AN EMPIRICAL RESEARCH ON VALUATION FACTORS FOR BANKING SECTOR IN CHINA

-WHAT FACTORS THE MARKET IS VALUING BANKS?

By

LIU, Zhonglei

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
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ABSTRACT

AN EMPIRICAL RESEARCH ON VALUATION FACTORS FOR BANKING SECTOR IN CHINA

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As banks in China face the boom of financial sector reform and opening opportunity, more and more attention is attracted to the investment opportunity on banks. Last year, Industrial and Commercial Bank of China became the most profitable bank in the world again, even after one of the most serious financial crisis in human history, recording a net profit CNY129.4 billion(about USD19 billion). Until the end of 2009, there are 14 banks that are listed on Shanghai and Shenzhen stock exchanges. It's inevitable for China investors to keep research on banking sector.

On the other hand, during the process of market economy reform and capital market improvement, valuation theories and methods are gradually accepted by China investors. The importance of applying modern valuation method into banks investment and management is widely admitted.

This paper is trying to do some research on valuation theories and methods proper for China banks based on the previous studies. And then focus on EVA valuation method to value China listed banks.

Valuation is not our pure goal to this paper. Next step, we compare the intrinsic value calculated from EVA method and the past 200 days moving average price to come out market

premium. The ultimate goal of this paper is identifying the important factor that closely related with market valuation point of view.

Keywords: China market, banking sector, financial statements, valuation factors, valuation model, CAPM, Gorden model, Economic value added(EVA), regression analysis

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TABLE OF CONTENTS

I. INTRODUCTION…….……...10

A. Research Background and significance

Research Background…….11

Research Significance.....12

B. Research Content and new trails.....14

Research contents

Research trails creation

II. VALUATION TECHNOLOGY FOR CHINA BANKS……15

A. Prior studies on valuation technology

Discounted Cash flow……...……17

Comparable market price …….18

Residual earnings and EVA

B. Bank valuation methods……23

Bank's particularity

Valuation methods

C. China banks valuation technology selection……24

III. EMPIRICAL RESEARCH TO STOCK RETURNS……...…27

A. Sampling and data collection

Banks sampling description

Data collection

B. Intrinsic value calculation of China banks……..28

IV. FACTORS AFFECTING BANKS VALUATION……35

A. Banks balance sheet and income statement……36

B. Factors related to banks valuation

C. Regression analysis……...……45

V. CONCLUSION AND SUGGESTIONS……..….50

A. Research results

Findings

Significance

B. Suggestions……..51

To government

To managers

To investors

C. Deficiencies and Prospects…….52

VI. APPENDIX……...53

VII.BIBLIOGRAPHY……56

LIST OF TABLES

1. Table 1. Banks listed on Shanghai and Shenzhen Stock Exchanges 27

2. Table 2. FY2009 (3 banks from FY2008)All banks NOPAT 28

3. Table 3. FY2009 (3 banks from FY2008)All banks WACC 30

4. Table 4. China Construction Bank EVA stock valuation based on FY2009 31

5. Table 5. All the banks prices and compared with market price for MA200 days 32

6. Table 6. Commercial banks asset/liability structure and profit model 36

7. Table 7. Variables used for valuation 44

8. Table 8. Descriptive statistics for all the variables 45

9. Table 9. Regression on Market premium 46

10. Table 10. Regression on banks P/E 47

11. Table 11. Regression on banks P/B 49

INTRODUCTION

Banks' businesses almost follow the same model, especially in China. But why are some banks creating considerable returns to investors while others not?

The first problem we want to resolve is what's the value of banks in China? How to choose a proper method to value banks?

So, looking for a new method or perspective in investing and monitoring banks is an urgent task. Based on a contest analysis of released audited financial reports and price movements of China Shanghai and Shenzhen listed banks in China, this paper reports the corporate financial performance and corporate market performance.

The premium or discount compared with average level is a good point for research. We choose three factors to evaluate the premium or discount: compared value with intrinsic value, P/E and P/B.

We select 14 listed banks in China and stock price for last 200 days(Dec.2009 to Apr. 2010) moving average. Also, based on prior studies on banks operating factors, we choose 11 factors that could represent banks profitability, operating efficiency, risk management and development potentials.

We'd like to find out correlation among banks' valuation, market premium and factors via regression analysis. We aim to answer the following questions:

Which valuation approaches we should apply when valuating banks?

Which factors are closely related with banks valuation?

I. A. Research background

China is attracting the world's attention more closely with its fast growing economy.

Since 1978, when China launched Reform and Opening-up policy, China has been keeping promoting its GDP annual growth at 9.7% (UNCTAD).

At the same time, The connection of China and the world is becoming more and more closely. China's foreign trade dependency (which is the ration of total trade amount divided by GDP) rose from 9.75% in 1978 to 66.6% in 2007(Macro China Database).

After 2001, on which year China joined World Trade Organization (WTO), China's development is totally integrated with other economic groups, from trade to capital market. Especially the capital market, which China government promised to open China's capital market in 5 years after joining WTO, has changed dramatically.

From December 2006, when China released<Foreign Banks Regulation Principle>, together with the opening of capital market and appreciation of CNY, the world has been paying more attention to China's capital market. "Hot money" or "Refugee Capital" became a popular word in China. It means the speculation money that always uses short, arbitrage and speculation approaches to chases for maximum return or minimum risk. It usually blows asset bubbles and abruptly withdraws from the country which results in serious financial crisis. Asian financial crisis in 1997 was a representing case caused by "Hot Money".

And at the same time, China started "Gugai" which means shares allocation reform in order to solve the conflicts between state shares(usually non-circulation stocks) and individual shares in listed companies.

Under these circumstances, Shanghai Composite Index and Shenzhen Composite Index which are China's two main stock indexes, rose by over 500% from 2006 to Oct. 2007.

The wealth effect attracted many investors, individual investors reached to 100 million in 2007. The market capitalization overcame Japan market, ranking No. 2 in the world. Stocks have become very important part of people's wealth and investment is also part of people's life.

The current financial crisis accelerate burst of stock market bubble, the Shanghai Composite Index collapsed in 2007, from 6,124 point to the lowest of 1,665 in October 2008. Investors experienced the "roller coaster" market and realized the serious risks associated with the market.

Significance

Another light spot of China market is banking sector. China is developing its financial industry at a rapid space. As one of the core parts, banks become more and more important. Banks in China could be divided into 3 groups: 4 state-owned banks, including Industrial and Commercial Bank of China(ICBC), Band of China(BoC), Agricultural Bank of China(ABC) and China Construction Bank(CCB); about 20 national shareholding commercial banks, including Bank of Communications, China Merchants Bank, Everbright Bank, Beijing Bank, etc. and also hundreds of local city commercial banks.

Before 2000, only two banks got listed on stock exchange. After joining WTO in 2001, China government encouraged commercial banks to go public to face fierce foreign competition after opening domestic financial market. Among above 3 groups, national shareholding commercial banks got listed on stock exchanges, followed by the state-owned banks and lastly the city commercial banks. One point to mention that there is no clear standard to divide national shareholding banks and city commercial banks for expanding market

nationally is the goal of every city commercial bank and also a result of growing. The listing of banks on stock exchanges has been booming since 2007, especially the city commercial banks.

On July 19, 2007, Nanjing Bank and Ningbo Bank listed on Shanghai stock exchange and Shenzhen stock exchange separately. Comparing with IPO price, Nanjing Bank's first day closing stock price rose by 72.18% and Ningbo Bank soared even more, by 140.5%. City commercial banks have their unique advantages: active investment activities bring high returns, like Nanjing Bank; comparatively strong local area dominant power and asset operating abilities, like Ningbo Bank. The successful listing injected sufficient bullets for further national expansion. Not only had the banks benefited from the listing but also the shareholders of these banks. Yage Er, one of the shareholders of Ningbo Bank invested at about CNY1.01 per share before IPO of Ningbo Bank. After the IPO the Ningbo Bank's price jumped over CNY30, recorded more than 30 times return. It's only right and proper that city commercial banks' shareholders' stocks were also preferred by investors.(New Finance & Economics Monthly, 2007).

Comparing with high returns from city commercial banks, state-owned banks have been performing steadily. Taking ICBC as an example, it rose by 5.13% on its first trading day on October 27, 2006, much lower than Ningbo Bank and Nanjing Bank. It may come out because of the market situation, IPO pricing level and so forth. However the volatility which we also call beta also has huge disparity. Is it from the market size or anything else? We expect the difference mainly comes from banks' operating abilities, investment returns, investors' higher return expectation on city commercial banks' expansion and so forth. We'll

test that in the following part.

So, identifying a valuation approach that is suitable to China market could be a meaningful effort. However the wide range fluctuation of stocks' prices raised urgent questions to investors, they include: how to set stock prices? Is the current price reasonable or sustainable? What are the prospects of future stock prices? How to analyze and identify listed companies' value? Which stocks could be invested?

