Does corporate integrity improve the quality of internal control?

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A R T I C L E   I N F O

A B S T R A C T

Using unique survey data to measure corporate integrity, we examine the relation between corporate integrity and internal control quality. The results show that corporate integrity is significantly and negatively associated with internal control weaknesses. We find a substitution effect between informal and formal institutions for improving internal control quality. In other words, the negative association between corporate integrity and internal control weaknesses is more significant when the legal development or market competition is weaker. Furthermore, we find that more effective corporate governance can strengthen the relation between corporate integrity and internal control quality. These findings indicate that corporate integrity can improve the quality of internal control. Our findings also provide empirical evidence for the construction of stronger internal controls.

1. Introduction

The objective of this study is to examine whether and how corporate integrity culture affects internal control quality in Chinese listed firms. Our research question is important because internal control systems play a crucial role in protecting the interests of investors around the world, especially since the Sarbanes–Oxley Act (SOX) of 2002 was enacted. Therefore, the issue of how to improve internal control quality has become a heavily researched topic in theoretical and practical studies. In June 2008, Chinese authorities issued the Enterprise Internal Control Standard (EICS), which closely resembles SOX Section 404.

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The staggered implementation of the new requirements began in January of 2012, and this implementation provides an opportunity for us to investigate the determinants of the internal control weakness in China.

Previous research finds that corporate fundamental characteristics such as company traits, business complexity, financial conditions, employee quality and corporate governance are significantly associated with internal control quality (Ge and McVay, 2005; Krishnan, 2005; Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Goh, 2009; Hoitash et al., 2009; Dhaliwal et al., 2011; Johnstone et al., 2011; Lin and Rao, 2009; Liu and Yao, 2014; Liu et al., 2017). Several researchers also verify the association between the institutional environment and internal control quality. These researchers find that the degree of protection for home-country investors (Gong et al., 2013), the marketization process and the legal environment (Liu et al., 2012; Li, 2013) are all significantly correlated with internal control quality. However, few previous studies have investigated the relationship between informal systems (such as corporate integrity culture) and internal control quality.

As the cornerstone of a market economy (Arrow, 1972), integrity culture acts as an important informal institution that not only alleviates moral hazard and reduces transaction costs, but also serves as a lifeline for improving an enterprise's efficiency, thereby enabling its survival and development (Fukuyama, 1995; Denison and Mishra, 1995; Guiso et al., 2015; Garrett et al., 2014). Guiso et al. (2015) define corporate integrity culture as the set of concepts and values that are shared by all corporate members and that affect the enterprise's performance. These researchers find that once corporate integrity increases by one standard deviation, the Tobin's Q increases by 0.19 standard deviations, and profit margins increase by 0.09 standard deviations. Jiang et al. (2015) find that a corporate culture that is oriented toward "integrity" can restrain corporate earnings management. Therefore, we consider how corporate integrity, as an informal system, affects internal control quality. This question is important for business managers, and it requires our further discussion and analysis. Therefore, this study focuses on the governance effect that corporate integrity culture has on internal control.

We argue that corporate integrity culture determines the key elements of internal control and has a significant impact on the entire internal control system. Therefore, we first test the relationship between corporate integrity and internal control quality. Furthermore, we consider that the formal and informal systems do not exist independently. In both mature and emerging transitional economies, these two systems inevitably coexist and influence each other (North, 1990; Greif, 1993). Therefore, this study examines the interaction between formal and informal systems, and it discusses the relationship between corporate integrity and internal control under different conditions of legal system development and market competition.

The empirical results show that corporate integrity displays a significant negative correlation with internal control weaknesses. In other words, the higher the degree of corporate integrity, the lower the probability of internal control weaknesses. We also find that there is a substitute relationship between corporate integrity and legal system/market competition. When the legal system is weaker or the market competition is lower, a negative correlation between corporate integrity and internal control weaknesses becomes more significant. However, this relationship is not significant. Further study finds that strong corporate governance helps to enhance the effect of corporate integrity on the internal control quality.

Our study contributes to two streams of literature. Our first contribution is to the literature on the economic consequences of corporate culture. The previous studies in this area explore the impact of corporate culture on firm performance (Guiso et al., 2015), but they rarely focus on the governance effects (Jiang et al., 2015). Our study focuses on the impact that corporate integrity culture has on corporate governance, and we find that corporate integrity is significantly related to the quality of internal control.

Our second contribution is to the literature on the determinants of internal control. At present, the available research in this area is mainly focused on the effects of company level characteristics (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007). Little study has yet empirically examined the determinants of internal control from the perspective of informal systems such as corporate integrity culture. Our study's results indicate that corporate integrity, acting as an informal system, can influence internal control quality. Our findings should be of interest to regulators who wish to strengthen and expand their countries' credit systems.

The rest of the study is organized as follows. Section 2 presents the literature review. We discuss the theoretical analysis and research hypotheses in Section 3. Section 4 describes the research design, and Section 5

presents the results. Next we show the results of additional tests and a robustness test in Sections 6 and 7. Section 8 presents the study's conclusions.

2. Literature review

2.1. Role of corporate integrity

Prior researchers have generally focused on exploring the correlation between integrity cultures and corporate behaviors. Early studies in this area explored the effects of organization integrity on job attitudes, conflict management, cooperation, information communication and organizational transformation (Zand, 1972; Chami and Fullenkamp, 2002; McEvily et al., 2003; Libby and Lindsay, 2013; Chong and Ferdiansah, 2011). More recently, a meta-analysis by Dirks and Ferrin (2001) shows that corporate integrity can have a significant impact on business decisions through effectively reducing moral hazard and agency costs within the organization.

A limited body of empirical research directly investigates the association between corporate integrity and corporate behavior. Guiso et al. (2015) broadly define corporate integrity culture as the set of basic concepts and values that are shared by an organization's members. In general, the higher the level of corporate integrity, the better the corporate performance. Using the indicators proposed by the Great Place to Work Institution, Garrett et al. (2014) measure organizational integrity cultures in terms of the employees' trust in management, and these researchers empirically study the relationship between corporate integrity and financial reporting. Their findings indicate that corporate integrity promotes the delivery and sharing of information, and that the higher the level of corporate integrity, the higher the quality of corporate financial reporting. Other studies examine the impact of corporate integrity on corporate budgets (Chong and Ferdiansah, 2011), M&A activities (Wang, 2014; Bargeron et al., 2015) and earnings management (Biggerstaff et al., 2015; Jiang et al., 2015). Zhai et al. (2015) conduct tests and find evidence that an "integrity"-oriented corporate culture increases access to commercial credit.

