

## Research Article

### Analysis the Impact of XBRL in China's Capital Market Using Methods of Empirical Research

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**Abstract:** XBRL is a financial reporting language, which is based on XML. Since 2003 we have tried to use financial reporting based on XBRL for listed company disclosure in China. This study mainly stands on the perspective of small investors, using empirical research methods to investigate whether XBRL reduced the level of information asymmetry in China's capital market or not and further explaining XBRL promotes the rational allocation of resources in China's capital market and provided a guarantee for China's capital market having a rapid and stable development. This study generalizes the significance of the application of XBRL in China capital market, while its challenges have also been summarized. The main significance of this study is finding more "deminders" for the universal application of XBRL in China.

**Keywords:** Accounting information, capital markets, information asymmetry, small investors, XBRL

#### INTRODUCTION

XBRL (extensible Business Reporting Language) is based on XML (Extensible Markup Language) for financial reporting. XBRL was originally from the Washington State Public Accountants Chahes Hoffman made in 1998, the prototype for the "XFRML", later renamed as XBRL.

Today, many companies release publish information (including financial information, company shares and other important information) mainly through the network, among a variety of information released by the company, financial reporting information should be the most important information. Before the birth of the XBRL, the network of financial reporting primarily uses two ways -HTML and PDF to express information. However, the above-mentioned 2 ways of financial reporting based on the network from all aspects of financial reporting have no essential differences with the reporting based on the study. At this point, users of financial reporting information only just remain in the view of existing data on the information, if they want to further analyze and compare information, needing further manual input, which will increase the error probability of information and information processing. The emergence of XBRL solves the above mentioned problems and XBRL can easily exchange data between the various systems (Baldwin *et al.*, 2006; Autore and Kovacs, 2010; Farewell and Pinsker, 2005; Hodge *et al.*, 2004; Premuroso and Bhattacharya, 2008; Teixeira, 2005; Farewell, 2006).

From 2001 to 2012, XBRL international organizations has held 24 international conferences in

the United Kingdom, the United States, Australia, Germany, Canada, Japan, the Netherlands and other countries successively. In February 2006 China begin to reserve for "XBRL organization in China," China Accounting Information Committee and XBRL organization established in China on November 12, 2008. In May 2010 "XBRL organization in China" was approved as regional Global Alliance members by XBRL International Organizations. "XBRL organization in China" was dedicated to promote the application of XBRL in China.

From the above mentioned, we know that XBRL in recent years has made a rapid development in China. As we thought, this development is not a short-lived, but if you want to further the development of XBRL in China, exploring whether XBRL in China has a positive impact on the market or not is particularly important. This study mainly studies the application of XBRL in China whether reduces the level of information asymmetry in Chinese Capital Market, which further explains that the application of XBRL provides a strong protection for rapid and stable development of china's capital market Abbreviations and Acronyms. Define abbreviations and acronyms the 1<sup>st</sup> time they are used in the text, even after they have been defined in the abstract (Baldwin *et al.*, 2006; Pinsker and Li, 2008; IT Governance Institute, 2005).

This study mainly stands on the perspective of small investors, using empirical research methods to investigate whether XBRL reduced the level of information asymmetry in China's capital market or not and further explaining XBRL promotes the rational allocation of resources in China's capital market and

provided a guarantee for China's capital market having a rapid and stable development. This study generalizes the significance of the application of XBRL in China capital market, while its challenges have also been summarized. The main significance of this study is finding more "deminders" for the universal application of XBRL in China.

#### **APPLICATION OF XBRL IN THE CHINA'S CAPITAL MARKET**

There is a lot of information in the capital market; High-quality information has always been an important factor for promoting to develop a healthy and stable situation in the capital market. As we known, nearly all the trading parties' grasp some information, but not everyone master the same information when they want to have a deal. Generally speaking, some transaction subjects master information for transaction more than the other in some cases; we say that is the information asymmetry. However, In the capital market the degree of information asymmetry is related to the securities market's efficiency, At the same time, It is related to whether the capital market can allocate resource and promote economic growth or not (Farewell and Pinske, 2005; Hodge *et al.*, 2004; Premuroso and Bhattacharya, 2008).

**XBRL application allows users of information in capital markets to obtain information more "democratization":** Before the application of XBRL, various types of information users in capital market need to spend a lot of time to gather information, then they should analyze and process the collected information relying on their own understand, but they can process it only when they get information first. There has a large amount of investment analysis companies in the market, because they can quickly get the information they needed and do professional analysis, they will get more information than others, so it is easy to lead to information asymmetry. But the emergence of XBRL changed it, When companies release information through the network, investors can get information at the same time, In other words, Investors need not take time to gather information and the information geted is equal with each other in number, Moreover XBRL provides a fully automated process, In a word, If investors need analyze the data, you just need click your mouse. From the above mentioned, we know that Information users are equal to get data and process it, It makes financial information "democratization" possible (Premuroso and Bhattacharya, 2008; FSS, 2007; Teixeira, 2005).