And as an investor who is interested in banks, how to select a bank with high return potential is a critical but also difficult job. This paper is trying to tell the difference between good banks and bad banks based on historical financial and market performance data.

I.B. Research Content and new trails

Since we're trying to find out factors that influence banks' valuation, we'd better first clarify what valuation is. According to Tom Copeland and Jack Murrin, Valuation is an economics measurement in order to measure the market value of companies, internal business units and branches (Valuation 2002).With the development of modern ownership, corporate ownership transaction, share exchange, assets reforestation and M&A, corporate valuation is more important and is core factor in determining the above transactions. And valuation also becomes the vital standard to tell the ability of investment banks.

We'll collect all the 14 listed banks in China and use the same valuation method to come out an intrinsic value. At last, compare the intrinsic value with market price to get a premium. We'll analyze the correlation between market premium and valuation factors.

II. Valuation technology for China banks

II.A. Prior Studies

As the heart of finance, valuation has been a popular topic since the formulation of finance. Investors need to use valuations models to select comparatively cheap stocks, company managers should consider valuation when making an investment decision, portfolio managers are also required to find firms with lower risk and higher potential in the portfolio.

Irving Fisher was the first scholar who raised corporate valuation theory in his book <The nature of Capital and Income> which was published in 1906. In this book, Fisher discoursed the relationship between income and capital, and argued that the ultimate substance of capital value is the net present value of future income or the capitalization of future income.

Modigliani and Miller published the famous<The Cost of Capital, Corporation Finance and the Theory of Investment>in 1958 and pointed out the relationship between investment, financing decision and corporate value.

They were the first bench of people who drew the concept of uncertainty into corporate valuation and uncovered the relationship between corporate value and corporate capital structure that established the foundation of modern corporate valuation theory.

In 1961, Modigliani and Miller published<Dividend policy, growth, and the valuation of shares> and raised the MM theory which settled foundation for corporate valuation.

Professor Tom Copeland(1990) explained calculation process of free cash flow. And in 1990s of 20th century, Professor Bradford Cornell and Aswath Damodaran also did much research On free cash flow.

In China, many scholars did many China characteristic studies based on foreign theories.

Liangmin(2002) compared the four methods widely used for listed company valuation: discounted cash flow method, book value, comparable price and option pricing method.

Xiahui(2005)argued in his<How to price enterprise value in M&A> that Financial option pricing methods could be adjusted for valuation in company M&A.

Quhong, Wangming and Wang Yuguo(2000) compared advantage and disadvantage of the four valuation methods. Linking with China banks' features, they came out the conclusion that discounted cash flow method is the most proper method for China banks valuation.

Long Jianwei and Cai Ruhai(2008) argued that EVA is more scientific approach for banks valuation for it could make the goal of shareholders and banks come to the converge: profit maximum.

According to S. Penman (Financial Statement Analysis & Security Valuation, 3rd edition, McGraw-Hill), There are four methods that are widely used in finance valuation:

First, discount cash flow (DCF) model, which firstly calculate the free cash flow from operating activities and then accumulate the free cash flow to come out how much cash the business could generate in an appropriately long time. This method is based on the business itself position, measuring the cash recreating ability. Secondly, liquidation and accounting valuation, is usually based on company existing asset or book value and assess its asset appreciation potential. The third method is comparable market price, comparing the valuation of a stock with its peers in the market. And the last method is option pricing models that could be used to pricing assets with characteristics of options. We'll talk about the 3 methods here: DCF, comparable market price and residual earnings or economic value added(EVA)

model.

Discounted Cash flow

The base of this method is present value, which means that the value of asset equals the total present value of its future expected values.

$$V = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

V: value of asset; CF: cash flow generated by asset at time t; n: life period of asset; r: discount rate which reflects risks associated with expected cash flow;

To stocks, cash flow are dividends. R is determined by asset risks, the higher the risks, the higher the r is.

The most famous model under DCF is Gordon model which could be used to value stable growth company stocks.

$$P_0 = \frac{D_0(1+g)}{(1+r)} + \frac{D_0(1+g)^2}{(1+r)^2} + \ldots \frac{D_0(1+g)^\infty}{(1+r)^\infty}$$

When the company could keep grow at the rate of g and r>g, it could be re-written,

$$P_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

Hereby the vital and most difficult part is estimating the constant growth rate r.

DCF and Gordon model value company's equity part, while when valuing corporate cash flow as a whole, we use free cash flow for the firm (FCFF). Then we use FCFF minus firm liabilities to get firm value.

FCFF=EBIT×(1-tax rate)+Depreciation- Capex-Working capital

Under FCFF model, firm value could be calculated by:

$$FirmValue = \sum_{t=1}^{\infty} \frac{FCFF_t}{(1+WACC)^t}$$

Where, FCFF: cash flow generated by asset at time t; WACC: weighted average cost of capital that is weighted average cost of debt and equity costs.

Comparable market price

It's an approach that selecting analogous listed companies to use suitable ratios or multipliers to value the targeted enterprise. The reference companies are listed companies which already have The multipliers are usually using ratios between enterprise value and the factor we select, like EPS, cash flow per share, net book value etc.

Every ratio represents some meaning: Price earnings ratio(P/E),which is got by calculating mean of similar companies, is easy to get and closely links company valuation and its market expectation; Price book value ratio(P/B) uncovers profitability of assets and expected cash flows. It could be meaningful even when company's EPS is minus. So, this method is suitable for the industry that asset has high weight and the asset has high liquidity, such as

Banks, insurance company and securities company. Another ratio is Tobin's Q which is calculated by dividing company asset market value by replacement cost. It's always applied when M&A happens.

The theoretical foundation of comparable market price is substitution principle:

based on market trading price in order to come out enterprise value. The premise hypothesis is that market is efficient, companies are comparable, market values correctly to the reference company.

This method is ego dystonic, using its peers as measurement means the peers' valuation is reasonable while why we think the valued company is unreasonable?

Residual earnings and EVA

Although previous DCF model has its advantages, it only considers future cash flow influence not base on balance sheet and income statement data.

With the development and completeness of accounting, valuation and capital investment also move to financial statements for valuation research.

Many researchers, including Ball, Brown, Barth, Collin, Kothari, Ohison and Bernad, did many researches based on financial statements. Among all the theories, F-O model and EVA are the two most famous models.

F-O model is derived from the Clean Surplus Relation (CSR). CSR could be expressed by the following formula:

$$BV_t = BV_{t-1} + earn_t - D_t$$

Where: BV is book value of equity; earn is surplus for the period of t; D represents dividends.

At the same time, F-O also applies the concept of extraordinary income. To be simple, extraordinary income means earnings that exceed ordinary expected income. It could be written in the formula:

$$Earn_t = (ROE_t - r_t) \times B_{t-1}$$

Where: ROE means return on equity, r represents cost of equity. The formula shows that when ROE=r, extraordinary income is zero, market value is higher than book value when and only when ROE is higher than cost of equity. F-O model integrates variable factors that could lead to difference between equity market value and book value. These factors include but no limited to company future growth potential, management quality, company economic

environment and accounting method. F-O model describes economic goodwill, intangible assets and at the same time applies accounting data, avoiding the disadvantages in DCF model.

EVA represents Economic Value Added which means a company's return on capital(ROC) after deducting its cost of capital(COC). To be simple, it's the difference of a company's capital income and capital cost.

EVA considers all costs for the profits company comes out. The formula could be written as following:

$$EVA = NOPAT - TC \times WACC$$

Where NOPAT stands for net operating profit after tax, and TC stands for total cost, WACC means weighted average cost of capital.

Investors invest capital into company to get return. It measures investment opportunity cost. When the EVA is plus, investors are getting higher returns back than investing on other projects or companies. On the other hand, when EVA is minus, the company is reducing investors' capital value. For example, a company's revenue is CNY100m, cost of sales is CNY70m and SGA is CNY10m, income tax rate is 30%. The company's net income is (100-70-10)*(1-30%)=14m

If the company's asset is CNY200m, equity is 100m and debt is 100m. The capital cost of equity (required return for equity investment) is 12%, the debt capital cost is 3%, then the WACC is CNY15m, calculating from (3%*1/2+12%*1/2)*200. We could get the EVA of the

company to investors: 14-15=-1m! It shows us that the company is losing money for investors instead of accounting number of plus CNY14m. We could understand that investors of this company would prefer investing other companies or project to get CNY15m profits. EVA could measure the increase of shareholders' value better than other methods.

There are many advantages to use EVA method. Through adjusting accounting items, like operating profits after tax, capital investment, balance sheet items and income statement items, it scientifically shows the value corporate could create to investors.

Firstly, it considers shareholders' equity cost. DCF doesn't include cost of equity as a valuation factor, which is not a complete cost analysis method. EVA insists standing from the point of view from investors that only by increasing shareholders capital return, the company is creating profits.

