



## Product-market competition, internal control quality and audit opinions. Evidence from Chinese listed firms

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### ABSTRACT

Based on data on listed firms in the Shanghai and Shenzhen A-share stock markets from 2007 to 2015, this study examines the relations among the quality of internal control, product-market competition and audit opinions. The empirical results reveal that (1) the better the quality of the internal control of listed firms is, the more likely a certified public accountant will be to issue a unmodified opinion; (2) the product-market competition is positively associated with unmodified opinions; (3) the product-market competition weakens the positive relation between the quality of the internal control of listed firms and the likelihood that a unmodified opinion will be issued by a certified public accountant; and (4) the significant impact of product-market competition on the relation between internal control quality and unmodified opinions exists only in non-monopoly industries.

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### Competencia en el mercado de productos, control interno de calidad y opiniones de auditoría. Evidencia de empresas chinas que cotizan en bolsa

### RESUMEN

Sobre la base de los datos de las empresas que cotizan en los mercados bursátiles A de Shanghai y Shenzhen entre 2007 y 2015, este estudio examina las relaciones entre la calidad del control interno, la competencia en el mercado de productos y las opiniones de auditoría. Los resultados empíricos revelan que (1) cuanto mejor sea la calidad del control interno de las empresas que cotizan en bolsa, más probable es que un contador público certificado emita una opinión sin modificaciones; (2) la competencia en el mercado de productos se asocia positivamente con las opiniones sin modificaciones; (3) la competencia en el mercado de productos debilita la relación positiva entre la calidad del control interno de las empresas que cotizan en bolsa y la probabilidad de que un contador público certificado emita una opinión sin modificaciones; y (4) el impacto significativo de la competencia en el mercado de productos sobre la relación entre el control interno de la calidad y las opiniones sin modificaciones sólo existe en las industrias no monopolísticas.

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## 1. Introduction

The effectiveness of the capital market depends on reliability, transparency and information sharing. Audit opinions issued by certified public accountants (CPAs) provide evaluations of the quality of accounting information and play an important role in the development of capital markets. Audit opinions reflect the fairness of firms' financial statements and their legitimacy and policy consistency. According to COSO 1992, maintaining the reliability of financial reports is one of the three major goals of internal control. Therefore, the establishment and maintenance of strong internal controls will improve the quality of financial information and the reliability of financial reports and will ultimately increase the probability that auditors will issue unmodified audit opinions on financial reports. However, firms with poorer financial information may need to improve the quality of their information by establishing strong internal controls. As a result of such changes, auditors will be more likely to issue unmodified opinions about these firms. This study examines the impact of internal control quality on audit opinions.

Furthermore, intensive product-market competition forces firms to implement beneficial governance and to create a positive information environment. Firms can replace the internal controls with the product-market competition of external governance mechanisms to improve the quality of corporate information. Xiao and Li (2012) and Mahdi et al. (2017) find that in a highly competitive market, sound internal governance is not significant, suggesting that product-market competition creates an alternative relation with corporate governance. Thus, this study investigates the impact of product-market competition on audit opinions.

Based on accounting information on listed firms in the Shanghai and Shenzhen A-share stock markets from 2007 to 2015, this study investigates the relations between the quality of internal control, product-market competition and audit opinions. The study first examines the influence of internal control and product-market competition on audit opinions. Then, the study focuses on the effect of product-market competition and internal governance mechanisms on audit opinions. Finally, the study examines the influence of internal and external governance mechanisms on audit opinions in monopoly and non-monopoly industries.

This study empirically finds that (1) the internal control quality of listed firms is positively related to the likelihood that unmodified opinions will be issued by CPAs; (2) product-market competition is positively associated with the likelihood that unmodified opinions will be issued by CPAs; (3) the product-market competition weakens the positive relation between the quality of the internal control of listed firms and the likelihood that an unmodified opinion will be issued by a certified public accountant; and (4) the significant impact of product-market competition on the relation between the quality of internal control and audit opinions exists only in non-monopoly industries. The product-market competition (the external governance mechanism) fails to exert effective governance in monopoly industries.

This study contributes to the literature on the economic consequences of internal control mechanisms by presenting a new perspective. Most prior studies that examine internal control quality are based on the US SOX Act. This study provides evidence for emerging countries and their internal control mechanisms. The compulsory auditing quality of internal control under the SOX 404 clause promotes the quality of internal control and the protection of investors. The SOX Act was introduced in China in 2006. Chinese listed firms

were encouraged to implement internal control audits. In 2012, all listed firms were required to implement compulsory auditing for internal control, namely, the Chinese version of the SOX 404. This study aims to fill the gap as it relates to the introduction of the SOX Act in China.

Second, this study enhances the relevant literature related to internal control and audit quality. Goh et al. (2013) find that internal control and audit opinions are the joint products of the auditing process. However, their findings are limited to firms with internal control deficiencies and modified auditing opinions. This study is more generalised to investigate the relations between internal control quality and both unmodified and modified audit opinions. Finally, this study adds to the literature regarding the impact of product markets on corporate governance. This study also discusses the positive role regarding the relation between external governance and audit opinions.

The remainder of this paper is organised as follows. The next section reviews the related literature on product-market competition, internal controls and audit opinions. Section 3 develops the hypotheses. Section 4 describes the study's empirical design. This section includes the sample selection and introduces the data sources, the definitions and measurement of the variables, and the setup for the metrology model. Section 5 presents the descriptive statistics of the variables and the results based on regression analysis, and the results of a robustness test are also described. Section 6 concludes by illustrating the contribution to the literature.