2.2. Determinants of internal control

Several studies have investigated the impact of various company characteristics and institutional environments on the quality of internal control. In terms of company characteristics, Doyle et al. (2007) and Ashbaugh-Skaife et al. (2007) find that companies that disclose material weaknesses in their internal control tend to be smaller, younger, in poorer financial condition, more complicated as businesses, more rapidly growing or to have experienced reorganization during the previous year. In China, several researchers find similar results (Fang et al., 2009; Lin and Rao, 2009; Tian et al., 2010; Zhang and Zheng, 2010). These studies show that factors such as corporate complexity, financial condition, growth rate and internal audit quality are all related to internal control quality.

In terms of assessing corporate governance, our study finds that the characteristics of the board of directors and its audit committee (such as board diligence, audit committee independence and professionalism, or the professional ability of chief financial officer (CFO)) are all significantly related to the quality of internal control (Krishnan, 2005; Hoitash et al., 2009; Goh, 2009; Dhaliwal et al., 2011; Johnstone et al., 2011; Krishnan and Visvanathan, 2008).

The existing research also notes the impact of the institutional environment. Gong et al. (2013) find that the degree of protection for home-country investors plays a vital role in determining the efficiency of internal control in cross-listed companies. Managers are more capable and more motivated to encroach on the interests of small- and medium-sized investors if legal protections are relatively weak. In such cases, the managers are often reluctant to disclose internal control weakness, as they aim to protect the private interests that control their firms. Yang et al. (2011) finds that the disclosures made in self-assessment reports by Chinese listed companies have varying levels of transparency. The level of marketization, the legal environment and the nature of the shareholders can all affect information disclosure. Liu et al. (2012) also shows that the institutional environment has a significant impact on the quality of internal control.

The studies discussed above are mainly focused on the determinants of internal control at the formal, institutional level, for example in terms of corporate governance and legal counsel. To date, few studies have examined the relations between informal institutions and internal control behavior. Accordingly, this study attempts to explore the impact of corporate integrity on corporate internal control behavior. For those concerned with actively promoting an integrity-oriented business environment in China, this study should have important theoretical and practical significance.

3. Theoretical analysis and research hypotheses

3.1. Corporate integrity and internal control quality

For business enterprises, integrity involves having a stable code that all employees abide by (O'Reilly and Chatman, 1996). The sense of shared integrity can serve to guide the employees' psychological concerns or behaviors and to stabilize decision making. Clearly, the firm's integrity culture affects the implementation of internal control.

One channel through which corporate integrity may influence internal control quality is the formation of an effective control environment. Paying more attention to the firm's integrity and moral values tends to form an effective control environment, which then improves internal control quality. Within an enterprise, the shared sense of integrity and adherence to ethical values reflects the degree to which senior managers are able to form and maintain a moral company culture (Cremer, 1993; Erhard and Jensen, 2014; Guiso et al., 2015). According to COSO (2013), "Internal control is a process which can be implemented by an entity's board, managements, and other employees." Therefore, whether managers take their relevant responsibilities seriously becomes an important precondition for integrity (Liu et al., 2013). No internal control system can curb self-interested behavior without the presence of a faithful, ethically principled management team. Hence, the moral tone of management is highly important for ensuring an effective system.

Corporate integrity also affects the efficiency of information communication and transmission within an organization. Paying more attention to integrity and moral values can promote better communication and sharing of information, which can ultimately improve internal control quality. On one hand, integrity is a fundamental factor for achieving appropriate information delivery and sharing (Staples and Webster, 2008). Integrity can also provide employees with a set of reliable psychological expectations (Liu et al., 2009), while reducing the degree of information asymmetry and moral hazard. On the other hand, shared integrity and moral values promote mutual trust among employees (Guiso et al., 2015). Such trust, in turn, inspires the employees to voluntarily comply with the existing internal control system and to achieve self-regulation in their work standards (Wang and Sui, 2010). In that case, when employees discover problems and risks in implementing their directives, they are more willing to communicate promptly and openly with trusted executives, and to propose corrective suggestions for improving the efficiency of internal control.

To summarize the above-mentioned observations, we argue that greater attention to corporate integrity and shared moral values can significantly affect a firm's internal control quality. Therefore, we propose the following hypothesis:

Hypothesis 1. Higher corporate integrity has a significant positive relation with internal control quality.

3.2. Legal development, corporate integrity and internal control quality

Informal institutions, such as standards of corporate integrity, cannot affect actual decision-making without the backing of formal institutions (North, 1990). Both types of institutions are necessary in forming the basis for social interactions in all types of societies (Greif, 1993). Previous studies have suggested that informal institutions (e.g., corporate integrity) become more significant in affecting trading behavior when formal systems fail to regulate markets in an orderly way (La Porta et al., 1997; Zak and Knack, 2001). For example, Guiso et al. (2004) examine an Italian sample, and find that the impact of social capital (including integrity) on financial development is more significant in areas with poor legal protection. In studying China's economy,

Allen et al. (2005) emphasize that reputation and relationship are important alternative mechanisms that can remedy the weakness of formal institutions in providing legal protection.

Corporate integrity has a more prominent role in countries and regions with weaker legal protection. When the legal system fails to control corporate behavior, informal institutions (e.g., corporate integrity) can help to maintain trust and confidence in market trading. In environments with stronger legal systems, however, enterprises are more willing to conduct high-quality internal control and achieve compliance with externally imposed requirements. This strength of formal institutions can weaken the role of informal institutions, and where formal institutions are weaker, the informal institutions become more crucial. In that case, integrity, which arises from an enterprise's own culture and morality, may form an alternative environmental basis for implementing internal control through regulating the conduct of all employees. Thus, we propose the following second hypothesis:

Hypothesis 2. Within a weak legal environment, higher corporate integrity has a more significantly positive relation with internal control quality.

3.3. Market competition, corporate integrity and internal control quality

External market competition can also restrain an enterprise's internal behaviors (Alchian, 1950), and can undermine the role of corporate integrity culture. In addition, fierce market competition can lower the ethical standards of society as a whole (Shleifer, 2004). Participating in market competition means that the enterprises involved are bound not only by social norms, but also by the need to actively deal with threats induced by fierce market competition. According to economic transition theory (Alchian, 1950; Stigler, 1958), product market competition is the strongest driver for achieving economic efficiency. To obtain a higher market share, companies typically try to reduce information asymmetry and to actively shape a good social and market image of themselves (Johnson et al., 2000).

In addition, fierce market competition affects corporate behaviors by increasing the risk of mergers and acquisitions. Especially for firms with weak internal control and poor risk-prevention capability, market competition can exert great pressure on managers. Such competition can force firms to enhance their level of corporate internal control and increase their capabilities for risk prevention. Therefore, we propose the following third hypothesis:

Hypothesis 3. When market competition is lower, higher corporate integrity has a more significantly positive relation with internal control quality.