Secondly, it excludes impact of different accounting method or even accounting mistakes. EVA requires doing some adjustments to financial statements to reflect company's performance more preciously and completely.

Thirdly, EVA could be a good performance index and is a proper value creation direction for companies. DCF is merely a valuation assessment method that could not be used by companies to create maximum values for investors. EVA could be used as foundation to implement new integrated financial management system.

Also, EVA could be applied in special industries, like new technology industries. Unlike DCF that treats R&D as expenses, EVA treats R&D expenses as re-investment and accumulates the

new capital to reflect future potential returns.

EVA is not perfect and also has some defects. EVA can't avoid the impact of inflation, like asset replacement. EVA could not show out company's real returns rate. Another disadvantage to use EVA to direct company's managers is that managers have high incentives to change company's capital structure to control cost of capital. Like when stock market performs well, which means that company could finance on stock market at a comparably low cost. Company would like to issue new shares or apply share dividend policy to draw down their WACC. While, when the market shifts abruptly, as the case in 2008 when serious bear market started, companies could have undertaken huge loss if they stick on the same financing methods. We'll not discuss much on disadvantages here since no perfect valuation methods.

From investors' point of view, the higher the EVA, the more return the company could generate to them, the better the company's stock performs. Comparing with traditional EPS, ROE and FCF methods, EVA models considers not only debt cost but also equity cost and calculates investment returns more preciously.

Given their common roots, the above valuation approaches can be shown to "yield the same value for an asset, if we make consistent assumptions. In practice, though, proponents of these approaches continue to argue for their superiority and arrive at very different asset values, often because of differences in the implicit assumptions that they make within each approach."(**Aswath D. 2005**)

All the above valuation methods support west and American capital market. Those are also what the Wall Street big players are using to determine their investment. When all the

investors believe the valuation methods actually reflect equities' intrinsic value, the market could perform efficiently by itself.

II.B. Bank's particularity

Banks are different with other kinds of industries. They have many distinguish features: franchise value (FV) which gives banks special monopoly benefits, also gives difficulties to valuation.

Generally speaking there are three main parts that banks are different with common firms:

First, business scope and income sources are different. Banks also have many common characteristics with others, needing self capital, pursuing maximum profits and undertaking profits as well as losses. However banks' operating subject is financial asset and liabilities, and product is money and capital. Main businesses include money transaction, savings and loans and money related financial services. Main profits come from interest spread between saving and loan, off-balance sheet activities etc.

Second, assets structure of banks and common industrial companies are different. Fixed assets weights quite lower comparing with others. Due to low fixed assets weight, appreciation is usually low and operating leverage is also very low. Another difference is that asset-liability ratio (liability/ asset) is much higher than others. Industrial company's A-L ratio is usually at about 50%, if it's higher than 75%, then the company will face very serious liquidation problem. While bank's A-L ratio could stay above 75% and even over 90% especially for commercial banks. It doesn't mean banks could go bankruptcy for government allows bank to create values via its liabilities.

The third difference is risks undertaking. Risk is probabilities of losing assets or probabilities of undertaking losses. Normal companies face market risk and specific risk, while besides these risks, banks should also take other risks, like credit risk(counterparty refuses or is not able to pay back loans), liquidation risk(matching asset and liabilities), interest(raising and lowering interest) and FX rate risks, country risk and law risk.

The last characteristic is unique credit creation function of banks. Credit creation function is based on credit intermediary agent and transaction agent functions. Banks provide loan from savings. During the circulation of check and loans, new derivative savings could be created. This brings more risks to banks.

In sum, due from particularity of banks, choosing a proper valuation method to calculate intrinsic value is very important.

II. C. China banks valuation technology selection

Normally, China also follows international equity valuation approaches.

China State Council released asset valuation approaches in 1991, suggesting four approaches: Income current value method, Current market price method, replacement cost method and asset liquidation method. These methods are consistent with international valuation standards.

On the other hand, China capital market has its distinguish features: low efficiency with high transaction costs, market price can't reflect company intrinsic value, only one out of three shares could be traded on the market (by 2000), serious securities information asymmetric problems, especially the unfair market position of "zhuangjia"(institutional investors who manipulate one specific share) and "sanhu"(small individual investors) and pretty low

dividend distribution. In this market, not all traditional valuation methods are suitable and models trials and selection is an important task.

Discounted Cash flow (DCF) model: Dividends are stock investment cash flows and it's very common in mature capital markets, like Europe and US markets. As described in the above paragraph, China companies are not always distributing dividends.

Actually, majority firms have been paying more attention to how to financing more or collecting more money from capital market instead of returning profits to investors. It's a tragedy for China investors. From 2005 to 2008, China Mobile, China Unicom, Petro China and Sinopec, which we also call them "four kings" representing state-owned super companies that are list on foreign exchanges(Hong Kong and New York Stock exchange), distributed over CNY100 billion (appropriately CNY600~700 billion). Comparatively, during the 18 years from 1990 to 2008, the total amount distributed by China listed companies doesn't exceed CNY180 billion.

It's a tragedy of China investors. The reasons lying behind are China capital market characteristics (short term investment and speculations), backward corporate governance and regulation and so forth. We're not going to discuss this topic too much hereby.

According to China market's low distribution characteristic, DCF model would undervalue China stocks.

Comparable market price: It's easy to be applied and widely used to value unlisted firms when M&A occurs and cross trading in portfolio investment.

However, there are many limitations to use the method in China.

1. The number of listed banks is 14 which is a comparably small size to come out a standard. According to China security regulation commission (SRC), we should sample at least 10 comparable companies that with same industry, similar outstanding shares and profit to proceed our analysis. When the samples are many enough, it's reasonable to come out a proper valuation. China only has 14 banks listed and 12 got listed after 2002. Both sample number and historical data are not enough to apply the method.
2. The efficiency of China capital market is very low. In this market, the ratios could not represent firms' intrinsic value. The basic foundation of market price is market is reflecting real information. That means market may not show the right intrinsic value for one specific company, but the market as a whole is properly reflected. However China capital market could been seen as segmented market which means different markets could value same asset differently. Like Shanghai and Shenzhen markets could reflect different market valuations under same circumstances.
3. The ratios of listed companies could be unreasonable. China market is seriously affected by government policies. The market has been relying deeply on government support and even newly list companies' prices are regulated by government, realizing by control PE ratio. So, the market ratios are not reflecting intrinsic values. A good example is extraordinary high yields on buying IPO shares that shows China market stocks pricing system is unreasonable.

Due to the method flaw and we're trying to find out different factors effecting banks valuation, as well as all are listed banks, we'll not apply this method either.

In sum, we believe EVA method is the proper model to evaluate banks.

III. Empirical Research to stock returns

A. Banks sampling description and data collection

As of December 31, 2009, there have been 14 banks that got listed on Shanghai and Shenzhen stock exchanges. They could be briefly divided into 2 groups: state-owned and commercial banks. They are the followings:

Table 1. Banks listed on Shanghai and Shenzhen Stock Exchanges

Ticker	Company Name	Type
601939	China Construction Bank Corporation	State-owned
601169	Bank of Beijing Co.,Ltd.	Commercial
600036	China Merchants Bank Co., Ltd	commercial
601398	Industrial and Commercial Bank of China	state-owned
601009	Bank of Nanjing Co., Ltd.	commercial
000001	Shenzhen Development Bank Co.,Ltd	commercial
601328	Bank of Communications Co Ltd	state-owned
601166	Industrial Bank Co., Ltd.	commercial
600016	China Minsheng Banking Corporation Ltd.	commercial
600000	Shanghai Pudong Development Bank Co. Ltd	commercial
601988	Bank of China Limited	state-owned
002142	Bank of Ningbo Co., Ltd.	commercial
600015	Hua Xia Bank Co., Limited	commercial
601998	China CITIC Bank Corporation Limited	commercial

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports*

We want to calculate intrinsic value of banks and then compare the sample of sample banks with huge differences on valuation. We divide data into three groups:

Profitability data, showing financial performance such as Sales growth, sales margin, operating margin, return on asset (ROA), return on equity (ROE), …

Market valuation data: price earnings ratio (P/E), price book value ratio (P/B), ..

Other factors that influence valuation: capital structure

Intrinsic Value calculation of China banks

As already stated above, EVA formula could be written:

$$EVA = NOPAT - TC \times WACC$$

Where: NOPAT stands for net operating profit after tax; IC stands from investment capital; WACC stands for weighted average cost of capital.Net profit after tax is adjusted profit after tax and investment capital includes debt cost and equity cost.

