



# Budget Analysis of Enterprise Accounting Audit Quality Under the Fluctuation of Economic Cycle Based on Big Data

Lixia Zeng<sup>1</sup> and Peng He<sup>2</sup>(✉)

<sup>1</sup> School of Economics and Management, Xiamen University of Technology, Xiamen, China

<sup>2</sup> School of Cultural Industry and Tourism, Xiamen University of Technology, Xiamen, China  
258212045@qq.com

**Abstract.** In the regulatory mechanism of capital market, audit is one of the important means to ensure the quality of capital information. Under the background of cyclical economic fluctuation, there are some problems in the audit quality budget of enterprise accounting. In addition to the change of company risk, the audit quality budget will also be interfered by the management of enterprise. In view of this, this paper attempts to verify the relationship between quality budget and risk of enterprise accounting audit under the fluctuation of economic cycle through empirical method and big data, so as to get specific solutions. The results show that the correlation between enterprise risk and audit quality budget has a positive impact on the upside and downside of the economy, and the risk of enterprises needs to be strictly controlled.

**Keywords:** Cycle Fluctuation · Accounting · Audit Quality · Problem · Budget · Big Data

## 1 Introduction

With the rapid growth of China's economy turning into a medium-low growth rate, the fluctuation of corporate earnings is particularly frequent. Whether audit reports can truly and fairly reflect corporate financial information is the focus of public and investors. The fluctuation of economic cycle will affect the economic output benefit of enterprises. When the economic cycle is in the period of contraction, the economic benefits of enterprises will decline, but enterprises will frequently operate surplus in order to obtain the listing qualification, rights offering and other opportunities. In the face of high audit risk and performance pressure, auditors are likely to issue inappropriate audit opinions or reduce necessary audit procedures, thus reducing the quality of audit. Therefore, it is necessary to study the impact of economic fluctuation on auditor audit quality.

## 2 Research Background

### 2.1 Literature Review

In recent years, the quality of enterprise accounting audit has always been a hot issue of social concern. Under the situation of high-speed economic growth, enterprises are

facing greater pressure of production and operation, and a large number of financial fraud cases appear in the audit market [19]. How to budget and judge the quality of enterprise accounting audit is the key problem in the process of enterprise accounting audit. In this context, many scholars have carried out a detailed study.

Audit quality is the life and foundation of audit. The evaluation of audit quality will not only affect the result of audit quality, but also guide the behavior of relevant actors [12]. Therefore, it is important to understand the concept of audit quality. As for the definition of audit quality, different scholars have different views in different periods. At present, the most widely used foreign academia is the definition of DeAngelo [4], she argues, audit quality is the auditor of the auditees accounting system are found irregularities and report these irregularities joint probability, and put forward the auditor found the auditees system exists the possibility of irregularities is decided by the auditor's technical ability and income; The possibility of reporting violations is determined by its independence. In China, Zhang (1994) [20] holds a representative point of view that audit quality refers to the quality of audit process and auditors, which is ultimately reflected in the quality of audit reports, focusing on the extent to which audit work improves the reliability of financial statements. Feng (2004) [6] pointed out that audit quality is determined by the quality of audit work and its results based on social and professional standards. According to the special legal system environment of our country, this paper selects audit opinion as the substitute variable of audit quality.

In domestic literature research, some scholars have pointed out that by analyzing the number of customers and litigation risks, we can get the specific mechanism of the number of accounting practitioners and division of labor and cooperation, and then point out the forming elements of the audit quality of the company, which can effectively improve the actual situation of the accounting quality of the enterprise, and give the specific application scenarios [18]. From the macro perspective, Li (2009) [14] believes that the macroeconomic cycle will affect the business performance of a company. When the economic cycle is in the upward phase, the growth and profitability of an enterprise will also increase. Growth and profitability also shrink during downturns. Some scholars also use the principal-agent theory to analyze the listed companies in Shanghai and Shenzhen from 2011 to 2016. The research points out that when the budget is slack, the company's growth will decrease, which will dampen the enthusiasm of employees. The author further analyzes and finds that budget management is related to the role of corporate growth, and audit quality and internal control variables play a positive role in regulating the quality of corporate accounting audit [13]. This kind of cognition is helpful for enterprises to recognize the importance of budget management and improve the budget of accounting quality. However, in the situation of economic growth changing from high speed to slow growth, China's economy has entered the new normal, and the pressure of production and operation of relevant enterprises has gradually increased, so it is impossible to budget the quality of market accounting audit [9]. In this situation, some scholars have also carried out specific research. In the micro aspect, some scholars have conducted correlation research on accounting audit quality through economic cycle [5]. In the macro aspect, some scholars analyze the economic cycle and the quality budget of accounting and auditing through the theory of macro-economic change. These two aspects of research point out that under the economic fluctuation, the quality of enterprise

