

AUDITING: A JOURNAL OF PRACTICE & THEORY
Vol. 22, No. 2
September 2003
pp. 281-295

An Empirical Study on the Impact of Culture on Audit-Detected Accounting Errors

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SUMMARY: This study draws on the theoretical framework of Hofstede's model to examine the impact of different cultural dimensions on audit-detected accounting errors. Based on the accounting errors detected in 80 foreign enterprises of different cultures operating in China, we test the direct effect of the cultural dimensions, power distance and individualism, on the magnitude of accounting errors. The results indicate that power distance and individualism have significant explanatory power in describing the differences in the relative magnitude of errors. Centralization of power in a few individuals, management override of controls, and less competent personnel are important attributes of a large power distance enterprise that contribute to larger errors. Enterprises of an individualist culture, which are characterized by higher personnel turnover and more reliance on accounting numbers for individual performance evaluation, are found to have larger errors. These results should be useful for auditors in assessing the likelihood of material errors from a cultural perspective.

Keywords: audit-detected accounting errors; cultural influence; individualism; power distance.

Data Availability: Contact the authors.

INTRODUCTION

The main responsibility of auditors is to plan and perform audits to provide reasonable assurance of detecting material misstatements in financial statements. To detect misstatements, auditors rely heavily on professional judgment, past experience, and knowledge of accounting errors. Information on the characteristics of accounting errors helps auditors assess risk, plan audit procedures, and thus improve the effectiveness and efficiencies in detecting misstatements.

Over the past decades, substantial archival research has studied the incidence of accounting errors and their detection by auditors mainly in the U.S., U.K., and Canada (for details, see Eilifsen and Messier 2000). However, little empirical evidence exists about the characteristics of errors detected in accounting populations outside the Anglo-American countries. Only two studies (Chan and Mo 1998; Eilifsen et al. 2002) examined the characteristics of errors in Hong Kong and Norway.

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We thank William Messier (the editor), Arnold Wright, two anonymous reviewers, the participants at the Hong Kong Polytechnic University Research Workshop, and the participants at the 2001 American Accounting Association Annual Meeting, Atlanta, for their valuable comments and suggestions. Financial support from the Research Grants Council of Hong Kong (HKP2/95H) and Lingnan University (RES-019/200) is gratefully acknowledged.

*Submitted: January 2001
Accepted: December 2002*

The results of these two studies indicate some unique features of misstatements detected. These differences are due to different economic, cultural, and financial environments. To enhance understanding of the incidence of misstatements in different countries, Eilifsen and Messier (2000) call for more multinational archival error studies in countries outside the Anglo-Saxon sphere, particularly those in emerging economies. In response to this call, our study examines the accounting errors detected by auditors in China and compares the errors across firms of different cultures.

Culture is an important environmental factor influencing accounting practices and management control systems. For example, cross-cultural studies suggest that people from different cultural background have different preferences for management practices and control systems (Birnberg and Snodgrass 1988; Chan et al. 2001). Different error patterns are found in companies with different management practices and accounting control systems (Wallace and Kreutzfeldt 1995). Thus, the extant literature provides some evidence on linking culture to factors that contribute to accounting errors. However, no empirical research has been conducted to examine *directly* the relationship between culture and accounting errors. To fill this gap in the literature, we explore empirically whether specific cultural dimensions have explanatory power in describing the differences in accounting errors for firms of different cultures based on the established cultural framework of Hofstede (1991, 2001).

Two cultural dimensions (power distance and individualism) are identified as dimensions that relate closely to factors affecting errors detected in accounting population. Hypotheses on the influences of these two cultural dimensions on the magnitude of errors are formulated and tested by regression models based on the accounting errors detected in the audit of 80 foreign enterprises of different cultures operating in China. The regression results indicate that power distance and individualism have significant explanatory power in differentiating the tainting and the materiality of errors detected in different cultural enterprises. Large power distance enterprises and individualistic enterprises tend to have larger errors in accounts receivable and accounts payable than do their counterparts. Our findings provide empirical evidence on the relationship between individual cultural dimensions and error characteristics for companies of different cultures. Linking culture directly to accounting errors is potentially useful for auditors because this provides auditors with supplementary information on the likelihood of material errors in financial statements.

This paper is organized as follows. The next section reviews prior literature on factors that affect accounting errors, and develops hypotheses. The third section describes the research method. The fourth section discusses the empirical results and the last section concludes with a discussion on the limitations of the study.

BACKGROUND LITERATURE AND HYPOTHESES DEVELOPMENT

Cultural Influence on Accounting

Hofstede (1991, 2001) identified five dimensions along which national cultures could be compared and contrasted: individualism versus collectivism, large versus small power distance, strong versus weak uncertainty avoidance, masculinity versus femininity, and short-term versus long-term orientation. These cultural dimensions have served as a basis for a number of cross-cultural studies in accounting with significant cross-cultural differences found in different contexts (e.g., Arnold et al. 1999; Chow et al. 1999; Harrison 1993; Tsui 1996). However, none of the prior studies specifically examine cultural differences in the magnitude of accounting errors detected in the audits of financial statements.

