Specific guidance on compliance with this provision was published in the 1999 Turnbull

extent that our control firms are not sufficient benchmarks for German firms, we rely on firm- and country-level controls as well as controls for unobserved factors when conducting our tests.

**[Insert Figure 2 here]**

Given the inherent difficulty in measuring earnings quality, we follow previous studies (e.g., Barth et al., 2007; Lang et al., 2003, 2006) and conduct our analyses using several measures of earnings quality developed in the literature. The use of multiple empirical measures ensures that our results are not driven by any particular measure and helps mitigate the potential effects of correlated omitted variables. We also focus on accounting characteristics used in prior studies of accounting quality and transparency in international settings (e.g., Barth et al., 2007; Bhattacharya et al., 2003; Leuz et al., 2003; Wysocki, 2006). This facilitates comparison with prior evidence. Our measures are timely loss recognition and the level of earnings management as indicated by the smoothness of earnings and the tendency to report small positive earnings. In the next subsections, we discuss each measure in turn and provide empirical predictions.

### *3.2 Timely loss recognition*

Consistent with Basu (1997), we define timely loss recognition as the extent to which current-period accounting earnings asymmetrically incorporate economic losses relative to economic gains. This definition is also termed conditional conservatism (see, e.g., Ball and Shivakumar, 2005, Beaver and Ryan, 2005).<sup>19</sup> As discussed above, prior studies argue that German accounting provides greater incentives and opportunities for insiders to defer or smooth economic losses over multiple periods rather than recognize them as they occur. We expect effective internal controls to curtail such incentives and opportunities. Furthermore, effective controls can increase internal transparency, and thus the ability to identify and account for loss-

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Report and later appended to the 2003 revision of the Combined Code. Compliance is not mandatory, but firms must report their compliance or reasons for non-compliance.

<sup>19</sup> Conditional conservatism is distinct from the unconditional form of accounting conservatism. Conservatism is unconditional when predetermined aspects of the accounting process result in an understatement of the book value of net assets. Our results and their interpretation are unchanged when we control for unconditional conservatism (see Section 5.4 for further details).

making investments in current periods rather than defer them to future periods (Ball and Shivakumar, 2005; Bushman et al., 2006). We therefore conjecture that German firms will experience an increase in timely loss recognition following the KTG reform.

We operationalize timely loss recognition using two piecewise linear regression models, namely, the Basu (1997) returns-based model and an accruals-based model proposed by Ball and Shivakumar (2005, 2006).

*Basu (1997) model*

To investigate the post-KTG change in asymmetric loss timeliness, we use the following differences and DID returns-based models to estimate changes in the incremental sensitivity of accounting earnings to economic losses as proxied by negative returns:

$$NIPS_{it} / P_{it-1} = \beta_0 + \beta_1 RET + \beta_2 NEGRET + \beta_3 KTG + \beta_4 (KTG \times RET) + \beta_5 (KTG \times NEGRET) + \sum_{k=6}^K [\beta_k (Controls + T + I)] + \varepsilon \quad (3a)$$

$$NIPS_{it} / P_{it-1} = \alpha_0 + \alpha_1 RET + \alpha_2 NEGRET + \alpha_3 KTG + \alpha_4 (KTG \times RET) + \alpha_5 (KTG \times NEGRET) + \alpha_6 GER + \alpha_7 (GER \times RET) + \alpha_8 (GER \times NEGRET) + \alpha_9 (GER \times KTG) + \alpha_{10} (GER \times KTG \times RET) + \alpha_{11} (GER \times KTG \times NEGRET) + \sum_{k=12}^K [\alpha_k (Controls + LegalEnvironment + T + I)] + \varepsilon, \quad (3b)$$

where  $NIPS_{it}$  is net income before extraordinary items per share for firm  $i$  in fiscal year  $t$  and  $P_{it-1}$  is price per share at the beginning of the fiscal year.  $RET_{it}$  is the market-adjusted buy-and-hold return including dividends over fiscal year  $t$ .  $NEGRET$  proxies for economic losses and equals negative values of  $RET$ , zero otherwise.<sup>20</sup> To control for exogenous within-country events that may affect returns, we adjust the returns for firm  $i$  by deducting the comparable return in fiscal year  $t$  on a value-weighted portfolio of the sample firms domiciled in the same country.<sup>21</sup>

<sup>20</sup> Note that the traditional Basu model includes a dummy variable to indicate negative return values. For ease of interpretation, we estimate separate coefficients for negative return values so that the DID interaction terms are products of no more than three variables.

<sup>21</sup> Our reported results do not change when we use equal-weighted market-adjusted returns.

We also control for firm size (*SIZE*), one-year sales growth (*GROWTH*), and leverage (*LEVERAGE*), which proxy for exogenous volatility in economic income (Ball and Shivakumar, 2005). Further, as discussed below (see section 4.1), we include an indicator variable, *NEUER\_MKT*, to identify those firms listed on Germany's Neuer Markt exchange.

The coefficient  $\beta_2$  ( $\alpha_2$ ) measures the incremental sensitivity of earnings to economic losses for German (control) firms in the pre-KTG period. If losses are recognized in a timelier manner than gains, then we expect  $\beta_2 > 0$  ( $\alpha_2 > 0$ ). In equation 3a, the coefficients  $\beta_4$  and  $\beta_5$  represent, respectively, the change in timely gain and loss recognition for German firms after KTG. Similarly,  $\alpha_{10}$  and  $\alpha_{11}$  in equation 3b represent the change in timely gain and loss recognition for German firms *relative* to the control group. If the KTG reform had a positive effect on timely loss recognition, then we expect  $\beta_5 > 0$  and  $\alpha_{11} > 0$ . Given managers' incentives to recognize gains in a timely manner, we reasonably expect no change in timely gain recognition, i.e.,  $\beta_4 = 0$  and  $\alpha_{10} = 0$ .

#### *Accruals-based model*

The returns-based model implicitly assumes that stock returns efficiently incorporate firm-level economic performance. To the extent that this assumption is invalid across countries (Morck et al., 2000), results from a returns-based model could be biased. Moreover, the significant stock market run-up and decline during our sample period could confound our returns-based results. To mitigate these concerns, we employ an accruals-based model that is not dependent on stock returns.

Accrual accounting improves the quality of reported earnings by mitigating noise in operating cash flows (Dechow, 1994; Dechow et al., 1998). As demonstrated by Ball and Shivakumar (2005, 2006), a second role of accruals is the timely recognition of economic gains and losses, which creates a negative but asymmetric relation between accruals and

contemporaneous cash flows. This asymmetry suggests a positive association between economic losses (as proxied by negative cash flows) and accruals since losses are more likely to be recognized on a timely basis through the use of unrealized accrued charges against income. We therefore estimate the following cash flow models:

$$ACC = \beta_0 + \beta_1 CFO + \beta_2 NEGCF O + \beta_3 KTG + \beta_4 (KTG \times CFO) + \beta_5 (KTG \times NEGCF O) + \sum_{k=6}^K [\beta_k (Controls + LegalEnvironment + T + I)] + \varepsilon, \quad (4a)$$

$$ACC = \alpha_0 + \alpha_1 CFO + \alpha_2 NEGCF O + \alpha_3 KTG + \alpha_4 (KTG \times CFO) + \alpha_5 (KTG \times NEGCF O) + \alpha_6 GER + \alpha_7 (GER \times CFO) + \alpha_8 (GER \times NEGCF O) + \alpha_9 (GER \times KTG) + \alpha_{10} (GER \times KTG \times CFO) + \alpha_{11} (GER \times KTG \times NEGCF O) + \sum_{k=12}^K [\alpha_k (Controls + LegalEnvironment + T + I)] + \varepsilon, \quad (4b)$$

where *ACC* is accruals scaled by lagged total assets, *CFO* is cash flows from operations scaled by lagged total assets, and *NEGCF O* equals negative values of *CFO*, zero otherwise. Since cash flow information is missing for most of the German sample, we measure *ACC* for all firms using the balance sheet method.<sup>22</sup> Following prior studies (e.g., Leuz et al., 2003), we approximate *CFO* as net income before extraordinary items minus accruals (*NI* – *ACC*). We also re-estimate equations (4a) and (4b) with change in revenue ( $\Delta REV$ ) and gross property, plant, and equipment (*PPE*), both scaled by lagged total assets, as additional variables. This alternative specification is an extension of the Jones (1991) model.

