

# Empirical Research of Fair Value Measurement in Chinese Financial Enterprises—Analysis Based on Commercial Banks and Securities Corporations 2007-2012

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**Abstract:** *The use of fair value in China is closely linked with that of the United States, which calls for attention from the Chinese accounting academics. A series of hypothesis were tested and the relationship between the fair value information and the financial enterprises' value was examined. Results revealed that there is a correlation between changes in fair value and the share price of financial companies but not very significant. Furthermore, differences exist in the value relevance of fair value across financial companies (securities corporations and banks) during the sample period.*

**Keywords:** *Fair value; Value relevance; Financial enterprises*

## 1. Introduction

Firstly, this paper aims at testing the influence of fair value accounting in Enterprise Accounting Standards of China on the Chinese listed financial companies including securities corporations and commercial banks and to seek whether there is a difference of fair value relevance across them. Secondly, this paper attempts to study whether the value relevance of the balance sheet and income statement information has improved or not, as well as whether the fair value has incremental value relevance or not, in order to evaluate the effect of the implementation of existing accounting standards. Thirdly, this paper mainly uses empirical research and combined with theoretical reflection methods. In the specific empirical research, this article selects ten companies listed on Shanghai or Shenzhen A-share market financial company including securities corporations and commercial banks as sample.

## 2. Literature Review

The empirical research findings of fair value relevance and information content can be roughly divided into two groups, one considers the fair value of having value relevance and incremental value relevance, the other type of research conclusion is not fully support the fair value information with incremental explanatory ability compared with the historical cost. As in 1994, FASB issued “SFAS No.119 — value disclosure of derivative financial instruments and financial instruments” the study of estimate whether derivative financial instruments related and reliable or not increased. The reason is that the evaluation techniques and tools are in the market constantly evolving which did not form a complete measurement of the same standard framework.[1]

## 3. Research Methodology

### 3.1. The theory value relevance studies

#### 3.1.1. The hypothesis of efficient market

Fama (1970) put forward the efficient market hypothesis: In a stock market, if the stock price can fully reflect all available information, so the market is called efficient market. According to the different reactions to market information, the market efficient is divided into Weak Form Efficient Market, Semi-Strong Form Efficient Market and Strong-Form Efficient Market. In the weak form efficient market, securities prices only reveal past price information. Semi-strong efficient market hypothesis suggests that securities prices can completely reflect all information available to public,

investors can obtain this information quickly and will immediately reflected in the stock price. Strong-form efficient market hypothesis considers that securities prices are able to reflect all information about company's operations including disclosed or undisclosed information. The market environment used in this study is semi-strong efficient market. More specifically, we assume that the stock price can reflect all public information that related to the company's business prospects. In efficient capital market, the trading price of the stock is dynamic measurement of enterprise value which is results from investors who have fully information on the capital market optimize investment decisions based on their information.[2] Therefore, in theory, the value relevance of accounting information mainly through the correlation between stock prices and financial indicators to measure and gain coefficients from related model and goodness-of-fit (or correlation coefficient adjusted  $R^2$ ) to represent. Value relevance research, therefore, based on several important assumptions: that the market is the effective capital market that is the stock price can fully reflect the public information on the market investors make the optimal investment decisions based on these information to form stock prices, enterprise value can be converted to some specific financial index. In this case, the value relevance of accounting information can be quantified as the stock price of certain financial indicators regression. Time series data regression analysis is used to obtain goodness-of-fit (or correlation coefficient adjusted  $R^2$ ) to reflect the value relevance level of accounting information.