4. Research design

4.1. Sample selection and data sources

We capture corporate integrity data from an internal control-related survey that was conducted by China's internal control research group in 2014.[1] This research group cooperated with the China Securities Regulatory Commission (CSRC) in sending questionnaires to A-share listed companies on the Shanghai and Shenzhen stock exchanges to investigate the implementation of internal controls in China's listed companies. A total of 2536 A-share listed companies from all industries received the questionnaires. Each of these companies received questionnaires addressed to the chairman, CEO, board secretary, CFO, the internal auditors, the IT director and the internal control director. After collecting the questionnaires, we conducted field research

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[1] For details, please refer to Ministry of Finance, Corporate Internal Control Briefing (No. 4, 2015), available at http://kjs.mof.gov.cn/zhengwuxinxi/kuaijiguanlidongtai/201509/t20150925_1476561.html.

on a number of listed companies during late October and early November 2014, and we reviewed the questionnaire data to confirm its credibility.

Up to 31 October 2014, the research group recovered 12,551 questionnaires from 2154 A-share listed companies, for a response rate of 84.95%. We then sent questionnaires to 1427 companies listed in the main board market, and received 6898 responses from 1140 listed companies, for a response rate of 79.89%. Furthermore, we sent questionnaires to 722 small- and medium-sized listed companies, and received 3933 responses from 702 of these companies, for a response rate of 97.23%. In addition, questionnaires were distributed to 387 companies listed in the second board market, and we received 1720 completed forms from 312 of these companies, for a response rate of 80.62%. In this empirical research, we deleted the missing samples.

Our sample spans 2012 to 2014. The sample is limited to these years because the survey was conducted in 2014, and the reported levels of corporate integrity could have changed after that period. In addition to the data from the questionnaire survey, other data are obtained from the CSMAR database and the Wind financial database. Furthermore, we exclude some of the samples in the following ways: (1) we eliminate the sample companies that did not reply the questionnaire; (2) we eliminate B-share listed companies; (3) we eliminate financial firms; (4) we eliminate firms with missing variables in the regression; and (5) we eliminate ST, T and PT firms. Finally, we obtain a total of 5488 observations. To eliminate possible heteroscedasticity, we also use a robust function to readjust the data in the regression. Furthermore, we add year and industry dummy variables in the regression to control for fixed effects. We Winsorize all of the continuous variables in the model at the 1st and the 99th percentiles to mitigate the possible effects from outliers.

4.2. Variable definitions and model settings

4.2.1. The definitions of the main variables

(1) Corporate integrity

We construct the corporate integrity index *Integrity* by evaluating responses to the survey item inquiring about "the degree to which the enterprise attaches importance to integrity and moral values." In terms of variable processing, we refer to the method of Li et al. (2014). We recode the response to this item as 1 if a survey participant selects "strongly disagree," "disagree," or "neither disagree nor agree." We recode the responses as 2 if they select "agree," and as 3 if they select "strongly agree." We use the mean of the responses from each firm as our measure of corporate integrity (*Integrity*). The greater the measure of *Integrity*, the higher the level of corporate integrity.

We also test the reliability and validity of the questionnaires for reporting on integrity and its related problems. The coefficient of the reliability test is 0.780, which is greater than 0.4, which indicates that the questionnaire is reliable and stable. In terms of validity, there is a significant correlation between the indicators, which shows that the indicators have good validity.

(2) Internal control quality

We capture internal control quality by measuring the internal control weaknesses. The index we use comes from the DIB database of internal control evaluations and audit weaknesses. The information in this database is obtained from internal control evaluation reports, internal control audit reports and annual reports issued by listed companies. Specifically, the weakness index is classified according to the "Enterprise Internal Control Standards" and the "Guidelines for Enterprise Internal Control," which are manuals issued by five ministries and commissions, including the Ministry of Finance. In addition, we consider nonstandard audit opinions and the relevant information on corporate frauds to supplement our indicators of internal control weaknesses.

On this basis, we construct the indicator of internal control weaknesses (*IC_Dum*). *IC_Dum* equals 1 if an enterprise has internal control weaknesses, and 0 otherwise. In considering Hypothesis 1, we also classify internal control weaknesses by severity, based on the COSO (2013) and the "Guidelines for the Evaluation of Enterprise Internal Control." Specifically, we use "3", "2" and "1" to represent "material weakness," "significant deficiency" and "deficiency," respectively. We apply these ratings to test the impact of corporate integrity on the severity of internal control weaknesses (*IC_level*). In the robustness test, we evaluate the reliability of

our findings by comparison with data from the DIB internal control objective index (*IC_object*) and the disclosure index (*IC_disclosure*).

4.2.2. Empirical model

In considering the methods of previous studies (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Liu et al., 2012), we construct the following logit regression model to test Hypothesis 1:

$$IC\_Dum_{it} = \alpha_0 + \alpha_1 Integrity + \alpha_2 Controlvariables_{it} + \alpha_3 \Sigma Industry_{it} + \alpha_4 \Sigma Year_{it} + \varepsilon. \tag{1}$$

To test Hypothesis 2, we construct the interaction index in model (2). Using the median value of the law variable, we construct a new dummy (*Dum_law*) to divide the sample into high and low legal systems, and we test model (1) to determine whether there is a significant difference in the α_1 coefficient. For the pooled sample, we further test the influence of the legal system on the relation between corporate integrity and internal control by adding the interaction terms of *Integrity* and *Dum_law* into model (2). According to Hypothesis 2, we expect that the coefficient of α_3 should be significantly positive.

$$IC_{Dum_{it}} = \alpha_0 + \alpha_1 Integrity + \alpha_2 Dum\_law + \alpha_3 Integrity * Dum\_law + \alpha_4 Controlvariables_{it}$$
$$+ \alpha_5 \Sigma Industry_{it} + \alpha_6 \Sigma Year_{it} + \varepsilon \tag{2}$$

To test Hypothesis 3, we assess the influence of corporate integrity on the quality of internal control under different levels of market competition. In accordance with Yin et al. (2010), we use each industry's Herfindahl–Hirschman index (*HHI*) to reflect the degree of industry concentration. A lower *HHI* represents higher market competition. Using the median of the law variable, we construct a new dummy (*Dum_HHI*) to divide the sample into high and low levels of market competition, and we test model (1) to determine whether there is a significant difference in the coefficient α_1. For the pooled sample, we further test the influence of market competition on the relationship between corporate integrity and internal control by adding the interaction terms of *Integrity* and *Dum_HHI* into model (3). According to Hypothesis 3, we expect that the coefficient of α_3 should be significantly positive.

$$IC\_Dum_{it} = \alpha_0 + \alpha_1 Integrity + \alpha_2 Dum\_HHI + \alpha_3 Integrity * Dum\_HHI + \alpha_4 Controlvariables_{it}$$
$$+ \alpha_5 \Sigma Industry_{it} + \alpha_6 \Sigma Year_{it} \tag{3}$$

Following the prior literature, we also control for a series of characteristics that can affect internal control quality (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Rice and Weber, 2012). These characteristics include the size of the company (*Size*), the asset debt ratio (*Lev*), sales growth (*Growth*), CEO duality (*Dual*), board size (*Bdsize*), supervision mechanism (*ZH*), the ratio of independent directors (*Pindepen*), whether the firm hires a big ten accountant (*Big10*), whether the enterprise suffers losses in two consecutive years (*Loss*) and whether the enterprise has engaged in a merger or acquisition activity (*MA*). We also control for the form of ownership (*Soe*). In China, the form of ownership is an important factor that affects the implementation of internal controls. The quality of internal control in a state-owned listed company is, in general, significantly higher than that in a private company. In accordance with Wang et al. (2017), we also use the Lawindex[2] from "China's sub-province market index report" (2016) as a control variable to measure the level of legal system development in the area concerned. A summary of the variable definitions is included in Table 1.

