

# Environment Uncertainty, Cash Flexibility and Internal Control Quality

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**Abstract:** A theoretical analysis is presented on the relation between cash flexibility and internal control as well as the adjustment effect of environmental uncertainty on the two's relation. Based on theoretical analysis, an empirical test is made with 450 non-financial listed companies on A shares mainboard in Shanghai Stock Exchange and Shenzhen Stock Exchange in 2005-2014 as object for research to find that: the higher the enterprise's cash flexibility is, the higher the internal control quality is, and environmental uncertainty has an suppressing effect on the positive correlation between cash flexibility and internal control quality. This research enriches and expands the literature related to cash flexibility and internal control quality and is of certain guidance to enterprises' practice of internal control.

**Keywords:** Environmental uncertainty, cash flexibility, internal control quality.

## 1. Introduction

With popularization of systematology, the scholars gradually agree that enterprises' development is the result of joint evolution of enterprises and environment. Presently, the complicated and changeable politicoeconomical situation and increasingly intense market competition raise the environmental uncertainty for the enterprises, thereby posing huge risk to enterprises' survival and development. Against this background, the high management must attach importance to enterprise's risk management, enhance internal control means and improve internal control quality in an effort to guarantee enterprises' survival and development.

To improve internal control quality, the enterprises should reserve proper cash flexibility and form effective fund chain management and protection mechanism, which is also an effective means to cope with environmental uncertainty and evade risk. The existing financial flexibility theory believes that financial flexibility can guarantee the enterprise enters capital market more conveniently and meets enterprise's unexpected surplus drop and the fund demand needed to seize investment opportunities. Therefore when environmental uncertainty is high, the enterprises with ample cash reserve are less subjected to financial constraint influence [1]. The enterprises with high cash flexibility reserve can utilize investment opportunities more flexibly [2], i.e. cash flexibility reserve can enhance enterprise's capacity of raising and redeploying cash resources [3]. Liu Mingxu [4] thought cash flexibility referred to enterprise's capacity of keeping cash held higher than industry average and directly using and acquiring fund in critical environment in future. According to dynamic capacity theory, the enterprise to reserve cash flexibility can guarantee its demand for cash resources is met and effectively cope with the risk caused by environmental uncertainty. As the main means of risk management, internal control quality can be improved by cash flexibility reserve to promote healthy development of internal controls internal control.

The topic in discussion in this paper belongs to the research category of factors influencing enterprises' internal control. For the last decade, the academia has made deep and extensive exploration into the factors influencing internal control from a good many perspectives. However, existing literature rarely made systematic research from the perspective of reserving cash flexibility to cope with environmental uncertainty. Based on this, the paper takes the listed companies in A share on mainboard of Shanghai Stock Exchange and Shenzhen Stock Exchange in 2005-2014 to make empirical research on the relation among environmental uncertainty, cash flexibility and internal control quality in the hope of exploring whether there is direct effect in the research on the influence

of cash flexibility on internal control quality. This research enriches literature of cash flexibility and internal control quality on one hand, and on the other hand hopes to provide some theoretical reference for perfection of flexible management means of listed companies and enhancement of internal control quality.

## **2. Theoretical analysis and putting forward hypotheses**

### **2.1 The relation between environmental uncertainty and cash flexibility**

There are many environmental factors influencing operation of enterprises [5]. The supervisors must consider the influence of random environmental factors and react properly and timely when making enterprise development strategy and decisions [6]. Environmental uncertainty is a grand problem the company must confront in the operation and management, as it will influence deployment of business resources and make the enterprise's redundant resources flow to the business operations that play a vital function to success [7]. The existing literature mainly researches environmental uncertainty from enterprise development strategy, organization performance as well as operating management behavior, while little research is done on influence of environment uncertainty on enterprise's finance. Marlin, et al. [8] found the enterprises prefer to invest in fixed assets to maintain lower risk of manufacturing cost reduction when environment is stable. The strategy management theory and dynamic contingency theory believe that individual organization is not passive receiver of environment, but will actively adjust own behavior to adapt to environmental change, i.e. the enterprise has some flexibility which is the enterprise's adaptability to uncertain environmental change [9] [10] [11]. In terms of cash resource utilization and acquisition, enterprise's flexibility is cash flexibility, which is the enterprise's ability to timely acquire or use cash held with reasonable cost to effectively cope with and utilize environmental uncertainty and maximize enterprise value. When the environment is highly uncertain, the enterprise faces bigger pressure to achieve financial objective. The cash flexibility of an enterprise reflects to what extent the enterprise's excess cash held reacts and utilizes environmental uncertainty. If the enterprise's future cash flow is definite, the enterprise needs not to acquire additional financial resources. However, as environment is uncertain, the enterprise must reserve cash flexibility to avoid risk. The higher the requirement on enterprise's decision flexibility is in future, the more valuable the cash flexibility reserve is [4], i.e. environmental uncertainty is the prior condition for the enterprise to acquire cash flexibility. Therefore following hypotheses are put forward:

Hypothesis 1: the degree of environmental uncertainty before the enterprise is significantly positively related to cash flexibility.