This study extends prior research on cross-cultural differences in accounting by examining directly the impact of culture on accounting errors. There is an absence of prior literature or established theory *directly* linking culture to accounting errors. However, there is research that describes the relationship between culture and certain factors that contribute to accounting errors. This paper relies on the theoretical framework provided by Hofstede (1991, 2001). Hofstede's approach un-bundles culture into specific components (dimensions) and permits the specification of hypothetical

associations between those components and the variables of interest (Harrison 1993). According to Hofstede (2001), an organization's control systems reflect the basic cultural norms and are closely related to power distance. On the other hand, the individualism versus collectivism dimension relates to management integrity, personnel turnover, and other inherent risks contributing to accounting errors. Gray (1988) also suggests that these two dimensions are closely linked to the accounting subcultures, particularly professionalism and uniformity. These two accounting subcultures are concerned with the authority and enforcement of accounting systems, which in turn will affect the quality of accounting information. Therefore, power distance and individualism are identified as the two most relevant cultural dimensions that have implications for factors affecting accounting errors. In the following sections, hypotheses on the influences of the two cultural dimensions on the magnitude of errors are developed. We focus on studying the magnitude of error because this is what auditors are ultimately concerned with when expressing an audit opinion (AU508, AICPA 1999).

Power Distance

According to Hofstede (2001, 98), power distance can be defined as the extent to which the less powerful members of institutions and organizations expect and accept that power is distributed unequally. There are a number of key differences between large and small power distance organizations. Specifically, in a large power distance organization, power is typically centralized in a few hands (Wong and Birnbaum-More 1994). Employees or workers are relatively uneducated and there is a wide salary range between the top and the bottom of the organization. In contrast, in a small power distance organization, hierarchy in organization is established for administrative convenience. Decentralization is fairly popular and subordinates tend to be highly qualified. Subordinates are to be consulted and superiors are easily accessible (Hofstede 2001, 107).

These characteristics have important implications for the effectiveness of internal controls and other factors contributing to error occurrence. In large power distance organizations, the accounting systems are often seen as a tool used by top management to justify their decisions and figures are twisted to present the desired image (Hofstede 2001, 383). Thus, it is more likely for managers or supervisors in large power distance organizations to circumvent or override existing controls. Centralization of power in a few individuals is considered an important attribute leading to increased risk of material misstatements in the financial reporting process (Haskins 1987). Further, subordinates in a large power distance organization tend to be less educated and trained. As insufficient accounting knowledge and incompetence of personnel are important causes of error (Wright and Ashton 1989), the total accounting error should be larger in enterprises of large power distance culture after controlling for size and industry effects.

On the other hand, in a small power distance organization, the use of power should be legitimate, and subject to more checks and balances. Management integrity is expected to be comparatively higher and employees tend to be better trained and equipped in an organization with a small power distance culture (Gray 1988; Hofstede 1991). Thus, smaller accounting error is expected. Accordingly, the following hypothesis is formulated:

- H1:** The magnitude of total absolute accounting errors detected in a large power distance enterprise is expected to be larger than that detected in a small power distance enterprise.

Individualism

Individualism pertains to societies in which individuals are supposed to look after only themselves or their immediate families. Collectivism, as its opposite, pertains to societies in which individuals throughout their lives remain emotionally integrated into in-groups, which protect them

in exchange for unquestioning loyalty (Hofstede 2001, 225). Members of an individualist culture are expected to act according to their own interest and they champion individual achievements. Management in an individualist organization is management of individuals and the relationship between employer and employee is conceived as a business transaction based on mutual benefits. In a collectivist culture, an individual's behavior is strongly influenced by in-group goals and it is considered desirable to place collective goals ahead of personal goals if conflict exists. Management in a collectivist organization is management of groups and employees have high loyalty for the organization (Hofstede 2001, 237).

From a control perspective, this cultural dimension relates to the behavioral aspects of the internal control system and inherent risks. There is a growing recognition of the importance of personnel policies and practices in implementing effective controls to prevent and detect errors or irregularities in financial statements (Glover and Aono 1995). The extent of turnover of client's personnel is rated as one of the important attributes affecting the control environment (Haskins 1987). In individualist organizations, low employee loyalty should lead to high turnover. Frequent changes of personnel, particularly senior accounting personnel, will increase the likelihood of error occurrence because of unfamiliarity with business practices and regulations during the changeover period and because of the employees' short-term opportunistic attitude toward their jobs (Kreutzfeldt and Wallace 1986). In addition, individualist organizations place more reliance on accounting numbers for performance evaluation (Hofstede 2001, 383) and thus managers have more incentive to manipulate earnings. Conversely, employees of collectivist organizations aspire to join a permanent work group with life-long or long-term employment. They tend to be very loyal to their organizations. In addition, they are more able to rely on the team or group to carry out their work and the close ties among the team members are the foundation of trust. This relationship of trust is a signature feature of an effective control environment. Finally, the coordination and communication among related functions for financial reporting purposes in an individualist organization will be less effective since employees are likely to focus on individual self-interest rather than collective goals. This is also considered as an important indicator of high inherent risk, which in turn can lead to more misstatements (Haskins 1987). This leads to the following hypothesis:

- H2:** The magnitude of total absolute accounting errors detected in an individualist enterprise is expected to be larger than that detected in a collectivist enterprise.

RESEARCH METHOD

Data Collection

This study focuses on examining the impact of cultural dimensions on audit-detected accounting errors. In order to control for potentially confounding variables such as the level of economic development and operating environment, all the enterprises chosen in this study are operating in China. This research setting facilitates the comparison of different cultures within the same operating environment. The sample enterprises are either majority-owned or wholly owned by different foreign nationalities including U.S., Japan, Singapore, and Hong Kong. The complete or majority foreign ownership facilitates headquarter influence on subsidiary's management.