### ***3.1.2. The research methods of value relevance***

The main aim of value relevance research is to evaluate how the accounting data reflect investor demand for accounting information. According to the differences in research content and research angle, the value relevance research can be mainly split into three categories: The first category is Relative Association Studies. To research compared with existing generally accepted accounting principles (GAAP), whether the accounting surplus value measured by specific criteria more relevant with the stock market value or return. In other words, to test whether is helpful to improve accounting information decision relevance by replacing the current criteria. The relative association studies specialize in testing the relative usefulness of bottom line numbers of financial statement. The method used is to compare the regression equation  $R^2$  (Lev, 1989, 1999; Brown & Lys, 1999), the higher the  $R^2$ , the stronger the correlation. The second category is Incremental Association Studies. The main research is under the condition of given other variables to test whether a particular accounting data can explain the value of income or gains. Incremental association studies specific in exam value relevance of single part of financial statements. If the estimated regression coefficients significantly no equal to zero which means that specific accounting data has incremental value relevance of accounting information. For example, to whether fair value can increase the value relevance of accounting information. The third category is Information Content Studies. Research specific in testing whether accounting information bring incremental information for investors in a relatively short time. If there is a significant stock price reaction, says there exists value relevance of accounting information.[3]

This paper uses the relative association studies and the incremental association studies, based on analyzing the relationship between variables and stock prices to exam whether the regression coefficient of the ratio of changes in fair value and operating income and stock prices is significantly different from zero and reach the significant level to illustrate the explanatory power of variables on stock prices.

### ***3.2. Theoretical analysis of the fair value impact on the share price***

Efficient market hypothesis was first proposed by Paul Samuelson (1965) and Fama (1965,1969). Fama(1970) pointed out that in the efficient market, securities price can always timely, accurately and fully reflect all relevant information. Generally, in an efficient market, the stock price adjusted by market expected return rate could correctly estimate future value of stock. If the enterprise accounting information and stock prices remain empirical correlation, therefore, fair value measurement attribute could make accounting more quickly and accurately communicated to investors.[4]

### ***3.3. Research hypothesis***

From the perspective of the literature review, the majority of scholars, in particular the U.S. scholars do a lot of empirical research on value relevance of fair value information. Although the specific conclusions of the study are different, most studies provide some supporting evidences to value relevance of fair value information, especially using objective market price as the basis of fair value estimates. Most studies prone to fair value superior to historical cost. From the perspective of Chinese

standards change view, obviously, the purpose of the implementation of a series of accounting reform policies is to improve the quality and usefulness of accounting information provided by listed companies and to optimize the stock market allocation of resources.

Based on the above reasons, fair value measurement has a certain impact on the volatility of financial markets. Accordingly, in this paper I put forward the following hypothesis:

Null Hypothesis 1: There is no significant correlation between changes in fair value and the share price of financial companies.

Hypothesis 1: Based on the Income Statement prepared in accordance with the new Accounting Standard, there is a significant correlation between changes in fair value and the share price of financial companies

Null Hypothesis 2: There exists difference in the value relevance of fair value across financial companies (securities corporations and banks) during the sample period.

Hypothesis 2: Based on the Income Statement prepared in accordance with the new Accounting Standard, there is no difference in the value relevance of fair value across financial companies (securities corporations and banks) during the sample period.

### 3.4. Research model

The earliest study about value relevance is that Ball and Brown (1968) in the “An Empirical Evaluation of Accounting Income Numbers” studied the correlation between accounting data and capital markets to the concept of “value relevance” applied in the field of accounting in 1993. After that Olson and Feltham developed a more mature F-O valuation model. Lundholm(1995) states that the Ohlson(1995) and Feltham and Ohlson(1995) papers are landmark works in financial accounting. Price model and revenue model are general research models of value relevance study in recent years, both of them are evolved by Ohlson model. Price model is used to verify the correlation of financial data and stock market and test accounting data on what extent has explanatory power of stock data. Income statement, balance sheet and capital markets are linked to evaluate the usefulness of accounting information. In general, the revenue model of accounting surplus explanatory power tends to be low, therefore, in this paper I only choose price model. I learn from Barth(1994) and Ohlson(1995) model and create the following price model to test the correlation of the fair value impact on stock price.