**XBRL application greatly reduces the time and cost for investors to analyze financial information:** Before the application of XBRL, analysis tools and

skilled professional skills and a lot of time generally are required to analyze financial information for investors, it is the only way to get the information they needed. But the emergence of XBRL has brought good news to investors, which makes investors relieve from a large number of complicated financial statements and financial analysis tools and so on. Investors can easily achieve all financial data comparison and can easily analyze the data based on XBRL prepared financial statements. As we known, Most investors want to analyze accounting item which always stands at the bottom of the accounting title, However, this analysis because of the lack of certain experience and technology will become very difficult, The good news is financial statements based on XBRL help investors solve this problem: XBRL supports searching data top-down, in other words, Investors can use this function to search the lowest level feature items from the general ledger accounts and can simply compare and analyze the data which has the same tag on subjects. To some extent, XBRL saves a lot of time and cost for investors (Farewell, 2006).

**XBRL application improves the quality of financial information disclosure:** China Securities Regulatory Commission revised the "public offering of securities of the company's Information Disclosure Rule No.15-Financial Reporting of General Provisions" and the "public offering of securities of the company's Information Disclosure Rule No. 9-Net assets rate of return and earnings per share calculation and disclosure of" comments in the rule 15 of the annex added to the form-" financial reporting disclosure forms "in December 2009 and added the relevant disclosure requirements. Russo (1997) study showed that: if you use a tabular format to display information relative to the form of a text even more to enhance the user's decision-making capacity. Using tables to express the information enhance the user's decision-making capabilities, which is relative to the use of text to convey information. The financial statements based on XBRL mainly shown in the form of tabular. Not only can XBRL tag financial information and may also disclose non-financial information, the unit of XBRL information disclosure documents design the matters required to be disclosed in detail, including defining key attributes of information units and designing the relationship between disclosures of information each other. At the source of the information financial reporting based on XBRL ensure a certain degree on the quality, meantime, It is also made some requests in information quantity, so XBRL applications improves the quality of information disclosure and as we mentioned above High-quality financial disclosure information provides a stable environment for capital markets development.

**XBRL improve the quality of accounting information:** Market competition requires a lot of information; financial statements provide financial information to meet certain needs of the market. However, since this century, it happened the financial scandals of Enron, WorldCom and other financial fraud, it not only damaged the interests of investors, but also to some extent shaken the foundation of the capital markets, affecting the effective operation of capital markets. Therefore, in order to maintain the effectiveness of the market, the financial information provided should have a certain degree of reliability and for timely as needed.

**XBRL enhanced the relevance of accounting information:** Relevance of accounting information refers to information and decision-making, it was contributed to the needs of various stakeholders, including relevant information to meet the needs of the country's macroeconomic management and to meet the needs of the investors' understanding of corporate financial operating conditions of its operating results and to meet internal operation and management needs. To make the reported accounting information useful on the market and contribute to the formation of a stable and efficient on capital markets, the report provided that must be able to have an impact on investor decision-making behavior and it can be to produce a reasonable expectation.

Foreign scholars (Hyungwook *et al.*, 2010) putted the implementation of XBRL in Korea as the study sample, used paired t-test and multiple regression analysis method to test the extent of the implementation of XBRL whether can reduce the information asymmetry, it found the implementation of XBRL may effectively reduce the level of information asymmetry of Korean capital markets, which can effectively enhance the relevance of accounting information, which is favorable to investors to make decision analysis. The implementation of the XBRL standard can be structured for all relevant information, mark and the formation of a large financial database information the user to need, users according to self-information demand dynamic collection of personality-related information, just use the mouse to click, so that filter out irrelevant information and full support personalized decision-making.

**XBRL enhanced the reliability of the information:** Reliability of accounting information depends on whether the accounting information authenticity, neutrality. If the financial information false or biased circulated in the market, its false information will cause the price of related financial products to deviate from its true value and false financial information cannot be "see through" long-term it will occur "function lock phenomena" in capital market. The capital market will

never be achieved effectively, so it is particularly important to enhance the reliability of accounting information. Most of the scholars studied that the implementation of the XBRL standard to some extent, strengthened the reliability of accounting information (Debreceeny and Gray, 2001; Pan and Lin, 2006). Debreceeny and Gray (2001) studied: the widespread using of XBRL mean that the spread of Internet Financial Reporting in humans and intelligent software agents can make the reliability of financial information guarantee.