Management practices including accounting practices of foreign enterprises are affected by both the cultures of the home country as well as the host country. Hofstede's (2001) study controlled the influence of home country culture and surveyed the differences in work-related values of IBM's employees in different host countries to derive the cultural dimensions. On the other hand, studies by Chan and Mo (1998), Firth (1996), Ireland (1991), and Wong and Birnbaum-More (1994) examined the influence of home country culture for foreign enterprises operating in the same host country. Both approaches share the same research objective, i.e., to detect the impact of the differences in

national culture on management and accounting practices and their results should be complementary to each other. In this study, we followed the latter approach to examine the impact of home country culture on accounting errors for foreign enterprises operating in China.

Foreign enterprises in China often adopt parent company accounting practices, internal control system, and performance evaluation policies to facilitate better coordination and control of global operations and the preparation of consolidated financial statements by their parent companies. Firth (1996) and Ireland (1991) find that the accounting and control systems adopted by a foreign enterprise in China are heavily influenced by the culture of its foreign parent company. Particularly, American and U.K. firms are found to be insistent on implementing the headquarters' management structures and accounting systems in foreign subsidiaries and joint ventures (Firth 1996; Ireland 1991). Robins and Lin (2000) also find that international joint ventures in China are influenced by the norms and practices of their parent companies. Joint ventures' adoption of the accounting system of the foreign partner is consistent with the Chinese government's policy to bring in modern management skills to China. In addition, for majority foreign-owned enterprises, the Chinese partners usually play a passive role. Thus, the influence of home country culture on foreign enterprises in China is more likely to transcend that of local. Indeed, extensive discussions with two partners of the international accounting firm that provided the data for our study confirmed this phenomenon for our sample companies. In particular, the partners pointed out that adoption of head office's management and accounting systems is justified since it reduces the extra work of converting the local system for consolidation and performance evaluation purposes. In addition, expatriates from head offices occupy these subsidiaries' key positions such as general managers and chief finance officers. Many local staff who are in senior positions have received overseas training in the head office. Since work-related values of key leaders in an organization shape organizational cultures, these cultures in turn affect ordinary members through shared practices. In this study, most of the ordinary members at the foreign enterprises are Chinese nationals. As China is a large power distance society in which people accept a hierarchical order, their behaviors and daily practices are influenced by the management culture of the foreign parents. In summary, the effects of foreign parent companies are reflected not only in the management practices of subsidiaries, but also in the attitudes of Chinese managers (Robins and Lin 2000). Therefore, we examine the impacts of cultural dimensions on accounting errors by reference to the cultural characteristics of the top-level managers of the foreign enterprises.

Data in this study were obtained from one Big 5 accounting firm in China for audits with a 1999 calendar year-end.¹ In China, the accounting year must be the same as the calendar year. Most of the prior empirical studies on error characteristics adopt this single-firm approach of data collection (Eilifsen and Messier 2000, 11–12). This approach facilitates the comparability of data and controls for the confounding effects of differences in the audit client portfolios and audit procedures across different accounting firms (Chan and Mo 1998).

We requested the accounting firm to select randomly either wholly foreign-owned or majority foreign-owned enterprises of different nationalities. Enterprises that have equal or minority foreign ownership were not included in the sample. Therefore, the role of Chinese partners in the management of the sample firms is small, if any. Data were extracted directly from the audit files by the staff of the accounting firm in the presence of a researcher. For each enterprise selected, we collected data

¹ The Chinese government allowed foreign auditors to enter the Chinese audit market via the formation of joint venture accounting firms or member firms in China. The international accounting firms generally adopt firm-wide audit policies and procedures in their overseas affiliates (Ho and Chang 1994) and their Chinese establishments including joint venture accounting firms are no exception. In addition, the Ministry of Finance has promulgated a total of 41 auditing standards and guidelines in 1995, 1996, 1999, and 2001 (Chinese Institute of Certified Public Accountants [CICPA] 2002). These standards are, on the whole, comparable to international standards of auditing (Lin and Chan 2000). Thus, it is expected that the accounting errors found in this study are detected by auditors following similar auditing standards and techniques as those in prior studies.

from three account categories: accounts receivable, accounts payable, and inventory. We selected these accounts because prior studies found that the majority of the detected errors fall in these accounts. In addition, these accounts usually have a significant impact on the financial statements and are more vulnerable to errors (Eilifsen and Messier 2000, 13). Details of the information collected for each account include book and audit values of the line items audited as well as the account balances. In addition, demographic information of the enterprises such as sales, total assets, and the foreign enterprise's nationality and industry were collected.

The sample consisted of 80 clients and Table 1 (Panel A) shows that 54 percent of the sample enterprises are from Asian countries, mainly Hong Kong, Japan, and Singapore. U.S. companies account for 16 percent of the sample and dominate those from Western countries. The mean sales of the companies is RMB 160 million (approximately U.S.\$19.3 million), while the mean of their total assets is RMB 269 million (approximately U.S.\$32.4 million).

Measurement of Variables

An error is defined as the absolute value of the difference between the book and the audit values for an item. The book value is the amount recorded by the client before audit and the audit value is the amount deemed by the auditor to be the correct value for that item. Since any error detected (either overstatement or understatement) indicates a problem and our objective is to examine the magnitude, not the direction of errors, absolute value is used in the analysis. In addition, we make no differentiation between adjusting (i.e., booked) and nonadjusting (i.e., waived) errors. According to Maletta and Wright (1996) as well as Wright and Ashton (1989), studies focusing on detected error characteristics should consider a broader spectrum of errors by including both booked and waived errors because the auditors' main concern is detection of errors, not the ultimate resolution of the adjustment. Errors may be waived due to considerations such as materiality and nature, but often by somewhat different criteria for different firms. Therefore, we include both types of errors in our analyses, as excluding the latter would distort the underlying error patterns.