We also control for innate firm characteristics that could be correlated with both accounting and internal control quality (Becker et al., 1998; Dechow and Dichev, 2002; Ashbaugh-Skaife et al., 2007, 2008; Doyle et al., 2007a,b). In addition to *SIZE*, *LEVERAGE*, *GROWTH*, and *NEUER\_MKT*, we also control for the occurrence of losses (*LOSS*), the

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<sup>22</sup> We measure accruals as  $(\Delta CA - \Delta CASH) - (\Delta CL - \Delta STDEBT - \Delta TAX) - DEPN$ , where *CA* denotes total current assets; *CASH*, cash and cash equivalents; *CL*, total current liabilities; *STDEBT*, the current maturities of long-term debt and other short-term debt included in current liabilities; *TAX*, taxes payable; and *DEPN*, depreciation and amortization expense.

beginning-of-year book-to-market equity ratio (*BM*), the firms' life cycle stage (*LIFECYCLE*), the existence of foreign transactions (*FOREIGN*), the issuance of common equity shares (*EISSUE*), and auditor quality as proxied by an indicator variable (*NONBIG4*) that equals one if the firm is audited by a non-Big 4 firm, zero otherwise.<sup>23</sup> Following DeAngelo et al. (2006), we define a firm's life cycle stage as the ratio of retained earnings to total common equity. The existence of foreign transactions is measured using an indicator variable (*FOREIGN*) that equals one if the firm reports non-zero foreign currency adjustments in year *t* and zero otherwise. Following Barth et al. (2007), we measure equity issuance (*EISSUE*) as the percentage change in common shares outstanding after adjusting for stock splits and stock dividends. Our predictions for the accruals-based models are similar to those for the Basu model, i.e.,  $\beta_5 > 0$  and  $\alpha_{11} > 0$ .

### 3.3 Earnings management: Smoothing of earnings

We expect internal control requirements to curb the intentional manipulation of earnings through accruals and in turn to improve the quality of reported income. Accordingly, we expect German firms to engage in fewer earnings-smoothing activities and thus, exhibit greater variability in earnings relative to cash flows after the KTG reform. Following prior studies (e.g., Barth et al., 2007; Lang et al., 2003, 2006; Leuz et al., 2003), we define earnings smoothing as the ratio of the firm-level standard deviation of earnings (scaled by lagged total assets) to the firm-level standard deviation of operating cash flows (scaled by lagged total assets), denoted  $\sigma NI / \sigma CFO$ . Higher values of  $\sigma NI / \sigma CFO$  indicate less earnings smoothing. Consistent with Barth et al. (2007) and Lang et al. (2003, 2006), we control for firm- and country-specific

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<sup>23</sup> Our sample period (1994–2002) spans the 1998 merger of Price Waterhouse and Coopers & Lybrand, and the 2002 collapse of Arthur Andersen. These events reduced the Big 6 international accounting firms to the now Big 4. For convenience, we refer to the original Big 6 as the Big 4. Furthermore, we obtain similar results when we control for other determinants of internal control quality such as operating cycle and the level of inventory to total assets. We also obtain similar results when we re-define growth using industry mean-adjusted sales growth and an indicator variable for extreme sales growth.

differences in earnings volatility by first estimating pooled regressions of *NI* and *CFO* on our control variables—*SIZE*, *LEVERAGE*, *GROWTH*, *LOSS*, *BM*, *LIFECYCLE*, *FOREIGN*, *EISSUE*, *NEUER\_MKT*, and *NONBIG4*—and on fixed time- and industry-effects as well as the country-level legal environment variables. Using the residual values (denoted  $NI^*$  and  $CFO^*$ ), we calculate  $\sigma NI^*/\sigma CFO^*$  separately for Germany and the control group before and after KTG, and then examine the differences and DID of the mean ratios.

We alternatively define earnings smoothing as the Spearman rank correlation between changes in accruals and changes in operating cash flows  $\rho(\Delta ACC, \Delta CFO)$ , both scaled by lagged total assets (Barth et al. 2007; Leuz et al., 2003). Accruals and operating cash flows have an inherent negative correlation (Dechow, 1994). However, all else equal, a more negative correlation indicates the smoothing of earnings that does not reflect a firm's underlying performance. Since  $\Delta ACC$  and  $\Delta CFO$  are likely to be affected by various firm characteristics, we measure  $\rho(\Delta ACC^*, \Delta CFO^*)$  using the residual values of  $\Delta ACC$  and  $\Delta CFO$  from a regression of each variable on the controls and on fixed time-, industry-, and country-level variables. We calculate separate correlation coefficients for Germany and the control group before and after KTG, and then examine the differences and DID of the coefficients.

### *3.4 Earnings management: Frequency of small positive earnings*

Our second measure of earnings management is the tendency to manage earnings towards a positive target. Prior studies document that positive earnings (or loss avoidance) is a common benchmark that managers focus on (see, e.g., Graham et al. 2005). Hence, several studies argue that a high frequency of small positive earnings reflects the management of discretionary accruals to avoid reporting losses (Burgstahler and Dichev 1997, Leuz et al. 2003). If internal control requirements curtail managers' intentional manipulation of earnings, then we expect to find a decrease in the frequency of small positive earnings after KTG. We follow Barth et al.

(2007) and Lang et al. (2003, 2006) closely and test this conjecture using the following logit regressions:

$$SMALL\_POS = \beta_0 + \beta_1 KTG + \sum_{k=2}^K [\beta_k (Controls + T + I)] + \varepsilon, \quad (5a)$$

$$SMALL\_POS = \alpha_0 + \alpha_1 KTG + \alpha_2 GER + \alpha_3 (KTG \times GER) + \sum_{k=4}^K [\alpha_k (Controls + LegalEnvironment + T + I)] + \varepsilon, \quad (5b)$$

where *SMALL\_POS* is an indicator variable that equals one if reported net income (*NI*) scaled by total assets is between 0 and 0.01, and zero otherwise.<sup>24</sup> A positive coefficient on *KTG* ( $\beta_1$ ) and *KTG*  $\times$  *GER* ( $\alpha_3$ ) suggests that German firms are less likely to manage earnings towards a positive target in the post-KTG period.

#### 4. Data, Sample Selection, and Descriptive Evidence

##### 4.1 Data and sample selection

We compile our sample from the intersection of the Compustat Global Industrial/Commercial and the Compustat Global Issues databases. We use the ISO country of incorporation code to determine a firm's home country. We begin our analyses in fiscal year 1994 since Compustat's coverage of German firms is low for prior years. We end the test period in 2002 to ensure that our results are not confounded by other regulatory reforms in our sample countries. This results in a relatively equal time frame before and after KTG. Specifically, the pre-KTG period spans calendar years 1994 – 1998 and the post-KTG period spans 1999 – 2002.

We exclude all German firm-years without 12-month fully consolidated financial statements. We do not exclude consolidated information prepared according to IFRS or US-GAAP since all firms are subject to the KTG requirements, irrespective of the accounting

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<sup>24</sup> Unlike Barth et al. (2007) and Lang et al. (2003, 2006), we use the *SMALL\_POS* indicator variable as the independent variable since our control variables are chosen as explanatory factors of accounting quality.

standard used. In addition, firms providing IFRS or US-GAAP consolidated statements are still required to prepare individual statements using GGAAP. Nevertheless, robustness tests show that our results are not sensitive to the inclusion of IFRS or US-GAAP information (see Section 5.4 for further details). Further, in all of our analyses, we exclude observations for those fiscal years when a company switches to IFRS/US-GAAP reporting. This ensures that our change variables (e.g.,  $\Delta ACC$ ,  $\Delta CFO$ ) are not confounded by changes in reporting standards.

We next delete all German firm-years with missing data for the calculation of our test variables. To mitigate the loss of potentially informative observations and possible selection bias, we do not delete firm-years with missing data for the calculation of  $\Delta ACC$  and  $\Delta CFO$ . Consistent with prior studies, we exclude financial institutions (SIC 6000 – 6999) and observations with negative book-to-market ratios. These criteria result in a final unbalanced data panel of 2,563 firm-years for 643 German firms. The number of firm-years in the pre- and post-KTG periods are 1,060 (301 firms) and 1,503 (607 firms), respectively. Using the same criteria, we complete our data panel by adding all control firms with available data for the calculation of our test variables. This brings our final pooled sample to 13,395 firm-years (2,885 firms) over the fiscal years 1994 – 2002.<sup>25</sup>

Panel A of Table 1 reports the sample distribution by country and year. The increase in the number of firms over the sample period reflects the increased coverage of Compustat Global as well as the listing of young, innovative growth firms on newly established exchanges such as the Neuer Markt in Germany and Switzerland, and the Nouveau Marché in France. This is evident in Panel B, which reports the yearly distribution of German Neuer Markt firms versus firms listed on other German stock exchanges. We identify Neuer Markt firms by cross-matching

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<sup>25</sup> The sample reduces to 12,443 firm-years (2,410 for German firms and 10,033 for the control group) when we delete observations with missing data for the calculation of  $\Delta ACC$  and  $\Delta CFO$ . Our results are unchanged when we replicate all our tests using this reduced sample.

