

Earning Response Coefficients And The Financial Risks Of China Commercial Banks

Cheng F F¹ and A. Nasir²

This paper reports new findings of a significant relationship between financial risks, price risk, market risk, foreign exchange and earnings response coefficients of commercial banks: The financial risks are interest rate risk, liquidity risk, credit risk and solvency risk. The methodology used is the well accepted earnings-to-share price relation regression with the risks as the controlling factors. Overall, the study discovers that China commercial banks have a very strong returns-to-earnings relation Test results indicate that the liquidity risk factors of China commercial banks contributed significantly to the returns-to-earnings relation. The liquidity risk contains the information beyond earnings changes in the return-to-earnings relation. These findings suggest that lending and borrowing activities of banks will be considered as efficient if activities reduce the liquidity risk through the proper asset-liability management. The results are plausible as they show the importance of asset-liability management in commercial banks.

Field of research: Accounting, Banking, Earning response coefficients.
Financial risks, China Commercial Banks

1.0 Introduction

The banking industry has gone through many reforms since the BASEL I and II accord being introduced. Banking in China is one of the industries that has undergone reform and also expanded very rapidly. The reformation started in 1978 for China commercial banks had expanded the banking system by establishing several large state-owned commercial banks and splitting the Big Four state-owned banks and the lending functions from the People Bank of China (PBOC). The Bank of China (BOC, 1912), China Construction Bank (CCB, 1954), Agricultural Bank of China (ABC, 1979), and Industrial and Commercial Bank of China (ICBC, 1984) were initially designated to serve their sector of economy. In 1985 the Big Four were allowed to compete in all sectors. But their competition among them was limited because they served mainly as policy lending “conduits” for the government and lacked incentive to compete until mid- 1990s (Yang, 2002). Therefore the research questions are (1) What is the current financial situation of China commercial banks? (2) Which risk factor is significant in the earnings response?

¹ Senior Lecturer, Department of Economics, Faculty of Economics and Management University Putra Malaysia, 43400, Serdang, Selangor, Malaysia;

² Dean, Professor, Faculty Economics and Management, University Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

Cheng & Nasir

Risk is the level of uncertainty in all business. Financial risk is referred to any risk associated with any form of financing. In this paper, there are four major financial risks in managing banks. Credit risk; also know as default risk or asset quality risk, is the probability of loss due to a debtor's non-payment of a loan or other line of credit such as interest. Liquidity risk is the potential ability of a bank to fund its financial needs. Solvency risk or capital risk refers to the capital cushion of a bank has to offer to protect its depositors and borrowers from decline in assets value. Interest rate risk is variability in value borne by an interest bearing asset such as loan. It also refers to the potential of negative effects on the net cash flows and liabilities resulting from the change of interest rate. There are other risks such as stock price risk or equity risk. Stock price risk is the risk that one's investments will depreciate because of stock market dynamics that causing one to earn negative return. The measure of risk used in the equity markets is typically the standard deviation of a security's price over a number of periods. The standard deviation will delineate the normal fluctuations one can expect in that particular security above and below the mean, or average. Market risk is also know as systematic risk, the risk that the value of an investment will decrease due to moves in market factors and which cannot be diversified . Exchange rate risk is the risk that investors face because the changes in exchange rates may have an effect on investments that they have made.

The earning response coefficient, ERC is used to estimate the relationship between return of equities and the unexpected return of companies' earnings announcements. Under efficient market hypothesis (Fama 1970,1976 and 1991), equity prices adjust rapidly to the arrival of new information related to the equity. Investors with the superior information are expected to use that information until the share prices have effectively reflects the information and that cause the change of the company's share price. The ERC is an estimate of the change in company's stock price due to the information in a company's earnings announcement coming into the market. Cheng *et al.* (2001) found a significant price-to-earnings relation, the strength, consistency and magnitude of the relation in emerging market were not as large as those reported in any institutionally more developed markets. Firm-specific variables -revenue, firm size, and debt-equity and auditor choice - do not appear to affect the price-to-earnings relation. Only the extraordinary earnings item has significant information content beyond unexpected earnings in emerging markets. A research conducted by Freeman (1987) suggested that the relationship between unexpected earnings and equity return could be nonlinear which is generally considered to be linear and ERC is the slope coefficient of a linear equation.