5. Empirical analysis

5.1. Descriptive statistics

Table 2 reports the descriptive statistics of the main variables. For the period we survey, 18.3% of the participating firms report being exposed to internal control weaknesses. Regarding the independent variables, the mean (median) of *Integrity* is 2.386 (0.627), the Max (Min) is 3 (1), and the standard deviation is approximately 0.627. These figures suggest that there are tremendous differences among corporate behaviors. Pertain-

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[2] As this index is updated every two years, our study uses the index of 2012 for 2013.

Table 1
Variable definitions.

Dependent variable	
IC_Dum	Dummy variable that equals 1 if there are internal control weaknesses in that year, and otherwise 0
Independent variable	
Integrity	Integrity is constructed from a survey conducted by China's internal control research group in 2014. The survey asks about "the degree to which enterprises attach importance to their integrity and moral values." We recode the responses to this question as 1 if a survey participant answers "strongly disagree," "disagree" or "neither disagree nor agree," as 2 if they select "agree" and as 3 if they select "strongly agree." Next, we average the responses of all respondents from one firm to produce a firm level measure of corporate integrity
Control variables	
Size	A company-size scale, measured as the natural logarithm of the total assets of a company at the end of the year
Lev	Measured as the sum of a firm's long-term and short-term loans divided by total assets
Loss	A dummy variable that equals 1 if a firm suffers a loss in two consecutive years, and 0 otherwise
Growth	Measured as the rate of sales growth
MA	A dummy variable that equals 1 if a firm has engaged in merger or acquisition activity, and 0 otherwise
Dual	A dummy variable that equals 1 if the chairman and the general manager are the same person, and 0 otherwise
Bdsize	The size of the board, measured by the number of board members
ZH	A measure of the supervision mechanism, which equals the ratio of the largest shareholder's holdings to those of the second-largest shareholder
Pindepen	The ratio of independent directors, measured as the number of independent directors divided by the number of board members
Big10	A dummy variable for auditor style that equals 1 if the firm's auditor belongs to a top ten accounting company, and 0 otherwise
Soe	A dummy variable that equals 1 if the firm is state-owned, and 0 otherwise
Law	The level of legal development at the site of the company, which is measured by a legal environment index on the site of the company (Wong et al., 2017)
asIndustry	A dummy variable that equals 1 if the firm belongs to one single industry, and 0 otherwise. The industry classifications are based on the standards used by the CSRC in 2012
Year	A dummy variable that equals 1 if the sample belongs to one single year, and 0 otherwise

ing to the control variables, the mean of size is 21.92, the mean of *Lev* is 0.152, and the mean of *MA* is 0.446, which indicates that 44.6% of the firms in the sample have engaged in merger and acquisition activities. Also, 26.2% of the sample firms have a chairman and general manager who are the same person. The mean of *Bdsize* is 2.148, and the mean of *Independ* is 0.371 (0.333). The Max (Min) of *law* is 12.680 (0.440), and the standard deviation is approximately 6.314, which suggests that there are tremendous variations among the legal environments in different regions.

Table 3 presents the Pearson correlations of the main variables. This table shows that corporate integrity is significantly and negatively correlated with internal control weaknesses. These results provide preliminary proof for Hypothesis 1, indicating that the higher the level of corporate integrity, the lower the likelihood of experiencing internal control weaknesses.

5.2. Empirical results

5.2.1. Corporate integrity and internal control quality

We test the relation between corporate integrity and internal control weaknesses by estimating the *Logit* regression model specified in model (1), and we present the results in Table 4. The coefficient estimates for the industry and the year fixed-effect variables are suppressed for brevity. As predicted by model (1), the

Table 2
Descriptive statistics for the main variables.

Variable	N	Mean	Median	Min	Max	SD
IC_Dum	5488	0.183	0.000	0.000	1.000	0.386
Integrity	5488	2.386	2.000	1.000	3.000	0.627
Size	5488	21.920	21.760	18.780	25.960	1.239
Lev	5488	0.152	0.123	0.000	0.709	0.145
Loss	5488	0.012	0.000	0.000	1.000	0.111
Growth	5488	0.520	0.131	-0.983	13.840	1.720
MA	5488	0.446	0.000	0.000	1.000	0.497
Dual	5488	0.262	0.000	0.000	1.000	0.440
Bdsize	5488	2.148	2.197	1.609	2.773	0.195
ZH	5488	12.670	4.281	1.006	252.100	25.060
Pindepen	5488	0.372	0.333	0.182	0.556	0.052
Big10	5488	0.620	1.000	0.000	1.000	0.485
Soe	5488	0.381	0.000	0.000	1.000	0.486
Law	5488	6.314	6.730	0.440	12.680	2.185

coefficient of *Integrity* in column (1) is negative with a significance level of 5%, which reveals that higher corporate integrity has a negative relation with internal control weaknesses. Furthermore, we consider the weaknesses classified by severity, and we find that the coefficient of *Integrity* in column (2) is negative with a significance level of 1%. All of these findings indicate that higher corporate integrity can truly improve internal control quality.

Concerning the control variables, Table 4 shows that corporate size can significantly reduce the severity of internal control weaknesses. The table also indicates that higher leverage and poor financial conditions can drive poor internal control quality. These results are consistent with those of prior research on the determinants of internal control (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Liu et al., 2013).

5.2.2. Relation between corporate integrity and internal control quality: Depending on legal system

To investigate the influence of the legal system, we again use model (2) to retest the association between corporate integrity and internal control weaknesses in the subsamples of high and low law (or high and low legal system strength). Table 5 presents the corresponding results of the logit regression, with the coefficient estimates for the industry and year fixed-effects suppressed for brevity. In the high law subsample, column (1) shows no significant association between these variables, but in the low law subsample, column (2) shows that the coefficient of *Integrity* displays a significantly negative relation to internal control weaknesses. Finally, with the pooled sample, we add the interaction of *Integrity* and *Dum_law* into model (2). Column (3) shows that the coefficient of the interaction between *Integrity* and *Dum_law* is positive at a significance level of 10%. These findings show that a substitute effect exists between corporate integrity and the level of the legal system, thereby providing proof for Hypothesis 2.