our sample with a list of all Neuer Markt IPOs in Germany.<sup>26</sup> As noted in the previous section, we control for any systematic differences between these two sets of firms by including the *NEUER\_MKT* indicator variable in all our regressions.<sup>27</sup>

**[Insert Table 1 here]**

#### 4.2 Descriptive evidence

Panel A of Table 2 presents summary statistics for German firms and the control group. To mitigate the influence of extreme outliers, we winsorize all variables at the 1% and 99% levels in each country sample. Consistent with asymmetric loss recognition, we observe in both subsamples that  $NIPS/P_{t-1}$  is negatively skewed, while *RET* is positively skewed. Nonparametric tests of differences in means using the *t*-test and the Wilcoxon rank sum test indicate that German firms, on average, have more negative accruals relative to the control group (−7.45 versus −4.93 percent of lagged total assets, *t*-statistic = −9.10). This finding is not surprising given Germany’s conservative practices in accounting for liabilities and contingencies under the prudence principle (*Vorsichtsprinzip*). We note that German firms have a higher frequency of small positive earnings than the control group, consistent with the evidence in Leuz et al. (2003). The summary statistics for our control variables indicate that German firms, on average, are larger (*SIZE*) and more levered (*LEVERAGE*). We also find that non-Big 4 audits (*NONBIG4*) are more common for German firms, indicating that firms contract mostly with local audit firms. The control firms appear to engage in more equity issuances (*EISSUE*) than German firms; however, further analysis show that this difference is largely driven by U.K. firms. This finding is again not surprising given the U.K.’s highly-developed equity market and strong investor

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<sup>26</sup> We thank the German Stock Institute (*Deutsches Aktieninstitut*) for providing this list.

<sup>27</sup> Due to a significant number of corporate scandals and accounting violations (which contributed to the exchange’s closing in 2003), Germany’s Neuer Markt firms were well-criticized for their lack of effective control mechanisms and poor accounting quality (see, for e.g., Wassener, B., June 12, 2002. “Tarnished image in need of restoration: Neuer Markt,” *Financial Times*). To the extent that this argument holds, including these firms in our sample works against our finding significant results. Nevertheless, robustness tests show that our results are qualitatively similar when we delete these firms from our sample.

protection as indicated by the country-level values of *IMP\_EQMKT* and *INVESTOR\_RIGHTS* in Panel B of Table 2.

**[Insert Tables 2 and 3 here]**

Table 3 presents pairwise correlation coefficients for our primary regression variables. Pearson (Spearman) coefficients are presented above (below) the diagonal. Consistent with the noise-mitigating role of accruals, there is a strong negative association between the levels and changes of accruals and operating cash flows (respectively, Spearman  $\rho(ACC, CFO) = -0.5650$ ,  $p$ -value  $< 0.00$ ; Spearman  $\rho(\Delta ACC, \Delta CFO) = -0.7576$ ,  $p$ -value  $< 0.00$ ).

## 5. Empirical Results and Robustness Tests

### 5.1 Timely loss recognition

#### *Basu (1997) model*

Columns 1 and 2 of Table 4 present regression results for equations (3a) and (3b), respectively. The  $t$ -statistics (in parentheses) for these and all subsequent regressions are calculated using standard errors clustered by firm to correct for unobserved within-firm correlation patterns (Petersen, 2007).<sup>28</sup> In column 1, the incremental sensitivity of earnings to negative returns is significantly positive for German firms in the pre-KTG period ( $\beta_2 = 0.1241$ ,  $t$ -statistic = 2.97), consistent with an asymmetry in timely loss recognition. As expected, the estimated coefficient on  $KTG \times RET$  indicates no significant increase in timely gain recognition after the KTG reform. The estimated coefficient on  $KTG \times NEGRET$  is significantly positive at the 9% level ( $\beta_5 = 0.1433$ ,  $t$ -statistic = 1.72), suggesting a positive impact of the KTG reform on timely loss recognition.

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<sup>28</sup> For the DID regressions, we also find similar results when we correct for cross-sectional correlation using a supplemental procedure suggested by Bertrand et al. (2004). This procedure ignores the time-series variation in the data. For each firm, we average the regression variables before and after the reform, and then re-estimate our models on the averaged variables as a panel of length two.

**[Insert Table 4 here]**

We, however, find weaker evidence from our DID tests that benchmarks German firms against the control group. In column 2, we find no difference in the sensitivity of earnings to gain or losses between German firms and the control group during the pre-KTG period (i.e.,  $GER \times RET$  and  $GER \times NEGRET$  are not significantly different from zero). This finding provides some assurance that our control firms are suitable benchmarks regarding timely gain and loss recognition as measured using stock returns. The estimated coefficient on  $GER \times KTG \times NEGRET$  is positive, but not significant at conventional levels.

*Accruals-based models*

In contrast to the Basu model, the results from the accruals-based models provide strong evidence of an increase in timely loss recognition after KTG. Table 5 presents results for the accruals-based cash flow (columns 1 and 2) and Jones models (columns 3 and 4). We exclude *GROWTH* from the Jones model because it is highly collinear with  $\Delta REV$ . The estimated coefficients on  $\Delta REV$  and *PPE* (see columns 3 and 4) are consistent with model predictions. Also, the results for the control variables are consistent with prior studies.

**[Insert Table 5 here]**

The estimated coefficients on *CFO* are significantly negative across all regressions, consistent with the noise-reduction role of accruals; while, the coefficient on *NEGCF0* is significantly positive, indicating the timely loss recognition role of accruals. In both the cash flow and Jones models, the estimated coefficients for  $GER \times NEGCF0$  is significantly negative, suggesting that in the pre-KTG period, German firms exhibited less timely loss recognition as measured by accruals. More importantly, the coefficients on the differences and DID estimates both suggest a significant increase in timely loss recognition after the KTG reform. Specifically, for the German-only sample, the estimated coefficients on  $KTG \times NEGCF0$  in columns 1 and 3 are both positive and significant at the 1% level. This positive change remains statistically

significant even after adjusting for the corresponding change for the control group (see  $GER \times KTG \times NEGCF0$  in columns 2 and 4). Taken together, the results in Tables 4 and 5 indicate an increase in timely loss recognition after KTG and provide evidence that suggests a positive impact of internal control reform on earnings quality.

### 5.2 Earnings management: Smoothing of earnings

Table 6 presents the results of our earnings smoothing tests. Panel A examines firm-specific changes in the variability of earnings to cash flows ( $\sigma NI^*/\sigma CFO^*$ ) between the pre- and post-KTG periods. To calculate  $\sigma NI^*/\sigma CFO^*$ , we require each firm to have data for at least three years in either period.<sup>29</sup> We test for differences in the mean ratios using both a *t*-test and a Wilcoxon rank sum test. We test the DID of the mean ratios using equation (2).

**[Insert Table 6 here]**

As discussed above, higher levels of variability indicate less earnings smoothing. In Panel A, we find that German firms experience an increase in the mean  $\sigma NI^*/\sigma CFO^*$  between the pre- and post-KTG periods (0.7589 versus 0.5568, *t*-statistic = 3.15), while the control group experience a marginal (but statistically insignificant) increase. We find similar results using the Wilcoxon rank sum test (not tabulated), suggesting that this finding is not driven by extreme observations. Furthermore, in the DID test, we find that the post-KTG increase remains significant at the 5% level after adjusting for the corresponding increase in the mean  $\sigma NI^*/\sigma CFO^*$  for the control group (0.2021 versus 0.0414, *t*-statistic = 2.17).

Panel B of Table 6 examines changes in the correlation between the residuals of  $\Delta ACC$  and  $\Delta CFO$ , denoted  $\rho(\Delta ACC^*, \Delta CFO^*)$ . The differences in the correlation coefficients between the pre- and post-KTG periods for both groups are tested using Fisher's (1921) *z*-transformation (see Sheskin, 2004). We find a significant increase in  $\rho(\Delta ACC^*, \Delta CFO^*)$  for the German

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<sup>29</sup> Increasing the minimum requirement to four years does not affect our results.

sample ( $-0.8743$  versus  $-0.8326$ ,  $z$ -statistic = 3.61), indicating a decrease in earnings smoothing after KTG. Although we are unaware of any statistical test for the DID of correlation coefficients, we note that the increase in  $\rho(\Delta ACC^*, \Delta CFO^*)$  for German firms remains large after adjusting for the corresponding increase for the control group (0.0417 versus 0.0263).

### *5.3 Earnings management: Frequency of small positive earnings*

Column 1 of Table 7 presents results for the logit regression of changes in the tendency to report small positive earnings for the German subsample; column 2 presents similar results for the logit DID regression. For brevity, we do not report the estimated coefficients for the control and legal environment variables. The coefficients on these variables are consistent with prior evidence. In column 1, the estimated coefficient on the *KTG* variable is negative and statistically significant at the 1% level, suggesting that German firms are less likely to manage earnings to meet positive earnings targets. In column 2, the estimated DID coefficient on  $GER \times KTG$  remains negative and significant at the 11% level). Overall, our findings in Tables 6 and 7 suggests that German firms experience a decrease in earnings management after the KTG internal control reform.