Between the existing financial reporting systems it has to rely on manual if you want to transmit the relevant financial data often, at the same time, the financial data of the retrospective is very difficult, it is difficult to implement automatic calibration test if the problem happened and it is difficult to accurately locate the error. But Based on the combination of the XBRL standard and related technologies, which can effectively improve the empirical error can be prior to self-test in order to reduce its error. Pan and Lin (2006) studied XBRL through Web services and other cutting-edge technology integrated application, which raised the company of flexible on-demand reporting model, the model breakthrough is only the XBRL technology used in corporate financial reporting while the XBRL-depth internal applications and extends to the user terminal, to form a complete corporate reporting supply chain, from application the XW mode technology greatly enhanced the reliability of accounting information.

**The implementation of XBRL took an account and reliability of accounting information:** Previous studies have shown: in the traditional financial reporting model, It is difficult to simultaneously take into account the relevance and reliability of accounting information in provided information, however, to some extent, Financial reporting system based on XBRL standards resolved the conflict between the reliability and the relevance .XBRL standard, mainly through the definition of different levels of classification criteria and can be inspected the data sources top to down, "tracing" of the financial information of the financial report level, the level of the drill (Drill-down) to accounting books even transaction level, which effectively enhance the testability of the accounting information. Reliability of accounting information embodied from the following 2 aspects: 1<sup>st</sup>, the reliability of the single transaction level economic data and after the relevant accounting officers of subjective judgment, analysis and summary to reflect the reliability of the related projects in the financial statements. Based on the traditional financial reporting model, often because of differences in the subjective judgment of the accountant in the accounting information generation process and the limitations of the method used, making the relatively high reliability

of accounting data at the transactional level, after the relevant summary of its analysis, making a summary of the number of reliability of the financial report level disclosure of relevant subjects are also difficult to ensure. XBRL-based financial reporting, which can be tailor-made personalized financial report for the information users. In the based on the XBRL financial reporting system, provide the raw data of the transaction level, information users to extract their own decision-making of accounting information classification standards, which according to the preferences of the users of information and the information they need to get the content, structure, which adhere to its financial reporting requirements. XBRL technology, processing and processing of accounting information is processed automatically by a computer system processing process according to the information users need to control. Ultimately, whether the reliability of the original data can deduce the reliability of the information the user needs information, depending on the computer system processes and user subjective on the requirements of the process, that is, XBRL taxonomies. In addition, the traditional accounting mode, accounting information are not standardized, there are differences between different platforms, driven by interests there will be "internal control" phenomenon, that the financial data may be modified. XBRL-based financial reporting system in transactions occurs is marked via the Internet, timely delivery of information users, company managers is difficult to manipulate the data; the same time, because of the XBRL standard mapping data relationship, the user can conduct in-depth analysis of the report-level summary data, drill (Drill-down) to a breakdown or transaction level to confirm the accuracy and veracity of the data. Therefore, the reliability has been improved significantly.

**XBRL enhanced the comparability of information and taking into account the timeliness of:** Some scholars think that the use of XBRL technology can be in different countries, different industries to achieve comparability of financial data. Among them, Bonsn (2007) believes that XBRL technology development goal is to develop the financial data given a standard set of XML tags, this tag can be used to create a variety of different needs format instance document, XBRL Business Reporting can label standardization, which will enable corporate financial reports more easily comparable. Pan and Lin (2006) that the XBRL-based financial reporting process, the user can efficiently complete the analysis report, without the need for data conversion. Studies have shown that the implementation of XBRL to fully enhance the comparability of the information can be seen from the above research. Traditional financial reporting model, the financial reports of listed companies to disclose the general use of the PDF format or Word format,

investors If you want to analyze financial reporting information, you must manually one by one to download and then will need information about the entered manually or cut and paste way to copy the input to other software in order to carry out the comparison and other analysis. In this analysis, each additional company, the above action is to be repeated, is not only cumbersome and time consuming. In the financial reporting based on XBRL format reports, because the relevant information of all the financial reports were marked by XBRL taxonomies to their data, each type of information with the "ID". Therefore, in the same financial indicators for comparing different companies or the same enterprise in different period when financial indicators, simply check the relevant options of the system using the mouse, you can export directly to the relevant financial indicators were analyzed. XBRL-based format, both to avoid the possibility of mistakes in the manual input and compare the efficiency of query, greatly improving the comparability of the accounting information.