accounting audit will not be able to carry out accurate budget due to certain factors, and further in-depth research is needed [15]. Some scholars have pointed out that the impact of cyclical economic fluctuations on the quality of enterprise accounting audit is uncertain, and it will have a certain impact on its budget [8].

There are many foreign literatures that study the impact of business cycle on the audit quality of certified public accountants, most of which focus on the impact of macro environment on audit. Asare (1995) [1] pointed out in their study that the audit behavior of certified public accountants should be judged and distinguished according to information such as macroeconomic changes. Cohen (2000) [3] studied that when CPAs determine the overall audit scope of the audited entity, they will grasp the financial information and non-financial information of the audited entity. In addition, there are differences in the extent of financial information and non-financial information used by CPAs in auditing. The study also found that compared with non-financial information, certified public accountants are more inclined to use the financial information of the audited entity to audit, and certified public accountants also need to use non-financial information to carry out audit work, and use it as an auxiliary means of audit to ensure the final audit quality. In addition, Cohen's research also reveals that when the financial information of the audited firm shows a downward trend and is verified by non-financial information, certified public accountants are more inclined to expand the audit scope in order to collect evidence to ensure audit quality. Johl (2003) [11] studied whether auditors of different sizes had different attitudes toward earnings management of listed companies in the pre-crisis, mid-crisis and post-crisis stages, and found that before the financial crisis, "Big Five" and "non-Big Five" had no different attitudes toward earnings management. The "Big Five" reported less earnings management than the non-big Five. Jeremy Bertomeu and Robert P. Magee (2011) [10] studied the difference in demand for audit report quality of dominant interest groups in different economic cycles, and found that when the economy is booming, the dominant interest groups demand the highest quality of audit reports. After that, it will decline slowly and reach the lowest point in the economic stable stage, and then begin to rise again in the economic recession. Kothari (2006) found that after the legislation, the proportion of audit opinions issued by the top six accounting firms to audit clients in financial distress and finally entering bankruptcy proceedings was significantly increased. When listed companies are in financial trouble, the risk of debt default increases and auditors tend to issue non-standard audit opinions.

## 2.2 Purpose of Research

Among the influencing factors of audit quality budget of enterprise, it includes not only the characteristics of audit unit, external legal supervision environment, but also the fluctuation of economic cycle. From the perspective of macroeconomic cycle theory, in the process of economic development, there is usually the phenomenon of expansion, contraction, replacement and cycle. In the period of economic expansion, the increase of national income and the acceleration of economic growth, while in the process of economic contraction, there will be the phenomenon of unsalable products and the decline of residents' income. Under this principle, the growth and profitability of enterprises will fluctuate to different degrees. In the process of accounting audit quality, the fluctuation of economic cycle will further affect the budget. In the existing research programs,

there is little analysis of the impact of business cycle fluctuations on the audit quality of enterprises, and the research of this impact program is extremely important. Therefore, in order to effectively help enterprises to carry out accounting audit quality budget, this paper will explore the specific impact results of accounting audit quality budget in the context of economic cycle.