Two measures of the relative magnitude of errors are used as dependent variables to study the impact of culture. The first measure used is the error tainting (*TAINT*), which is defined as the absolute error amount of a line item in error divided by the book value of the line item (Ham et al. 1985).² This error rate provides a basis for estimating the dollar amount of errors in an account balance (Chan 1996). The second measure of error used is the materiality of error (*ERR-MAT*). As materiality is a relative concept, it is necessary to have a base to establish whether misstatements are material. Common bases used by auditors include total assets, total revenues, and income before taxes. The advantage of using total assets or total revenues is that for many companies these factors are more stable with less fluctuation from year to year than net income before taxes. Difficulties also arise in using net income as a base when a company is close to a break-even situation or experiencing a loss (Messier 2003, 84). Since the account categories studied are balance sheet items (accounts receivable, accounts payable, and inventory), we use total assets as the base. Therefore, materiality is defined here as total absolute error amount of an account divided by the total assets of a firm.

The independent variables in this study are the index scores of relevant cultural dimensions identified in the hypotheses: power distance (*PD*) and individualism (*IDV*). Details of the index scores for enterprises in the sample are summarized in Table 1 (Panel A). Although Hofstede's cultural scores are based on studies conducted in 1980 and 1991, the validity and reliability have been supported by subsequent studies (e.g., Bochner 1994; Merritt 2000; Smith et al. 1996). While Hofstede's specific cultural scores might have been changed over time, the relative ranking of these scores for different countries are effectively temporally invariant (Dunk and Kilgore 2000). In

² Since dollar-unit sampling was not used in our data, we adopted the approach used by Ham et al. (1985) by weighting each tainting by the associated book value.

TABLE 1
Descriptive Statistics for Cultural Variables and Error Magnitudes

Panel A: Index Scores of Cultural Dimensions for Enterprises in the Sample

Country of Origin of Investor	No. of Firms in the Sample	Power Distance Index (PD) ^a	Individualism Index (IDV) ^a
Australia	2	36 (S)	90 (I)
Canada	1	39 (S)	80 (I)
France	2	68 (L)	71 (I)
Germany	4	35 (S)	67 (I)
Hong Kong	15	68 (L)	25 (C)
Japan	13	54 (L)	46 (C)
The Netherlands	3	38 (S)	80 (I)
Singapore	10	74 (L)	20 (C)
Spain	1	57 (L)	51 (I)
Sweden	3	31 (S)	71 (I)
Switzerland	6	34 (S)	68 (I)
Taiwan	3	58 (L)	17 (C)
Thailand	2	64 (L)	20 (C)
U.K.	2	35 (S)	89 (I)
U.S.	13	40 (S)	91 (I)
Total	80		
Classification		Large (L) versus Small (S)	Individualism (I) versus Collectivism (C)

Panel B: Relative Magnitude of Errors by Account Categories

Variable ^b	Sample Size ^c	Mean	Standard Deviation
<i>TAINT</i> – accounts receivable	64	0.365	0.820
<i>TAINT</i> – accounts payable	65	1.076	2.536
<i>TAINT</i> – inventory	67	0.230	0.449
<i>ERR-MAT</i> – accounts receivable	80	0.935%	2.562%
<i>ERR-MAT</i> – accounts payable	80	1.994%	1.229%
<i>ERR-MAT</i> – inventory	80	0.606%	4.076%

^a The scores and classification are from Hofstede (2001).

^b Variable definition:

TAINT = the absolute value of the tainting of an account; and

ERR-MAT = the absolute value of total error amount of an account as a percentage of total assets.

^c Observations that had zero book values were ignored due to having undefined tainting, therefore the sample size for *TAINT* is less than 80 for each of the three accounts.

general, factors leading to such cultural change would affect all cultures in the same way. In addition, cultures change only slowly over time (Hofstede 2001, 34). Therefore, Hofstede's cultural ratings should be relevant and applicable to this study.

Control Variables

The focus of this research is to study the impact of individual cultural dimension on errors, not the impact of nationality on errors. However, in addition to culture, other external environmental factors such as sources of finance and legal system also affect the accounting system and practices adopted (Doupnik and Salter 1995). For example, in countries with strong equity markets, such as the U.S. and the U.K., companies are required to prepare and disclose more sophisticated accounting information. In contrast, in credit-based systems where banks are the dominant source of financing, accounting emphasizes creditor protection and disclosure levels are lower. A country's legal system also influences the promulgation and nature of accounting rules and regulations (Doupnik and Salter 1995). In code law countries such as France, Germany, and Japan, the laws stipulate minimum requirements and accounting rules tend to be highly prescriptive and procedural (Choi et al. 2002). By contrast, in common law countries, accounting rules are developed by professional organizations and allow the exercise of judgment. These differences may lead to variation in the occurrence and detection of accounting errors. To control for the impact of these factors on the accounting system and practices adopted, we include a control variable, *SYSTEM*, by classifying the firms' home countries into macro-uniform system and micro-based system according to Doupnik and Salter (1995). This macro/micro variable broadly captures the differences in legal system and sources of financing. For example, the micro-based group is predominately common law countries and has greater reliance on equity market for financing than the macro-uniform group (Doupnik and Salter 1995; Nobes 1998).³

Prior studies provide evidence of significant variation in errors across industries (e.g., for details see Eilifsen and Messier 2000, 32–34). For example, Kreutzfeldt and Wallace (1986) find that manufacturing companies had the greatest error rates, while Maletta and Wright (1996) find that clients in regulated industries had a lower incidence of errors. To account for the industry effect, we classify the sample firms into three groups: manufacturing (*MANUF*), trading (*TRADE*) and others, and include two dummy variables in our analysis for this purpose.