Disregarding the seeming simplicity of the formula for EVA calculation, the calculation itself is rather complicated. Precise determination of the following indicators is crucial for that: Indicators of the operating profit; volumes of capital and price of capital. (Elvira ZELGALVE, 2005)

When adjusting financial statements, NOPAT could be calculated by:

NOPAT=Operating Income*(1-effective tax rate) + change in Deferred tax

Taking China Construction Bank as an example:

FY2009 China Construction Bank NOPAT

NOPAT=137,602*(1-25%)+3,326=**CNY106,527.5million**

Table 2. FY2009 (3 banks from FY2008)All banks NOPAT

Ticker	Company Name	Operating Income, Reporting Currency, LFY	Deferred Tax - Total, Reporting Currency, LFY	Deferred Tax - Total, Reporting Currency, FY-1	Effective tax	NOPAT
601169	Bank of Beijing Co.,Ltd.	6836	-17.85	501.81	25%	**4607.34**
601988	Bank of China Limited	110558	-5,198.00	-3,608.00	0.25	**81328.5**
601328	Bank of Communications Co Ltd	38219	-1,090.00	-953	0.25	**28527.25**
601009	Bank of Nanjing Co., Ltd.	1874	0	-57.39	0.25	**1462.89**
002142	Bank of Ningbo Co., Ltd.	1753	25.37	-6.22	0.25	**1346.34**
601998	China CITIC Bank Corporation Limited	17615	-1,122.00	1,183.00	0.25	**10906.25**
601939	China Construction Bank Corporation	137602	-3,516.00	-6,842.00	0.25	**106527.5**
600036	China Merchants Bank Co., Ltd	26412	-1,213.00	235	0.25	**18361**
600016	China Minsheng Banking Corporation Ltd.	10412	-1,215.00	-267	0.25	**6861**
600015	Hua Xia Bank Co., Limited	4811	-414.5	-284.65	0.25	**3478.4**
601398	Industrial and Commercial Bank of China	165994	-4,272.00	-8,539.00	0.25	**128762.5**
601166	Industrial Bank Co., Ltd.	17217	254.66	-1,025.49	0.25	**14192.9**
600000	Shanghai Pudong Development Bank Co. Ltd	17178	-165.85	-414.79	0.25	**13132.44**
000001	Shenzhen Development Bank Co.,Ltd.	6159	217.91	-839.07	0.25	**5676.23**

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports*

Then we'll get total cost:
TC=Total owner's equity+ year end allowance for asset impairment-deferred tax asset

For China Construction Bank, TC=**CNY696,099 million**

The last step is calculation WACC, which is also the most difficult step:

WACC=Equity Cost+ After tax debt cost*(tax shield effect)

=Total debt/(total debt and equity)*Debt cost*(1-Tax)+

Total equity/(total debt and equity)*equity cost

To access common share equity cost, we'll apply CAPM model, Common share equity cost=risk free rate+ beta*market risk premium, which could also be written as:

$$R = R_f + \beta \times (R_m - R_f)$$

After tax debt capital cost=pre-tax debt cost*(1-effective tax)

So, we should reorganize the factors here we need to identify:

Risk free rate: 2.57%, using 5 years government bond rate from Reuters data.

Beta: 0.85 (See Appendix 1)

Market premium: Market required rate of return minus risk free rate. We use 11% as required rate of return according to China Banks Regulation Committee. So, market premium equals 11%-2.75%=8.25%.

For China Construction Bank, Common share equity cost

=2.75%+0.85*8.25%=**9.74%**

For debt required rate of return, we think using financial bond 5 years yield is proper for it could represent average risks and return for saving and investing in banks. According to market situation of bonds issuing of China Import and Export Bank, 5 years yield is 3.37%.

After-tax debt capital cost=pre-tax debt required rate of return*(1-tax rate) =3.37%*(1-25%) =**2.53%.**

WACC for China Construction Bank is:

WACC=D/A*After tax debt cost+ E/A*equity cost
=0.94*2.53%+0.06*9.76%=**3.74%**

Table 3. FY2009 (3 banks from FY2008)All banks WACC

WACC						
Ticker	**Company Name**	**D/A**	**E/A**	**Beta 5Yr Monthly**	**CAPM**	**WACC**
601169	Bank of Beijing Co.,Ltd.	0.92	0.08	0.9	10.16%	3.92%
601988	Bank of China Limited	0.94	0.06	0.82	9.48%	3.73%
601328	Bank of Communications Co Ltd	0.95	0.05	0.9	10.16%	3.71%
601009	Bank of Nanjing Co., Ltd.	0.92	0.08	1.2	12.69%	4.12%
002142	Bank of Ningbo Co., Ltd.	0.94	0.06	1.2	12.69%	3.93%
601998	China CITIC Bank Corporation Limited	0.92	0.08	1.1	11.84%	4.05%
601939	China Construction Bank Corporation	0.94	0.06	0.85	9.74%	3.74%
600036	China Merchants Bank Co., Ltd	0.95	0.05	1	11.00%	3.76%
600016	China Minsheng Banking Corporation Ltd.	0.95	0.05	1.01	11.08%	3.76%
600015	Hua Xia Bank Co., Limited	0.96	0.04	0.93	10.41%	3.62%
601398	Industrial and Commercial Bank of China	0.94	0.06	0.89	10.07%	3.75%
601166	Industrial Bank Co., Ltd.	0.96	0.04	1.2	12.69%	3.79%
600000	Shanghai Pudong Development Bank Co. Ltd	0.96	0.04	1.07	11.59%	3.71%
000001	Shenzhen Development Bank Co.,Ltd.	0.97	0.03	1.11	11.93%	3.67%

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports*

China Construction Bank's EVA for FY2009,

EVA=NOPAT-TC*WACC
=106,527.5-696,099*3.74%
=CNY80,493.4 million

We divide three stages for valuation: one is for FY2009, the second is for 5 years right after 2009, then the last is for terminal value.

Shares (including A and H shares) outstanding of China Construction Bank at the end of FY2009 are 233,689,084,000 shares.

EVA divided by shares: 1,585,887,290,000/233,689,084,000=**CNY6.79** per share

Table 4. China Construction Bank EVA stock valuation based on FY2009

601939	China Construction Bank Corporation					
5 years growth rate	8%					
Discount rate	3%					
EVA Estimate	2009	2010E	2011E	2012E	2013E	2014E
NOPAT	106,527.50	115,049.70	124,253.68	134,193.97	144,929.49	156,523.85
WACC	3.74%	3.74%	3.74%	3.74%	3.74%	3.74%
TC	696,099.00	751,786.92	811,929.87	876,884.26	947,035.00	1,022,797.80
EVA	80,511.31	86,952.22	93,908.39	101,421.06	109,534.75	118,297.53
PV	**80,511.31**	84,419.63	88,517.67	92,814.64	97,320.21	102,044.49
EVA Growth rate		3.34%	3.34%	3.34%	3.34%	3.34%
Second Stage, PV from 2010 to 2014		**465,116.63**				
Long term EVA growth rate	2%					
Required return	12%	1,242,124.07				
Third Stage, terminal value PV		**1,040,259.35**				
Sum of three stages value	**1,585,887.29**	million				
Shares outstanding			233,689.08	shares		
Intrinsic value per share		**¥6.79**				

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports*

Factors explanation:

NOPAT 5 years' growth rate is 8%, which is also China's absolute GDP growth rate. Since 1978, China seldom misses the 8% target except the late 1990s when Asia Financial Crisis happened. So, we believe this growth rate is reasonable for China banks 5 years growth estimation.

Discount rate is 3 %, which is also estimated based on government work reports, saying that China will maintain CPI inflation rate lower than 3%.

Long term EVA growth rate is 2%. This is terminal growth rate and we referred to US GDP growth rate, which is also stable growth rate when China's economy develops to a comparably developed level, it's about 2%.

Required return is 12% and it refers to China Banks Regulation Commission policy paper that banks in China should make ROE exceed 11%.

After considering all the factors and calculations, the intrinsic value could be divided into 3 stages: FY2009 EVA, 5 years estimation value and terminal value.

For China Construction Bank, the FY2009 EVA is CNY80,511 million, 5 years' estimation present value is CNY465,117 million and the present value of terminal value is 1,040,259 million.

We could calculate the proportions of these three parts: first year(FY2009)EVA is 5%, 5 years' estimation occupies 29%, and the terminal value reaches 66% of the whole value.

So, the selection of long term growth rate and discount rate are very crucial to the calculations.