Related requirements in the quality of accounting information characteristics of accounting information should have predictive value and feedback value and accounting information required to be provided in a timely manner. The timelier accounting information, the more it can affect the decision-making of most of the stakeholders and thus have an impact on securities prices. Information to provide more lag, insider information transactions will be generated and damage the validity of the capital markets. The trade of the XBRL specialists said that the use of the XBRL standard IT to simplify financial reporting, transmission and its analysis of XBRL technology does not change the premise of any accounting principles and accounting assumptions, the financial report of the relevant data into a unified XBRL standard data, use the same XBRL standard, coupled with the processing of computer technology in a wide range, will make data transfer faster and more automation and simplification of processes, thus facilitating the management and its investors more timely access to the relevant financial information.

## EMPIRICAL ANALYSIS

Some theories show that: financial reporting based on XBRL enhances the quality of financial information rather than increasing amount of information, it makes financial information more transparent, while financial reporting based on XBRL provides a series of standardized information in the capital markets. Meantime, some theories show that: There has a negative correlation between the quality of financial information disclosure and information asymmetry in capital markets, in other words, the higher quality of information disclosed the lower level of information asymmetry in capital market. Some researches showed that: if there has a lower degree of information

asymmetry in capital market, there will have more trading volume and more is able to promote the healthy development of capital market. This study attempts to study that the application of XBRL whether reduce the level of information asymmetry or not in China's capital market at the point of investor's view, which can show whether the application of XBRL played a positive affection in China capital market's development, also can find more applications "demanders" for the universal application of XBRL in China.

**The measure of information asymmetry in capital market:**

There are many ways to measure the level of information asymmetry, including the stock bid-ask spread, trading volume, stock price volatility and other measurement methods. The bid-ask spread refers to the difference between the price quoted by buyers and the price quoted by sellers for a given security. If there does not exist any information asymmetry in capital market, then the stock's bid-ask spread will be zero. The results show that: There has a positive correlation between bid-ask spread and information asymmetry, that is if there exists a higher degree of information asymmetry in capital markets, there will have a greater stock bid-ask spread. In many studies, the bid-ask spread model is widely used to measure the efficiency of the market. Trading volume-that is the total trading volume of market transactions body that changes stock at a given time. If we reduce the level of information asymmetry in capital market, the trading volume will be increased. Stock price volatility is defined as the return of stock price changed at a given period of time, Generally stock price volatility represents the risk or uncertainty in the capital market. Stock price volatility and information asymmetry exists a positive correlation, that is, if the level of information asymmetry in the capital market is relatively low in capital markets, naturally the level of stock price volatility is relatively low.

In the above three metrics, relatively speaking the relative bid-ask spread is the most widely used to measure the degree of information asymmetry in capital markets. Based on the status of China stock market, this study will use the bid-ask spread to measure the level of information asymmetry in the capital market.

**Design model:** Stock bid-ask spread is divided into two ways, namely absolute bid-ask spread and relative bid-ask spread. Absolute bid-ask spread is the absolute of bid-ask spread, which means the difference between the highest price and lowest price; Based on the absolute bid-ask spread to calculate as the value of the denominator, then divided by the best average trading price, The results obtained is relative bid-ask spread. In this study, we select the relative bid-ask spread for the research model, at the same time, We select the company's each trading days of each transaction for the study relative bid-ask spread standard criteria. represents the best selling price (the minimum price);

represents the best buying price (the maximum purchase price)  $\square$  is on behalf of the absolute bid-ask spread in a given time;  $\square$  represents the relative bid-ask spread;  $\square$  represents the average between the best selling price and best buying price:

$$\eta_t = A_t - B_t \tag{1}$$

$$P_t = (A_t + B_t) / 2 \tag{2}$$

$$K_t = \eta_t / P_t \tag{3}$$

**Data preparation:** In order to study the application of XBRL whether reduces the degree of information asymmetry in China's capital market, we randomly select 127 listed companies in Shenzhen Securities Exchange as research data, Meantime, we use these listed companies' stock data from October 2004 to March 2005 as a period standing for information asymmetry's performance before XBRL application in the capital market, at the same time, we use these listed companies' stock data from October 2009 to March 2010 as a period standing for information asymmetry's performance after application of XBRL. In order to ensure data comparability and efficacy, research data is mainly based on the following considerations:

- Shenzhen Stock Exchange begins to trial financial statements prepared production system based on XBRL in March 2005, more than 740 listed companies are listed in Shenzhen Stock Exchange, but in the 1st three months, Users rarely click and visit this system; after 3 months of its operation The number of people visiting and clicking system increased significantly, which indicates that XBRL was initially accepted by the market in October 2005. Therefore, we select the October 2004 to March 2005 as the research data before XBRL applications.
- In order to reduce the seasonal factors affecting on the study and maintain the overall comparability of data, in this study the data selected are available contrast, regardless of its length or month.