## 2. Literature review

There are increasing empirical findings regarding internal control after the enactment of the SOX Act. Based on the perspective of information economics, the extant studies document that the improvement in internal control quality increases with the transparency of corporate information, thereby improving the quality of financial reporting and corporate governance. Moreover, an improvement in internal control quality will lead to an increase in the quality of accounting information. Doyle et al. (2007) and Altamuro and Beatty (2010) demonstrate that internal controls can improve the accrual quality and prevent or correct false or inaccurate reports. Accordingly, the earnings information quality of firms that implement mandatory audits has been improved. Goh and Li (2011) argue that internal control can enhance the important characteristics of accounting information quality, specifically, conservatism. Strong internal controls further enhance corporate governance by improving the spillover effects of the information environment. Lenard et al. (2016) find that firms with internal control deficiencies are more likely to use real earnings management to implement earnings manipulation, while those that achieve compliance report less satisfactory performance levels the next year. Furthermore, firms with high-quality internal control can effectively suppress this type of surplus manipulation, which deviates from the production and operation objectives.

Bauer (2016) concludes that internal control as a governance element can unite the goals of shareholders and managers, thereby reducing associated agency costs, and that spillover effects not only affect the quality of financial information but also influence tax avoidance. Bauer (2016) finds that firms with significant internal control with respect to taxation have a significantly lower level of tax avoidance. The improvement in internal control quality increases with shareholders' interests. A few studies examine the relation between internal control quality and auditor behaviour. For

example, [Altamuro and Beatty \(2010\)](#) find that after the enactment of the Federal Deposit Insurance Corporation Improvement Act, auditors are more likely to issue unmodified audit opinions. [Goh et al. \(2013\)](#) determine that firms with financial distress exhibit a positive association between internal control deficiencies and modified audit opinions issued by continuing auditors. [Yang et al. \(2009\)](#), [Qin \(2011\)](#) and [Xiao and Li \(2012\)](#) demonstrate that high internal control quality increases with auditors' risk acceptance for firms.

Internal control is an effective mechanism of information assurance and internal governance, while the product-market is viewed as an effective external governance mechanism. Many studies explore the role of product-market governance in promoting corporate value ([Bhagat and Black, 1999](#)) and strengthening the governance efficiency of the board of directors ([Song et al., 2009](#)) while curbing excessive investments by managers ([Zhang and Wang, 2010](#)). Based on the perspective of information quality, [Marciuikaityte et al. \(2009\)](#) and [Balakrishnan and Cohen \(2011\)](#) determine that product-market competition prompts firms to improve the quality of information and reduce the possibility of inaccurate statements. A few studies link product-market competition to auditor risk perception ([Leventis et al., 2011](#); [Zhou and Zhou, 2014](#)). From the perspective of auditing fees, product-market competition affects the risk perception of the auditor, thereby affecting auditing fees. Internal control and product-market competition are, respectively, considered as internal corporate governance and external governance.

### 3. Hypotheses development

Based on the above statements, high-quality internal control improves a firm's access to unmodified audit opinions. The higher a firm's internal control quality is, the higher the quality of the accounting information produced by the firm. Accordingly, an auditor is more likely to issue unmodified audit opinions. In addition, there are studies on accounting conservatism ([Goh and Li, 2011](#)) and on the timeliness of information disclosure that verify that high-quality internal control improves the quality of the firm's accounting information ([Holder et al., 2016](#)).

High-quality internal controls improve the information environment, thereby creating spillover effects that reduce the firm's operating and financial risks. Auditors reduce the uncertainty of the firm's future judgements, and thus, they are more likely to issue unmodified audit opinions. [Arping and Sautner \(2013\)](#) and [Lee et al. \(2014\)](#) conclude that the higher the quality of internal control is, the lower the information asymmetry of the firm. Thus, operating efficiency ([Feng, 2015](#)) and investment efficiency ([D'Mello et al., 2017](#)) are higher. Based on the above analysis, this study proposes that:

**H1: The internal control quality of listed firms is positively related to the likelihood that unmodified opinions will be issued by CPAs.**

Effective internal control can effectively improve the quality of financial information and reduce a firm's future risks. CPAs are more willing to provide unmodified audit opinions in such situations. An important issue is whether the product-market competition, as an important external governance mechanism, also influences the audit opinions issued by the CPAs, and if so, what effect the product-market competition will have. Due to the more intensive product-market competition and the great risks faced by firms, firms are more

likely to establish quality transparent information disclosure as well as quality risk management and control. Accordingly, CPAs are more willing to issue unmodified audit opinions for these firms. The higher the degree of product-market competition is, the more likely the CPA is to issue unmodified audit opinions. Therefore, product-market competition is an alternative mechanism for the internal control of firms.

[Shleifer and Vishny \(1997\)](#) and [Al-Najjar and Rong \(2014\)](#) find that the more intensive the product-market competition is, the more helpful the firm's information environment, the lower the asymmetry in the information of investors, and the higher the quality of corporate financial reporting. In addition, product-market competition enables managers to optimise business management and reduce business and financial risks, all of which provide positive incentives ([Bhagat and Black, 1999](#); [Mahdi et al., 2017](#)). Product-market competition has a positive impact that can improve the information environment and governance efficiency. Therefore, this study proposes the second research hypothesis as follows:

**H2: Product-market competition is positively related to the likelihood that unmodified opinions will be issued by CPAs.**

According to the theory of information economics, the internal control quality of internal governance mechanisms and the product-market competition of external governance mechanisms play positive roles in promoting the firm's information environment, improving the quality of its financial information, and enhancing its corporate governance efficiency. Previous research suggests that high-quality internal controls play a greater role in promoting corporate tax avoidance and investment efficiency ([D'Mello et al., 2017](#)) in poor information environments. Thus, internal control enhances the financial information ([Jordan and Clark, 1996](#); [D'Mello et al., 2017](#)).