The paper is divided into four chapters. Chapter 2 deals with the literature review. Chapter 3 contains an explanation of the research design, hypotheses, data and variable selection: methodological issues were also discussed. The

findings and discussion were presented in chapter 4 while paper end with conclusions and limitation in chapter 5.

2.0 Literature Review

Reported earnings consist of very different components and each of them with different value implications. Therefore it is inappropriate to expect the same price reaction to a dollar of unexpected earnings. Lipe (1986) suggested the simple regression of returns on earnings understates the true ability of earnings to explain returns with the recognized of the accounting earnings limitations. It is clear that the relationship between stock prices and returns in particular countries and economic variables have received great attention over the past few years. In Australia, prior empirical research of was carried by Cheng and Ariff in 2008. They have tested the model in their study extends models reported extensively in the earning response literature with four variables (credit risk, interest risk, solvency risk and liquidity risk) incorporated into the model to accommodate the Australia banks stocks. The majority of previous studies indicated that earnings effects share prices is one to one. Cheng *et al.* (2001) identified credit risk factor of banks as a significant influence on returns to earnings relation and which is an important factor that enters the revaluation of bank share prices.

The relation between default risk and stock returns has important implications for risk-reward trade-off in the financial markets. If default risk is systematic, then investors should demand a positive risk-premium for bearing this risk. The standard implementation of Capital Asset Pricing Model might fail to completely capture the default risk premium if corporate failures are correlated with deterioration in investment opportunities or unmeasured components of wealth such as human capital (Fama and French (1990)) and debt securities. In contrast to the theoretical prediction, recent empirical studies Dichev, (1998) and Campbell, Hilscher, and Szilagyi (2008) document a negative relation between default risks and realized stock returns in the post-1980 period. This evidence suggests that the cost of equity capital decreases with default risk, a finding that has important implications for corporate financial policies also. The negative relation between default risk and stock returns can be taken as evidence in support of market inefficiency. However, it remains unclear why some rational investors are not able to arbitrage away this anomaly. The study suggests that it is difficult to uncover the true risk-return relation using realized return as a proxy for the expected return in small samples. This concern is especially severe for portfolios of high default risk stocks because of their high return volatility.

The closer investigation of the post-1980 analysis shows that the anomaly is predominantly driven by large under-performance of high default risk stocks during the decade of 1980. Their result showed that the post-1980 under-performance of high default risk stocks does not represent an asset pricing anomaly; rather it is an outcome of surprisingly low realized returns of high

default risk stocks during this decade. In terms of ex-ante expectation, which is what matters for the risk-return trade-off, the relation between default risk and stock returns is positive. Lastly they concluded regarding risk-return trade-off can change significantly depending on the way the expected return is measured. It can be a fruitful task for future empirical work to construct better measures of the expected return to uncover the true risk-return trade-off in the financial markets.

Dhaliwal and Reynolds, 1994 present evidence that firms with higher debt-equity ratios have lower Earnings Response Coefficients (ERCs), after including proxies for equity beta and earnings persistence. They conclude that proxy for firm discount rates, equity beta does not fully reflect the default risk of debt. Their interpretation relies on the assumption that higher debt-equity ratios are associated with higher expected future returns. However, Dichev, 1997 who finds that firms with a higher bankruptcy probability and firms that have experienced exchange delisting, an alternative measure of default risk earn lower than average future stock returns. Dhaliwal and Reynolds' study had directly assesses the relationships between debt-equity ratios and future stock returns and it also considers an alternative interpretation to the observed associations between ERCs and debt-equity. The higher debt-equity ratios reflect lower earnings persistence and growth not adequately captured in the time-series persistence measure by them.

3.0 Research Methodology

3.1 Research Design

Many previous studies on earnings response acknowledged on the existence of strong correlations among the changes in stock price and the changes of earnings. This research is to study the impact of earnings to share price for China commercial banks and the magnitude of earnings response coefficient that stock prices change affects by risk determinants.

3.2 Abnormal Return

The abnormal return was calculated by using the difference between current year return and previous year return and which is commonly used in accounting literature. Sharpe's (1964) Market Model: Analysis of Abnormal Returns as a standard general equilibrium relationship for asset returns was used. Abnormal Returns (AR) are:

$$AR_{it} = R_{it} - [\alpha_i + \beta_{it} R_{mt}]$$

With $R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$ and $R_{mt} = (I_t - I_{t-1}) / I_{t-1}$. In addition, I referred to market's composite index. The market parameters α_i and β_{it} were estimated by ordinary least square regression over trading periods, -71 months to -11 months (parameter estimation period) relative to the announcement month.