**Statistical assumptions:**

**H0:**  $U_1 = U_2$ , that is there is no significant difference between the average of two samples

**H1:**  $U_1 \neq U_2$ , that is there is significant difference between the average of 2 samples. The hypothesis testing approach is t test:

$$T = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{n \frac{\sum x_1^2 + \sum x_2^2}{n_1 + n_2} - \frac{n_1 + n_2}{n_1 \times n_2}}} \tag{4}$$

**Test results and analysis:** Table 1 presents the descriptive statistics of the relative bid-ask spread variables for the XBRL pre-adoption and post-adoption

Table 1: Description statistics

Statistics	N	Min.	Max.	Mean	S.D.
Relative bid-ask 04	127	3E-2	7E-2	4.00E-2	7.610E-3
Relative bid-ask 09	127	2E-2	5E-2	3.85E-2	5.161E-3
Valid N	127				

Min: Minimum; Max: Maximum; S.D.: Standard deviation

Table 2: Paired sample statistics

To 1 (relative bid-ask 04)	Relative bid-ask 04	Mean	N	S.D.	S.E. of mean
	Relative bid-ask 09	4.00E-2	127	7.610E-3	6.753E-4
		3.85E-2	127	5.161E-3	4.580E-4

S.D.: Standard deviation

Table 3: Paired sample statistics

Paired difference		95% confidence interval difference							
		Mean	S.D.	S.E. of mean	Lower limit	Upper limit	t	df	Sig. (2-tailed)
To 1 (relativebid-ask 04)	Relativebid-ask 04-relativebid-ask09	1.472E-3	6.667E-3	5.916E-4	3.014E-4	2.643E-3	2.488E0	126	0.014

S.D.: Standard deviation

periods and also shows a comparison of the sample means for each variable between the pre-adoption and the post-adoption period in China's capital markets. We use the paired t-test to study relative bid-ask spread for the XBRL pre-adoption and post-adoption periods, the test results list in Table 2 and 3.

In Table 1 relative bid-ask spread 04 stands for relative bid-ask spread in pre-adoption periods, while the relative bid-ask spread 09 stands for relative bid-ask spread in post-adoption periods. From Table 1 we can see that the relative bid-ask spread 04 is higher than relative bid-ask spread 09 (relative bid-ask spread 04 is 4.00E-2, the sample standard deviation is 6.753E-4; relative bid-ask spread09 is 3.85E-2, sample standard deviation is 4.580E-4), while the relative bid-ask spread is the main measurement in this study, from the above analysis we draw a conclusion the application of XBRL reduces level of the information asymmetry level to some extent.

From Table 2 and 3 we can see that: we study relative bid-ask spread for the XBRL pre-adoption and post-adoption periods by paired t-test, we found by the formula (4) calculation of the statistic P value is 0.014, less than 0.05, which illustrates that the relative bid-ask spread has a significant difference between the XBRL pre-adoption and post-adoption periods. In summary, we believe that the application of XBRL significantly reduced the level of information asymmetry in china's capital market, to the external bringing a certain interest for small and medium investors and improving the efficiency of market transactions and most importantly it effectively enhances the liquidity of the market and plays a positive role for promoting the stability of China's securities market.

**Analysis of the factors affecting model:** One hundred and twenty seven companies were selected as positive sample, we selected the data based on the method of random selection, in other words, we do not analyze all

companies in capital market and Therefore, Relatively speaking the analysis results will have a little uncertainty.

In order to research on the XBRL whether reduce the level of information asymmetry in capital market or not, we selected the relative bid-ask spread as a measurement, but the theory shows that the company size, stock price, trading volume and other factors have a correlation with the relative bid-ask spread, there has so many factors affecting our analysis, bounding to our research findings and related interpretations having some uncertainty.

## CONCLUSION

XBRL as a new financial reporting language widely supported by within the government in foreign countries, major industries and suppliers and has been widely praised by the IT industry in a few decades. Although at this stage the development of XBRL in China is not perfect, but from the application and study abroad terms, XBRL application not only brings benefits for small investors, but also for the government and most of the information users. This study gets a conclusion that the initial application of XBRL in China strengthen the quality of enterprise information, significantly reducing the level of information asymmetry in china's capital market and transaction costs and bringing benefits for small investors, Most of important XBRL lays a good foundation for the health development of China's capital market and promotes reasonable allocation of resources.

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