### 3 Overview of Relevant Theories

#### 3.1 Cyclical Economic Fluctuation

The so-called economic cycle can be described as the Philip curve of “output price”, and also as a relationship between growth and fluctuation. This kind of curve is to replace the unemployment rate of Phillip curve with economic growth rate, and in many cases, it is realized through “Okun Law”. Lucas, a foreign scholar, once pointed out that the fluctuation of economic cycle has a very important influence on the relationship between the overall economic variables. When the policy changes, economic participants will adjust their expectations and behaviors in real time, which will lead to changes in the parameters of the measurement model [7]. From the research of the scholar, it is found that the fluctuation of economic cycle is realized by the established model, but the actual effect of policy change cannot be accurately predicted. In contrast to this theory of the fluctuation of economic cycle, many neoclassical analyses (Neoclassical means New Classical Economics, it is a school of refinement of the previous Neoclassical Economics, which was formed in the 1970s. Its theoretical framework consists of rational expectations hypothesis and natural unemployment rate hypothesis.) explore the objective constraints of manufacturers and households from a micro perspective, indicating that the model validation and prediction of the theoretical parameters of economic cycle fluctuations are more effective [16].

Therefore, the fluctuation of the economic cycle is mainly caused by the monetary policy of the bank, and to a large extent, it is affected by the monetary shock. The fluctuation of money in the economic cycle will have a great impact on the price level first, and it will take some time for economic participants to distinguish this change. In fact, the fluctuation of economic cycle will have a huge impact on the monetary shock in this period of time, and then have a greater impact on output. Moreover, the economic participants with rational expectation will constantly correct the wrong production decisions, and correctly predict the future price, so that the economy can return to the normal level [17]. Therefore, as long as the monetary policy of monetary authorities is systematic, the fluctuation of economic cycle will not affect the path of output growth.

In practice, business cycle fluctuations are divided into four stages, as shown in Fig. 1. The price fluctuation of futures market is not only related to the domestic cycle, but also directly related to the economic prosperity of various countries, and has a certain impact on the price of commodities. Specifically, the economic cycle is generally divided into four stages: prosperity, recession, depression and recovery. In the boom period, the increasing demand for goods leads to the supply unable to meet the growing demand, which makes the price of products rise rapidly. In the period of recession, the demand of commodities shrinks, the demand is lower than the supply, and the increase of inventory leads to the decline of commodity prices. During the depression, prices stopped falling,

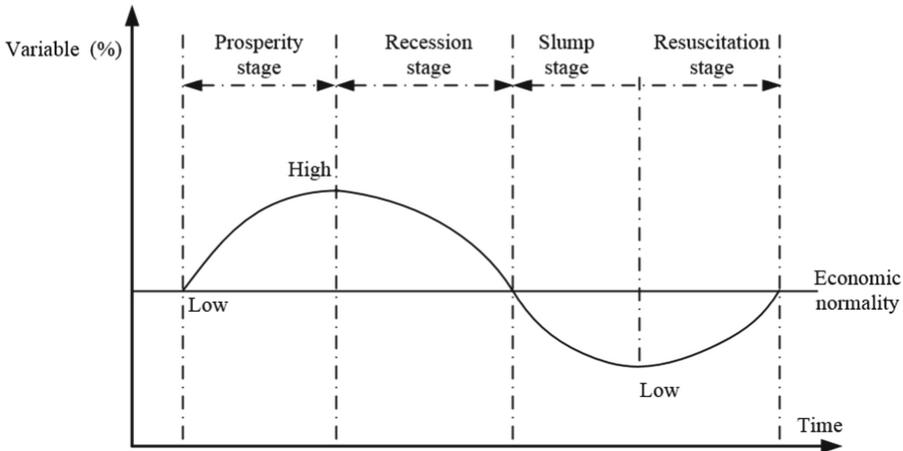


Fig. 1. Four Stages of Business Cycle Fluctuation

but they were still at a low level. In the recovery stage, the recovery of industry and the increase of development demand make the commodity price rise.