**[Insert Table 7 here]**

### *5.4 Robustness Tests*

#### *Cross-sectional tests of unconditional conservatism*

Prior studies document a negative interaction between unconditional and conditional conservatism (e.g., Beaver and Ryan, 2005; Roychowdhury and Watts, 2007). Unconditional conservatism is a primary source of unrecorded economic rents and/or unrecognized increases in asset values, and thus provides a form of “accounting slack” that preempts the application of conditional conservatism or asymmetric timeliness (Beaver and Ryan, 2005). Given this preemptive interaction, it is important to control for unconditional conservatism when assessing

the conditional form. This is especially important for our study because unconditional conservatism is frequently associated with prudent German accounting.

Following prior studies, we use the book-to-market ratio (*BM*) to proxy for unconditional conservatism and the scope to account for economic losses. Firms with high *BM* ratios (i.e., low unconditional conservatism) are more sensitive to write downs or impairments in recorded asset values and thus, have higher conditional conservatism (Roychowdhury and Watts, 2007). If the effect of KTG on loss recognition is related to unconditional conservatism, then the effect could increase with the level of book-to-market. To examine this issue, we re-estimate the returns- and accruals-based models separately for firm-years with high and low book-to-market ratios. We classify firm-years as having a high (low) *BM* ratio if the ratio falls in the top (bottom) one-third of each country sample.

For brevity, Panel A of Table 8 presents only the differences and DID coefficients for our proxies of economic losses (i.e., negative returns or negative cash flows). The Basu regression for the German subsample shows a marginally significant difference between the high and low *BM* classifications. However, this difference is no longer significant when we compare the DID coefficients for the pooled sample of German and the control firms. We also find no significant difference between high versus low *BM* observations for all our accruals-based models. In addition, with the exception of the Basu model, the estimated differences and DID coefficients for both proxies of economic losses remain positive and significant. Thus, we safely conclude that the KTG reform is associated with an increase in timely loss recognition, even after controlling for unconditional conservatism.

**[Insert Table 8 here]**

*Adoption of IFRS and US-GAAP accounting standards*

In April 1998, Germany passed the *Law to Facilitate the Raising of Capital* (KapAEG), allowing firms to prepare consolidated financial statements solely under internationally accepted

accounting standards, primarily IFRS or US-GAAP. Before KapAEG, firms voluntarily adopting IFRS or US-GAAP were still required to prepare consolidated statements in accordance with GGAAP. Given this change in the accounting regime, one concern is whether the observed post-KTG increase in earnings quality is driven by the adoption of IFRS or US-GAAP reporting.

While it is often argued that internationally accepted standards provide higher information quality than local standards, prior studies provide mixed evidence on the quality of financial reports prepared under IFRS/US-GAAP vis-à-vis local standards. For example, in the German context, Bartov et al. (2005) and Hung and Subramanyam (2007) find, respectively, more value-relevant earnings and book value adjustments for voluntary IFRS and US-GAAP adopters. In contrast, Van Tendeloo and Vanstraelen (2005) find no significant difference in earnings management and earnings smoothing for firms reporting under IFRS versus GGAAP.

Despite these mixed findings, we control for the adoption of international standards by eliminating observations for all German and control firms that switched to IFRS or US-GAAP reporting from fiscal 1997 onwards, to coincide with the anticipated and actual passage of KapAEG. Panel B of Table 8 presents the differences and DID coefficients for this reduced sample (2,197 firm-years for German firms and 10,639 for the control group). The estimated coefficients are consistent with our previous findings, indicating that our results are robust to the adoption of IFRS or US-GAAP. In particular, we continue to find evidence of an increase in accruals-based timely loss recognition and a decrease in earnings smoothing after KTG. The differences and DID coefficients for the Basu model continue to be positive, although not significant at conventional levels. The estimated differences in the frequency of small positive earnings are also consistent with our previous findings.

#### *Alternative sample construction*

Our main findings are based on an unbalanced data panel, which has a higher number of sample firms in the post-KTG period. As discussed above, this increase is primarily due to

additional coverage by Compustat Global and the listing of young, innovative firms to new exchanges such as the German Neuer Markt (launched in March 1997). To examine whether our results are sensitive to sample construction, we eliminate all firms that enter the sample from 1997 onwards, to coincide with the opening of “new market” exchanges in Germany and our control countries. This restriction results in a relatively balanced sample in the pre- and post-KTG periods. We do not delete exiting firms in order to conserve sample size and minimize survivorship bias. The results from this analysis (not tabulated) are consistent with our main findings. Alternatively, we replicate the Germany-only differences tests after deleting Neuer Markt firms. We again find similar and, in most cases, even stronger results when we exclude Neuer Markt firms (which were well-known for their poor accounting quality).

#### *Pre-existing differences in time trends*

Our DID tests implicitly assume that pre-existing time trends in earnings quality are common to both German firms and the control group. To test the validity of this assumption, we replicate our regressions in the pre-KTG period and estimate whether there is a significant difference in the time trends of earnings quality between the two groups. Following previous DID studies, we create a time trend variable (*TREND*) for the fiscal years 1994 – 1998 and then interact *TREND* with our regression variables. We find no significant difference in earnings quality trends between the two groups.

## **6. Conclusion and Implications**

In this study, we find that German firms following the 1998 KTG internal control reform experience an increase in timely loss recognition and a decrease in earnings management as indicated by several measures of earnings smoothing and the frequency of small positive earnings. Together, these results are consistent with one of the main goals of internal control regulation—increased earnings quality through efficient and effective internal controls. To our

knowledge, this study is the first to examine the financial reporting effects of mandatory internal control regulation in an international setting. Also, this study extends prior research on internal control regulation under SOX 302 and 404, and provides large-sample evidence of a positive impact of internal control regulation on earnings quality. Finally, our study extends prior work on the quality of international accounting by documenting the role of internal control regulation in improving earnings quality in an international setting

While our results are largely consistent across all our analyses, we are cautious in drawing inferences about causality. We control for confounding firm-specific, time-trend and macroeconomic factors in our empirical tests; however, it is possible that our techniques do not completely parse out these effects. Further, given the lack of public disclosures on internal control effectiveness by German firms and external auditors, our analyses do not identify firm-specific changes in internal control quality following KTG. Thus, our results may not be attributable solely to improvements in internal control quality.

Despite these caveats, our study provides several interesting implications for regulators and standard-setters in Germany as well as other jurisdictions. First, our findings suggest that the German regulatory approach to internal controls positively impacts earnings quality. Hence, the KTG legislation can serve as a useful basis for defining internal control requirements in other jurisdictions (Dobler, 2005). This provides justification for the fact that, indeed, the KTG legislation has become a leading basis for internal control regulation in the EU. For example, risk reporting requirements, similar to those specified by KTG, were introduced in the EU by the Modernization Directive 2003/51/EC, amending the 4th and the 7th Company Law Directives. As of 2005, the reporting of risks and internal controls is mandatory in all EU member states.

Second, our findings imply that the KTG regulation and its supporting guidance standards provide a suitable system for improving and maintaining internal control quality within German corporations. As such, our results lend credence to recent recommendations that SOX 404

requirements should not be applied (or should be partially applied) to foreign firms subject to equivalent home-country requirements (CCMR, 2006; USCOC, 2007). While the regulatory requirements in Germany and other foreign countries are not directly comparable to those of the U.S., it may be onerous for foreign firms to comply with both home- and listing-country internal control requirements.

Finally, under KTG, German firms are not required to disclose an explicit conclusion of the effectiveness of their internal control and risk management systems. Furthermore, the auditor's attestation of the effectiveness of these systems is disclosed only to the supervisory board and not to the public. While additional mandated disclosures can provide useful information to investors and other stakeholders, it is unclear whether these perceived benefits will outweigh the costs (Healy and Palepu, 2001). Nevertheless, German regulators and policy-setters should continue to debate this issue.