However, intensive product-market competition forces firms to implement strong governance and to create a positive information environment. Therefore, firms can replace internal controls with the product-market competition of external governance mechanisms to improve the quality of the corporate information. [Xiao and Li \(2012\)](#) and [Mahdi et al. \(2017\)](#) investigate the relation between product-market and internal governance and find that in a highly competitive market, strong internal governance is insignificant, suggesting that product-market competition creates an alternative relation with corporate governance. Therefore, this study proposes that:

**H3: Product-market competition can weaken the positive relation between internal control quality and the likelihood that unmodified opinions will be issued by CPAs.**

A large number of studies (e.g., [Bhagat and Black, 1999](#); [Kruse and Rennie, 2006](#); [Cohen et al., 2010](#)) indicate that product-market competition leads firms to improve corporate governance and financial information quality. However, the market in which the firm is located is assumed to be a completely competitive market, even though a monopoly formed in the industry due to legal controls may lead to market failure. Monopoly is characterised by a lack of product-market competition to produce the good or service. At this point, product-market competition has only a small promotion effect for the firms. Because pricing and services are controlled by government regulators, a firm's share may not be the result of marketisation but rather the result of policy guidance.

Under this circumstance, the role of product-market competition is constrained. The product-market competition in these industries is often the result of policy, and thus, such competition leads the firm to incompletely competitive markets in which it is not possible to put pressure on firms to improve governance. Thus, this study proposes that:

**H4: Product-market competition has a significant influence on the relation between internal control quality and unmodified opinions only in non-monopoly industries, not in monopoly industries.**

## 4. Research Design

### 4.1. Sample selection

This study selects firms listed on the A-shares of the Shenzhen and Shanghai Stock Exchanges from 2007-2015 as the basic sample to investigate the impact of product-market competition and internal control quality on audit opinions. The data are processed as follows: (1) the study excludes data from the financial industry because of these firms' special properties with regard to their accounting systems and professional quality; (2) the study eliminates firms with missing data; (3) the study excludes firms from 2007 to 2015 by ST<sup>1</sup>; and (4) the study rejects firms with abnormal values<sup>2</sup>. Thus, the sample includes 15,202 observations from 2007 to 2015. The data are extracted from the Wind database, and this study uses the internal control index of listed firms in China from the Internal Control Index Group at Xiamen University, led by Professor Chen.

### 4.2. Variable set

The dependent variable is audit opinions, while the independent variables are product-market competition, corporate internal control quality and the nature of the business. This study also adds several control variables to test the hypotheses.

#### 4.2.1. Dependent variable

The dependent variable is audit opinion (Opin), which includes five types of audit opinions: unqualified opinions, unqualified opinions with explanatory language, qualified opinions, adverse and disclaimer. This study classifies the final four types of opinions as modified opinions that take the value of 1, while unqualified opinions take the value of 0.

#### 4.2.2. Independent variables

##### (1) Internal control quality (IC)

The index is based primarily on the design principles of the internal control evaluation system combined with the basic situation of the internal control of listed firms in China. This study uses China's laws and regulations and corresponding documents and draws on prior internal control evaluation studies to determine the five primary evaluation indicators, namely, internal environment, risk assessment, control

activities, information and communication, and internal supervision. The indicators are composed of a series of subdivided evaluation indicators. In the end, the evaluation system of this study consists of four indicators that include five first-level indicators, 24 second-level indicators, 43 third-level indicators, and 144 fourth-level indicators. Indicator data are obtained through the manual collection of public information, including regular and temporary announcements as well as company-related systems. The analytic hierarchy process and the coefficient of variation method are used to weight the indicators, and the weights are obtained using the internal control index. The current internal control index is one of the mainstream methods for measuring the quality of the internal control of firms in China (interested readers can refer to Chen, Dong, Han & Zhou, 2017). This study uses the natural logarithm of the internal index of Xiamen University, which is a percentage with a minimum score of 0 and a theoretical maximum of 100 points, to measure a firm's internal control quality. The higher the score is, the higher the corporate internal quality. The index consists of five first-level evaluation indicators, including internal environment (Ie), result assessment (Ra), control activity (Ca), information and communication (Ic) and internal supervision (Is). This study further investigates the impact of these factors on audit opinions to enrich Hypothesis 1.

##### (2) Product-market competition (HHI)

The extant studies primarily measure product-market competition using the Herfindahl-Hirschman Index (HHI) or Concentration Ratio (CRn). The HHI is the sum of the total market share of all firms in the industry, while the CRn reflects the sum of the market share of the largest N firms in various industries to determine whether a monopoly exists and the concentration of the market in the industry. However, the CRn cannot reflect the degree of influence of mutual behaviour among firms. Following DeFond and Park (1999), this study adopts the Herfindahl-Hirschman Index (HHI), a composite index of the degree of market concentration and the sum of the total industry revenue as a percentage of each market's competition in an industry to measure product-market competition:

$$HHI_j = \sum_{i=1}^n S_{ij}^2$$

where  $S_{ij}$  is the market share of firm  $i$  in industry  $j$ , which is the ratio of the total sales of firm  $i$  to the total sales of the industry, and  $n$  is the number of firms in industry  $j$ . This study uses operating income rather than sales amount to calculate the HHI. The smaller the HHI is, the more competitive the product market is, and, conversely, the larger the HHI is, the less competitive the product market is. This study calculates various industries' HHIs based on the classification standard adopted by the China Securities Regulatory Commission (CSRC), whereby manufacturing is divided by the first two codes, while the others are determined only by the first code.

##### (3) Nature of the industry (monopoly)

Based on the classification of monopoly industries developed by Wang (2003), this study divides industries into monopoly industries and non-monopoly industries. There are two main reasons for the formation of monopolies in Chinese firms. One is that the law gives firms franchise power, resulting in only one or a few firms operating in the market.

<sup>1</sup> Special Treatment refers to those listed firms with financial distress that are to be specially treated in the Chinese stock market.

<sup>2</sup> e.g., extreme value.

Another possibility is that the market capacity may be low, resulting in only one firm creating economies of scale. The former is called an administrative monopoly, whereas the latter is called a natural monopoly (Wang, 2003).

The specific monopoly industries are shown in Table 1. When the listed firms are in a monopoly industry, the Monopoly variable equals 1; when the listed firms are in a non-monopoly industry, the Monopoly variable equals 0.