The relative size of errors is also affected by company size. Icerman and Hillison (1990) find that the relative magnitude of misstatements decreased with an increase in company size as larger companies generally have stronger internal control systems. In this study, we measure the size of the company (*SIZE*) by taking the logarithm of sales and also use it as a control for the strength of the internal control system.

Statistical Tests of Hypotheses

The hypotheses are tested using multiple linear regression. The regression models used are as follows:

$$TAINT_i = \beta_0 + \beta_1 PD_i + \beta_2 IDV_i + \beta_3 SYSTEM_i + \beta_4 MANUF_i + \beta_5 TRADE_i + \beta_6 SIZE_i + \varepsilon_i \quad (1)$$

$$ERR-MAT_i = \beta_0 + \beta_1 PD_i + \beta_2 IDV_i + \beta_3 SYSTEM_i + \beta_4 MANUF_i + \beta_5 TRADE_i + \beta_6 SIZE_i + \varepsilon_i \quad (2)$$

where:

$i = 1, \dots, n$, where n is the sample size;

$TAINT_i$ = tainting of an account of firm i ;

³ Our sample shows that uncertainty avoidance and *SYSTEM* measures are highly correlated (-0.73). Supplemental analysis discussed later indicates that the *SYSTEM* measures are stronger in our empirical models. That, and other theoretical reasons, led us to include only *SYSTEM* in our primary models.

$ERR-MAT_i$ = total absolute error amount of an account as a percentage of total assets of firm i ;

PD_i = power distance score for the home country of firm i ;

IDV_i = individualism/collectivism score for the home country of firm i ;

$SYSTEM_i$ = 1 if firm i is from a micro-based country, 0 otherwise;

$MANUF_i$ = 1 if firm i is a manufacturing company, 0 otherwise;

$TRADE_i$ = 1 if firm i is a trading company, 0 otherwise; and

$SIZE_i$ = the logarithm of the annual sales of firm i .

For each model, we ran three separate multiple regressions, one for each account category. Therefore, a total of six regressions were conducted.

RESULTS

Descriptive Statistics and Univariate Tests

Table 1 (Panel B) presents descriptive statistics for the dependent variables used in the regression models: tainting (*TAINT*) and materiality of error (*ERR-MAT*) for accounts receivable, accounts payable, and inventory. Among the three accounts, accounts payable has significantly larger tainting than accounts receivable and inventory. Similar results are also found in the materiality of errors measured as a percentage of total assets. The largest errors detected in accounts payable and accounts receivable are 21.23 percent and 16.47 percent of the total assets, respectively. The largest error detected in inventory accounts is 7.48 percent of total assets. The mean materiality of errors for the three accounts ranges from 0.61 percent to 1.99 percent. The average number of errors per company is 2.99, whereas the average number of errors for accounts receivable, accounts payable, and inventory is 0.66, 1.23, and 1.10, respectively. These results are comparable to the findings of other studies (Eilifsen and Messier 2000; Icerman and Hillison 1990; Kreutzfeldt and Wallace 1986).

Table 2 presents the results of the univariate tests on the categorical control variables. The results indicate that on the whole, there is no significant difference in mean tainting and materiality of errors between companies of different system, industry and size.

Regression Results

Table 3 provides the regression results on the impact of cultural dimensions on error tainting and the materiality of errors. The regression models for accounts receivable and accounts payable are significant at 5 percent level, whereas the models for inventory are not significant.

The results show that the estimated coefficients of power distance (*PD*) and individualism (*IDV*) have the expected signs and are highly significant ($p = 0.01$) for both accounts receivable and accounts payable. These results support the hypotheses that larger error tainting and materiality of errors are expected in enterprises with large power distance or individualist culture. In contrast to the univariate test results, *SYSTEM* is significant ($p = 0.01$ to $p = 0.10$) for both accounts receivable and accounts payable. As micro-based countries are predominately common law countries with greater reliance on equity markets for financing, companies are expected to have better accounting system with higher level of disclosure, and have smaller errors. *MANUF* and *SIZE* are marginally significant for the materiality of errors for accounts payable only.⁴

⁴ Heteroscedasticity was checked using White's procedure (Gujarati 1999) and it indicates no heteroscedasticity. Also, given the expected sign and the statistical significance of the regression coefficients as explained, interpretation of our regression results should not be affected by the potential multicollinearity problem caused by a high correlation between power distance and individualism (Gujarati 1999, 327).