## References

- Altamuro, J., Beatty, A., 2007. Do internal control reforms improve earnings quality? Working Paper, The Ohio State University.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., 2007. The discovery and reporting of internal control deficiencies prior to SOX-mandated audits. *Journal of Accounting and Economics* 44, 166-192.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., LaFond, R., 2008. The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review* 83, 217-250.
- Ball, R., 2004. Corporate governance and financial reporting at Daimler-Benz (DaimlerChrysler) AG: From a "Stakeholder" toward a "Shareholder Value" Model. In: Leuz, C., Pfaff, D., Hopwood, A., (Eds.). *The Economics and Politics of Accounting*. London: Oxford University Press, 103-145.
- Ball, R., Kothari, S. P., Robin, A., 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting & Economics* 29, 1-51.
- Ball, R., Shivakumar, L., 2005. Earnings quality in UK private firms: Comparative loss recognition timeliness. *Journal of Accounting and Economics* 39, 83-128.
- Ball, R., Shivakumar, L., 2006. The role of accruals in asymmetrically timely gain and loss recognition. *Journal of Accounting Research* 44, 207-242.
- Barth, M., Landsman, W., Lang, M., 2007. International accounting standards and accounting quality. *Journal of Accounting Research*, forthcoming.
- Bartov, E., Goldberg, S., Kim, M., 2005. Comparative value relevance among German, US, and International Accounting Standards: A German stock market perspective. *Journal of Accounting, Auditing & Finance* 20, 95-119.
- Bertrand, M., Duflo, E., Mullainathan, S., 2004. How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics* 119, 249-275.
- Basu, S., 1997. The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics* 24, 3-37.
- Bédard, J., 2006. Sarbanes-Oxley internal control requirements and earnings quality. Working paper, Bentley College.
- Beaver, W., Ryan, S., 2005. Conditional and unconditional conservatism: concepts and modelling. *Review of Accounting Studies* 10, 269-309.
- Becker, C., Defond, M., Jiambalvo, J., Subramanyam, K. R., 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15, 1-24.
- Bhattacharya, U., Daouk, H., Welker, M., 2003. The world price of earnings opacity. *The Accounting Review* 78, 641-678.
- Bushman, R., Piotroski, J., 2006. Financial reporting incentives for conservative accounting: The influence of legal and political institutions. *Journal of Accounting and Economics* 42,

107-148.

- Bushman, R., Piotroski, J., Smith, A., 2006. Capital allocation and the timely accounting recognition of economic losses: International evidence. Working paper, University of Chicago.
- Chan, K., Farrell, B., Lee, P., 2008. Earnings management of firms reporting material internal control weaknesses under Section 404 of the Sarbanes-Oxley Act. *Auditing: A Journal of Practice and Theory*, forthcoming.
- Committee on Capital Markets Regulation (CCMR), 2006. Interim report of the Committee on Capital Markets Regulation. Cambridge.
- Cox, C., 2007. Speech by SEC Chairman: Re-thinking regulation in the era of global securities markets. 34<sup>th</sup> Annual Securities Regulation Institute. Coronado.
- DeAngelo, H., DeAngelo, L., Stulz, R., 2006. Dividend policy and the earned-contributed capital mix - a test of the life-cycle theory. *Journal of Financial Economics* 81, 227-254.
- Dechow, P., 1994. Accounting earnings and cash flows as measures of firm performance - The role of accounting accruals. *Journal of Accounting and Economics* 18, 3-42.
- Dechow, P., Dichev, I., 2002. The quality of accruals and earnings. *The Accounting Review* 77, 35-59.
- Dechow, P., Schrand, C., 2004. Earnings quality. The Research Foundation of CFA Institute: Charlottesville.
- Deutscher Bundestag, 1998. Gesetzentwurf der Bundesregierung, Entwurf eines Gesetzes zur Kontrolle und Transparenz im Unternehmensbereich (KonTraG). Drucksache 13/9712 (January).
- Dobler, M., 2005. National and international developments in risk reporting: May German Accounting Standard 5 lead the way internationally? *German Law Journal* 6, 1191-1200.
- Donaldson, W., 2005. Testimony concerning the impact of the Sarbanes-Oxley Act. House Committee on Financial Services. U.S. House of Representatives: Washington, D.C.
- Doyle, J., Ge, W., Mc Vay, S., 2007a. Accruals quality and internal control over financial reporting. *The Accounting Review* 82, 1141-1170.
- Doyle, J., Ge, W., Mc Vay, S., 2007b. Determinants of weaknesses in internal control over financial reporting. *Journal of Accounting and Economics* 44, 193-223.
- Enriques, L., Volpin, P., 2007. Corporate governance reforms in Continental Europe. *Journal of Economic Perspectives* 21, 117-140.
- Ernst & Young, 2005. Submission letter to the SEC File No. 4-497: Implementation of Sarbanes-Oxley internal controls provisions. Washington, DC.
- European Federation of Accountants (FEE), 2005. Risk management and internal control in the EU. Discussion paper (March). Brussels, Belgium.
- Fisher, R., 1921. On the 'probable error' of a coefficient of correlation deduced from a small sample. *Metron* 1, 3-32.
- Hammersley, J., Myers, L., Shakespeare, C., 2008. Market reactions to the disclosure of internal

- control weaknesses and to the characteristics of those weaknesses under Section 302 of the Sarbanes-Oxley Act of 2002. *Review of Accounting Studies* 13, 141-165.
- Healy, P., Palepu, K., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics* 31, 405-440.
- Hung, M., 2000. Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting and Economics* 30, 401-420.
- Hung, M., Subramanyam, K. R., 2007. Financial statement effects of adopting international accounting standards: The case of Germany. *Review of Accounting Studies* 12, 623-657.
- Jones, J., 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193-228.
- Kinney, W., 2000. Research opportunities in internal control quality and quality assurance. *Auditing: A Journal of Practice & Theory* 19 (Supplement), 83-90.
- Krishnan, J., 2005. Audit committee quality and internal control: An empirical analysis. *The Accounting Review* 80, 649-675.
- La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R., 1997. Legal determinants of external finance. *Journal of Finance* 52, 1131-1150.
- La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R., 1998. Law and finance. *Journal of Political Economy* 106, 1113-1155.
- Langevoort, D., 2006. Internal controls after Sarbanes-Oxley: Revisiting corporate laws “Duty of care as responsibility for systems.” Working Paper, Georgetown University Law Center.
- Land, J., Lang, M., 2002. Empirical evidence on the evolution of international earnings. *The Accounting Review* 77, 115-133.
- Lang, M., Raedy, J. S., Yetman, M. H., 2003. How representative are firms that are cross-listed in the United States? An analysis of accounting quality. *Journal of Accounting Research* 41, 363-386.
- Lang, M., Raedy, J. S., Wilson, W., 2006. Earnings management and cross listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics* 42, 255-283.
- Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69, 505-527.
- Meyer, B., 1995. Natural and quasi-experiments in economics. *Journal of Business & Economic Statistics* 13, 151-161.
- Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-260.
- Ogneva, M., Subramanyam, K. R., Raghunandan, K., 2007. Internal control weakness and cost of equity: Evidence from SOX Section 404 disclosures. *The Accounting Review* 82, 1255-1297.

- Petersen, M., 2007. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, forthcoming.
- Public Company Accounting Oversight Board (PCAOB), 2004. An audit of internal control over financial reporting performed in conjunction with an audit of financial statements. Auditing Standard No. 2. Washington, DC
- Rajan, R., Zingales, L., 1995. What do we know from capital structure: Some evidence from the international data. *Journal of Finance* 50, 1421-1460.
- Roychowdhury, S., Watts, R., 2007. Asymmetric timeliness of earnings, market-to-book and conservatism in financial reporting. *Journal of Accounting and Economics* 44, 32-35.
- Securities and Exchange Commission (SEC), 1988. Disclosure amendments to Regulation S-K, Form 8-K and Schedule 14A regarding changes in accountants and potential opinion sopping situations. Financial Reporting Release No. 31 (April), SEC Docket 1140–1147. Washington, D.C.
- Securities and Exchange Commission (SEC), 2003. Management’s reports on internal control over financial reporting and certification of disclosure in exchange act periodic reports, Final Rule Release No. 33-8238 (June 5). Washington, D.C.
- Securities and Exchange Commission (SEC), 2006. Concept release concerning management’s reports on internal control over financial reporting, Concept Release No. 34-54122 (July 11). Washington, D.C.
- Sheskin, D., 2004. Handbook of parametric and nonparametric statistical procedures. Boca Raton: Chapman & Hall/CRC Press.
- Tafara, E., 2006. Statement by SEC Staff: A race to the top, International regulatory reform post Sarbanes-Oxley. *International Financial Law Review* 12 (September).
- U.S. Chamber of Commerce (USCOC), 2007. Commission on the Regulation of U.S. Capital Markets in the 21<sup>st</sup> Century: Report and Recommendations. Washington, D.C.
- Van Tendeloo, B., Vanstraelen, A., 2005. Earnings management under German GAAP versus IFRS. *European Accounting Review* 14, 155-180.
- Wysocki, P., 2006. Assessing earnings and accruals quality: U.S. and international evidence. Working paper, MIT.