**Table 1**

The classification of monopoly industries in China

Natural monopoly industries	Administrative monopoly industries
1. Electric power industry	1. Oil and petroleum products
2. Telecom industry	2. Radio
3. Railway sector	3. Wireless and cable TV
4. Civil aviation industry	4. Tobacco monopoly
5. Highways	5. Salt monopoly
6. Shipping port facilities	
7. Postal industry	
8. Pipeline transportation of natural gas	
9. City tap water	
10. City gas supply	
11. Urban residents' heating	
12. Urban sewage	

#### 4.2.3. Control variables

Chow and Rice (1982) and Bao and Chen (1998) demonstrate that firms that receive unmodified audit opinions have significantly higher levels of liquidity and profitability but a lower asset-to-liability ratio. Carcello and Neal (2000) and Mutehler et al. (1997) find that the probability of receiving modified audit opinions increases with increased corporate scale. Lennox (2000) and Reynolds and Francis (2000) assert that the probability of receiving modified audit opinions is lower due to the increased scale of listed firms. However, Carcello and Neal (2000) find that there is no significant relation between corporate scale and audit opinions. Teoh and Lim (1996) and Houghton and Jubb (1999) illustrate that the audit fee has a significantly negative impact on the independence of the CPA. Bao and Chen (1998) find that the asset-to-liability ratio, losses, total return on assets and home region of listed firms influence audit opinions.

In China, Fang et al. (2004) find that CPAs are more likely to issue modified audit opinions for firms with losses, lawsuits, and high asset-to-liability ratios. Cai et al. (2005) demonstrate that the scale of corporate assets, the total asset turnover, and the asset-to-liability ratio are key factors that influence the type of audit opinion issued. Lee et al. (2014) find that listed firms with a low audit fee and low asset-to-liability ratios are more likely to receive modified audit opinions, but firms with strong profitability and continuous operational ability are likely to receive unmodified audit opinions. Zhao and Liu (2006) find that listed firms with a higher ratio of largest shareholders are more likely to receive modified audit opinions.

Therefore, this study selects the corporate scale, asset-to-liability ratio, losses, quick ratio, audit fee, ratio of largest shareholders and the nature of the firm as the control variables. At the same time, this study controls for the influence of industry and year. The variable definitions are shown in Table 2.

#### 4.3. Regression models

To test the above hypotheses, this study establishes the following regression models and tests them using multivariate

**Table 2**  
Variable definitions

Type	Name	Code	Measure	
Dependent Variable	Audit opinion	Opin	A modified opinion takes the value of 1 and 0 otherwise	
Independent Variables	Internal control (IC)	Index	Internal index by Xiamen University	
		Ie	Internal environmental score	
		Ra	Risk assessment score	
		Ca	Control activity score	
		Ics	Information and communication score	
		Is	Internal supervision score	
	Product-market competition	HHI	Measured by the Herfindahl-Hirschman Index	
	Nature of the industry	Monopoly	A monopoly industry takes the value of 1, and a non-monopoly industry takes the value of 0	
	Control Variables	Corporate scale	Size	The natural log of the total assets of the firm
		Asset-to-liability ratio	Lev	Total liabilities / total assets
Loss			Loss	A firm showing a loss takes the value of 1 and 0 otherwise
Quick ratio		Sdbl	Quick assets / current liabilities	
Ratio of largest shareholders		Fshare	The ratio of shares held by the largest shareholder of the firm	
Audit fee		Fee	The natural log of the audit fee	
Nature of firm		State	A stated-owned firm takes the value of 1, and a non-state-owned firm takes the value of 0	
Year		Year	Control	
Industry		Industry	Control	

regression analysis. Logistic regression is used because the audit opinion (Opin) of dependent variable is a 0-1 variable.

$$\text{Opin} = \alpha_0 + \alpha_1 \log(\text{IC}) + \alpha_2 \text{Size} + \alpha_3 \text{Lev} + \alpha_4 \text{Fshare} + \alpha_5 \text{sdbl} + \alpha_6 \text{Loss} + \alpha_7 \text{Fee} + \alpha_8 \sum \text{year} + \alpha_9 \sum \text{Industry} + \varepsilon \quad (1)$$

$$\text{Opin} = \alpha_0 + \alpha_1 \text{HHI} + \alpha_2 \text{Size} + \alpha_3 \text{Lev} + \alpha_4 \text{Fshare} + \alpha_5 \text{sdbl} + \alpha_6 \text{Loss} + \alpha_7 \text{Fee} + \alpha_8 \sum \text{year} + \varepsilon \quad (2)$$

$$\text{Opin} = \alpha_0 + \alpha_1 \log(\text{Index}) + \alpha_2 \text{HHI} + \alpha_3 \text{Index} \times \text{HHI} + \alpha_4 \text{Size} + \alpha_5 \text{Lev} + \alpha_6 \text{Fshare} + \alpha_7 \text{sdbl} + \alpha_8 \text{Loss} + \alpha_9 \text{Fee} + \alpha_{10} \sum \text{year} + \varepsilon \quad (3)$$

$$\text{Opin} = \alpha_0 + \alpha_1 \log(\text{Index}) + \alpha_2 \text{HHI} + \alpha_3 \text{Index} \times \text{HHI} + \alpha_4 \text{Size} + \alpha_5 \text{Lev} + \alpha_6 \text{Fshare} + \alpha_7 \text{sdbl} + \alpha_8 \text{Loss} + \alpha_9 \text{Fee} + \alpha_{10} \text{State} + \alpha_{11} \sum \text{year} + \varepsilon \quad (4)$$

This study uses model (1) to test Hypothesis 1, model (2) to test Hypothesis 2, model (3) to test Hypothesis 3 and model (4) to test Hypothesis 4. This study divides sample firms into monopolistic and non-monopolistic industry groups to conduct regression model (4) to test Hypothesis 4. Meanwhile, IC in the model is based on the total internal control index (Index) or one of the first-level assessment indicators in the internal control index, including internal environment (Ie), risk assessment (Ra), control activity (Ca), information and communication (Ic) or internal supervision (Is).