Based on the same growth rate, discount rate and other factors, we estimate all the listed banks intrinsic values as followings:

Table 5. All the banks prices and compared with market price for MA200 days

Ticker	Company Name	Shares outstanding million	Stock Intrinsic Value	200 days moving average market price	Market yield or discount
601169	Bank of Beijing Co.,Ltd.	6,227.56	￥10.05	￥17.12	23.14%
601988	**Bank of China Limited**	253,827.47	￥4.38	￥4.20	-1.82%
601328	**Bank of Communications Co Ltd**	48,994.38	￥8.85	￥8.88	0.15%
601009	Bank of Nanjing Co., Ltd.	1,836.75	￥9.69	￥17.72	26.20%
002142	Bank of Ningbo Co., Ltd.	2,500.00	￥7.39	￥14.24	28.51%
601998	China CITIC Bank Corporation Limited	39,033.34	￥3.37	￥6.58	**29.00%**
601939	**China Construction Bank Corporation**	233,689.08	￥6.79	￥5.89	-6.15%
600036	China Merchants Bank Co., Ltd	19,976.18	￥14.92	￥16.04	3.13%
600016	China Minsheng Banking Corporation Ltd.	18,823.00	￥4.76	￥7.60	20.36%
600015	Hua Xia Bank Co., Limited	4,990.53	￥8.87	￥11.50	11.30%
601398	**Industrial and Commercial Bank of China**	334,018.84	￥5.76	￥5.09	-5.37%
601166	Industrial Bank Co., Ltd.	5,000.00	￥46.98	￥36.71	-10.72%
600000	Shanghai Pudong Development Bank Co. Ltd	8,830.05	￥22.01	￥22.00	-0.03%
000001	Shenzhen Development Bank Co.,Ltd.	3,105.43	￥30.93	￥22.75	**-13.33%**

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports, Yahoo Finance*

From the above table, we could observe very interesting phenomenon:

First, all 14 banks could be naturally divided into 2 camps according to market yield comparing 200 days market moving average price and calculated EVA intrinsic value.

The 4 state-owned banks: Bank of China, Industrial and Commercial Bank of China, China Construction Bank and Band of Communications are grouped into the first camp, whose intrinsic value and market price are matching each other.

On one hand, it releases that EVA has its rationality could explain banks' intrinsic value reasonably.

On the other hand, it uncovers that the current market is a proper level to reflect economic situation. The market capitalizations of the 4 banks may occupy about 10 to 20% of the whole China stock exchange market capitalization. The moving average of Shanghai Composite Index is about at 3,000 which is not as over positive as 6100, not as over pessimistic as 1,660 points.

Besides the four banks, there are also 2 other banks: China Merchants Bank and Shanghai Pudong Development Bank are showing close correlation with the intrinsic value.

We could understand that these two banks are comparatively big banks, especially China Merchants Bank. It's the biggest commercial bank not owned by government.

The second phenomenon is that the commercial banks or city banks' market prices are commonly having a premium, from 10% to near 30%. The highest is China CITIC Bank that has a premium of 29%. We could explain that the growth rate(8% for 5 years coming, and EVA growth 2% for terminal value) for EVA calculation may be too conservative.

Because of the small asset amount, they could keep growing at a fast space, much faster than state-owned banks. We could treat the state-owned banks as elephants, huge bulks, moving stably and slowly; commercial banks as wolves, though small bulks, but they are ambitious and moving agilely. So, these comparatively small banks have their own advantages. We'll discuss more in the following part.

Thirdly, the higher the stock price, the lower the market premium, even discounted to intrinsic value, like Shenzhen Development Bank and Industrial Bank. We try explain this phenomenon by the abnormality that lower prices always bring higher returns than peers. That's also like stock splits could spur company's stocks although it's purely financial activities. Maybe it could attract more investors by the low price. Industrial Bank and Shenzhen Development Bank have been trading at CNY37 and CNY23 separately, which are much higher than the other banks' prices.

However, we may observe the disadvantages of EVA during this process.

One is it heavily depends on FY2009 or FY2008's NOPAT. Since we start from one years' NOPAT, it's hard to avoid the impact from that year's operating environment. China banks didn't affect seriously by the ongoing financial crisis, most banks kept a consistent and stable growing pace during the crisis. That situation is beneficial for applying EVA methods.

We should also mention one outlier of the samples: Shenzhen Development Bank, the market discounts about 13% comparing with intrinsic value. According to its FY2009 annual reports, its FY2009 net income soared by 719% year to year. The bank made a huge loan provision for bad debts in the fourth quarter of FY2008 and reviewed the provision in FY2009, leading to the rapid growth. Luckily, it doesn't affect net operating profit and will not impact NOPAT

result much.

Another disadvantage is the difficulty of estimating long term growth rate and discount rate. For China Construction Bank's case, the terminal value part occupies about 66% of whole intrinsic value. However this part is very hard to value and estimate, the bank's value could drop tremendously in case of long term growth rate changes. For example, we estimate China economic growth rate could keep at 8% for at least 5 years. This expectation is already reflected on stock prices according to the valuation model and other valuation indexes, like P/E, P/B ratios which are usually much higher than developed countries implying a higher growth estimation. When the expectation of long term growth rate becomes passive, stock prices may fall seriously. That could also partly explain the high volatility of China stock market.

IV. FACTORS AFFECTING BANKS VALUATION

In the previous chapters, we discussed models that are suitable to banks valuation, valuation practices to banks and also the comparison among banks. Hereby we'd like to *discuss factors affecting banks valuation* and then *compare* Shenzhen Development Bank and China CITIC Bank to find why they have different premium.

IV. A Banks balance sheet and income statement

Table 6. Commercial banks asset/liability structure and profit model

Interest-bearing assets Reserves in central bank Amount due from banks and call money Customer loans and pre-paid money Investment Sub-standard debts	**Interest-bearing liability** Borrowing from central bank Due to banks Deposits Deposit papers
Non interest-bearing assets Cash Facilities and equipment Tax payable Other assets **Total Assets**	**Non interest-bearing liability** Deferred tax asset Deferred tax liability Other debt and provision **Owners' equity**

Interest income
-interest expense
Net Interest income
+Net service charge and commission income
+Other non-interest income
Operating Income
-Operating expenses
-Asset impairment
Pre-tax income
Income tax
Net income

From the table, we could observe that the main income of banks is from interest income from interest-bearing assets, and main expenses are from interest-bearing liabilities. This income model asks banks to promote asset liability management to get interest margin income. Another income is non interest income or commissions from investment, sales and agency.

We could also see that banks' asset-liability structure is much different with traditional manufacture companies: One is that fixed asset only occupies a slight par of the left side(assets); the other factor is that equity is very small percentage of the right side. These

factors decide two features of banks' income statement: first, depreciation expenses is a small portion in operating expense part; second, provision for loans needs sufficient capital to absorb, especially when economy is during declining cycle. This makes capital adequacy and risk management crucial for banks.

IV.B Factors affecting banks profitability

According to Qin Xiao, the chairman of China Merchants Bank, there are six factors that are vital to banks: scope, growth, business structure,

1) Scope means total assets to banks. The related indexes to total assets are number of branches and number of customers. Banking is an industry that counters economy of scope very important. The importance of scope doesn’t mean the control of fixed cost and variable costs, it means the ability of banks to provide better services to more locations, more customers with more kinds of products efficiently.

Banks with large number of customers not only has advantage on deposit and loans businesses, but also could benefit from non interest income like commission from off balance activities, like fund sales, trading financing and insurance.

Therefore, economy of scale for banks could be written as: Large interest bearing assets+ wide branches networks+ big customers’ foundation=high returns from interest income and non-interest income.

While on the other side, due to location’s restriction, industry limitation and some other inconvenience to big banks, medium and small banks have advantage to provide services to these areas and customers. In this background, banking sector has formed a pattern that includes Agricultural Saving Community, City Commercial banks, National Commercial

banks and National banks. So, the most important task for banks' strategy is market positioning, selecting a proper market development approach.

Scope is not the whole story of banks. Large scope or total asset could be a heavy burden to banks for it also means more costs and expenses. Expansion of branches needs more staff and assets, and also makes control of headquarter difficult.

So, scope could bring more interest income, while it is only starting point of profit which is also affected by asset structure, efficiency and quality.

2) Growth is measured by the growth rate of total assets and net profit. This is expected to be the main factor of bringing the valuating differences between commercial banks and national state-owned banks. The commercial banks could keep growing at a fast space, like listed city commercial banks Bank of Beijing, Bank of Ningbo, Bank of Nanjing etc. These banks are enjoying a comparatively high growing space and market premium than state-owned banks. These banks are expected to expand faster at near few years, then they will grow at a stable space and enter continuous growing rate together with GDP macro economy.

For China, the factor is crucial for valuing banks. China economy keeps growing at a high rate. Banks also benefit from the fast growing economy and people growing income. From the above valuation trials, we could observe that prevalence of market premium on China banks. We could say it's from the optimism on banks future growth and China economy.

On the other side, it doesn't mean banks could always keep growing even in developing countries. There are potential risks associated with growth, like many kinds of risks, credit risk, market risk, liquidation risk and operational risks. The vital problem of growth is risk control and growing ability maintenance.