### 3.2 Quality Budget of Enterprise Accounting Audit

The quality of accounting audit is the basis of enterprise audit. Whether the budget evaluation of accounting audit quality is orderly or not is not only related to the behavior of the main managers of enterprises, but also has an important impact on the audit quality of enterprises. Therefore, we need to understand this concept in depth. Quality is the most basic concept in modern management, which is an evaluation of product or service quality. As a special service, audit is not only a systematic process, but also provides the final audit report for enterprises. In this case, quality should include the quality of results and the quality of work. Specifically speaking, the audit result sorting budget is an index to judge the reliability of audit report, while the work quality budget refers to the work audit budget result index. Therefore, these two types of budget are the criteria to judge the quality of audit business.

There is no unified view on the definition of audit quality budget. At present, the academia mainly uses the definition of De Angelo. According to the scholar, audit quality is determined by multiple factors, among which the key is the possibility that the auditor discovers the violation of the system of the auditee, which is determined by his income and technical ability. At home, many scholars agree with Zhang Longping's point of view. According to the scholar, the audit quality budget is finally reflected by the audit report, and the key is the reliability of the financial statements. In addition, some scholars have pointed out that audit quality budget is based on the social and professional audit work. The audit scope is financial statements and attached schedules of listed companies.

## 4 Empirical Analysis

### 4.1 Research Hypothesis

Under the modern risk oriented audit mode, auditors have paid special attention to the operational risk assessment of customers. Especially when the continuous operation ability of the enterprise is affected by the loss, the management will strengthen the modification of the financial statements in order to obtain more high salary. In this case, the financial statements will have a greater possibility of risk. In addition, in order to improve the quality of work, auditors continue to adopt more audit measures, which increases the audit cost. In this process, auditors will also consider litigation risk and regulatory risk, and make more cautious reports. In this case, hypothesis 1 is proposed.

Hypothesis 1: In a certain economic environment, the greater the enterprise risk, the higher the audit quality budget.

In the period of economic downturn, the international market shows a shrinking trend, which will lead to the decline of the ability of sustainable operation of enterprises, and further aggravate the risk of bankruptcy of the company. Relatively speaking, the audit quality budget will be further improved. But at the same time, in the competitive market environment, the fluctuation of economic cycle will lead to the increase of preference risk of enterprise managers, which is not conducive to the accurate judgment of auditors. As a result, auditors will reduce the necessary audit procedures to reduce audit costs. In this case, the audit quality of auditors will be greatly reduced, thus reducing the phenomenon of finding misstatements. From the perspective of loss making enterprises, loss making listed companies have the problem of delisting supervision, which leads to the motivation of earnings management, or tend to low-quality audit services. In addition, the economic cyclical fluctuations, that is, the upward and downward periods, have a certain impact on the audit risk and audit quality of enterprises. Hypothesis 2 and hypothesis 3 are proposed.

Hypothesis 2: Compared with the economic upward period, the correlation between enterprise risk and audit quality budget in the downward period is weaker.

Hypothesis 3: The impact of business cycle fluctuation on the relationship between enterprise risk and audit quality only exists in the non top ten firms.

### 4.2 Research Design

#### 4.2.1 Sample Selection and Data Source

In this paper, all A-share listed companies in 2011–2021 are taken as samples. Our way through the big data collection, collect the information of listed companies, corporate information, corporate information, personnel list, grab the page data, collected site data, the process using the hot technology in the development of large data, such as: python crawler, HTML web page extraction, one-stop site data acquisition technology, BI data analysis, etc. [2]. Here, we use Python's request method. Python is designed for crawler and big data. It is best to design network distributed crawler in Python, because Python has many existing libraries that can be directly called. The core code is as follows:

```

Import requests # import requests #
Response = request.get('https://www.qcc.com/') #Use GET to simulate requests#
Print (response.text) #They've been collected#
    
```

Considering the particularity of the company, the financial and insurance companies are excluded; at the same time, the samples of ST, \*ST and incomplete data are excluded. In order to deal with the data outliers, it is necessary to add 1% winsorized tail to the continuous variable data. Through the above selection, 15284 were finally obtained. The GDP growth rate comes from China Statistical Yearbook in 2021. The ranking of accounting firms comes from the official website of China Accounting Association. Other data comes from scmar financial statement database of China's listed companies.