## 5. Empirical tests and analysis

### 5.1. Descriptive statistics

Table 3 shows the descriptive statistics of the full sample, while Table 4 shows the sub-sample descriptive statistics of the sample firms receiving modified and unmodified audit

opinions. Table 3 shows that the proportion of sample firms receiving modified audit opinions is small, at only 2.6%. The average internal control score is 42.772, which indicates that the internal control systems of listed firms is currently poor in China and should be strengthened. The mean of the HHI is only 0.105, which indicates that most of the listed firms' industries are still highly competitive. The maximum of the HHI is 0.987, while the minimum is 0.018, which shows that the intensity of market competition differs for the listed firms' industries. The mean of Monopoly is only 0.065, which indicates that most listed firms are in non-monopoly industries, and few are in monopoly industries. The results seem to suggest that the systemic reform of China's monopolistic industries has achieved great progress.

**Table 3**  
Descriptive statistics of the full sample

Variable	N	Mean	S.D.	Min	Max
Opin	15202	0.026	0.158	0.000	1.000
Index	15202	42.772	9.283	3.862	75.002
Ie	15202	34.767	12.004	0.868	86.138
Ra	15202	26.811	17.257	0.000	87.734
Ca	15202	62.882	16.354	0.000	98.800
Ic	15202	51.451	12.456	1.471	97.504
Is	15202	40.053	16.425	0.095	96.842
HHI	15202	0.105	0.098	0.018	0.987
Monopoly	15202	0.065	0.246	0.000	1.000
Size	15202	21.874	1.277	17.388	28.509
Lev	15202	0.441	0.215	0.007	0.998
Sdbl	15202	1.997	2.867	0.156	18.955
Loss	15202	0.084	0.277	0.000	1.000
Fshare	15202	0.359	0.154	0.003	0.900
Fee	15202	1051795.000	2858987.000	4000.000	119000000.000
State	15202	0.413	0.492	0.000	1.000

All variables as previously defined.

As shown in Table 4, compared with listed firms that receive unmodified opinions, those that receive modified opinions have lower overall scores on internal control and on the five factors of internal control, thus indicating poor internal control. In addition, their product-market competition scores are higher, which indicates that their product-market competition is not intense. Finally, listed firms with high asset-to-liability ratios, small corporate scales and low quick ratios are more likely to be issued modified audit opinions because of their high operating risk.

**Table 4**  
Sub-sample descriptive statistics

Variable	Sub-sample of modified opinions				Sub-sample of unmodified opinions			
	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
Index	33.905	9.758	13.607	57.667	43.006	9.155	3.862	75.002
Ie	25.112	11.585	2.408	67.852	35.022	11.910	0.868	86.138
Ra	21.293	16.501	0.000	76.531	26.956	17.253	0.000	87.734
Ca	49.721	16.816	16.472	92.297	63.229	16.198	0.000	98.800
Ic	42.577	11.466	12.677	80.376	51.686	12.396	1.471	97.504
Is	34.531	17.482	4.609	86.565	40.199	16.372	0.095	96.842
HHI	0.120	0.114	0.018	0.987	0.105	0.098	0.018	0.984
Monopoly	0.059	0.236	0.000	1.000	0.065	0.246	0.000	1.000
Size	21.008	1.294	17.388	23.947	21.897	1.268	17.998	28.509
Lev	0.588	0.231	0.040	0.997	0.437	0.213	0.007	0.998
Sdbl	1.171	1.781	0.156	18.955	2.019	2.887	0.156	18.955
Loss	0.432	0.496	0.000	1.000	0.075	0.263	0.000	1.000
Fshare	0.293	0.141	0.040	0.724	0.361	0.154	0.003	0.900
Fee	687292	455473	150000	4000000	1061418	2894916	4000	119000000
State	0.353	0.478	0.000	1.000	0.415	0.493	0.000	1.000

All variables as previously defined.

## 5.2. Logistic regression analysis

This study uses logistic regression analysis to estimate various variables and test the hypotheses. The results of the regression analysis are shown in Table 5 to Table 7. Table 5 shows the empirical results of Hypothesis 1 to Hypothesis

3 using model (1), model (2) and model (3), respectively. Table 6 shows the influence of the five factors of internal control on the type of audit opinions issued. Table 7 shows the empirical results of Hypothesis 4 regarding the different impacts of product-market competition on the association between internal control and audit opinions in monopoly and non-monopoly industries.

Model (1) in Table 5 examines the impact of internal control quality on audit opinions. The regression results reveal that the regression coefficient for the natural logarithm of the internal control scores, i.e.,  $\log(\text{Index})$ , is -2.993 and is significant at the 1 per cent level. The results indicate a positive relation between internal control quality and unmodified audit opinions, which means that CPAs are more likely to issue unmodified audit opinions for listed firms with high internal control quality. Thus, H1a is supported.

Model (2) in Table 5 examines the impact of product-market competition on audit opinions. The regression results reveal that the regression coefficient of the HHI is 1.596 and is significant at the 1 per cent level, indicating that listed firms in less competitive industries are more likely to receive modified audit opinions. With more intense product-market competition, managers are more willing to spend more time and energy on corporate governance and risk responses to reduce the probability of being dismissed and the risk of unemployment due to corporate bankruptcy, which leads to an improvement in the principal-agent relation, decreased earnings management and improved accuracy of financial statements. As a result, CPAs are more likely to issue unmodified audit opinions. Accordingly, product-market competition has a positive influence on the likelihood of CPAs issuing unmodified audit opinions, which supports H2.

**Table 5**  
Results of internal control quality as measured by internal control scores

Variable	Model (1)	Model (2)	Model (3)
Log(Index)	-2.993*** (-12.94)		-2.551*** (-8.71)
HHI		1.596*** (3.21)	5.189*** (2.80)
HHI*Index			-0.112** (-2.04)
Size	-0.641*** (-11.01)	-0.819*** (-14.84)	-0.637*** (-11.15)
Lev	3.787*** (11.76)	4.077*** (13.04)	3.549*** (11.21)
Sdbl	0.043 (1.32)	0.017 (0.51)	0.027 (0.80)
Loss	1.465*** (11.78)	1.507*** (12.61)	1.506*** (12.27)
Fee	7.12e-08*** (2.90)	6.99e-08*** (2.89)	7.33e-08*** (3.12)
Fshare	-1.467*** (-3.37)	-1.723*** (-4.05)	-1.339*** (-3.12)
_cons	19.120*** (13.37)	12.070*** (10.36)	17.930*** (12.15)
Year	control	control	control
Industry	control	—	—
PseudoR <sup>2</sup>	27.31%	22.01%	26.60%
LRchi2	990.80	799.84	966.60

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively. The t-value is inside parentheses.