3) Business structure is the percentage of various factors in total assets. It's a deep level of bank's asset, including features like asset, customers, branches, employees and income. We'd like to compare business structure as research target. There are two main ratios in business structure: interest income to non interest income, company loans to retailing loans. These two ratios could represent the degree of China banks' development.

We expect the interest income is high for the strictly regulated China banks interest rate and Chinese high saving rate tradition. China banks, especially state-owned banks, have been benefiting from the margin. However, the large amount of interest bearing assets make it more difficult to manage risks associated.

Non-interest bearing income mainly includes commission charges, investment income and other intermediary service income, which are usually low cost and easy to control costs. In mature markets, non interest bearing income normally occupies above 40% of operating income, comparing with about 15% that of China.

Now China is promoting the intermediary service businesses very hard. Before 2006, China financial market was divided by government. Banks could not operate securities businesses, insurance company could not operate banking sector either. After loosing the regulation, banks could operate fund, securities and insurance businesses. These businesses are foreign banks' main profit sources.

The other ratio is company loans to retailing or individual loans. Retailing loans mainly include real estate mortgages, credit card and durable product consumption.

With the development of China economy, domestic consumption ability is increasing. The retailing industry could be next economy pulling power for China economy. Banks should

make use of this developing trend to expand individual businesses. Also, retailing loans interest rate is higher than company loans.

Besides the two ratios above, businesses structure of banks also include big company loans to small and medium size companies. The same for retailing customers: they could be divided to middle and high end customers and low end customers. High quality customers are the target for banks to customers.

While the small and medium companies are at weak position to negotiate with banks. We could also explain by asymmetric information theory, which says small and medium companies with good financial and operating conditions are always treated as sub-standard loans. It's hard for these companies to receive loans from banks even though they have stable ability to repay the loans. We think banks could consider these customers. They usually would like to pay high yields to banks. Banks with strong ability to control risks could expand market and create high returns from small and medium companies.

Customers of banks could be described as "Two-Eight Law", meaning 20% customers of banks contribute 80% profits. High end customers usually prefer low interest time deposit, for they are not satisfied at the low interest rate and prefer investing in other bank's financing assets. This is also an opportunity for China banks to push the strategic transformation, increasing non-interest income weight.

4) Efficiency could also be considered as profitability margins or the ratio of resources input to services output. Banks should always consider how to produce more services with less costs or expenses.

From the profitability model, we could observe the input are mainly cash and operating

expenses. Cash input includes capital invested and liabilities.

Operating expense and costs include: labor costs, research and development, selling, administration and fix assets depreciation and assets impairment, etc.

We could measure output using two indexes: net operating income and net income.

To promote the indexes, banks could lower the liabilities' costs via increasing retailing deposits and time deposits, raising loan to deposit ratio.

Another index is operating margin that is calculated by the ratio of operating expenses and costs to operating income. We could also call it cost expense ratio which reflects operating efficiency. Banks may raise this ratio by control operating expenses, including labor costs and fix assets deprecation and impairment. Banking is a labor intensive industry, the development and human resources and allocation is the main factor to support banks businesses. Cost control on human resources has big potential to increase banks' operating efficiency. On the other side, human resources control is not a merely cost reduction, for banks should also consider the quality of employees and compensation. We'll test the factor in our model to identify to what degree controlling human resources related to market premium of banks.

Banks should relate the operating income growth with the increase of labor costs.

The increase of net profit and net capital growth should surpass the growth of total assets and loan amount is the foundation of sustainable growth of banks. A principle of cost control is on the basis of meeting the needs of banks’ operation and development, keeping the profit growth at the same pace with total assets growth.

There are other labor productivity indexes, like net profit per person, net revenue per person, net income per branch and so forth.

5) Quality of banks. The total loan amount is controlled in China. The current regulated loan to deposit ratio is constrained below 75%.

Even though, banks operation could face other risks, like credit risk, market risk and operational risk. Risk control is crucial to banks profit. From the profit creation model, we could see operating profit after reducing costs and expenses is not net profit. Banks should write down some provision as asset impairment. This part is vital to banks' bottom line. Taking Shenzhen Development Bank as an example, Chin Bank Regulation Commission asked this bank to record a huge provision at the end of 2008 according to the serious financial crisis. While in 2009, the economy was not as bad as forecasted. Shenzhen Development bank wrote back the provision, promoting the net income for 2009 over 700% compared with the previous year. (Annual Report of FY2009).We could see the power of provision. Some banks may manipulate financial statements using this term.

This also shows us the proper selection for calculation of stock value via EVA method for it uses NOPAT as basis which is usually stable and hard to manipulate.

Based on international asset quality classification standard, banks assets could be divided into five classes: Normal, Special mentioned, sub-standard , doubtful and loss. The later three classes are non-performing loans. The percentage of non-performing loans to total loans is non-performing rate; the ratio of provision to non-performing amount is provision cover ratio; and provision over average total loan is credit cost.

The provision rate could reflect banks attitude to potential risks in the future. In the same situation, the higher the provision rate, the stronger banks ability to withstand economy declining risk. However, it also shows a bank's risk management work if the rate keeps high,

which will also affect net profit.

Another important rate is loans mobility rate, which means the decline of loans quality from previous class to the next. Regulation commission is paying more attention to the mobility rate from special mentioned class to sub-standard class. This reflects the changing of quality of a bank's quality. We'd like to test if these factors reflected in market price performance.

6) Effective tax.

Every company doesn't like tax. In our valuation model, tax is a fixed factor and the same to every bank. While in the reality situation, banks could make use of some particular cases from tax law to get some privileges from tax. According to Qin Xiao, China tax law to banks is different with international standards in the followings: China imposes operating tax which is 5% of operating income both from interesting income of loans and off balance activity charges. Special provision for the non-performing loans could not be waived from tax. Only when the provision released, banks could apply for tax reimbursement. One percent of total loan amount could be deducted from tax. The tax system prevents banks from adopting prudent measures to loans.

We could foresee the tax system for banks could change accordingly.

7) Profitability ability is the core competition power for banks. From the above analysis on banks scope, growth, structure, efficiency and quality, we conclude the banks' ultimate goal of operating is making profit and should adjust all the factors based on the direction of promoting profitability power. Profitability ability could be measured by net income, ROAE (return on average equity) and ROAA(return on average asset).

Net income is the most important factor investors and managers care. ICBC (Industrial and

Commercial Bank of China) has become the most profitable bank in the world. In the year of ending at December 31, 2009, ICBC recorded a net income after tax of CNY1293.5 (ICBC Homepage).The fast growing net income reflects ICBC's growing ability to create returns for investors. However ICBC only performs an average level with other banks. This explains the other side of ICBC, the biggest net income may come from the more shareholders equity and assets.

The introduction of ROAA and ROAE could consider the capital and assets employed to better measure banks profitability performance. We'll include the two factors in our comparison models in the following part. To sum up the above factors which are crucial to banks, we conclude the following factors for regression analysis:

Table 7. Variables used for valuation

1	***TA***	Total Assets
2	***No. of Bran.***	Number of branches
3	***No. of Cust.***	Number of Customers
4	**Δ*TA***	Growth of total assets
5	**Δ*NI***	Growth of net income
6	***Interest/Non-inter.***	Interest income to non-interesting income ratio
7	***Priv./comp.***	Retailing loan to Company loan ratio
8	***Per. NI***	Net income per staff
9	***Bran. NI***	Net income per branch
10	***Non-perform. Ratio***	Non-performing loans/ Total Loans
11	***Non-perform. Mobility***	Special mentioned to non-performing rate
12	***Provision Cover***	Cover ratio, Provision/ non-performing loan
13	***ROAA***	Return on average asset
14	***ROAE***	Return on average equity

Most of the above factors in the table are peculiar to banks. Some of the factors are common, like total assets, branches number, ROAA and ROAE etc.

However some factors are mutually overlapping if we use all for regression analysis. We'd better filter some of them: Number of branches and number of customers are represented by

net income per branch and total assets. And according to banks annual reports, branches number is hard to get, we'll also omit this variable.

III.C Regression analysis

So, 11 variables could be included in our regression model and the model could be written as:

$$Y = a + \beta_1 TA + \beta_2 \nabla TA + \beta_3 \nabla NI + \beta_4 Interest/Non + \beta_5 Priv./Comp + \beta_6 Per.NI + \beta_7 Non-perf.Ratio + \beta_8 Non-perf.Mobility + \beta_9 ProvisionCover + \beta_{10} ROAA + \beta_{11} ROAE + \varepsilon$$

Where the dependant variable Y is market premium according to the previous calculation based on EVA; the other factors are as described.