$$P_{jt} = \alpha_0 + \alpha_1 ROA_{jt} + \alpha_2 PE_{jt} + \alpha_3 FV_{jt} / OI_{jt} + \mu \quad (1)$$

The dependent variable:  $P_{jt}$  is the closing price of stock  $j$  at time  $t_{1,5}$ . The independent variables:  $ROA_{jt}$  is the return on assets of stock  $j$  at time  $t$ ;  $PE_{jt}$  is the price-earning ratio of  $j$  at time  $t$ ;  $FV_{jt} / OI_{jt}$  is the ratio between the fair value changes and operating income of stock  $j$  at time  $t$ . [5]

### 3.5. Sample selection

Securities corporations as analysis objects were listed from the Shanghai Stock Exchange and the Shenzhen Stock Exchange and screening as follow:

Firstly, in order to calculate the impact of the use of the fair value of listed companies on stock price and stock returns, the required listed companies should disclose relevant data integrity. Therefore, this article excludes the companies that incomplete with relevant data. Secondly, select only a few annual reports of listed parent company but taking consolidated financial statements. Because consolidated financial data could be unification data that adjusted by the number of subsidiaries and parent company's accounting policy. In the process of accounting policy adjustment, fair value measurement may be adjusted according to parent company fair value so that this does not reflect the fair value performance of parent companies and subsidiaries respectively. In the end, cutting out the related data of incomplete company, this paper obtains five securities corporations and five commercial banks listed in China A-shares from Shanghai Stock Exchange and Shenzhen Stock Exchange which can provide annual reports from 2007 to 2012. All annual stock prices referred to the closing prices on April 30 of the following year. Data are gained from RESST database (<http://www.resst.cn>).

4. Analyses & Results

4.1. Descriptive statistic on the fair value by sectors

Table 1: Descriptive statistic on fair value variables of selected securities corporations (2007~2012).

	P	FV	PE	ROA
Mean	20.06867	-0.024389	29.61078	0.049306
Median	15.32000	-0.000730	25.59414	0.039746
Maximum	51.99000	0.184186	101.7331	0.120554
Minimum	9.720000	-0.708694	-24.31013	0.017771
Std. Dev.	11.50078	0.154254	23.51863	0.026399
Observations	5	5	5	5

Table 2: Descriptive statistic on fair value variables of selected commercial banks (2007~2012).

	P	FV	PE	ROA
Mean	14.95800	0.000486	0.375844	0.008605
Median	13.49500	0.000159	7.930900	0.008576
Maximum	35.01000	0.008747	34.46087	0.013326
Minimum	5.590000	-0.012660	-348.1429	0.001294
Std. Dev.	7.395257	0.004551	66.33700	0.002951
Observations	5	5	5	5

Table 1 and Table 2 present the descriptive statistic for the variables of pooled securities corporations and commercial banks during the sample period respectively. These tables list the descriptive statistic results of securities corporations and banks of the same sample size. The standard deviation of stock prices of banks is smaller than the standard deviation of stock prices of securities corporations while the mean of stock prices of banks is smaller relatively compared with that of securities corporations. The standard deviation of the ratio between the fair value and operating earnings of securities corporations is higher than that of banks, the difference is significant.

4.2. Correlation analysis

This paper combines six years' relevant variables data from 2007 to 2012, and links with a summary of time series sample to do correlation analysis.

Table 3: Correlation matrix of each variable in price model.

	P	ROA	PE	FV
P	1	0.0523***	0.089	0.161
ROA	0.0523***	1	0.146**	0.035
PE	0.089	0.146**	1	0.002
FV	0.161	0.035	0.002	1

Notes: \*\*\* indicates 1% significant level; \*\* indicates 5% significant level

Table 3 shows the results of Pearson correlation across pooled firms during the sample period. As can be seen from the table, the ratio between the changes in fair value gains and losses has positive correlation with stock price, return on assets and price-earnings ratio, but not very significant.