TABLE 2
Univariate Tests

Variables	Classification	Mean <i>TAIN</i> T			Mean <i>ERR-MAT</i>		
		Accounts Receivable	Accounts Payable	Inventory	Accounts Receivable	Accounts Payable	Inventory
<i>SYSTEM</i>	Micro	0.338	1.080	0.301	0.006	0.017	0.016
	Macro	0.395	1.070	0.142	0.014	0.023	0.003
	Difference in mean	-0.057 t = -0.28 (p = 0.78)	0.010 t = 0.02 (p = 0.98)	0.159 t = 1.45 (p = 0.15)	-0.008 t = -1.13 (p = 0.19)	-0.006 t = -0.62 (p = 0.54)	0.013 t = 1.43 (p = 0.16)
<i>MANUF</i>	Manufacturing	0.399	1.130	0.242	0.011	0.024	0.118
	Otherwise	0.232	0.850	0.180	0.005	0.006	0.005
	Difference in mean	0.167 t = 0.65 (p = 0.52)	0.280 t = 0.34 (p = 0.73)	0.062 t = 0.45 (p = 0.66)	0.006 t = 0.82 (p = 0.42)	0.018 t = 1.77 (p = 0.08)	0.113 t = 0.66 (p = 0.51)
<i>TRADE</i>	Trading	0.335	1.260	0.143	0.006	0.009	0.002
	Otherwise	0.370	1.050	0.242	0.010	0.022	0.011
	Difference in mean	-0.035 t = -0.12 (p = 0.91)	0.210 t = 0.20 (p = 0.84)	-0.099 t = 0.58 (p = 0.56)	-0.004 t = -0.43 (p = 0.67)	-0.013 t = -0.94 (p = 0.35)	-0.009 t = -0.75 (p = 0.46)
<i>SIZE</i> ^a	Large	0.296	1.390	0.184	0.010	0.016	0.016
	Small	0.413	0.880	0.259	0.009	0.022	0.006
	Difference in mean	-0.117 t = -0.56 (p = 0.58)	0.510 t = 0.79 (p = 0.44)	-0.075 t = -0.71 (p = 0.51)	0.001 t = 0.10 (p = 0.92)	-0.006 t = -0.68 (p = 0.50)	0.010 t = 0.81 (p = 0.31)

^a *SIZE* = a firm is classified as Large (Small) if its annual sales are larger (smaller) than the mean sales of the sample firms.

TABLE 3
Regression Results for the Impacts of Cultural Dimensions on Errors

Variable	Regression #1: Accounts Receivable			Regression #2: Accounts Payable			Regression #3: Inventory			Regression #4: Accounts Receivable			Regression #5: Accounts Payable			Regression #6: Inventory		
	β	t-stat.	Prob.	β	t-stat.	Prob.	β	t-stat.	Prob.	β	t-stat.	Prob.	β	t-stat.	Prob.	β	t-stat.	Prob.
Intercept	-3.941	-2.55	0.014	-14.510	-2.90	0.006	0.381	0.42	0.678	-0.958	-1.96	0.054	-2.381	-3.68	0.000	-0.043	-0.19	0.851
PD (+) ^a	0.062	3.92	0.000***	0.182	3.53	0.001***	-0.005	-0.54	0.588	0.017	3.22	0.002***	0.039	5.89	0.000***	0.001	0.58	0.565
IDV (+) ^a	0.026	3.11	0.002***	0.080	3.01	0.004***	-0.004	-0.79	0.431	0.007	2.71	0.008***	0.020	5.91	0.000***	0.002	1.36	0.179
SYSTEM	0.581	-2.43	0.016**	-1.475	-1.93	0.056*	0.199	1.40	0.166	-0.229	-3.07	0.003***	-0.412	-4.22	0.000***	0.042	1.22	0.227
MANUF	0.441	1.02	0.298	1.081	0.91	0.358	0.073	0.32	0.746	0.082	0.65	0.516	0.218	1.68	0.091*	-0.042	-0.92	0.361
TRADE	0.327	0.62	0.524	1.088	0.79	0.440	-0.034	-0.13	0.898	0.009	0.06	0.949	0.080	0.51	0.594	-0.062	-1.14	0.256
SIZE	-0.033	-0.46	0.631	0.131	0.53	0.595	0.015	0.31	0.756	-0.014	-0.56	0.579	-0.052	-1.78	0.079*	-0.004	-0.34	0.738
Sample size	64			65			67			80			80			80		
F-stat. (p)	2.87 (0.017)**			2.19 (0.049)**			0.51 (0.797)			2.27 (0.047)**			7.58 (0.000)***			1.71 (0.131)		
Adjusted R ²	0.152			0.092			0.000			0.094			0.312			0.051		

Model 1: $TAINT_i = \beta_0 + \beta_1 PD_i + \beta_2 IDV_i + \beta_3 SYSTEM_i + \beta_4 MANUF_i + \beta_5 TRADE_i + \beta_6 SIZE_i + e_i$

Model 2: $ERR-MAT_i = \beta_0 + \beta_1 PD_i + \beta_2 IDV_i + \beta_3 SYSTEM_i + \beta_4 MANUF_i + \beta_5 TRADE_i + \beta_6 SIZE_i + e_i$

*, **, *** Indicate significance at 10%, 5%, and 1% levels, respectively.
^a Expected signs are noted in parentheses.

Variables are defined as follows:

- $TAINT_i$ = tainting of an account of firm i ;
- $ERR-MAT_i$ = total absolute error amount of an account as a percentage of total assets of firm i ;
- PD_i = power distance index score for the home country of firm i ;
- IDV_i = individualism index score for the home country of firm i ;
- $SYSTEM_i$ = 1 if firm i is from a micro-based country, 0 otherwise;
- $MANUF_i$ = 1 if firm i is a manufacturing company, 0 otherwise;
- $TRADE_i$ = 1 if firm i is a trading company, 0 otherwise; and
- $SIZE_i$ = the logarithm of the annual sales of firm i .



Further analysis of the error types by cultural dimensions (not tabled) indicates that individualist companies have significantly greater cutoff and classification errors than collectivist companies. Cutoff and classification errors for individualist companies are 349 percent and 117 percent greater, respectively, than those for collectivist companies. This finding is consistent with the cultural characteristics that individualist companies have more reliance on accounting numbers for individual performance evaluation. This evaluation system coupled with a shorter term perspective (i.e., higher turnover) creates greater incentive for managers to manipulate earnings (Hofstede 2001, 383). Two popular ways to manipulate earnings are the use of year-end cutoffs and reclassification of expenditures. In addition, large power distance companies have a 24 percent greater classification error than small power distance companies. Centralization of power in the hands of a few powerful people may allow override of existing controls, and may explain this difference in classification error (Haskins 1987). Finally, large power distance companies have 873 percent more misapplication of GAAP and 125 percent more judgmental errors. Less well-trained and less educated accounting personnel result in more errors of these types.