Model (3) in Table 5 examines the interaction effect of internal control quality and product-market competition on

audit opinions. The interaction coefficient of product-market competition and internal control quality is -0.112 and is significant at the 5 per cent level. The marginal impact of high internal control quality on audit opinions is -2.439 (= -2.551 (-0.112)) in low product-market competition, while the corresponding impact is -2.551 in high product-market competition. The results seem to suggest that firms with high internal control quality in low product-market competition are more likely to receive unmodified audit opinions. As the product-market competition becomes increasingly intense, the positive relation between internal control quality and audit opinions weakens. The product-market competition can, to some extent, weaken the positive association between internal control quality and unmodified audit opinions issued by CPAs, which supports Hypothesis H3.

Models (4) to (8) in Table 6 examine the impact of the five factors of internal control on audit opinions. The regression results indicate that the regression coefficient of the natural logarithm of the internal environment scores, risk assessment scores, control activity scores, information and communication scores, and internal supervision scores are -1.065, -0.156, -1.676, -2.457, -0.464, respectively, and they are all significant at the 1 per cent level, indicating that CPAs are more likely to issue unmodified audit opinions when there is a positive internal environment, perfect risk assessment and control activity, efficient information and communication and effective internal supervision. The results further support H1 and contribute to the literature on the impact of internal control quality on audit opinions.

**Table 6**  
Results of the impact of the five internal control factors on audit opinions

Variable	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Log (Ie)	-1.065*** (-10.31)				
Log (Ra)		-0.156*** (-3.66)			
Log (Ca)			-1.676*** (-9.73)		
Log (Ic)				-2.457*** (-10.88)	
Log (Is)					-0.464*** (-4.94)
Size	-0.716*** (-12.42)	-0.815*** (-14.32)	-0.728*** (-12.74)	-0.739*** (-12.85)	-0.804*** (-14.21)
Lev	3.976*** (12.43)	4.205*** (13.13)	3.779*** (11.77)	3.970*** (12.35)	4.250*** (13.36)
Sdbl	0.044 (1.36)	0.039 (1.18)	0.029 (0.88)	0.030 (0.90)	0.042 (1.28)
Loss	1.468*** (11.97)	1.490*** (12.19)	1.450*** (11.81)	1.426*** (11.56)	1.505*** (12.39)
Fee	7.05e-08*** (2.89)	7.11e-08*** (2.89)	6.12e-08** (2.23)	7.74e-08*** (3.01)	6.84e-08*** (2.76)
Fshare	-1.604*** (-3.71)	-1.734*** (-3.99)	-1.594*** (-3.67)	-1.889*** (-4.30)	-1.783*** (-4.13)
_cons	12.940*** (9.88)	12.160*** (9.34)	16.850*** (12.00)	19.600*** (12.92)	13.080*** (9.91)
Year	control	control	control	control	control
Industry	control	control	control	control	control
PseudoR <sup>2</sup>	25.42%	22.89%	25.18%	26.22%	23.37%
LRchi2	922.19	817.04	913.60	951.26	847.82

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively. The t-value is inside parentheses.

Model (9) and model (10) in Table 7 examine the influence of product-market competition on the positive relation between internal control quality and audit opinions in monopoly and non-monopoly industries. Model (9) shows the empirical results in non-monopoly industries, which are consistent with the results of the full-sample regression. The regression coefficient of the natural logarithm of the internal control scores is -2.560 and is significant at the 1 per cent

level, indicating that there is a positive relation between internal control quality and unmodified audit opinions issued by CPAs in non-monopoly industries. The better the internal control quality of the listed firms is, the more willing CPAs are to issue unmodified audit opinions.

The regression coefficient of the HHI is 6.439 and is significant at the 1 per cent level, which indicates that product-market competition provides an external governance mechanism in non-monopoly industries. CPAs are more likely to issue unmodified opinions to firms in highly competitive markets. The interaction coefficient of product-market competition and internal control quality is -0.152 and is significant at the 1 per cent level, thus indicating that product-market competition weakens the positive relation between internal control quality and unmodified audit opinions issued by CPAs in non-monopoly industries.

However, in monopoly industries, the coefficients of internal control quality, product-market competition and the interaction coefficient of product-market competition and internal control quality are not significant, which indicates that internal control quality and product-market competition fail to provide effective governance effects in monopoly industries.

**Table 7**  
Regression results in monopoly industries and non-monopoly industries

Variable	Model (9)	Model (10)
Log(Index)	-2.560*** (-8.50)	-1.937 (-1.24)
HHI	6.439*** (3.31)	-4.607 (-0.56)
HHI*Index	-0.152*** (-2.59)	0.200 (0.95)
Size	-0.611*** (-9.97)	-1.200*** (-4.57)
Lev	3.422*** (10.49)	6.686*** (3.87)
Sdbl	0.028 (0.84)	0.057 (0.32)
Loss	1.527*** (12.03)	1.061** (1.99)
Fee	0.000000108*** (2.93)	-0.0000000424 (0.26)
Fshare	-1.740*** (-3.77)	2.854** (2.01)
State	0.078 (0.60)	-0.467 (-0.88)
_cons	17.610*** (11.20)	23.450*** (3.50)
Year	control	control
Industry	—	—
N	14220	982
PseudoR <sup>2</sup>	26.98%	35.10%
LRchi2	921.69	76.56

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively. The t-value is inside parentheses.