Table 4: Correlation matrix of selected banks (2007~2012).

	P	ROA	PE	FV
P	1	-0.071826	-0.072275	0.205849
ROA	-0.071826	1	-0.028373	-0.077039
PE	-0.072275	-0.028373	1	0.040761
FV	0.205849	-0.077039	0.040761	1

Table 5: Correlation matrix of selected securities corporations (2007~2012).

	P	ROA	PE	FV
P	1	0.615398*	0.187354	0.232699
ROA	0.615398*	1	-0.297334	0.182127
PE	0.187354	-0.297334	1	0.107441
FV	0.232699	0.182127	0.107441	1

Notes: \*indicates 10% significant level

Table 4 and Table 5 represent the results of Pearson correlation across securities corporations and banks respectively. Hypothesis2 tests whether there is a difference in the value relevance of fair value across securities corporations and banks. The correlation analysis results show that there is no significant difference between their coefficients. The coefficient between the fair value and stock prices of securities corporations is 0.232699 while the coefficient between the fair value and stock prices of banks is 0.205849, there is no significant difference between them. Therefore, the results in the study basically support Hypothesis2 that there is no difference in the value relevance of fair value across securities and banks during the sample period.

### 4.3. Regression Analysis

#### 4.3.1. Regression analysis on the fair value for pooled sample during the sample period

This study considers the sample data are consistent with panel data. Listed company code is considered as the cross-sectional variable while year is regarded as time-series variable. DW test values are all relatively close to 2, which mean that the selected data does not exist autocorrelation. The coefficients of return on assets ratio and the ratio between changes in fair value and operating income are 184.9502 and 13.00185 respectively. This suggests that both the return on assets ratio and the ratio between fair value changes and operating income have a positive explanatory power on stock prices. The research of fair value could increase the value relevance of stock prices and other accounting information. The research of fair value could increase the value relevance of stock prices and other accounting information. The probability of F-statistic is far less than the significance level ( $\alpha=0.01$ ) which indicates that the model pass F-statistic at 1% significant level. In other words, the model is statistically significant, a significant linear relationship. In most cases, the coefficients of price-earnings ratio and return on assets are greater than zero, in particular which suggest that both price-earnings ratio and return on assets have a positive explanatory power on stock prices. Compared to other indicators, the ratio between profits and losses in fair value and operating income has a greater degree of influence on stock price. The research of fair value could increase the value relevance of stock prices and other accounting information. It could further explained that with 2008 financial crisis ease, both the correlation between fair value measurement and market performance and the correlation between profits and losses in fair value and stock price have significantly improved. Changes in fair value gains and losses have a superb explanatory power on stock prices. However, the overall goodness of fit of the model is not ideal enough since the coefficient of determination adjusted  $R^2$  is not large enough. The determination coefficient adjusted  $R^2$  is only 0.294310 which means that the overall goodness of fit of the model is not very perfect. In this paper, the choice of variables can only be based on publicly available data, however, even only study impact of fair value on stock price, there are also items contained in the fair value accounts which cannot afford to get through public information without fully consideration.

In a word, there is no significant correlation between changes in the fair value and the share price of financial companies that rejects Hypothesis 1. However, the fair value has a positive explanatory power on stock prices.[6]

#### 4.3.2. Regression analysis on the fair value by sector

Table 6: Regression results for selected securities (2007~2012).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA	314.7248	62.81002	5.010741	0.0000
PE	0.193579	0.069728	2.776217	0.0101
FV	4.368595	10.32301	0.423190	0.6756
C(constant)	-1.074606	4.570878	-0.235098	0.8160
R-squared	0.532382		Mean dependent var	20.06867
Adjusted R-squared	0.478426		S.D. dependent var	11.50078
S.E. of regression	8.305877		Akaike info criterion	7.195370
Sum squared resid	1793.677		Schwarz criterion	7.382196
Log likelihood	-103.9305		Hannan-Quinn criter	7.255137
F-statistic	9.866970		Durbin-Watson stat	2.065310
Prob(F-statistic)	0.000161			

Table 6 represents the descriptive statistic for the variables of pooled firms in 2012.