The windows of analysis for the ARs were taken as 12 months. The windows of analysis were from the month of earnings announcements to 11 months before the announcements.

3.3 Analysis of Unexpected Annual Accounting Earnings

Unexpected annual earnings were computed using the naive expectation model, which assumed that the next period's expectation is simply the current period's annual earnings. This was consistent with the study to investigate the effect of price changes at a point in time. Unexpected annual earnings (UEs) were computed using naïve model:

$$UE_{it} = [E_{it} - E_{I(t-1)}] / E_{I(t-1)}$$

To study on the returns-to-earnings relation, the coefficient was tested in the regression analysis between unexpected earnings as independent variable and abnormal return as the dependent variables. The significance of the slope coefficient (b) and the coefficient of the determination or the R square were used to measure the inferences regarding the information content of annual earnings. The model being used:

$$CAR_i = a_1 + b * UE_i + \epsilon_i$$

Where,

CAR_i : Cumulative abnormal returns over 12 month's window

UE : Unexpected Annual Earnings

ϵ_i : A random disturbance term assumed to be normally distributed

The slope coefficient of the regression b was called the Earnings Response Coefficient (ERC).

3.4 Risk Determinant Factors

The seven financial risk factors were identified. The financial ratios from the balance sheets were grouped as factors used for factor analysis. The seven financial risks were identified are interest risk factor, liquidity risk factor, credit risk factor, solvency risk factor, stock price risk factor, market risk factor and exchange risk factor. In this study, the following ratios were used to measure the seven financial risks.

Interest rate risk, I_r	: Short Term Liability/ Total liability
Liquidity risk, L_r	: Net Loans / Total Assets
Credit risk, C_r	: Loan Loss Reserve / Gross Loans
Solvency risk, S_r	: Total Capital Ratio
Stock price risk, σ_i	: Standard deviation of stock returns
Market risk, σ_m	: Standard deviation of market returns
Exchange rate risk, E_r	: Standard deviation of exchange rate of Renminbi (RMB, Yuan) to United States dollar (USD, \$)

Cheng & Nasir

The relation between abnormal return as dependent variable and unexpected earnings, interest rate risk, liquidity risk, credit risk, solvency risk, stock price risk, market risk and exchange rate risk as independent variables were tested in the regression:

$$CAR_i = a_1 + a_2UE_i + a_3Ir_i + a_4Lr_i + a_5Cr_i + a_6Sr_i + a_7\sigma_i + a_8\sigma_m + a_9Er_i + \epsilon_i$$

Where,

CAR_i : Cumulative abnormal returns over 12 month's window

UE : Unexpected Annual Earnings

Nine simple regressions were performed according to the above specification: The research question is to identify these factors whether have the information content over and above the information from the earnings disclosures (UE). The panel ordinary least square regression was used for regressions and determined the key factors to be more significantly in adding information to price determinants.

3.5 Data Collection

The China commercial banks data set was organized from the monthly closing prices, annual earnings and balance sheets information in the sources: Bankscope financial data in the China Stock Exchange; the financial information from the Company Annual Reports; and the annual earnings announcements obtained from China Stock Exchange website.

Cheng & Nasir

Table 1 :Total Assets, Deposits, Equity, Income and Loans of Selected Banks.

2008						
No	Bank	Total Assets	Deposits & S-T funding	Shareholder Equity	Net Income	Loans
1	Bank of Beijing Co Ltd	417,021	365,451	33,814	5,417	187,690
2	Bank of China Limited	6,951,680	5,972,449	489,887	65,894	3,189,652
3	Bank of Communications Co.Ltd	2,682,947	2,445,281	150,095	28,490	1,298,776
4	Bank of Nanjing	93,716	77,198	11,296	1,456	39,057
5	Bank of Ningbo	103,263	87,570	8,805	1,332	48,466
6	China CITIC Bank Corporation Limited	1,188,152	1,056,360	95,661	13,354	651,352
7	China Construction Bank Corporation	7,555,452	6,867,357	467,562	92,642	3,683,575
8	China Merchants Bank Co Ltd	1,571,797	1,420,232	79,781	20,946	852,754
9	China Minsheng Banking Corporation	1,050,141	946,158	53,810	7,831	646,443
10	Hua Xia Bank	731,637	666,039	27,421	3,071	345,668
11	Industrial & Commercial Bank of China	9,757,146	8,900,520	606,630	111,226	4,436,011
12	Industrial Bank Co Ltd	1,020,899	886,354	49,022	11,385	489,986
13	Shanghai Pudong Development Bank	1,309,425	1,199,950	41,702	12,516	681,267
14	Shenzhen Development Bank Co Ltd	474,440	442,873	16,401	614	281,715