The results in Table 5 to Table 7 seem to suggest that product-market competition has a substitution effect that makes up for the negative impact of poor internal control quality in non-monopoly industries. However, monopoly industries can cause market failures, so internal control quality and product-market competition fail to provide governance effects. Accordingly, the listed firms can effectively combine internal governance mechanisms (internal control) and

external governance mechanisms (product-market competition) to ensure accurate financial statements.

### 5.3. Robustness test

To strengthen and regulate corporations' internal control, China's Ministry of Finance, together with the relevant departments, established a standards committee on the internal control of firms on July 15, 2006, and released a draft of 'Internal control specifications—basic specifications', which included 17 specifications, on March 2, 2007. In addition, 'The basic code of the internal controls of enterprise' was officially published on May 22, 2008, and was implemented on July 1, 2009. The data for the sample firms utilised in this study were collected for the period between 2007 and 2015, so it is necessary to consider the robustness of the results. As 'The basic code of the internal controls of enterprise' was implemented for listed firms on July 1, 2009, the sample period of this study can be divided into two periods, from 2007 to 2008 and from 2009 to 2015.

Table 8 shows the results of the robustness test, and models (11) to (13) show the regression results for the period from 2007 to 2008. The results of model (11) display the positive effects of internal control quality on unmodified audit opinions, while the results of model (12) reveal the positive relation between product-market competition and unmodified audit opinions issued by CPAs.

**Table 8**  
Regression results for the sub-sample years

Variable	2007-2008			2009-2015		
	Model (11)	Model (12)	Model (13)	Model (14)	Model (15)	Model (16)
Log(Index)	-3.125*** (-5.13)		-2.264*** (-2.88)	-3.042*** (-12.04)		-2.565*** (-7.73)
HHI		2.171** (2.11)	5.365 (1.12)		1.423** (2.51)	5.659** (2.47)
HHI*Index			-0.131 (-0.72)			-0.122* (-1.90)
Size	-0.468*** (-2.78)	-0.648*** (-4.06)	-0.488*** (-3.01)	-0.673*** (-10.60)	-0.848*** (-14.16)	-0.664*** (-10.69)
Lev	2.932*** (3.24)	3.110*** (3.51)	2.397*** (2.70)	3.986*** (11.50)	4.223*** (12.60)	3.731*** (10.98)
Sdbl	0.093 (0.77)	0.033 (0.25)	0.053 (0.44)	0.047 (1.38)	0.020 (0.57)	0.030 (0.86)
Loss	1.577*** (4.76)	1.818*** (5.75)	1.675*** (5.20)	1.444*** (10.69)	1.461*** (11.27)	1.481*** (11.11)
Fee	2.91e-08 (0.31)	2.27e-08 (0.21)	3.54e-08 (0.43)	9.81e-08*** (2.94)	9.25e-08*** (2.83)	1.03e-07*** (2.99)
Fshare	-0.865 (-0.75)	-1.084 (-0.99)	-0.709 (-0.64)	-1.577*** (-3.34)	-1.810*** (-3.91)	-1.427*** (-3.07)
_cons	15.350*** (3.99)	8.100** (2.46)	12.830*** (3.15)	19.730*** (12.58)	12.650*** (10.05)	18.47*** (11.29)
Year	control	control	control	control	control	control
Industry	control	—	—	control	—	—
PseudoR <sup>2</sup>	27.81%	19.54%	24.47%	27.94%	22.46%	27.03%
LRchi2	135.09	95.17	119.22	876.80	706.35	849.85

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively. The t-value is inside parentheses.

However, the coefficient of the interaction between product-market competition and internal control quality is negative and not significant based on the results of model (13), which means that the substitution effect is not significant in the relation between internal control quality and unmodified audit opinions issued by CPAs. Product-market competition does not have a significant substitution effect on the association between internal control quality and unmodified audit opinions. A possible explanation for this result is that, in 2007, China began to introduce the SOX Act. At that time, the Chinese government's implementation of internal control quality construction was strong, and many firms began to attach importance to the establishment of internal control.

Hence, this result may be due to the promotion of the SOX Act in China, a factor that has led to significant improvement in the quality of China's internal control over that in the past.

Accordingly, compared with those in the past, firms have now shifted from external governance that is more dependent on product-market competition to internal control quality that relies on internal corporate governance. As a result, the correlation between the 2007-2008 product-market competition and the auditor's audit opinions declined to become insignificant. Models (14) to (16) present the regression results for the period 2009 to 2015. These results are consistent with the previous results, thus indicating that the findings of this study are robust.

**Table 9**  
Regression results of the robustness test

Variable	Model (17)	Model (18)	Model (19)	Model (20)	Model (21)
Log(Index)	-2.993*** (-12.94)		-2.583*** (-8.65)	-2.620*** (-8.66)	-2.196 (-0.74)
PMC		0.192* (1.73)	0.906** (2.14)	1.167*** (2.67)	-3.129 (-0.87)
PCM*Index			-0.021* (-1.81)	-0.027** (-2.29)	0.047 (0.51)
Size	-0.641*** (-11.01)	-0.829*** (-15.08)	-0.645*** (-11.36)	-0.623*** (-10.22)	-1.213*** (-4.56)
Lev	3.787*** (11.76)	4.048*** (13.01)	3.537*** (11.18)	3.413*** (10.47)	6.315*** (3.78)
Sdbl	0.043 (1.32)	0.027 (0.80)	0.028 (0.85)	0.028 (0.83)	0.039 (0.21)
Loss	1.465*** (11.78)	1.496*** (12.52)	1.492*** (12.17)	1.508*** (11.89)	1.113** (2.06)
Fee	7.12e-08*** (2.90)	7.28e-08*** (2.97)	7.51e-08*** (3.22)	0.00000011 (3.03)	5.10e-08 (0.31)
Fshare	-1.467*** (-3.37)	-1.700*** (-4.01)	-1.309*** (-3.06)	-1.714*** (-3.73)	2.911** (2.06)
State				0.065 (0.50)	-0.599 (-1.09)
_cons	19.120** (13.37)	12.340*** (10.67)	18.250*** (12.14)	18.090*** (11.50)	26.780*** (2.15)
Year	control	control	control	control	control
Industry	control	—	—	—	—
PseudoR <sup>2</sup>	27.31%	21.83%	26.41%	26.81%	34.36%

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively. The t-value is inside parentheses.