5.2.3. Relation between corporate integrity and internal control quality: Depending on market competition

To investigate the influence of market competition, we again use model (3) to retest the association between corporate integrity and internal control weaknesses in the subsamples of high and low market competition. Table 6 presents the results of the logit regression, in which the coefficient estimates for the industry and year fixed-effects are suppressed for brevity. For the high market competition subsample, column (1) shows that the coefficient of *Integrity* displays an insignificant negative relation, but in the low market competition subsample, column (2) shows that the coefficient is positive with a significance level of 1%. Finally, in the pooled sample, we add the interaction of *Integrity* and *HHI* into model (3), and column (3) shows that the coefficient of interaction between these factors is significantly positive. These results show that a substitute effect exists between corporate integrity and market competition, thereby providing proof for Hypothesis 3.

Table 3
Correlation matrix of main variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. IC_Dum	1												
2. Integrity	−0.034**	1.000											
3. Size	−0.079***	0.124***	1.000										
4. Lev	0.089***	−0.006	0.336***	1.000									
5. Loss	0.071***	−0.009	−0.032**	0.109***	1.000								
6. Growth	−0.009*	−0.003	−0.006	0.021	0.014	1.000							
7. MA	−0.007	0.013	0.100***	0.046***	−0.051***	0.054***	1.000						
8. Dual	0.007	−0.031**	−0.183***	−0.081***	−0.007	−0.037***	0.006	1.000					
9. Bdsize	0.003	0.051***	0.282***	0.118***	0.001	−0.021	−0.016	−0.182***	1.000				
10. ZH	−0.015	−0.015	0.149***	0.116***	0.028**	0.028**	−0.015	−0.089***	0.010	1.000			
11. Pindepen	−0.004	0.006	0.006	0.001	0.028**	0.006	0.007	0.117***	−0.488***	0.015	1.000		
12. Big10	0.043***	−0.035***	−0.016	0.001	0.010	0.004	0.010	0.051***	0.003	0.018	−0.013	1.000	
13. Soe	0.022*	0.092***	0.363***	0.188***	0.061***	0.019	−0.060***	−0.278***	0.250***	0.219***	−0.074***	0.016	1.000
14. Law	−0.035***	−0.023*	0.013	−0.123***	−0.024*	−0.009	0.032**	0.053***	−0.079***	−0.022	0.021	0.003	−0.071***

Table 4
Regression analysis: Corporate integrity and internal control quality.

	IC_Dum (1)	(IC_level) (2)
Integrity	−0.097**	−0.113***
	(−2.18)	(−2.60)
Size	−0.270***	−0.282***
	(−9.91)	(−9.33)
Lev	1.999***	2.096***
	(5.19)	(4.87)
Loss	0.738***	0.915***
	(5.16)	(5.68)
Growth	−0.003	−0.002
	(−0.13)	(−0.09)
MA	0.056	0.048
	(0.56)	(0.48)
Dual	0.015	0.019
	(0.30)	(0.34)
Bdsize	0.153	0.175
	(0.70)	(0.81)
ZH	−0.003**	−0.003**
	(−2.23)	(−2.37)
Pindepen	0.354	0.427
	(0.45)	(0.54)
Big10	0.225***	0.206***
	(4.23)	(4.40)
Soe	0.267***	0.253**
	(2.73)	(2.47)
Law	0.005	0.007
	(0.53)	(0.70)
Cons1	4.260***	−4.519***
	(5.35)	(−5.48)
Cons2		−3.475***
		(−4.22)
Cons3		−3.251***
		(−3.89)
Year & Industry	Yes	Yes
N	5488	5488
p_R2	0.041	0.032

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

6. Additional tests: The effect of corporate governance

We consider that other conditions (such as the corporate governance condition) may also affect the relation between corporate integrity and internal control weaknesses. Corporate governance involves a series of institutional measures that can be used to coordinate the relationships of interest between the company and its clients, and such governance can ultimately affect corporate decision making on matters including the implementation of internal controls. Hoitash et al. (2009) and Goh (2009) show that stronger corporate governance can improve internal control effectiveness. Our study further investigates whether corporate governance can affect the relation between corporate integrity and internal control quality.

Table 5
The relation between corporate integrity and legal system in affecting internal control quality.

	IC_Dum		
	High	Low	Pooled sample
	(1)	(2)	(3)
Integrity	−0.015	−0.166***	−0.159***
	(−0.29)	(−2.79)	(−2.90)
Dum_law			−0.192
			(−0.97)
Integrity * Dum_law			0.129*
			(1.84)
Size	−0.325***	−0.229***	−0.274***
	(−8.10)	(−6.22)	(−10.07)
Lev	2.335***	1.720***	2.029***
	(5.35)	(4.13)	(5.35)
Loss	0.484	0.973***	0.731***
	(1.60)	(4.00)	(5.08)
Growth	−0.003	−0.003	−0.003
	(−0.06)	(−0.13)	(−0.12)
MA	0.025	0.095	0.054
	(0.17)	(1.22)	(0.54)
Dual	0.101	−0.072	0.009
	(0.90)	(−1.30)	(0.16)
Bdsize	0.179	0.171	0.157
	(0.33)	(0.59)	(0.72)
ZH	−0.001	−0.004**	−0.003**
	(−0.67)	(−2.00)	(−2.28)
Pindepen	1.154	−0.387	0.369
	(1.24)	(−0.37)	(0.47)
Big10	0.384***	0.082	0.222***
	(4.90)	(1.37)	(4.18)
Soe	0.272	0.240***	0.270***
	(1.55)	(3.00)	(2.80)
Cons	4.744***	3.992***	4.491***
	(3.90)	(3.68)	(5.64)
Year & Industry	Yes	Yes	Yes
N	2728	2760	5488
p_R2	0.048	0.042	0.042

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

First, in accordance with the study by Bai et al. (2005), we choose eight indicators and build a comprehensive governance index (*Governance*) via principal component analysis. These eight indictors include a dummy that reflects whether the CEO and the chairman of the board are the same person, a dummy that reflects whether an enterprise owns its parent company, a dummy that reflects whether an enterprise is listed in another market, a dummy that reflects whether a company is state-controlled, and indicators giving the proportion of independent directors, the management shareholding ratio, the shareholding ratio of the largest shareholder and the ratio of the company's largest shareholder to its second largest shareholder. After controlling for this comprehensive variable, the results listed in column (1) of Table 7 show that a significantly

Table 6
Relation between corporate integrity and market competition on internal control quality.