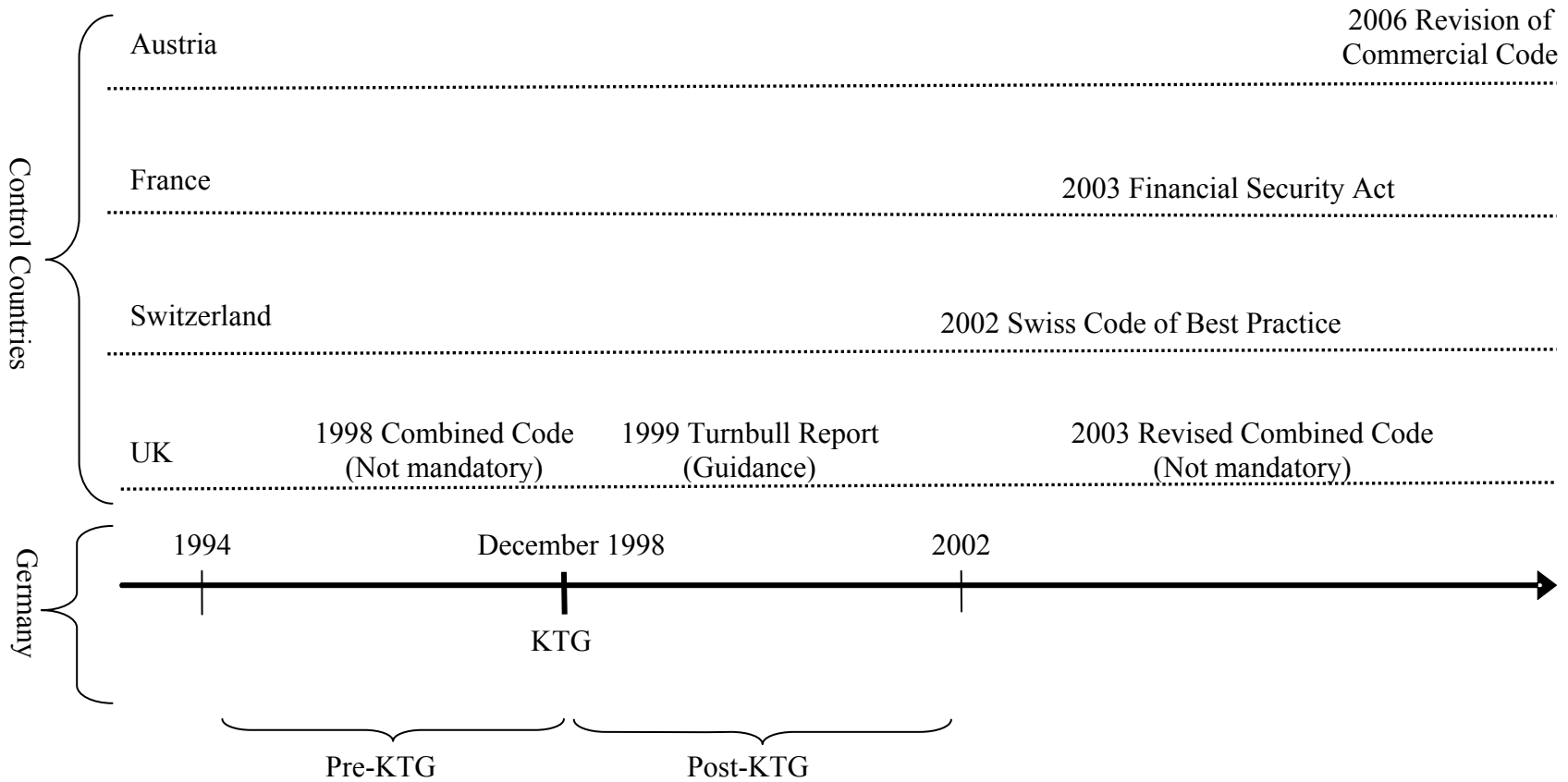
**Figure 1**  
**Comparison of KTG and SOX Internal Control Requirements**

Legislation	Mandatory?	Scope of requirements									External auditors' involvement?	External auditors' opinion?	Mandatory framework?	Suggested frameworks	Specific legal enforcement sanctions
		Types of controls			Types of activities										
		Financial Reporting	Compliance	Operational and strategic	Manage Risks			Disclose							
					Identify and evaluate	Respond	Conclude on effectiveness	Overall Process	Management of specific risks	Effectiveness conclusion					
<b>KTG</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	reported internally to supervisory board	×	IDW standards (based on COSO)	✓
<b>SOX</b>	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	reported externally in financial report	×	COSO CoCo Turnbull Other*	✓

Adapted from FEE (2005), Appendix III.

\* Other evaluation frameworks specific to a firm's home country may be used (SEC 2003).

**FIGURE 2**  
**Timeline of internal control reform in Germany and the control countries**



**TABLE 1**  
**Sample Distribution by Year and Country<sup>1</sup>**

<b>Panel A: All sample firms</b>										
Country	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Germany	165	181	209	251	262	284	394	390	427	2,563
Austria	22	29	32	51	50	46	45	50	45	370
France	98	166	219	315	313	324	360	455	417	2,667
Switzerland	47	57	63	83	93	97	107	116	126	789
UK	561	603	650	902	943	880	830	862	775	7,006
Total Control Group	728	855	964	1,351	1,399	1,347	1,342	1,483	1,363	10,832
Total	893	1,036	1,173	1,602	1,661	1,631	1,736	1,873	1,790	13,395
<b>Panel B: German Neuer Markt firms</b>										
Classification	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Non-Neuer Markt firms	165	181	209	251	261	266	293	255	267	2,148
Neuer Markt firms	-	-	-	-	1	18	101	135	160	415
% of total German sample	-	-	-	-	0.38%	6.34%	25.63%	34.62%	37.47%	16.19%

<sup>1</sup> All fiscal years ending after December 1998 are classified as the post-KTG period ( $KTG = 1$ ). The control group consists of all firms with available data domiciled in Austria, France, Switzerland, and the U.K. We identify Neuer Markt firms by cross-matching our sample with a list of all Neuer Markt IPOs in Germany.

**TABLE 2**  
**Summary Statistics for German and Control Firms<sup>1</sup>**

<b>Panel A: Firm-level variables</b>								
	German firms			Control Firms			Differences in Means	
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	<i>t</i> -test	Wilc. rank sum
Primary variables:								
<i>RET</i>	-0.2376	-0.3077	0.5113	-0.1398	-0.2009	0.5418	(-8.60)***	(-9.80)***
<i>NIPS/P</i> <sub><i>t-1</i></sub>	-0.0014	0.0370	0.3309	0.3585	0.0586	0.4452	(-4.76)***	(-10.50)***
<i>ACC</i>	-0.0745	-0.0647	0.1303	-0.0493	-0.0438	0.1041	(-9.10)***	(-11.08)***
<i>CFO</i>	0.0702	0.7878	0.1404	0.0740	0.0854	0.1551	(-1.19)	(-2.82)***
$\Delta$ <i>ACC</i>	0.0060	-0.0022	0.2044	0.0279	-0.0035	0.3078	(-4.24)***	(-0.17)
$\Delta$ <i>CFO</i>	-0.0091	0.0028	0.1960	-0.0287	0.0044	0.3302	(3.80)***	(0.81)
<i>SMALL_POS</i>	0.0987	0.0000	0.2983	0.0502	0.0000	0.2184	(7.75)***	(9.33)***
$\Delta$ <i>REV</i>	0.0073	0.0259	0.3823	0.0792	0.0596	0.4089	(-8.45)***	(-9.52)***
<i>PPE</i>	0.7329	0.6419	0.5347	0.6020	0.5512	0.4023	(11.63)***	(9.35)***
Control variables:								
<i>SIZE</i>	6.1316	5.9629	1.9268	5.3762	5.1300	2.0422	(17.64)***	(17.44)***
<i>LEVERAGE</i>	0.6500	0.6890	0.1994	0.5587	0.5694	0.1982	(20.86)***	(21.98)***
<i>GROWTH</i>	0.0363	0.0253	0.3746	0.1023	0.0624	0.4532	(-7.69)***	(-10.53)***
<i>LOSS</i>	0.2856	0.0000	0.4518	0.2158	0.0000	0.4114	(7.15)***	(7.56)***
<i>BM</i>	0.9294	0.5917	1.1317	1.1970	0.5705	4.8038	(-5.22)***	(-2.75)***
<i>LIFECYCLE</i>	0.1029	0.1055	0.5780	0.1190	0.2038	1.2104	(-0.99)	(-9.12)***
<i>FOREIGN</i>	0.1970	0.0000	0.3978	0.1875	0.0000	0.3903	(-1.10)	(-1.19)
<i>EISSUE</i>	0.1207	0.0000	0.9341	0.0592	0.0008	0.2301	(3.31)***	(21.83)***
<i>NEUER_MKT</i>	0.1619	0.0000	0.3684	0.0000	0.0000	0.0000	(22.25)***	(42.54)***
<i>NONBIG4</i>	0.5369	1.0000	0.4987	0.3102	0.0000	0.4626	(20.97)***	(21.58)***
<b>Panel B: Country-level Variables</b>								
	Germany	Austria	France	Switzerland	UK			
Legal environment:								
<i>LEGAL_ENF</i>	9.1	9.4	8.7	10.0	9.2			
<i>IMP_EQMKT</i>	5.0	7.0	9.3	24.8	25.0			
<i>INVESTOR_RIGHTS</i>	1	2	3	2	5			

All variables are winsorized at the 1% and 99% levels in each country sample.