Data from year 2002-2008 were used and the population of sample

consisted of 14 listed and traded banks over the test period. Table 1 shows the general information about these 14 banks in year 2008. These banks are Bank of Beijing Co Ltd, Bank of China Limited, Bank of Communication Co. Ltd, Bank of Nanjing, Bank of Ningbo, China CITIC Bank Corporation Limited, China Construction Bank Corporation, China Merchants Bank Co Ltd, China Minsheng Banking Corporation, Hua Xia Bank, Industrial & Commercial Bank of China (The)-ICBC, Industrial Bank Co Ltd, Shanghai Pudong Development Bank Co., Ltd.

4,0 Findings and Discussion

4.1 Returns-to-Earnings for Banks

Table 2 shows the regression results of the returns-to-earnings relation of the fourteen banks in the period 2002 to 2008. The regressions are between risk-adjusted cumulative abnormal returns as dependent variable and the unexpected annual earnings, the seven risk factors as the independent variables. To estimate the returns to earnings relation, the independent

variables were regressed one by one. The results in table 1 are shown the first eight regression models then follow by a final regression model which consists of all the independent variables that significantly affect the returns-to-earnings relation. From the Model 1, the regression result indicates that the coefficient for UE is positive. The value for UE is 0.188 and its t-statistic is 2.331 which are significant. The R-square in Model 1 is 0.133. The 14 banks exhibited strong return-to-earnings relation.

4.2 Risk Determinants of the Returns-to-Earnings Relation for Banks

The seven risk factors were subsequently added one by one into the regression of risk adjusted cumulative abnormal returns and unexpected annual earnings. The models 2, 4,5,6,7 and 8 shown the coefficient for interest risk, credit risk, solvency risk, stock risk, market risk and exchange rate risk factors are insignificant, except the coefficient for liquidity risk factor in model 3. Model 3 indicates that the coefficient of the liquidity risk factor has a t-statistic of -2.068 and a p-value of 0.048 which is significant at 0.05 level. The coefficient of the liquidity risk factor has a negative sign which shows that the lower the bank liquidity risk factor the banks have the lower ability to fund their financial needs. It also has the mean for banks that having the same unexpected earning and the one with lower liquidity risk, the higher the investor's valuation of the bank share prices in response to the earnings changes.

The model 9 indicates the coefficient for the liquidity risk factor has a t-statistic 1.460 and a p-value of 0.046. This result suggests that within 95 per cent confidence, the coefficient for liquidity risk factor is greater than being zero. Therefore, liquidity risk factor is to be taken as indicating as having a directional and also a magnitude effect after the earning variable. In this study, there is no econometric problem and the data used are pooled data. Therefore, these data do not have auto correlation problem. The Durbin-Watson statistics lie between 1.901-2.257 shows that the data does not have autocorrelation problem. The values of Variance Inflation Factors (VIF) lie between 1.00-1.00, which are below significant level. Hence there is no multicollinearity problem. Generally there is no econometric problem and the residuals do not display serial correlation or heteroscedasticity. Hence given these parameters are estimated with no serial correlations and no serial correlations and no heteroscedasticity one could suggest that these regression results provided robust estimates of the parameters.

5.0 Conclusion

The findings in this paper suggest that accounting earnings is a price relevant variable. The earnings have a contemporaneous impact on share prices for China commercial banks. The risk determinants affect the magnitude of the

Cheng & Nasir

earnings response coefficients that stock prices change in a significant manner in response to the change of earnings. The liquidity risk factor of China commercial banks contributed significantly to the returns-to-earnings relation. Overall, the study discovers that china commercial banks have a very strong returns-to-earnings relation. The liquidity risk contains the information beyond earnings changes in the return-to-earnings relation. Therefore, the liquidity risk should be of concerned after the unexpected earning variable. The other six risk factors are not significant and this may due to the investor are not concern about the risk and the 14 commercial banks are very well managed by their managers.