	IC_Dum		
	High	Low	Pooled sample
	(1)	(2)	(3)
Integrity	0.016	−0.209***	−0.209***
	(0.19)	(−5.83)	(−2.95)
Dum_HHI			−0.488**
			(−2.41)
Integrity * Dum_HHI			0.223***
			(2.61)
Size	−0.290***	−0.239***	−0.272***
	(−3.64)	(−7.80)	(−9.76)
Lev	1.632***	2.389***	2.018***
	(8.70)	(5.57)	(5.19)
Loss	0.962***	0.491	0.745***
	(5.41)	(0.65)	(5.27)
Growth	0.008	−0.035	−0.004
	(0.25)	(−1.10)	(−0.16)
MA	0.027	0.090	0.056
	(0.28)	(0.39)	(0.55)
Dual	0.159	−0.140**	0.015
	(1.53)	(−2.42)	(0.29)
Bdsize	0.001	0.208	0.167
	(0.00)	(0.74)	(0.76)
ZH	−0.001***	−0.004*	−0.002**
	(−3.12)	(−1.85)	(−2.17)
Pindepen	0.613	0.023	0.401
	(0.56)	(0.02)	(0.51)
Big10	−0.024	0.451***	0.224***
	(−0.23)	(5.36)	(4.26)
Soe	0.351***	0.171	0.264***
	(5.34)	(1.23)	(2.76)
Law	0.013	−0.009	0.005
	(1.64)	(−0.56)	(0.51)
Cons	4.675*	3.955***	4.483***
	(1.92)	(4.42)	(5.66)
Year & Industry	Yes	Yes	Yes
N	2757	2731	5488
p_R2	0.047	0.052	0.042

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

negative correlation still exists between corporate integrity (Integrity) and internal control weaknesses (IC_Dum).

Second, we further divide the sample based on the median of the corporate governance index. Columns (2) and (3) of Table 7 show the empirical results for the subsamples in the high and low governance conditions. In the high corporate governance subsample, the coefficient of Integrity is negative with a significance level of 1%. However, in the low corporate governance subsample, Integrity is insignificantly negative. In the pooled sam-

Table 7
Relation between corporate integrity and internal control quality: Dependent on corporate governance.

	(IC_Dum)			
	Pooled sample (1)	Higher govern (2)	Lower govern (3)	Pooled sample (4)
Integrity	**−0.091**[*] **(−1.93)**	**−0.208**[***] **(−3.89)**	0.018 (0.18)	0.017 (0.18)
Governance	−0.056[***] (−6.17)			
Govern				0.355[**] (2.33)
Integrity * Govern				**−0.222**[**] **(−2.82)**
Size	−0.255[***] (−8.63)	−0.251[***] (−3.29)	−0.266[***] (−5.67)	−0.257[***] (−4.99)
Lev	2.065[***] (5.37)	2.145[***] (8.21)	2.071[***] (3.86)	2.089[***] (6.03)
Loss	0.619[***] (3.61)	0.761 (1.23)	0.499[**] (2.17)	0.609[**] (1.22)
Growth	−0.003 (−0.13)	−0.024 (−0.53)	0.008 (0.36)	−0.003 (−0.17)
MA	0.046 (0.44)	−0.019 (−0.13)	0.113 (1.46)	0.048 (0.38)
Big10	0.235[***] (4.02)	0.228[**] (2.01)	0.242[***] (4.62)	0.235[***] (2.90)
Law	0.007 (0.79)	0.006 (0.28)	0.014 (0.94)	0.008 (1.11)
Cons	4.388[***] (6.32)	4.659[***] (2.73)	4.241[***] (5.37)	4.256[***] (3.46)
Year & Industry	Yes	Yes	Yes	Yes
N	5354	2678	2676	5354
p_R2	0.040	0.0364	0.049	0.041

Note: [***], [**] and [*] indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

ple, we add the interaction of *Integrity* and the dummy of governance (*Govern*). As shown in column (4), the interaction coefficient of *Integrity* and *Govern* is significantly negative. These results indicate that effective corporate governance helps to enhance internal control quality.

7. Robustness test

7.1. Endogeneity problem

According to the results reported above, we believe that corporate integrity has a clear effect on corporate internal control behaviors. However, there is also a possibility that better internal control tends to produce higher integrity and stronger moral values. Therefore, internal control can also affect corporate integrity, which could result in a certain endogeneity problem. We use the instrumental variable method to solve this potential endogeneity issue. Guiso et al. (2004) believes that blood donations reflect the public morals of a region, and that the presence of such values can affect the level of local integrity. Therefore, in accordance with Pan et al. (2009), we conduct a two-stage regression analysis, with the provincial blood donation rate (*Blood*) in 2000 as an instrumental variable. First, the results show that the *p* value is 0.433, which reveals that the

Table 8
Relation between corporate integrity and internal control quality: Instrumental variable method.

	Internal control weakness (*IC_Dum*)					
	First stage	Second stage				
		Pooled sample	Higher legal	Lower legal	Higher competition	Lower competition
	(1)	(2)	(3)	(4)	(5)	(6)
Blood	**0.031*****					
	(2.88)					
Integrity		**−5.161*****	−1.756	**−8.114****	−3.077	**−6.836****
		(−4.41)	(−0.65)	**(−2.14)**	(−0.96)	**(−2.23)**
Size	0.050***	0.000	0.116	−0.151	0.093	−0.110
	(4.35)	(0.00)	(0.59)	(−1.01)	(0.57)	(−0.63)
Lev	−0.193	0.879*	0.649	1.269*	0.306	1.494*
	(−1.28)	(1.90)	(0.77)	(1.86)	(0.41)	(1.95)
Loss	−0.040	0.698***	0.438	1.048**	0.860*	0.484
	(−0.35)	(2.79)	(0.75)	(2.49)	(1.94)	(0.91)
Growth	−0.000	−0.006	−0.008	−0.004	0.002	−0.027
	(−0.06)	(−0.26)	(−0.19)	(−0.14)	(0.07)	(−0.60)
MA		0.070	0.040	0.098	0.057	0.075
		(0.74)	(0.34)	(0.91)	(0.49)	(0.67)
Dual		0.043	0.176	−0.066	0.222	−0.157
		(0.85)	(1.22)	(−0.46)	(1.63)	(−1.01)
Bdsize		0.199	0.328	0.127	−0.158	0.446
		(1.03)	(0.78)	(0.33)	(−0.40)	(1.04)
ZH		−0.003*	−0.001	−0.004	−0.002	−0.004
		(−1.65)	(−0.38)	(−1.44)	(−0.64)	(−1.23)
Pindepen		0.532	1.506	−0.272	0.495	0.132
		(0.66)	(0.98)	(−0.21)	(0.34)	(0.09)
Big10	−0.049**	0.024	0.110	−0.009	−0.357*	0.422**
	(−1.99)	(0.33)	(0.45)	(−0.05)	(−1.92)	(1.98)
Soe	0.065***	0.552***	0.784***	0.311	0.746***	0.319
	(3.13)	(5.42)	(2.64)	(1.53)	(3.18)	(1.25)
Law		−0.004			−0.007	−0.005
		(−0.35)			(−0.21)	(−0.15)
Cons	1.493***	11.486***	16.009***	6.557	14.661***	8.109
	(6.58)	(5.84)	(2.72)	(1.50)	(2.90)	(1.62)
Year & Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	4872	4872	2200	2672	2452	2420
R2/p_R2	0.021	0.041	0.054	0.039	0.049	0.050

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

instrumental variables are not related to the disturbance items. Second, we examine the correlation between the instrumental variables and the endogenous variables. The test results show that the F statistic is 13.774, which is greater than 10, thus indicating that the correlation between the instrumental variables and the endogenous variables is strong. These results show that the selected instrumental variables are valid.