### **2.2 The relation between cash flexibility and internal control quality**

According to flexibility theory and existing literature, enterprises' cash flexibility is mainly from enterprise's excess cash held [12]. Dynamic capacity theory believes that, in rapid-varying environment, the enterprises need to integrate, establish and reconstruct internal and external competitive power [13] to maintain competitive edge. As a capacity of using and acquiring fund, cash flexibility can guarantee enterprise's demand for financial resources is met, and can make its capacity of using and acquiring fund always outperform average industry level, effectively handle the operating management risk caused by environmental uncertainty, perfect enterprise's inner management means and improve internal control quality. Therefore, following hypotheses are put forward:

Hypothesis 2: cash flexibility is significantly positively related to internal control quality.

### **2.3 Regulating effect of environmental uncertainty**

The environmental uncertainty before the enterprise can be divided into uncertainty of enterprise's individual environment, industry environment and macro environment. Essentially, enterprise to reserve financial flexibility is to cope with various uncertainties in inner and outer environment. If environmental change is expectable, then the enterprise will arrange capital structure according to trade-off and pecking order theory, and the financial flexibility reserved by the enterprise will be valueless. The prevention property and utilization property of financial flexibility can only play greater role in uncertain environment [14]. Therefore, the higher the environmental uncertainty is, the

more capable the cash flexibility reserved by the enterprise is to make the enterprise handle unfavorable impact or seize investment opportunities. Cummins [15] found that, in a highly uncertain environment, the enterprise will take cash on hand as the buffer to future borrowing demand, so uncertainty is related to cash held. If the environment uncertainty is high, the enterprise will increase own cash held, leading to increase of cash holding cost, and high cost increases the enterprise's operation and management cost. Meanwhile, the high environmental uncertainty makes the investors difficult to observe concrete operating management activities in enterprise's management, and the self-seeking behavior by the management is possible to lead to non-efficiency investment, thereby reducing enterprise's operation performance, increasing agency cost, which supports the hypothesis of managerial opportunism. For internal control which is company's internal governance mechanism, the increase of operating management cost and agency cost means increasing enterprise's management control activities, while overmany redundant control activities lowers enterprise's internal control efficiency, and in turn influences enterprise's internal control quality. Therefore following hypothesis is put forward:

Hypothesis 3: environmental uncertainty adjusts the relation between cash flexibility and internal control quality in negative direction.

### **3. Research design**

#### **3.1 Definitions of researched variables**

Measurement of internal control quality: In this paper, DIB company's "DIB·internal control index for Chinese listed companies" is used as the index to assess enterprise's internal control quality, which is constructed with theory reference of definition for internal control in COSO report, covers implementation result of enterprise's strategy, operation return, trueness and integrity of information disclosure, operation legality and compliance and assets security supplements and corrects significant deficiency of internal control disclosed. Therefore this index can comprehensively and accurately reflect enterprise's internal control quality.

Measurement of cash flexibility. The paper borrows ideas from method of DeAngelo [16] and Zeng Weimin [17], and combines concrete background in China to measure cash flexibility by following methods:  $\text{cash flexibility} = \text{enterprise's cash ratio} - \text{industry cash ratio}$ . Due to some hysteresis quality of cash flexibility, the data lagging by one period are taken in choosing index to measure cash flexibility.

Measurement of environmental uncertainty: The paper borrows ideas from practice of Ghosh & Olsen [18] and Shen Huihui, et al [19], uses enterprise's standard deviation of operating income in the past five years and the value adjusted by industry to measure this enterprise's environmental uncertainty with steady growing part in operating income rejected, i.e. for each enterprise, use data of past five years and adopt ordinary least squares(OLS) running model (1) to estimate enterprise's abnormal operating income in the past five years. There into sale is operating income, year is annual variable. The closer the year is to the current year, the smaller the value of year (year = 5, 4, 3, 2, 1). Residual of model (1) is enterprise's abnormal operating income. The standard deviation of this residual is divided by average value of operating income in five years to get each enterprise's environment uncertainty index value. There into, industry environment uncertainty is the median of all enterprises' environment uncertainty that is not subjected to industry adjustment in the same industry in the same year. Each enterprise's environmental uncertainty not subjected to industry adjustment divided by industry environment uncertainty is the enterprise's environmental uncertainty after subjected to industry adjustment, i.e. the environmental uncertainty eu in this paper. Control variable: To guarantee reliability of findings as far as possible, the paper makes necessary control over the factors influencing enterprise's cash flexibility, internal control quality and environmental uncertainty, and borrows ideas from practice of like research, selects enterprise size, increase rate of total assets, proportion of independent directors, stock rights concentration, board size, capital intensity, Tobin's Q ratio and year as control variables. To sum up, the concrete definitions of variables in this paper and the calculation methods are as shown in table 1.