<sup>1</sup>The control group consists of all firms with available data domiciled in Austria, France, Switzerland, and the UK.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% (two-tailed).

*RET* = market-adjusted buy-and-hold stock return inclusive of dividends over the fiscal year.

*NIPS/P*<sub>*t-1*</sub> = net income before extraordinary items per share scaled by beginning-of-year price.

*ACC* = accruals, calculated as ( $\Delta CA - \Delta CASH$ ) - ( $\Delta CL - \Delta STDEBT - \Delta TAX$ ) - *DEPN*, where *CA* denotes total current assets; *CASH*, cash and cash equivalents; *CL*, total current liabilities; *STDEBT*, the current maturities of long-term debt and other short-term debt included in current liabilities; *TAX*, taxes payable; and *DEPN*, depreciation and amortization expense.

*CFO* = cash flows from operations, measured as net income before extraordinary items minus accruals (*NI* - *ACC*), both scaled by lagged total assets.

$\Delta$ *ACC* = changes in accruals scaled by lagged total assets.

$\Delta$ *CFO* = changes in operating cash flows scaled by lagged total assets.

$\Delta$ *REV* = change in revenue scaled by lagged total assets.

*SMALL\_POS* = "1" if net income scaled by total assets is between 0 and 0.01, "0" otherwise.

*PPE* = gross plant, property and equipment scaled by lagged total assets.

*SIZE* = log of total assets.

*LEVERAGE* = total liabilities divided by total assets.

*GROWTH* = one-year sales growth in percentage.

*LOSS* = "1" for all firm-years with negative income, "0" otherwise.

*BM* = ratio of beginning-of-year book value of equity to market value of equity.

*LIFECYCLE* = ratio of retained earnings to total common equity.

*FOREIGN* = "1" for all firm-years with non-zero foreign currency translation, "0" otherwise.

*EISSUE* = percentage change in common shares outstanding, adjusted for stock splits and stock dividends

*NEUER\_MKT* = "1" for firms listed on Germany's Neuer Markt, "0" otherwise

*NONBIG4* = "1" if the firm is audited by a non-Big 4 audit firm in year *t*, "0" otherwise.

*LEGAL\_ENF* = legal enforcement, measured as the average score across three country indices: the rule of law, level of corruption, and the legal system's efficiency (see La Porta et al., 1998).

*IMP\_EQMKT* = importance of equity markets, constructed by Leuz et al. (2003) as the average rank across three country measures: aggregate stock market held by minority shareholders, number of listed domestic stocks, and the number of IPOs (see La Porta et al., 1997).

*INVESTOR\_RIGHTS* = outside investor rights, which is the La Porta et al. (1998) anti-director rights index that captures the rights of minority shareholders.

**TABLE 3**

**Correlation Table for Primary Variables<sup>1</sup>**

	<i>RET</i>	<i>NIPS/P<sub>t-1</sub></i>	<i>ACC</i>	<i>CFO</i>	$\Delta ACC$	$\Delta CFO$	<i>SMALL_POS</i>	$\Delta REV$	<i>PPE</i>
<i>RET</i>	-	0.1329 (0.00)	0.0486 (0.00)	0.1562 (0.00)	0.0302 (0.00)	0.0368 (0.00)	-0.0363 (0.00)	0.1308 (0.00)	0.0407 (0.00)
<i>NIPS/P<sub>t-1</sub></i>	0.4001 (0.00)	-	0.1174 (0.00)	0.2138 (0.00)	0.0088 (0.33)	0.0655 (0.00)	0.0028 (0.75)	0.0827 (0.00)	0.0862 (0.00)
<i>ACC</i>	0.0570 (0.00)	0.1988 (0.00)	-	-0.4971 (0.00)	0.3491 (0.00)	-0.2654 (0.00)	-0.0228 (0.01)	0.2737 (0.00)	-0.4940 (0.00)
<i>CFO</i>	0.2154 (0.00)	0.3798 (0.00)	-0.5650 (0.00)	-	-0.2232 (0.00)	0.3287 (0.00)	-0.0078 (0.37)	-0.0538 (0.00)	0.1647 (0.00)
$\Delta ACC$	0.0610 (0.00)	0.0990 (0.00)	0.6030 (0.00)	-0.3941 (0.00)	-	-0.8895 (0.00)	0.0213 (0.02)	0.0554 (0.00)	0.0163 (0.07)
$\Delta CFO$	0.0867 (0.00)	0.1425 (0.00)	-0.4597 (0.00)	0.5516 (0.00)	-0.7576 (0.00)	-	-0.0208 (0.20)	-0.0258 (0.00)	0.0021 (0.82)
<i>SMALL_POS</i>	-0.0429 (0.00)	-0.1393 (0.00)	-0.0277 (0.00)	-0.0504 (0.00)	-0.0161 (0.08)	0.0093 (0.30)	-	-0.0311 (0.00)	0.0410 (0.00)
$\Delta REV$	0.1753 (0.00)	0.2293 (0.00)	0.2533 (0.00)	0.0471 (0.00)	0.0836 (0.00)	0.0026 (0.78)	-0.0498 (0.00)	-	0.1711 (0.00)
<i>PPE</i>	0.0603 (0.00)	0.1840 (0.00)	-0.0751 (0.00)	0.1916 (0.00)	0.0862 (0.00)	-0.0384 (0.00)	0.0300 (0.00)	0.1297 (0.00)	-

All variables are defined in Table 2.

<sup>1</sup>Pearson (Spearman) correlation coefficients shown above (below) the diagonal; *p*-values in parentheses are below each coefficient.

TABLE 4

## Tests of Changes in Timely Loss Recognition: Basu (1997) Model

Dependent Variable: <i>NIPS/P</i> <sub><i>t-1</i></sub>	Germany (1)	Germany vs Control Group (2)
<i>Intercept</i>	0.1879 (5.12)***	-1.908 (-0.91)
<i>RET</i>	0.0131 (0.58)	0.0034 (0.25)
<i>NEGRET</i>	0.1241 (2.97)***	0.1822 (5.42)***
<i>KTG</i>	0.1962 (2.84)***	0.0403 (2.30)**
<i>KTG</i> × <i>RET</i>	0.0147 (0.32)	-0.0080 (-0.40)
<i>KTG</i> × <i>NEGRET</i>	0.1433 (1.72)*	0.0774 (1.80)*
<i>GER</i>	-	-0.0752 (-1.69)*
<i>GER</i> × <i>RET</i>	-	0.0419 (1.27)
<i>GER</i> × <i>NEGRET</i>	-	-0.0810 (-1.49)
<i>GER</i> × <i>KTG</i>	-	-0.0013 (-0.06)
<i>GER</i> × <i>KTG</i> × <i>RET</i>	-	0.0088 (0.16)
<i>GER</i> × <i>KTG</i> × <i>NEGRET</i>	-	0.0409 (0.46)
<i>SIZE</i>	0.0229 (5.35)***	0.0175 (7.02)***
<i>LEVERAGE</i>	-0.4985 (-8.69)***	-0.2804 (-13.39)***
<i>GROWTH</i>	0.0456 (2.72)***	0.0298 (4.71)***
<i>NEUER_MKT</i>	-0.0602 (-2.05)**	-0.0732 (-2.84)***
<i>LEGAL_ENF</i>	-	0.2429 (1.02)
<i>IMP_EQMKT</i>	-	-0.0158 (-0.97)
<i>INVESTOR_RIGHTS</i>	-	0.0455 (0.73)
Fixed time effects	Included	Included
Fixed industry effects	Included	Included
Adjusted R-squared	0.2526	0.0695
No. of observations	2,563	13,395

Robust *t*-statistics clustered by firm are in parentheses.

All variables are winsorized at the 1% and 99% levels in each country-sample.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% (two-tailed).

*NEGRET* = negative values of *RET*, "0" otherwise.

*KTG* = "1" for all fiscal years ending after December 1998, "0" otherwise.

*GER* = "1" for all firms domiciled in Germany, "0" otherwise.

All other variables are defined in Table 2.