Product-market competition as measured by the HHI remains controversial, as no uniform index has been identified to measure it effectively. This study employs the mean of the number of listed firms in different industries and divides the industries into product-market competition that is intense and product-market competition that is not intense. If the number of listed firms in the industry is less than the mean value that takes the value of 1, then the industry is not considered to have intense product-market competition (PMC=1). If the number of listed firms in the industry is more than the mean value that takes the value of 1, then the industry is considered to have intense product-market competition (PMC=0). The regression results are shown in Table 9. Model (17) in Table 9 shows the impact of internal control quality on audit opinions. Model (18) shows the impact of product-market competition on audit opinions. Model (19) shows the impact of internal control quality and product-market competition on audit opinions. Model (20) shows the impact of internal control quality and product-market competition on audit opinions in non-monopoly industries. Model (21) shows the impact of internal control quality and product-market competition on audit opinions in monopoly



industries. As shown in Table 9, the results of the robustness test are consistent with the previous results, thus indicating that the results of this study are robust.

Table 10 shows the regression results using the probit method. Model (22) shows the impact of internal control quality on audit opinions. Model (23) shows the impact of product-market competition on audit opinions. Model (24) shows the impact of internal control quality and product-market competition on audit opinions. Model (24) in Table 10 shows that the coefficients for internal control quality and product-market competition are -1.213 and 2.468, respectively, and significant at the 1 per cent level, indicating that to some extent, the internal control quality has a substitution effect on product-market competition. The coefficient for the HHI\*Index is -0.050 and significant at the 5 per cent level, suggesting that internal control quality has a lower marginal impact on audit opinions than product-market competition. Model (25) shows the impact of internal control quality and product-market competition on audit opinions in non-monopoly industries. Model (26) shows the impact of internal control quality and product-market competition on audit opinions in monopoly industries. As shown in Table 10, the results of the robustness test are consistent with the previous results, thus indicating that the results of this study are robust.

**Table 10**  
Regression results of the full samples based on the probit method

Variable	Model (22)	Model (23)	Model (24)	Model (25)	Model (26)
Log(Index)	-1.416*** (-12.93)		-1.213*** (-8.65)	-1.219*** (-8.43)	-0.747 (-1.08)
HHI		0.777*** (3.39)	2.468*** (2.70)	3.108*** (3.21)	-2.372 (-0.64)
HHI*Index			-0.050** (-1.97)	-0.070** (-2.54)	0.082 (0.89)
Size	-0.292*** (-10.73)	-0.370*** (-14.53)	-0.288*** (-10.78)	-0.282*** (-9.77)	-0.443*** (-3.80)
Lev	1.860*** (12.13)	1.945*** (13.28)	1.729*** (11.56)	1.685*** (10.89)	2.581*** (3.38)
sdbl	0.026** (1.97)	0.016 (1.18)	0.019 (1.42)	0.019 (1.42)	0.027 (0.38)
Loss	0.710*** (11.68)	0.745*** (12.86)	0.727*** (12.12)	0.737*** (11.87)	0.629** (2.43)
Fee	3.21e-08*** (2.62)	3.09e-08*** (2.64)	3.29e-08*** (2.72)	4.70e-08*** (2.74)	-1.29e-08 (-0.08)
Fshare	-0.662*** (-3.46)	-0.677*** (-3.69)	-0.578*** (-3.07)	-0.738*** (-3.67)	1.229* (1.83)
State				0.0371 (0.62)	-0.304 (-1.26)
_cons	8.712*** (13.19)	5.077*** (9.50)	7.959*** (11.38)	7.923*** (10.57)	8.049*** (2.77)
Year	control	control	control	control	control
Industry	control	—	—	—	—
PseudoR <sup>2</sup>	27.30%	21.83%	26.46%	26.92%	32.17%

All variables as previously defined. \*\*\*, \*\*, and \* indicate significance.

## 6. Conclusion

This study uses data on listed firms in the Shanghai and Shenzhen A-share stock markets to demonstrate the impact of product-market competition and internal control quality on audit opinions. The findings of this study are as follows.

- (1) The results are consistent with the hypotheses. CPAs are more likely to issue unqualified opinions for firms with high internal control quality. The study further shows

that CPAs' evaluations of the five factors of internal control influence their audit opinions. The higher their evaluation is, the higher probability the firm will receive an unmodified audit opinion.

- (2) There is a positive relation between product-market competition and unmodified audit opinions. CPAs are more likely to issue unmodified audit opinions for firms in industries with intense product-market competition because in such industries, managers will spend more time and energy on corporate governance and risk responses and will strengthen their communication with shareholders to reduce the probability of being dismissed and the risk of unemployment due to corporate bankruptcy, leading to improved principal-agent relations and decreased earnings management. As a result, the probability of firms receiving unmodified audit opinions is high.
- (3) This study finds that product-market competition has a substitution effect in the relation between internal control quality and audit opinions. Product-market competition weakens the positive relation between internal control quality and unmodified audit opinions issued by CPAs. Therefore, managers should attempt to effectively combine internal control mechanisms (internal control quality) and external governance mechanisms (product-market competition).
- (4) This study finds that product-market competition weakens the positive relation between internal control quality and unmodified audit opinions issued by CPAs in non-monopoly industries but not in monopoly industries.

This study demonstrates that both external governance mechanisms (product-market competition) and internal control quality influence audit opinions in non-monopoly industries but not in monopoly industries. Therefore, the appropriate construction of internal controls is essential to strengthening or establishing effective market-competition mechanisms, and accelerating the systemic reform of China's monopoly industries will improve the quality of information disclosure and protect the interests of investors.

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## Conflicts of interest

The authors have no conflicts of interest to declare.

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