Concerning the empirical test, column (1) in Table 8 shows the results of the first stage of the regression, and columns (2)–(6) give the regression results for Hypotheses 1–3 in the second stage. In the first stage, the blood donation rate (*Blood*) is significant at the 1% level. In the second stage, the integrity of the enterprise (*Integrity*) is significant at the 1% level, which verifies Hypothesis 1. Concerning Hypotheses 2 and 3, the

Table 9
Robustness check of main tests: Other measurements of corporate integrity indicators.

	Internal control weakness (IC_Dum)						
	(1) Pooled sample	(2) Legal system	(3)	(4)	(5) Market competition	(6)	(7)
		High	Low	Pooled sample	High	Low	Pooled sample
Integrity_culture	−0.120***	−0.080	−0.165***	−0.146**	−0.080	−0.186***	−0.150***
	(−3.62)	(−0.93)	(−2.80)	(−2.57)	(−1.38)	(−3.70)	(−3.08)
Dum_law				0.079			
				(1.37)			
Integrity_culture * Dum_law				0.061			
				(0.80)			
Dum_HHI							0.013
							(0.24)
Integrity_culture * Dum_HHI							0.053
							(0.56)
Size	−0.269***	−0.323***	−0.221***	−0.270***	−0.285***	−0.235***	−0.268***
	(−9.64)	(−6.20)	(−5.72)	(−9.51)	(−3.79)	(−3.60)	(−9.49)
Lev	2.004***	2.334***	1.707***	2.023***	1.614***	2.370***	2.005***
	(5.43)	(4.81)	(4.27)	(5.58)	(4.89)	(5.18)	(5.40)
Loss	0.746***	0.490*	0.995***	0.745***	0.964***	0.482	0.744***
	(5.35)	(1.81)	(4.19)	(5.36)	(7.20)	(1.30)	(5.33)
Growth	−0.003	−0.003	−0.004	−0.003	0.008	−0.035	−0.004
	(−0.15)	(−0.11)	(−0.17)	(−0.13)	(0.37)	(−0.95)	(−0.15)
MA	0.056	0.026	0.092	0.053	0.028	0.090	0.056
	(0.56)	(0.31)	(1.16)	(0.52)	(0.21)	(1.17)	(0.56)
Dual	0.010	0.100	−0.078	0.006	0.156	−0.146**	0.009
	(0.19)	(0.74)	(−1.46)	(0.11)	(1.52)	(−2.53)	(0.18)
Bdsize	0.146	0.177	0.161	0.151	−0.008	0.199	0.152
	(0.67)	(0.27)	(0.54)	(0.70)	(−0.03)	(0.56)	(0.70)
ZH	−0.003**	−0.001	−0.004**	−0.003**	−0.001	−0.005**	−0.003**
	(−2.12)	(−0.65)	(−2.01)	(−2.18)	(−0.54)	(−2.50)	(−2.13)
Pindepen	0.303	1.126	−0.466	0.323	0.575	−0.104	0.309
	(0.39)	(0.92)	(−0.46)	(0.42)	(0.81)	(−0.08)	(0.41)
Big10	0.236***	0.389***	0.100*	0.233***	−0.020	0.472***	0.236***
	(4.59)	(6.16)	(1.70)	(4.51)	(−0.27)	(2.70)	(4.58)
Soe	0.257**	0.272	0.226***	0.262**	0.353***	0.152	0.256**
	(2.48)	(1.61)	(2.58)	(2.53)	(2.61)	(1.34)	(2.47)
Law	0.005				0.013	−0.009	0.005
	(0.54)				(1.13)	(−0.47)	(0.54)
Cons	4.079***	4.719***	3.542***	4.117***	4.665***	3.521***	4.039***
	(5.10)	(3.56)	(3.04)	(5.05)	(2.82)	(2.88)	(4.99)
Year & Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5488	2728	2760	5488	2757	2731	5488
R2/P_R2	0.041	0.048	0.042	0.042	0.047	0.051	0.041

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

Table 10
Robustness check of main tests: Other measurements of corporate integrity ranking.

	Internal control weakness (IC_Dum)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pooled sample	Legal system			Market competition		
		High	Low	Pooled sample	High	Low	Pooled sample
Rank	**0.124*****	−0.061	**0.175*****	**0.176*****	−0.003	**0.257*****	**−0.192******
	(−2.61)	(−0.53)	**(−2.72)**	**(−4.06)**	(−0.03)	**(−3.21)**	**(−2.38)**
Dum_law				−0.019			
				(−0.56)			
Rank * Dum_law				**0.147*****			
				(2.89)			
HHI							**−0.170*****
							(−1.73)
Rank * HHI							**0.227******
							(2.13)
Size	−0.271***	−0.322***	−0.230***	−0.275***	−0.289***	−0.240***	−0.273***
	(−9.87)	(−5.02)	(−8.68)	(−8.83)	(−4.24)	(−3.73)	(−9.69)
Lev	2.006***	2.326***	1.730***	2.034***	1.624***	2.401***	2.023***
	(5.23)	(5.16)	(10.64)	(14.14)	(3.75)	(5.02)	(5.28)
Loss	0.736***	0.486	0.972***	0.741**	0.961**	0.476	0.739***
	(5.18)	(0.94)	(2.77)	(2.18)	(2.45)	(1.24)	(5.28)
Growth	−0.003	−0.003	−0.003	−0.003	0.008	−0.035	−0.003
	(−0.14)	(−0.08)	(−0.12)	(−0.17)	(0.30)	(−0.96)	(−0.14)
MA	0.056	0.025	0.093	0.053	0.027	0.091	0.054
	(0.56)	(0.23)	(0.81)	(0.40)	(0.25)	(1.15)	(0.53)
Dual	0.014	0.103	−0.073	0.011	0.159	−0.140**	0.016
	(0.29)	(0.75)	(−0.72)	(0.22)	(1.20)	(−2.52)	(0.30)
Bdsize	0.160	0.184	0.180	0.155	0.001	0.225	0.158
	(0.73)	(0.45)	(0.30)	(0.46)	(0.00)	(0.63)	(0.73)
ZH	−0.003**	−0.001	−0.004***	−0.003***	−0.001	−0.005***	−0.002**
	(−2.24)	(−0.47)	(−2.83)	(−2.99)	(−0.36)	(−2.68)	(−2.20)
Pindepen	0.364	1.157	−0.345	0.351	0.611	0.050	0.371
	(0.46)	(0.81)	(−0.26)	(0.31)	(0.44)	(0.04)	(0.47)
Big10	0.225***	0.383***	0.083***	0.223***	−0.024	0.454**	0.226***
	(4.23)	(3.01)	(4.90)	(2.60)	(−0.19)	(2.57)	(4.36)
Soe	0.266***	0.275*	0.241**	0.269***	0.353**	0.168	0.261***
	(2.71)	(1.73)	(2.39)	(3.37)	(2.49)	(1.63)	(2.72)
Law	0.005				0.013	−0.009	0.005
	(0.57)				(0.42)	(−0.46)	(0.55)
Cons	4.134***	4.695***	3.740**	4.293***	4.689***	3.632***	4.039***
	(5.26)	(2.82)	(2.56)	(2.67)	(2.89)	(2.98)	(4.99)
Year & Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5488	2728	2760	5488	2757	2731	5488
R2/P_R2	0.041	0.048	0.042	0.042	0.047	0.052	0.041