**Table 1 Variable Definition table**

Type of variable	Variable name	Variable symbol
Explained variable	Internal controls quality	ic
Explaining variable	Cash flexibility	sfcash
	Environmental uncertainty	eu
Control variable	Enterprise size	size
	Increase rate of total assets	totassgrrt
	Proportion of independent directors	dir
	Stock rights concentration	owncon
	Board size	board
	Capital intensity	capint
	Tobin's Q ratio	tobinq

### 3.2 Sample selection and data source

The paper selects 450 listed companies on non-finance mainboard in A shares in Shanghai Stock Exchange and Shenzhen Stock Exchange in 2005-2004. As data of consecutive 5 years are needed in the research process, we delisted the listed companies that were listed less than five years consecutively, companies with abnormal operation such as ST or \*ST, etc. as well as the companies whose data are incomplete, and finally got 4,500 sample data of 450 companies in ten years. The internal control data of the listed companies in this paper are from DIB internal control and risk management database, and other data are from CSMAR database and RESSET database.

### 3.3 Construct model of relation among environmental uncertainty, financial flexibility and internal control quality

To verify the relation between cash flexibility and internal control quality, and the regulating effect of environmental uncertainty on the two's relation, we borrow ideas from research of Nicholas [20], to construct following models:

$$ic_{it} = \beta_0 + \beta_1 sfcash_{it} + \beta_2 size_{it} + \beta_3 totassgrrt_{it} + \beta_4 dir_{it} + \beta_5 owncon_{it} + \beta_6 board_{it} + \beta_7 capint_{it} + \beta_8 tobinq_{it} + \varepsilon_{it} \quad (1)$$

$$ic_{it} = \beta_0 + \beta_1 sfcash_{it} + \beta_2 eu_{it} + \beta_3 sfcash_{it} \times eu_{it} + \beta_4 size_{it} + \beta_5 totassgrrt_{it} + \beta_6 dir_{it} + \beta_7 owncon_{it} + \beta_8 board_{it} + \beta_9 capint_{it} + \beta_{10} tobinq_{it} + \varepsilon_{it} \quad (2)$$

### 3.4 Empirical result and analysis

**Descriptive statistics and correlation analysis.** To eliminate the drawback of section data regression and independent time series regression, comprehensively utilize sample information, and decrease the influence of multicollinearity among variables, the research adopts panel data model which can reflect the investigated object's change rule and characteristics at different time and different units. Measurement software stata11.0 is used for data processing. Meanwhile, in an effort to control the influence of sample extreme value on research conclusion, the paper subjects related variables to Winsor treatment at sample fractiles of 1% and 99% to make regression with internal control quality as explained variable. Relevance analysis shows that correlation coefficient of cash flexibility and internal control quality is positive, correlation coefficient of environmental uncertainty and financial flexibility interaction item is negative, and correlation coefficient of environmental uncertainty and cash flexibility is positive, which is consistent with the expected sign, indicating the indices selected in this paper basically can reflect the actual conditions.

**Regression result and analysis.** Due to two-dimensional property of panel data, the correct selection of model directly determines effectiveness of parameter estimation. Therefore before data analysis, the paper utilizes F test and Hausman test to select regression model. Table 2 presents result of F test and Hausman test. As result of F test is significant at 1% significance level, indicating fixed effect model outperforms hybrid regression model. As Hausman test result is significant at 1% significance level, indicating fixed effect model outperforms random effect model. Besides, the result of testing combined significance of fictitious variables in all years strongly rejects the null hypothesis of "no time effect" (Fvalue = 9.11,  $p < 0.01$ ). Thus, the paper adopts time fixed effect model for estimation.

**Table 2 Model test results**

Model(2)		Model(3)	
F test	Hausmantest	F test	Hausmantest
F value=13.93***	chi2(10) =187.35***	F value=13.74***	chi2(12) =216.64***

\*, \*\*, \*\*\*Indicate significant effects in two-tailed tests at the <0.01, <0.05, and <0.01 levels, respectively.

Model (2) in table 3 presents regression result of cash flexibility and internal control quality. Model (3) presents regression result of environmental uncertainty, cash flexibility and internal control quality. The regression result shows that in model (2) and model (3), total sample's flexible variable regression coefficient is significantly positive ( $\beta = 5.633218$ ,  $p < 0.05$ ;  $\beta = 6.060955$ ,  $p < 0.01$ ), indicating the greater the cash flexibility is, the higher the internal control quality is. The reason to explain this is the enterprises mainly reserve cash flexibility by increasing cash held. According to dynamic capacity theory, the improvement on enterprises' financial capacity is due to effective implementation of supervisory work by enterprise's high management to improve enterprises' internal control quality, also indicating positive correlation between cash flexibility and internal control quality, thus hypothesis h2 is verified.