Sensitivity Tests

To test the robustness of our results, we conducted a series of sensitivity tests. First, foreign enterprises in this study include majority foreign-owned joint ventures and wholly foreign-owned enterprises. To test the effect of possible contamination by a Chinese partner in joint ventures, we ran the regressions again by including the form of enterprises as a control variable. Second, we classified the cultural dimensions into dichotomous variables according to Hofstede's (2001) classification and reran the regressions. Third, we reran the regressions by including the other three cultural dimensions—uncertainty avoidance, masculinity, and long-term orientation—as additional independent variables in the models to test whether these cultural dimensions have significant influence on accounting errors. The significance of the power distance and individualism variables remains the same in all the regressions. No significant impact was found for the form of enterprises or for the three additional cultural dimensions, whereas the significance of the *SYSTEM* control variable changed slightly (from $p = 0.05$ to $p = 0.10$) when the additional cultural dimensions were included.

We also performed additional tests on our basic regression models by excluding certain types of errors from the sample. First, prior studies indicated that misstatements in liability accounts tend to be understatements, while overstatements dominate asset accounts, except for inventory where misstatements tend to be balanced between over- and understatements. We restricted our sample to overstatements for accounts receivable, understatements for accounts payable, and both over- and understatements for inventory. Second, we excluded the Japanese firms, which are the second largest group of observations from our sample, since Japan has a civil law system with unique accounting systems (Choi et al. 2002). Finally, we excluded nonadjusting (waived) errors from the sample. The regression results of these sensitivity tests indicate that the overall results remained unchanged with the only exception that individualism (*IDV*) lost its explanatory power in terms of error tainting for accounts receivable when nonadjusting errors were excluded. Further analysis of the nonadjusting errors for accounts receivable shows that most of the nonadjusting errors are small in absolute dollar value and are found in individualist enterprises. Some of these small errors are immaterial in terms of materiality (*ERR-MAT* in Model 2) but significant in terms of error tainting. Therefore, excluding these nonadjusting errors leads to insignificant difference in error tainting between individualist and collectivist enterprises. This result supports our presumption and that of prior literature that excluding nonadjusting errors distorts the underlying detected-error patterns. In summary, except for the insignificance of individualism found in the above regression (error tainting for accounts receivable), the two cultural dimensions remain significant in all other regressions for accounts receivable and accounts payable of the six sensitivity tests.

CONCLUDING REMARKS

This study provides empirical evidence that variations in cultural dimensions have a significant impact on auditor-detected accounting errors. This study uses Hofstede's (2001) cultural model to derive the theoretical framework for examining the differences in the magnitude of accounting errors for foreign enterprises with different cultures operating in China. The results indicate that power distance and individualism have significant explanatory power in differentiating the tainting and the materiality of errors detected in different cultural enterprises. Similar to other empirical studies on accounting errors, the data of this study are limited to detected errors and there is no evidence on the level of undetected errors in the accounting populations. In addition, we do not have direct evidence on the existence of some of the conditions for large power distance and individualist enterprises.

In this study, we focus on studying the main effects of individual cultural dimensions on accounting errors. Interactive effects are not considered due to the limited sample size. It is, however, important to point out that the influence of two cultural dimensions may be reinforcing or counteractive. For example, for French and Spanish companies, large power distance will be reinforced by individualism to generate large accounting errors. Indeed, our sample data indicate that the mean accounting errors of French and Spanish companies are significantly larger than those of other companies in terms of both tainting and materiality. For the two accounts where we found significant cultural effects, the accounts receivable mean errors (tainting and materiality) are at least 500 percent larger, and the accounts payable mean errors are at least 700 percent larger for French and Spanish companies than other companies. On the other hand, for an U.S. enterprise, our research results suggest that the influence of small power distance will be counteracted by individualism. An U.S. company that has a culture that stresses small power distance instead of individualism should have smaller accounting errors than another U.S. company that emphasises individualism (such as individual achievement or performance). Therefore, field studies are needed to ascertain the dominant cultural influence on the accounting errors of a given enterprise. Nevertheless, this study aims at providing empirical evidence on the overall influence of different cultural dimensions on accounting errors. We hope that our results will serve as a basis for future research in this area.

While auditors are educated and normally well trained in the technical skills required to audit financial statements, they generally lack comparable formal training in the evaluation of nonfinancial attributes that affect the control environment of an enterprise. The relationship between cultural dimensions and accounting errors provides a framework for auditors in assessing the likelihood of material misstatements from a cultural perspective.

REFERENCES

- American Institute of Certified Public Accountants (AICPA). 1999. *AICPA Professional Standards*. New York, NY: AICPA.
- Arnold, D. F., Sr., R. A. Bernardi, and P. E. Neidermeyer. 1999. The effect of independence on decisions concerning additional audit work: A European perspective. *Auditing: A Journal of Practice & Theory* 18 (Supplement): 45–67.
- Birnberg, J. G., and C. Snodgrass. 1988. Culture and control: A field study. *Accounting, Organizations and Society* 13: 447–464.
- Bochner, S. 1994. Cross-cultural differences in the self-concept: A test of Hofstede's individualism/collectivism distinction. *Journal of Cross-Cultural Psychology* 25: 273–283.
- Chan, K. H. 1996. Estimating accounting errors in audit sampling: Extension and empirical tests of a decomposition approach. *Journal of Accounting, Auditing and Finance* (Spring): 153–161.
- , and P. Mo. 1998. Ownership effects on audit-detected error characteristics: An empirical study in an emerging economy. *The International Journal of Accounting* 33 (2): 235–262.