The determination coefficient adjusted  $R^2$  is nearly 0.5 which means that approximately 50% can

be explained by the explanatory variables chosen in the model. The overall goodness of fit of the model is ideal. The probability of F-statistic is smaller than the significance level ( $\alpha=0.01$ ) which indicates that the model pass F-statistic at 1% significant level. In other words, the model is statistically significant, a significant linear relationship.

Table 7: Regression results for selected banks (2007~2012).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA	-146.3190	480.0055	-0.304828	0.7629
PE	-0.009172	0.021308	-0.430442	0.6704
FV	332.6666	311.4248	1.068208	0.2952
C(constant)	16.05894	4.371144	3.673853	0.0011
R-squared	0.052279		Mean dependent var	14.95800
Adjusted R-squared	-0.057074		S.D. dependent var	7.395257
S.E. of regression	7.603367		Akaike info criterion	7.018625
Sum squared resid	1503.091		Schwarz criterion	7.205452
Log likelihood	-101.2794		Hannan-Quinn criter	7.078393
F-statistic	0.478075		Durbin-Watson stat	1.269181
Prob(F-statistic)	0.700300			

As show in Table 7, the determination coefficient adjusted  $R^2$  is only -0.057074 which means that the overall goodness of fit of the model is not very ideal. However, the coefficient of the ratio between changes in fair value and operating income up to 332.6666 of banks that much larger than that of securities corporations. This suggests that the ratio between fair value changes and operating income has a positive explanatory power on stock prices especially for commercial banks. The research of fair value could increase the value relevance of stock prices and other accounting information. This is consistent with Barth (1994) findings, and he believed in the value of securities investment, the fair value information for investors to estimate the bank stock prices is relevant and reliable.

## 5. Discussion & Conclusions

### 5.1. Research conclusions

This study tests the value relevance of fair value from 2007 to 2012 in China. The selection of value relevance of fair value as criteria to measure accounting information, to evaluate the impact on Chinese accounting information quality since the introduction of fair value. In order to conduct this investigation, six years observations of five securities corporations and five commercial banks are selected as the research sample. We study the value relevance between the fair value and stock prices since China re-introduced fair value measurement. Also, this paper compares the financial sector effects on value relevance of fair value during the sample period.

The main conclusions of this study are as follow:

(1) With the stock price dependent variable being that for  $t_{1,25}$  whereas all the other variables were for  $t_1$ , any influence of the fair value variable on the stock price has been lost. According to the empirical results in this paper, in the price model correlation analysis, changes in fair value that prepared in accordance with Chinese new accounting standards has correlation with financial companies' stock prices, but not significant enough. In addition, there is no significant difference in the value relevance of fair value across securities and banks during the sample period. To the problem that how the fair value measurement influence the listed companies' stock prices, it may be because: the listed financial companies hold substantial financial assets and this part of financial assets under the old guidelines are accounted in accordance with cost but changes in fair value is not adjusted for the corresponding gains and losses. However, with the application of new standards, this part of financial assets that account for a larger proportion in financial enterprise would fluctuate with the market and adjust their values, so as to affect the profits and losses of the enterprise. Investors are most concerned about the company's profitability, and the use of fair value makes market volatility by profits and losses of the company conduct to investors, investors affected inevitably lead to stock price fluctuation.

(2) Fair value accounting has value relevance with accounting information, the introduction of fair value measurement has enhanced the decision usefulness of accounting information. Since the ratio between fair value changes and operating income as a representative indicator of fair value has a

positive explanatory power on stock prices especially for commercial banks. The research of fair value has incremental value relevance of stock prices.