The differences between model (3) and model (2) lie in that environment environmental uncertainty variable and its interaction item with financial flexibility are added into model (3) to verify adjustment effect of environmental uncertainty. The coefficient of environmental uncertainty in the sample is significantly positive ( $\beta = 2.438186$ ,  $p < 0.10$ ), i.e. environmental uncertainty and cash flexibility are significantly positively related. According to Porter's theory of five competitive powers, the environmental uncertainty before the enterprise is mainly from the environment of competition. To effectively cope with various threats, the higher the environmental uncertainty is, the greater the cash flexibility needing to be reserved is, which conduces to enhancing enterprise's risk resistance. Therefore, hypothesis H1 is verified. The coefficient of interaction item ( $eu \times sfcash$ ) in the sample is significantly negative ( $\beta = -2.757124$ ,  $p < 0.10$ ), indicating enhancing of environmental uncertainty lowers the promotion of cash flexibility to internal control quality, i.e. environmental uncertainty adjusts negatively the relation between cash flexibility and internal control quality.

The reason is when environmental uncertainty is high, the enterprise will certainly increase cash held to reserve high cash flexibility matching the high environmental uncertainty. According to agency theory, too high environmental uncertainty makes it difficult for investors to observe concrete operating management activities of enterprise management, and the management has more opportunities to conceal its faulty operation and management and wrongdoings, which causes risk to enterprises' strategic planning and operation development, but also increases enterprises' agency cost. For internal control which is company's internal governance mechanism, the increase of agency cost means increase of enterprise's management control activities, while overmany redundant control activities lowers enterprises' internal control efficiency, thereby influencing enterprises' internal control quality. Therefore, hypothesis H3 is verified.

Regression result of control variable shows that: enterprise size, increase rate of total assets, stock rights concentration and Tobin's Q ratio all significantly positively influence enterprises' internal control quality, while proportion of independent directors, board size and capital intensity all significantly negatively influence internal control quality.

**Table 3 Multivariate Regression Results**

Variables	Model(2)	Model(3)
cons	527.5587***(6.82)	540.0642***(7.04)
sfcash	5.633218**(2.49)	6.060955***(2.65)
eu		2.438186*(1.96)
eu×sfcash		-2.757124*(-1.72)
size	9.184131**(2.59)	8.670193**(2.46)
totassgrtt	0.5898095***(4.36)	0.5899902***(4.56)
dir	-58.09665**(-2.11)	-57.05402**(-2.07)
owncon	0.687472***(4.75)	0.6684128***(4.63)
board	-23.0402**(-2.53)	-23.36268**(-2.55)
capint	-1.474628***(-4.27)	-1.471549***(-4.27)
tobinq	4.260202***(3.85)	4.244067***(3.82)
year	control	control
N	4500	4500

\*, \*\*, \*\*\*Indicate significant effects in two-tailed tests at the <0.01, <0.05, and <0.01 levels, respectively.

### 3.5 Soundness test

To verify the soundness of the paper's result, following tests are made: first, transformation retrogressive method, borrowing ideas from practice of Chi Guohua et al. to use fictitious variable to measure continuous variables qualitatively. To be specific, categorize environmental uncertainty into high, middle and low according to greater than 1, equal to 1 and smaller than 1, which are denoted by 1, 2, 3, and re-regress the hypotheses; secondly, to decrease the influence of macroeconomic cycle on control sample, we divide the sample into two groups of 2005-2009 and 2010-2014 to regress them respectively. The result of these tests is identical with the aforesaid conclusion, indicating the result of this paper is sound. Due to space limitations, the regression result is not presented.

## 4. Conclusion

The paper takes the nonfinancial listed companies on mainboard in A shares in China in 2005-2014 as the subject for research, and mainly researches the relation between cash flexibility and enterprise's internal control quality under uncertain environmental conditions using analytical approach of panel data based on special system background in China. The findings are the environmental uncertainty is the precondition for the enterprise to reserve cash flexibility, and cash flexibility and internal control quality are positively related. Meanwhile, environment uncertainty adjusts the two's relation negatively. On one hand, the research provides empiric evidence for effective improvement on internal control quality from the perspective of cash holding, enriches literature of enterprise's internal control theory; on the other hand, it expands application category of dynamic capacity theory and cognition about cash flexibility connotation and effect. Therefore, the research provides important reference for Chinese enterprises' reform.

The paper's limitations include: when considering environmental uncertainty, the system environment and technological environment before the enterprise are not brought under the model; besides, in data acquisition, the sample adopted is nonfinancial companies listed in A shares with no extensive objects included. The future research direction is to solve and explore above limitations.

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