Table 8. Descriptive statistics for all the variables

Descriptive Statistics	N	Min	Max	Mean	STD.
TA	14	149565.81	11785053.00	3064121.55	3923202.13
ΔTA	14	0.15	0.63	0.28	0.15
ΔNI	14	-0.14	7.19	0.70	1.88
Interest/Non-	14	2.32	18.15	8.79	4.28
Priv./Comp.	14	0.09	1.61	0.34	0.38
Per. NI	14	0.31	0.99	0.50	0.19
Non-perf. Ratio	14	0.01	0.03	0.01	0.01
Non-perf. Mobility	14	0.06	0.74	0.24	0.21
Provision Cover	14	0.14	0.82	0.47	0.20
ROAA	14	0.01	0.01	0.01	0.00
ROAE	14	0.11	0.28	0.18	0.05
P/E	14	12.15	26.88	16.28	4.35
P/B	14	2.07	4.02	2.73	0.55

Fro the above table, we observed the descriptive for the 14 banks valuation and comparison variables. We add P/E and P/B for the market further prospects to the banks growth.

Then we'll run the regression model using the 11 variables to test which variable is closely related with the comparable market premium.

Table 9. Regression on Market premium

SUMMARY OUTPUT **Y=Market Premium**

Regression Analysis	
Multiple R	0.995979
R Square	0.991975
Adjusted R Square	**0.94784**
std. error	0.034766
N. Observed	14

Variance Analysis

	df	SS	MS	F	Significance F
Regression Analysis	11	0.298811	0.027165	22.47499	**0.04335**
RE	2	0.002417	0.001209		
Total	13	0.301228			

	Coefficients	Std Error	t Stat	***P-value***	Lower 95%	Upper 95%
Intercept	-1.03524	0.494279	-2.09444	0.171237	-3.16195	1.091473
TA	-1.3E-09	8.92E-09	-0.14132	0.900569	-4E-08	3.71E-08
ΔTA	0.657197	0.277586	2.367548	0.141498	-0.53716	1.851553
ΔNI	-0.03264	0.01176	-2.77511	0.109023	-0.08324	0.017964
Interest/Non-	0.020676	0.008941	2.312373	0.146898	-0.0178	0.059148
Priv./Comp.	0.110038	0.04397	2.502584	0.129394	-0.07915	0.299223
Per. NI	-0.03893	0.108278	-0.35956	0.753591	-0.50481	0.426949
Non-perf. Ratio	14.77548	7.051374	2.095404	0.171118	-15.5641	45.11509
Non-perf. Mobility	-0.03285	0.055901	-0.58763	0.616291	-0.27337	0.207676
Provision Cover	***0.56829***	***0.11863***	***4.79039***	***0.04092***	***0.05786***	***1.07872***
ROAA	29.12244	10.9631	2.656407	0.117297	-18.048	76.29284
ROAE	0.179449	1.194592	0.150218	0.894374	-4.96047	5.319363

Total R square is 0.95, which is properly high value indicating the factors listed above could explain much of the dependent variable here: market premium comparing with intrinsic value. And the F value is over 22, explaining the representing characteristics of samples.

$$Y = -1.04 + 0.66 * \nabla TA - 0.03 * \nabla NI + 0.02 * Interest/Non. + 0.11 * Priv./Comp. - 0.04 * Per.NI - 14.78 * Non-perf.Ratio - 0.03 * Non-perf.Mobility + 0.57 * ProvisionCover + 29.12 * ROAA + 0.19 * ROAE + \varepsilon$$

From the regression result, Provision coverage has significant correlation with market price premium. It confirmed the market focused field, loans loss provision. Loans loss provision is

the cushion for banks to defend credit risks. A high provision coverage (provision/ non-performing loans) shows the bank's ability to set aside thick cushion for future possible loan losses and will enable the bank to go through serious financial crisis. Back to the 14 banks' data, China CITIC Bank has the higher provision coverage, about 71%; much higher comparing with the state-owned banks' about 20% on average. It's commonly known that P-value of TA is pretty high, indicating the correlation is very low. Together with net income per employee and non-performance mobility. It's surprising that net income per employee which could be seen as the efficiency of banks has no strong correlation with market premium. And the same with ROAE and non-performing loans mobility.

We also extracted P/E and P/B ratios to represent absolute market valuation. Usually, P/E represents company future development potential. In ROCE model, shareholders pay attention to residual earnings companies make comparing with required return or capital opportunity costs. High P/E indicates that the market expects the company's ability to overbeat common returns. If a bank has high P/E ratio, we could say it's performing better than others.

Table 10. Regression on banks P/E

SUMMARY OUTPUT **Y: P/E**

Regression Analysis	
Multiple R	0.99909
R Square	0.998181
Adjusted R Square	**0.988178**
std. error	0.472943
N. Observed	14

Variance Analysis

	df	SS	MS	F	Significance F
Regression	11	245.5227	22.32025	99.78892	**0.009962**

Analysis			
RE	2	0.447349	0.223675
Total	13	245.9701	

	Coefficients	Std Error	t Stat	***P-value***	Lower 95%	Upper 95%
Intercept	-7.59059	6.724013	-1.12888	0.376145	-36.5217	21.3405
TA	-7.1E-08	1.21E-07	-0.58293	0.618911	-5.9E-07	4.51E-07
ΔTA	***18.95685***	***3.776188***	***5.020102***	***0.037465***	***2.709222***	***35.20447***
ΔNI	-0.08611	0.159981	-0.53823	0.644304	-0.77445	0.602237
Interest/Non-	***0.87928***	***0.121636***	***7.228777***	***0.018604***	***0.355922***	***1.402637***
Priv./Comp.	***5.164991***	***0.598148***	***8.634968***	***0.013148***	***2.591367***	***7.738616***
Per. NI	***-14.4584***	***1.472974***	***-9.81581***	***0.01022***	***-20.7961***	***-8.12074***
Non-perf. Ratio	42.70002	95.92464	0.445141	0.69976	-370.03	455.4305
Non-perf. Mobility	***3.862133***	***0.760466***	***5.07864***	***0.036653***	***0.590112***	***7.134154***
Provision Cover	***7.919078***	***1.613824***	***4.907028***	***0.03911***	***0.975355***	***14.8628***
ROAA	***2141.904***	***149.1385***	***14.36185***	***0.004813***	***1500.213***	***2783.596***
ROAE	-48.3005	16.25085	-2.97218	0.097009	-118.222	21.62131

We select variables with P<0.05: 5 variables are significant correlation with P/E. They are increase of TA, interest income to non-interest income, retailing loan to company loan, per staff net income, non-performance mobility, provision coverage and ROAA.

Obviously, the higher of increase of Total assets and ROAA, the more market premium investors give. One significant founding is that retailing loan to company loan(Priv./Comp.), it forms positive correlation with P/E, higher retailing loan portion could lead to stable cash flow. As stated above, on retailing loans banks tend to benefit from higher yields and low credit risks. We could estimate that banks would prefer to develop this field.

One special variable is net income per employee, Per NI. It has negative correlation with P/E. We're trying to explain this in this way, small and medium banks, which are usually high on P/E, are in expansion stage. They usually recruit many staffs preparing for further business needs. These staffs don't create value however would draw down per NI. Another reason may come from market expectation for the enhancement of operating efficiency.

Another variable is non-performing loan mobility that indicates fast growing banks may like risk -taking. When focus on market share expansion, they may choose small-medium companies that are usually with high credit risks.

We also chose P/B as dependent variable to test the independent variables. As its name showing, P/B means price to book value. High P/B value, higher than 1, indicates company's growth potential in accumulating book value. The higher the ratio, the higher the market expects company to exceed market required return.

Table 11. Regression on banks P/B

SUMMARY OUTPUT **Y=P/B**

Regression Analysis	
Multiple R	0.984561
R Square	0.969361
Adjusted R Square	**0.80085**
std. error	0.243342
N. Observed	14

Variance Analysis

	df	SS	MS	F	Significance F
Regression Analysis	11	3.746919	0.340629	5.752382	**0.15731**
RE	2	0.118431	0.059215		
Total	13	3.86535			

	Coefficients	Std Error	t Stat	***P-value***	Lower 95%	Upper 95%
Intercept	1.312168	3.45969	0.379273	0.740967	-13.5737	16.19801
TA	4.27E-08	6.24E-08	0.684747	0.564207	-2.3E-07	3.11E-07
ΔTA	1.38266	1.942953	0.711628	0.550503	-6.97719	9.742511
Δ*NI*	*0.000809*	*0.082315*	*0.009823*	*0.993055*	*-0.35336*	*0.35498*
Interest/Non-	*0.029681*	*0.062585*	*0.474258*	*0.682051*	*-0.2396*	*0.298963*
Priv./Comp.	0.542933	0.307764	1.764123	0.21976	-0.78127	1.867134
Per. NI	-0.51421	0.757886	-0.67848	0.567445	-3.77513	2.746708
Non-perf. Ratio	-58.4757	49.35587	-1.18478	0.357813	-270.837	153.8854
Non-perf. Mobility	*1.173488*	*0.391281*	*2.999094*	*0.095516*	*-0.51006*	*2.857032*
Provision Cover	0.556229	0.830357	0.669867	0.571926	-3.01651	4.128966

ROAA	104.0261	76.73585	1.355639	0.308001	-226.142	434.1939
ROAE	-0.37884	8.361509	-0.04531	0.967979	-36.3555	35.59783

Surprisingly, the variables don't show strong correlation with banks P/B ratios. While, this result is in agreement with the factors description that banks' main assets are intangible assets, credit and reputation, and financial assets, like loans. Comparing with P/B, P/E is closely attracting market's attention.