**4.2.2 Variable Definition and Model Construction**

The model verified this time mainly uses the following logistic regression model:

$$\text{Logit}(Y) = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 C \times D + \beta_4 \text{Ln}(E) + \beta_5 \text{Ln}(F) + \beta_6 \text{Ln}(G) + \beta_5 \sum_{i=1}^5 H + \varepsilon \tag{1}$$

$$A = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 C \times D + \beta_5 + \beta_5 \sum_{i=1}^5 H + \varepsilon \tag{2}$$

The connotation of specific variables is shown in Table 1. The standard audit opinion is: The audit report issued by certified public accountants with unqualified opinions. It does not attach explanatory paragraphs, emphatic paragraphs or any modifiers.

**Table 1.** The Connotation of Specific Variables

	Variable	Definition
Explained variable	Y	Audit opinion type. If it is a standard audit opinion, the value is 1, otherwise it is 0
	A	Absolute value of operating accruals
Explanatory variable	C	Company risk, the higher the value, the lower the risk
	D	Fluctuation of economic cycle: the upward period of economy is 1, otherwise it is 0
Intervening variable	E	Change of auditor, if changed, assigned as 1, otherwise 0
	F	The nature of controlling shareholder is 1, otherwise 0
	G	Logarithm of audit cost
	H	Industry situation

### 4.3 Empirical Analysis

#### 4.3.1 Descriptive Statistics

At this time, through empirical analysis, we can see that the average audit opinion is 0.98, which shows that many listed companies have obtained standard audit opinion. At the same time, the average value of Big 10 is small, so it can be seen that many companies are willing to choose small-scale accounting firms.

#### 4.3.2 Correlation Analysis

According to Pearson test, the correlation index of enterprise risk and audit opinion is 0.134, which is significant at the level of 0.01. It can be seen from this that the greater the risk of an enterprise, the non-standard audit opinion it obtains. From this, we can see that the audit quality budget will be higher, indicating that hypothesis 1 is valid.

#### 4.3.3 Regression Analysis

According to the analysis of multiple regression results, in formula (1), the coefficient of  $Z$  reaches 0.218, which is significant at the level of 1%. It can be seen that the higher the company's risk, the more non-standard the audit report issued by the auditor. In formula (2), the regression coefficient of  $Z * Fluc$  is negative, indicating that when audit opinion exists as an alternative variable, the correlation effect with risk is not obvious. According to this, during the economic downturn, the correlation between audit quality and risk is reduced. To a large extent, it is because accounting firms will reduce audit quality for profit. However, the negative correlation is not obvious because this phenomenon will cause the reputation loss of the firm. Therefore, hypothesis 2 holds. In addition, the regression coefficient of non top ten accounting firms is significantly negative at the level of 5%, which indicates that these accounting firms may take more economic risks and reputation risks into account without reducing the audit quality budget. In the economic downturn, the correlation between corporate risk and audit quality is also weakening, but it is not obvious. So, hypothesis 3 holds.

#### 4.3.4 Robustness Check

Through the empirical analysis, we can see that when the operating accruals are used as the alternative variables, the robustness test can be fully carried out. Finally, it is found that the result of this robustness test is consistent with that of audit opinion as an alternative result variable, indicating that the test effect is better.

## 5 Conclusion

To sum up, the higher the enterprise's operational risk is, the management will "optimize" the audit statements in order to obtain more benefits, which leads to a significant increase in the error rate of financial statements. As the client of audit business, in order to reduce this kind of misstatement, we need to constantly improve the audit quality budget and standardize the performance of the management in real time. At the same time, the

relationship between enterprise risk and audit quality budget will make auditors more cautious. Through the empirical study, we find that under the same conditions, corporate risk and audit quality budget have a positive impact. Compared with the economic fluctuation in the upward period, the significant relationship between enterprise risk and audit quality budget began to weaken gradually. However, this kind of relationship mainly exists in the non top ten accounting firms, which shows that profit plays a strong role in small-scale accounting firms. In this case, regulators need to consider not only the business risk, but also the crisis brought by the difference of economic fluctuation. Furthermore, regulators should also focus on the analysis of whether there is a universal relationship between firms of different sizes, so as to provide a certain program for the audit quality budget of enterprises.