TABLE 5

Accruals-based Tests of Changes in Timely Loss Recognition: Cash Flow and Jones (1991) Models

Dependent Variable: <i>ACC</i>	Cash Flow Model		Jones Model	
	Germany	Germany vs Control Group	Germany	Germany vs Control Group
	(1)	(2)	(3)	(4)
<i>Intercept</i>	0.0768 (6.77)***	-0.0302 (0.47)	0.0829 (7.31)***	0.0114 (0.18)
<i>CFO</i>	-0.9464 (-30.36)***	-0.6971 (-42.07)***	-0.9389 (-29.62)***	-0.7002 (-43.38)***
<i>NEGCF0</i>	0.1326 (1.83)*	0.4443 (9.99)***	0.1559 (2.19)**	0.4634 (10.61)***
<i>KTG</i>	0.0021 (0.29)	0.0138 (2.82)***	0.0023 (0.32)	0.0115 (2.45)**
<i>KTG × CFO</i>	-0.0071 (-0.19)	-0.0669 (-3.11)***	0.0079 (0.20)	-0.0526 (-2.51)**
<i>KTG × NEGCF0</i>	0.4794 (4.84)***	0.1743 (3.22)***	0.4300 (4.38)***	0.1497 (2.85)***
<i>GER</i>	-	0.0164 (3.88)***	-	0.0148 (3.54)***
<i>GER × CFO</i>	-	-0.2480 (-7.14)***	-	-0.2351 (-6.79)***
<i>GER × NEGCF0</i>	-	-0.3131 (-3.60)***	-	-0.2891 (-3.42)***
<i>GER × KTG</i>	-	0.0024 (0.46)	-	0.0025 (0.48)
<i>GER × KTG × CFO</i>	-	0.0557 (1.26)	-	0.0634 (1.41)
<i>GER × KTG × NEGCF0</i>	-	0.2980 (2.57)**	-	0.2623 (2.31)**
<i>ΔREV</i>	-	-	0.0389 (6.11)***	0.0460 (16.99)***
<i>PPE</i>	-	-	-0.0104 (-2.38)**	-0.0122 (-5.49)***
<i>SIZE</i>	0.0030 (2.49)**	-0.0001 (-0.29)	0.0029 (2.43)**	-0.0003 (-0.67)
<i>LEVERAGE</i>	-0.1041 (-6.92)***	-0.0421 (-7.70)***	-0.1041 (-6.91)***	-0.0480 (-9.05)***

<b>Table 5 contd.</b>	(1)	(2)	(3)	(4)
<i>BM</i>	-0.0047 (-2.85)***	-0.0005 (-2.47)**	-0.0043 (-2.73)***	-0.0003 (-2.30)**
<i>GROWTH</i>	0.0246 (3.18)***	0.0166 (5.66)***	-	-
<i>LOSS</i>	-0.1029 (-22.24)***	-0.1173 (-50.35)***	-0.0997 (-22.39)***	-0.1104 (-48.97)***
<i>LIFECYCLE</i>	0.0099 (2.01)**	0.0073 (6.39)***	0.0098 (2.00)**	0.0070 (6.13)***
<i>FOREIGN</i>	-0.0003 (-0.05)	0.0019 (1.01)	-0.0026 (-0.53)	-0.0000 (-0.02)
<i>NEUER_MKT</i>	-0.0434 (-4.31)***	-0.0400 (-5.42)***	-0.0462 (-4.72)***	-0.0473 (-6.51)***
<i>EISSUE</i>	0.0031 (2.05)**	-0.0012 (-0.70)	0.0029 (2.05)**	-0.0021 (-1.26)
<i>NONBIG4</i>	0.0011 (0.36)	-0.0001 (-0.07)	0.0005 (0.17)	-0.0008 (-0.53)
<i>LEGAL_ENF</i>	-	0.0072 (1.02)	-	0.0045 (0.65)
<i>IMP_EQMKT</i>	-	-0.0005 (-1.05)	-	-0.0004 (-0.94)
<i>INVESTOR_RIGHTS</i>	-	0.0061 (2.76)***	-	0.0042 (1.95)*
Fixed time effects	Included	Included	Included	Included
Fixed industry effects	Included	Included	Included	Included
Adjusted R-squared	0.6875	0.6004	0.6933	0.6193
No. of observations	2,563	13,395	2,563	13,395

Robust *t*-statistics clustered by firm are in parentheses.

All variables are winsorized at the 1% and 99% levels in each country-sample.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% (two-tailed).

*NEGCF0* = negative values of *CF0*, "0" otherwise.

*KTG* = "1" for all fiscal years ending after December 1998, "0" otherwise.

*GER* = "1" for all firms domiciled in Germany, "0" otherwise.

All other variables are defined in Table 2

TABLE 6

Tests of Changes in Earnings Smoothing

<b>Panel A: Std. dev. of earnings / Std. dev. of cash flows, (<math>\sigma NI^*/\sigma CFO^*</math>)<sup>1</sup></b>			
	Pre-KTG	Post-KTG	Difference in Mean Ratios <sup>2</sup>
Germany (N = 503)	0.5568	0.7589	0.2021 (3.15)***
Control Group (N = 2,160)	0.7165	0.7579	0.0414 (1.08)
Differences-in-differences of mean ratios: <i>t</i> -statistic (clustered by firm)			0.1607 (2.17)**
<b>Panel B: Spearman rank correlation of changes in accruals and cash flows, <math>\rho(\Delta ACC^*, \Delta CFO^*)</math><sup>1</sup></b>			
	Pre-KTG	Post-KTG	Difference in Coefficients <sup>3</sup>
Germany (N = 2,410)	-0.8743	-0.8326	0.0417 (3.61)***
Control Group (N = 10,033)	-0.8373	-0.8110	0.0263 (3.95)***
Differences-in-differences of correlation coefficients: (Test of significance not available)			0.0154

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% (two-tailed).  
All variables are defined in Table 2.

<sup>1</sup> Higher values of  $\sigma NI^*/\sigma CFO^*$  and  $\rho(\Delta ACC^*, \Delta CFO^*)$  represent lower levels of earnings smoothing. To calculate  $\sigma NI^*/\sigma CFO^*$ , we require firms to have at least three years of data in either the pre- or post-KTG periods. We compute  $NI^*$  ( $CFO^*$ ) as the residuals from the regression of  $NI$  ( $CFO$ ) on the control variables—*SIZE*, *LEVERAGE*, *BM*, *GROWTH*, *LOSS*, *LIFECYCLE*, *FOREIGN*, *EISSUE*, *NEUER\_MKT*, and *NONBIG4*—and on fixed time and industry effects, and the country-level legal environment variables. To calculate  $\rho(\Delta ACC^*, \Delta CFO^*)$ , we require firms to have data for at least two consecutive years to calculate  $\Delta ACC$  and  $\Delta CFO$ . We compute  $\Delta ACC^*$  and  $\Delta CFO^*$  as residuals from the regression of each variable on the control variables and on fixed time, country, and industry effects.

<sup>2</sup> *t*-statistics in parentheses. The significance of the difference-in-differences of mean ratios is tested using the following equation:

$$Y = \alpha_0 + \alpha_1 KTG + \alpha_2 GER + \alpha_3 (KTG \times GER) + \varepsilon$$

where *Y* equals the ratio of the standard deviation of earnings to the standard deviation of cash flows for firm *i* in the pre- and post-KTG periods.

<sup>3</sup> *z*-statistics in parentheses. The test statistic for the differences in the Spearman correlation coefficients is calculated using Fisher's (1921) *z*-transformation (see Sheskin 2004).

TABLE 7

Logit Regressions of Changes in the Frequency of Small Positive Earnings

Dependent Variable:	Germany	Germany vs Control Group
<i>SMALL_POS</i>	(1)	(2)
<i>Intercept</i>	-20.7793 (-15.96)***	-5.7180 (-1.56)
<i>KTG</i>	-17.0368 (-58.95)***	-0.0075 (-0.02)
<i>GER</i>	-	-0.1486 (-0.70)
<i>GER</i> × <i>KTG</i>	-	-0.2941 (-1.58)
<i>Control Variables</i>	Included	Included
<i>Legal Environment Variables</i>	n/a	Included
Fixed time effects	Included	Included
Fixed industry effects	Included	Included
Pseudo R-squared	0.0897	0.1776
No. of observations	2,563	13,395

For brevity, we do not report the coefficients on the control variables. The control variables include *SIZE*, *LEVERAGE*, *BM*, *GROWTH*, *LOSS*, *LIFECYCLE*, *FOREIGN*, *EISSUE*, *NEUER\_MKT*, *NONBIG4*, fixed time- and industry-effects, and the country-level legal environment variables (*LEGAL\_ENF*, *IMP\_EQMKT*, *INVESTOR RIGHTS*). All continuous control variables are winsorized at the 1% and 99% levels in each country sample.

Robust *z*-statistics clustered by firm are in parentheses.  
 \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% (two-tailed).  
 All variables are defined in Table 2.