Note: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

Table 11
Robustness check of main tests: Other measurements of internal control quality.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pooled sample	Legal system			Market competition		
		High	Low	Pooled sample	High	Low	Pooled sample
Panel A Internal control objective index (IC_object)							
Integrity	**0.030**[**]	0.014	**0.040**[***]	0.044[**]	0.005	**0.056**[***]	0.056[**]
	(2.53)	(1.16)	**(2.61)**	(2.61)	(0.43)	**(2.94)**	(2.71)
Dum_law				0.034			
				(0.57)			
Integrity * Dum_law				−**0.027**[*]			
				(−1.72)			
Dum_HHI							0.118[*]
							(2.06)
Integrity * Dum_HHI							−**0.052**[**]
							(−2.43)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5457	2706	2751	5457	2740	2717	5457
P_R2	0.032	0.046	0.029	0.032	0.042	0.052	0.032
Panel B Internal control disclosure index (IC_disclosure)							
Integrity	**0.013**[**]	0.011	**0.013**[**]	0.015[***]	0.007	**0.018**[*]	0.017[*]
	(2.88)	(1.58)	**(2.59)**	(3.61)	(1.55)	**(1.83)**	(1.98)
Dum_law				0.014			
				(0.81)			
Integrity * Dum_law				−0.005			
				(−0.75)			
Dum_HHI							0.014
							(0.50)
Integrity * Dum_HHI							−0.009
							(−0.81)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5457	2722	2735	5457	2740	2717	5457
P_R2	0.093	0.093	0.106	0.120	0.095	0.103	0.121

Note: [***], [**] and [*] indicate significance at the 1%, 5% and 10% levels, respectively (two-tailed test).

negative correlation between corporate integrity (*Integrity*) and internal control weakness (*IC_Dum*) is more significant in the samples with weaker legal systems and lower market competition. In general, the regression results of using instrumental variables are consistent with the conclusions from previous research.

7.2. Robustness check of main tests: Other measurements of corporate integrity indicators

To provide further evidence for the effect of corporate integrity, we draw on the study by Guiso et al. (2015) and use text analysis to obtain the corporate integrity culture index (*Integrity_culture*) based on materials published through the firms' official websites, annual reports, internal control reports and media reports. The dummy of *Integrity_culture* equals 1 if keywords such as sincerity, integrity, honest, genuine, piety, morality, credibility, trust, confide, credit, responsibility, fairness, justice or transparency are found in the materials that express the firm's corporate culture, and 0 otherwise. The empirical results shown in Table 9 indicate that corporate integrity culture (*Integrity_culture*) also has a significant negative correlation with internal control

weaknesses, which indicates that a culture of corporate integrity can significantly inhibit the occurrence of internal control weaknesses. These results are consistent with the conclusions of previous research, even in comparing firms that operate under different legal systems and different levels of market competition.

Based on the study by Zhang and Li (2012), we also build a new variable (*Rank*) for ranking firms in terms of corporate integrity. Table 10 shows that after controlling for other factors, *Rank* still holds a significant negative relation to internal control weaknesses.

7.3. Robustness check of main tests: Other measurements of internal control quality

We also use other variables to measure internal control quality. *IC_object* represents the Dibo internal control objective index, and *IC_disclosure* represents the Dibo internal control disclosure index.

First, concerning the firms' internal control frameworks, an internal control objective index (*IC_object*) is calculated based on the degree of achievement in terms of internal control compliance, asset security, reports, operations and strategy. The index is then revised according to the levels of material weaknesses that are disclosed in the internal control evaluation reports and the audit reports (Research Group on Internal Control Index of Listed Companies in China, 2011). The larger the internal control objective index figures, the better the quality of internal control. At present, this index is widely used in academic research (e.g., Zheng et al., 2013; Liu et al., 2015; Liu et al., 2017; Wang et al., 2018). We use the natural log of the internal control objective index as a variable. Panel A of Table 11 shows a significant positive correlation between corporate integrity and the internal control objective index. These results are consistent with the conclusions of previous research, even for firms operating under different legal systems and different levels of market competition.

Second, for the internal control framework, the internal control disclosure index (*IC_disclosure*) is calculated based on the establishment and improvement of internal control's five elements (namely the control environment, risk assessment, control activities, information and communication, and internal supervision) (Lin et al., 2016). We use the natural log of the internal control disclosure index as a variable. Panel B of Table 11 shows a significant positive correlation between corporate integrity and the internal control disclosure index. These results are consistent with those of previous research, even for firms operating under different legal systems and different degrees of market competition.

8. Conclusions

This study investigates the role played by corporate integrity in improving firms' levels of internal control quality. In a comprehensive sample collected through a questionnaire survey, we find that corporate integrity has a significant effect on internal control quality, and that corporate integrity can reduce internal control weaknesses. Considering the interactions and correlations with formal institution variables, including levels of legal development and market competition, we find a pattern of relationships between corporate integrity, legal development and market competition. In particular, the negative relation between corporate integrity and internal control weaknesses is more pronounced when legal development is weaker or when market competition is higher. Additional tests suggest that strong corporate governance can enhance the effect of corporate integrity on improving internal control quality.

This study contributes to a growing field of research that connects informal institutions with corporate behaviors. Our findings show that corporate integrity matters, especially when formal institutions are unable to effectively regulate corporate behaviors. This study extends the current literature on corporate integrity, and it highlights the need for new theories that can account for behaviors that cannot be explained by the activities of formal institutions.

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