## References

1. Asare. S.K and R.A. Davidson.(1995). Expectation of Errors in Unaudited Book Values:The Effect of Control Procedures and Financial Condition, *Auditing: A Journal of Practice&Theory* (14), 1–18.
2. Chen R., Yang B. (2022). Construction of an Intelligent Analysis Model for Website Information Based on Big Data and Cloud Computing Technology[J]. *Discrete Dynamics in Nature and Society*,(2),1–10.
3. Cohen.R.C, G. Krishnamoorthy and A.M. Wright.(2000). Evidence on the Effects of Financial and Nonfinancial Trends on Analytical Review, *Auditing: A Journal of Practice&Theory* (19), 27–48.
4. Deangelo L.(1981). Auditor size and audit quality. *Journal of Accounting and Economics*,3(3),183–199.
5. Deng L.J., Fan Q. (2014). Cross Strait Trade, Industrial Structure and Business Cycle Co Movement: Empirical Analysis with VECM Model. *Journal of Nanjing Institute of Audit*, 011 (002), 31–38.
6. Feng J. K. (2004). *Contract theory of audit relationship*. Beijing: China Financial and Economic Press,5–6.
7. Guan H.J. (2013). An Analysis of the Correlation between the Changes of the Income Structure of Chinese Farmers and the Income Fluctuation. *Journal of Nanjing University of Audit*, 10 (3), 17–23.
8. He J.Q., Zhang R. (2016). Research on the Interaction Between RMB Internationalization, Exchange Rate Fluctuation and Monetary Policy. *Audit and Economic Research*, 31 (03), 122–131.
9. Hu X.M., et al. (2015). The Choice of Value Multiplier in the Enterprise Valuation: Based on the Industry Heterogeneity. *Audit and Economic Research*, 030 (001), 66–73.
10. Jeremy Bertomeu, Robert P. Magee.(2011). From Low-quality Reporting to Financial Crises: Politics of Disclosure Regulation Along the Economic Cycle. *Journal of Accounting and Economics*,52(2),209–227.
11. Johl S.,Jubb C A.(2003). Houghton K A. Audit Quality: Earnings Management in the Context of the 1997 Asian Crisis. Paper Presented at the AEAANZ Conference, Brisbane, Australia, (4),1–44.
12. Kothari S.P., Leone A.J.(2005). Performance Matched Discretionary Accrual Measures.*Journal of Accounting& Economics*,25(3),85–88.
13. Li Q.Y., et al. (2013). A Study on the Persistence of Corporate Earnings Based on Economic Cycle - Empirical Evidence from Chinese Listed Companies. *China Accounting and Finance Research*, 15 (4), 129–191.

14. Li Y.P.(2009). The Divergence between Business Cycle and Listed Companies' Business Performance, *Economic Research*,21(3),100–102.
15. Liu R.X. (2013). Exploring the Source of China's Economic Growth: Factor Input, Productivity and Environmental Consumption. *World Economy*, 036 (010), 123–141.
16. Ren Z. (2018). The Impact of Infection and Wealth Fluctuations on Profit Margins is the General Profit Margin Rising or Falling? *Audit and Economic Research*, 033 (006), 112–123.
17. Sun Y.Y. (2009). Stock Price, Money Supply and Monetary Policy: An Empirical Analysis Based on China's 2000-2007 Data. *Audit and Economic Research*, 06 (2): 51–56.
18. Xu S., Si D.K.(2013). The Threshold Co Integration Effect of Investor Sensitive to Financial Mediation: Based on Different Economic Cycles of Data Validation. *Audit and Economic Research*, 028 (005), 96–104.
19. Zhai S.P, et al. (2018). Strategic Differences, CFO Financial Execution and Corporate Credit Rating. *Journal of Shanxi University of Finance and Economics*, 40 (11), 95–109.
20. Zhang L. P. (1994). On the Construction of Audit Quality Control Standards for Certified Public Accountants in China. *Accounting Communications*,(8),21–27.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