### ***5.2. Suggestions to application of fair value accounting in China***

(1) Further guidance of fair value should be introduced in China. China accounting standards not concentrated on the basic issue of fair value measurement in an uniform way, this causing the repeated phenomenon in the relevant provisions of specific guidelines. To solve this problem, China should develop a specific guideline relating to the basic issues of fair value. Furthermore, to form announcement to explain the guideline, so that could provide guidance of fair value measurement.

(2) The relevance and reliability of fair value information could be improved by standardizing fair value accounting system to avoid subjective human factors in the process of execution. First of all, it is necessary to standardize the fair value accounting policy especially under the non-active market environment. Chinese new accounting standards introduce the fair value measurement attribute cautiously and define the public active market. However, on the non-active public market level, a hidden danger for the subjective operation left. The new standards claim that financial assets and financial liabilities are initially measured at fair value while subsequent analysis is related to the classification of financial products. For example, if one buy a company's stock from an active public market but for some reasons the company is suspended for a long time. The case of U.S. subprime mortgage product is a more typical example. Secondly, it is essential to standardize valuation techniques and perfect valuation management systems. On one hand, accounting standards should require companies to choose the valuation model which is generally recognized by market participants and has been confirmed its reliability through previous transactions. On the other hand, the operation of valuation personnel's should be regulated. For instance, to claim what data should be used when collecting information, what conditions should be met when selecting and the validating model, the specific operation of model adjustment. Last but not least, perfect the disclosure ways and contents of uncertainty information. In order to realize stock price can reasonable response to enterprise management information and allow investors to achieve reasonable investments, enterprise information should be disclosed adequately and reasonably, especially disclosure of uncertain information. At present, the company's intangible assets, financial instruments and derivative financial instruments change so fast but investors can only gain the fair value measurement data after the balance sheet is published. Therefore, in addition to disclose fair value in the balance sheet, it is better to disclose changes in fair value during the period of asset holdings, or use the way such as stock K line graph which translates the maximum, the minimum and the mean price of the assets or the liabilities of affiliated accounting period into a form of graph of transaction price movements in order to reveal the dynamic changes of fair value. For using future cash flow to valuate assets, each estimator including cash flow, holding period, discount rate, etc. should be special disclosed.

### ***5.3. Research limitation***

This paper based on the efficient market and assumes that equity market capital is the unbiased estimator of equity value, but the exact market value of equity cannot be obtained and Chinese stock market does not meet the efficient market hypothesis currently. In addition, there exist three specific research problems:

(1) On the selection of sample, this paper is based on listed financial enterprises without considering non-financial enterprises. In addition, the main consideration in this paper is fair value measurement impact on listed financial enterprises and for how it influence other non-financial enterprises are not covered in this paper.

(2) On the selection of data, only ten companies choose in this paper, and the amount of sample data is small which may have some impact on the empirical results. From the Appendix are subject this limitation significantly, based as they are only ten observations each year are subject to this limitation significantly, based as they are on only ten observations each year. In addition, the data relates to a period of several global recession which might have distorted the data. Besides, the data relates to a period of severe global recession which might have distorted the data.

(3) On the selection of empirical methods, this paper selects price-earnings ratio and return on assets as the main indicators of stock price, but in fact, many other factors may affect stock price, thus, the key indicators selection may have some impact on the empirical results.

#### **5.4. Future research prospect**

In this paper, the empirical part only adopted the improved model of Ohlson valuation model rather than using revenue model and other models in supplemental test. In a further analysis, multiple models have better to be used to exam the value relevance of fair value. For example, using pricing models together with revenue models to makeup each single model its limitations and let the result of the hypothesis tested by different models become more comprehensive and more persuasive. Besides, under the premise of sample data readily accessible, the number of samples should be appropriately increased. At the same time, the type of sample could be divided into financial and non-financial industries to research.

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