- , A. Lew, and M. Tong. 2001. Accounting and management controls in the classical Chinese novel: A dream of the red mansions. *The International Journal of Accounting* 36(3): 311–327.
- Chinese Institute of Certified Public Accountants (CICPA). 2002. *The People's Republic of China Independent Auditing Standards*. Beijing, PRC: China Financial & Economic Publishing House.
- Choi, F. D. S., C. A. Frost, and G. K. Meeck. 2002. *International Accounting*. 4th edition. Upper Saddle River, NJ: Prentice Hall.
- Chow, C. W., M. D. Shields, and A. Wu. 1999. The importance of national culture in the design of and preference for management controls for multinational operations. *Accounting, Organizations and Society* 24: 441–461.
- Doupnik, T. S., and S. B. Salter. 1995. External environment, culture, and accounting practice: A preliminary test of a general model of international accounting development. *The International Journal of Accounting* 30: 189–207.
- Dunk, A., and A. Kilgore. 2000. Culture, disclosure and IASs. Working paper, University of Western Sydney, Nepean.
- Eilifsen, A., and W. F. Messier, Jr. 2000. The incidence and detection of misstatements: A review and integration of archival research. *Journal of Accounting Literature* 19: 1–43.
- , and L. A. Austen. 2002. Auditor detected misstatements: Causes, detection and the effect of information technology. Working paper, Georgia State University.
- Firth, M. 1996. The diffusion of managerial accounting procedures in the People's Republic of China and the influence of foreign partnered joint ventures. *Accounting, Organizations and Society* 21: 629–654.
- Glover, H. D., and J. Y. Aono. 1995. Changing the model for prevention and detection of fraud. *Managerial Auditing Journal* 10 (5): 3–9.
- Gray, S. J. 1988. Towards a theory of cultural influence on the development of accounting systems internationally. *Abacus* 24: 1–15.
- Gujarati, D. 1999. *Essentials of Econometrics*. 2nd edition. New York, NY: McGraw-Hill.
- Ham, J., D. Losell, and W. Smieliauskas. 1985. An empirical study of error characteristics in accounting populations. *The Accounting Review* (July): 387–406.
- Harrison, G. L. 1993. Reliance on accounting performance measures in superior evaluative style—The influence of national culture and personality. *Accounting, Organizations and Society* 18 (4): 319–339.
- Haskins, M. 1987. Client control environments: An examination of auditors' perceptions. *The Accounting Review* (July): 542–563.
- Ho, J. L., and C. J. Chang. 1994. Does national culture or professional knowledge affect auditors' probabilistic conjunction judgments? A study of the United States versus Taiwan. *The International Journal of Accounting* 29: 189–205.
- Hofstede, G. 1991. *Cultures and Organizations: Software of the Mind*. Berkshire, U.K.: McGraw-Hill International (UK) Limited.
- . 2001. *Culture's Consequences*. 2nd edition. Thousand Oaks, CA: Sage Publications.
- Icerman, R. C., and W. A. Hillison. 1990. Distributions of audit-detected errors partitioned by internal control. *Journal of Accounting, Auditing & Finance* (Fall): 527–543.
- Ireland, J. 1991. Find the right management approach. *China Business Review* (January/February): 14–31.
- Kreutzfeldt, R. W., and W. A. Wallace. 1986. Error characteristics in audit populations: Their profile and relationship to environmental factors. *Auditing: A Journal of Practice & Theory* (Fall): 20–43.
- Lin, K. Z., and K. H. Chan. 2000. Auditing standards in China—A comparative analysis with relevant international standards and guidelines. *The International Journal of Accounting* 35 (4): 559–577.
- Maletta, M., and A. Wright. 1996. Audit evidence planning: An examination of industry error characteristics. *Auditing: A Journal of Practice & Theory* (Spring): 71–86.
- Merritt, A. 2000. Culture in the cockpit: Do Hofstede's dimensions replicate? *Journal of Cross-Cultural Psychology* 31: 283–301.
- Messier, W. F. 2003. *Auditing and Assurance Services: A Systematic Approach*. 3rd edition. New York, NY: McGraw-Hill.
- Nobes, C. 1998. Towards a general model of the reasons for international differences in financial reporting. *Abacus* 34(2): 162–187.

- Robins, J. A., and Z. Lin. 2000. Institutional influences on organizational control: A comparative examination of agency theory in Sino-Japanese and Sino-American joint ventures. *Advances in International Comparative Management* 13: 119-148.
- Smith, P., S. Dugan, and F. Trompenaars. 1996. National culture and the values of organizational employees: A dimensional analysis across 43 nations. *Journal of Cross-Cultural Psychology* 27: 231-364.
- Tsui, J. 1996. Auditors' ethical reasoning: Some audit conflict and cross cultural evidence. *The International Journal of Accounting* 31 (1): 121-133.
- Wallace, W., and R. W. Kreutzfeldt. 1995. The relation of inherent risk and control risk to audit adjustments. *Journal of Accounting, Auditing & Finance* (Summer): 459-483.
- Wong, G. Y. Y., and P. H. Birnbaum-More. 1994. Culture, context and structure: A test on Hong Kong banks. *Organization Studies* 15 (1): 99-123.
- Wright, A., and R. H. Ashton. 1989. Identifying audit adjustments with attention-directing procedures. *The Accounting Review* (October): 710-728.