6.0 References

- Campbell, John Y., Jens Hilscher, and Jan Szilagyi 2008, In search of distress risk, *Journal of Finance* 63, 2899.
- Cheng, Ariff and Shamser. 2001, "Accounting Earnings and share Revaluation: Further Exploration". *Capital Market Review*. Vol.9. No1&2: 21-48.
- Cheng and Ariff 2007, "Abnormal Returns of Bank Stock and Their Factor-Analyzed Determinants" *Journal of Accounting-Business & Management*, Vol 14, October 2007.1-15.
- Collins, D.W., and S.P.Kothari.1989, "An Analysis of International and Cross-Sectional Determinants of Earnings Response Coefficients," *Journal of Accounting and Economics* ,pp.143-181.
- Dhaliwal, D and S. Reynolds 1989, "The effect of the firm's capital structure on the relationship between changes and stock returns," Working Paper, University of Arizona.
- Dichev, Ilia, 1998, "Is the risk of bankruptcy a systematic risk?", *Journal of Finance* 53, 1141-1148.
- Fama, E. F.1970, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, 25, Pages 383-417.32
- Fama, E. F. 1976, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Financial Economics*, Volume 3, Number 4, Pages 361-377.
- Fama, E. F.1990, "Stock Returns, Expected Returns and Real Activity", *Journal of Finance*, 45, pages 1089-1108.
- Fama, E. F. 1991, "Efficient Capital Markets II", *Journal of Finance*, 46, pages 1575-1617.

Cheng & Nasir

- Freeman, R.N. 1987, "The Association Between Accounting Earnings and Security Returns for Large and Small firms" *Journal of Accounting and Economics*,9,195-228.
- Lipe,R.C. 1990 "The Relation between Stock Returns and Accounting Earnings given Alternative Information". *The Accounting Review*, Vol.65,No.1, pp. 49-71.
- Simpson and Evans.1996, "Banking stock Returns and Their Relationship to Interest and Exchange Rates: Australia Evidence"
- Shamsher M. and Cheng F.F. 2001, "The Effect of Auditor Choice on the Earnings-to>Returns Relationship: The case of Malaysia" *Global Business and Finance review*, Vol6, No 2: 53-64.
- Sharpe. 1964, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance* 19, pp.425-442.
- Wong, Y. C. R., & Wong, M. L. S. 2001, "Competition in China's domestic banking industry", *Cato Journal*, 21(1), 19-41.
- Yang, X. 2002, "General financial history of China. Beijing: China Finance Publishing House".

Cheng & Nasir

Table 1: Regression Results for Returns-to-Earnings Relation for Banks in China from period 2002-2008

Independent variable	Constant	UE	Interest risk	Liquidity risk	Credit risk	Solvency risk	Price risk	Market risk	Exchange risk	Adj R-sq	VIF	F-Stat	DW
Model	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	a ₉				
1	-0.136 (-2.857) (-0.08)	0.188 (-2.331) (0.027*)								0.133	1.00	5.435 (0.027*)	2.137
2	-0.03 (-0.069) (0.946)		0.121 (0.528) (0.602)							-0.011	1.00	0.675 (0.418)	2.181
3	0.011 (-0.313) (-0.757)			-0.654 (-2.068) (0.048*)						0.102	1.00	4.278 (0.048*)	2.223
4	-0.01 (-0.041) (-0.968)				0.05 (-0.423) (-0.675)					-0.029	1.00	0.179 (-0.675)	2.128
5	-0.02 (-0.053) (-0.958)					0.132 (-1.051) (-0.302)				0.004	1.00	1.104 (-0.302)	2.257
6	-0.046 (-0.356) (-0.724)						0.398 (-0.371) (-0.713)			-0.031	1.00	0.138 (-0.713)	2.13
7	0.112 (-1.297) (-0.205)							-1.62 (-1.417) (-0.167)		0.034	1.00	2.009 (-0.167)	1.901
8	-0.07 (-0.167) (0.869)								-5.212 (-0.334) (0.741)	-0.032	1.00	0.112 (0.741)	2.190
9	-0.513 -1.955 0.061	0.200 (2.519) (0.018*)		0.070 (1.460) (0.046*)						0.166	1.00	3.893 (-0.033)	2.205

Note: Number in each bracket is t-statistic and p-value, significant at (*) 0.1, (**) 0.01, (***) 0.001 level. VIF- variance Inflation Factors, DW- Durbin-Watson statistics.