V. Conclusions and Suggestions

V.A Research results

From the above researches and analysis, we found that EVA is a proper valuation method for China banks. It could avoid accounting methods effect and better identify banks future development potential and space under consistent economic situation.

Among the 14 banks listed on China Shanghai and Shenzhen Stock Exchanges, Shenzhen Development Bank and Industrial Bank are undervalued the most. China CITIC Bank is receiving market premium of about 30%. Other commercial banks, like Bank of Ningbo, Bank of Nanjing and China Minsheng Banking Corporation are also performing comparatively well in the capital market. We can't fully deem the calculation and results are right, either the financial data. However, under the same scenario and assumptions, we could track the trend of premium or discounts of market price comparing with intrinsic value.

We then analyzed factors, including scale, profitability, operating ability, risk management and efficiency sides, to come out the result that a significant correlation between market premium and banks provision coverage (LLP, loan loss provision divided by non-performing loans).

V.B Suggestions

According the research result, provision coverage rate is crucial for banks valuation and risk

defendant ability. We suggest China government strengthen regulation on banks risk management ability. China is opening financial market, and will face the fierce competition from foreign bank, investment banks and financial institutions. Profitability is vital for banks to survive. While profit and risk always come together. During the financial crisis from US subprime mortgage, many profitable banks went bankruptcy due to the high leverage.

China should also strictly apply to Basel New Capital Accord, which requires the provision coverage ratio to reach at least 100%. And on the other side, government should encourage banks to conduct proper accounting principles to standard provision allocation, avoiding accounting manipulation. We also suggest banks managers put risk management into more important position. If the managers could enhance provision coverage ratio by 1%, the market premium could be promoted by 0.56%.

And according to P/E analysis, managers could also raise banks valuation by improve banks' profitability and intermediary services. Investors, especially small individual investors have been at a serious disadvantage in China. There is lack of self protecting mechanism for individual investors. They are in the position of loose corporate governance and information asymmetry. (Zhan, Economic Outlook) For investors interested in banks, the risk is even higher for the lack of tangible assets and depositor protecting mechanism. Instead of solely focus on banks' profitability, they should also pay more attention to risk indexes. Small and medium size banks may get some premium in the market. The market might be too optimistic on the risk management ability and further development. So, we suggest investors in banks take cross-trading strategy, comparing valuation among banks

using P/E, provision coverage ratios and EVA valuation combining approaches.

V.C Deficiencies and Prospects

Due to lack information and knowledge, we didn't make use of other valuation methods, using the same growth and discount estimation, to evaluate all the banks. We think that could be one reasonable method to be applied for more precious valuation.

Also, all the data are from Reuters Knowledge and company's annual reports. We think it would be wonderful if we could standardize accounting methods. For regression analysis, 14 banks are small size and 11 factors could be simplified. If we could standardize accounting method to US GAAP, then compare with US banks, it would be fruitful.

Banking sector is very complicated and much more sensitive to many factors. We hope other than provision coverage ratio and retailing loan ratio, many other factors could be identified and verified for the better valuation and management for banks. For example, not only retailing to company loans structure makes bank risk exposure and margins different, but industries banks' loans concentrate on may also bring in differences.

Valuation is affected not only by financial performance but also many other sides, such as corporate governance, financial activities, capital market liquidity and economy as a whole. We expect to do more research on banks valuation from other sides point of view to come out constructive results.

VI. APPENDIX

Appendix 1 Beta calculation for China Construction Bank

Regression Statistics					
Multiple R	0.80				
R Square	**0.64**				
Adjusted R Square	0.64				
Standard Error	0.01				
Observations	113				
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.040966962	0.040966962	199.0558195	**1.633E-26**
Residual	111	0.022844511	0.000205806		
Total	112	0.063811473			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	0.00	0.00	0.18	0.86	0.00
X Variable 1	**0.85**	0.06	14.11	0.00	0.73

***Data source**: Thomson Reuters Knowledge, Yahoo Finance and Banks Annual Reports*

Appendix 2 FY2009 (3 banks from FY2008)All banks TC

Ticker	Company Name	Total Equity,	Allowance for Asset Impairment	Deferred Tax - Total, Reporting Currency, LFY	TC
601169	Bank of Beijing Co.,Ltd.	33,794.22	2684	-17.85	36,496.07
601988	Bank of China Limited	514,992.00	147330	-5,198.00	667,520.00
601328	Bank of Communications Co Ltd	163,848.00	10896	-1,090.00	175,834.00
601009	Bank of Nanjing Co., Ltd.	12,038.96	1531	0	13,569.96
002142	Bank of Ningbo Co., Ltd.	9,741.98	699	25.37	10,415.61
601998	China CITIC Bank Corporation Limited	95,343.00	7716	-1,122.00	104,181.00
601939	China Construction Bank Corporation	555,475.00	137108	-3,516.00	696,099.00
600036	China Merchants Bank Co., Ltd	79,515.00	5154	-1,213.00	85,882.00
600016	China Minsheng Banking Corporation	53,880.00	6445	-1,215.00	61,540.00
600015	Hua Xia Bank Co., Limited	30,234.19	3378	-414.5	34,026.69
601398	Industrial and Commercial Bank of China	673,893.00	150397	-4,272.00	828,562.00
601166	Industrial Bank Co., Ltd.	59,597.46	518	254.66	59,860.80
600000	Shanghai Pudong Development Bank Co.	67,953.02	19764	-165.85	87,882.87
000001	Shenzhen Development Bank Co.,Ltd.	20,469.61	1575.1	217.91	21,826.80

***Data source**: Thomson Reuters Knowledge, Banks Annual Reports*

Appendix 3 FY2009 (3 banks from FY2008)All banks EVA

Ticker	Company Name	EVA
601169	Bank of Beijing Co.,Ltd.	**3,176.69**
601988	Bank of China Limited	**56,432.11**
601328	Bank of Communications Co Ltd	**22,010.75**
601009	Bank of Nanjing Co., Ltd.	**903.83**
002142	Bank of Ningbo Co., Ltd.	**937.47**
601998	China CITIC Bank Corporation Limited	**6,686.82**
601939	China Construction Bank Corporation	**80,511.31**
600036	China Merchants Bank Co., Ltd	**15,135.28**
600016	China Minsheng Banking Corporation Ltd.	**4,544.50**
600015	Hua Xia Bank Co., Limited	**2,246.04**
601398	Industrial and Commercial Bank of China	**97,664.30**
601166	Industrial Bank Co., Ltd.	**11,926.11**
600000	Shanghai Pudong Development Bank Co. Ltd	**9,868.27**
000001	Shenzhen Development Bank Co.,Ltd.	**4,875.62**

Appendix 4 China CITIC Bank Intrinsic Value calculation

601998	**China CITIC Bank**					
5 years growth rate	**8%**					
Discount rate	**3%**					
EVA Estimate	**2009**	**2010E**	**2011E**	**2012E**	**2013E**	**2014E**
NOPAT	10,906.25	11,778.75	12,721.05	13,738.73	14,837.83	16,024.86
WACC	4.05%	4.05%	4.05%	4.05%	4.05%	4.05%
TC	104,181.00	112,515.48	121,516.72	131,238.06	141,737.10	153,076.07
EVA	6,686.82	7,221.77	7,799.51	8,423.47	9,097.35	9,825.13
PV	**6,686.82**	7,011.42	7,351.78	7,708.67	8,082.87	8,475.25
EVA Growth rate		3.34%	3.34%	3.34%	3.34%	3.34%
Second Stage, PV from 2010 to 2014		**38,630.00**				
Long term EVA growth rate	2%					
Required return	12%	103,163.91				
Third Stage, terminal value PV		**86,398.15**				
Sum of three stages value		**131,714.97**	million			
Shares outstanding		39,033.34	shares			
Intrinsic value per share		**¥3.37**				

Appendix 5 Shenzhen Development Intrinsic Value calculation

000001	Shenzhen Development Bank Co.,Ltd.					
5 years growth rate	**8%**					
Discount rate	**3%**					
EVA Estimate	**2009**	**2010E**	**2011E**	**2012E**	**2013E**	**2014E**
NOPAT	5,676.23	6,130.33	6,620.75	7,150.42	7,722.45	8,340.24
WACC	3.67%	3.67%	3.67%	3.67%	3.67%	3.67%
TC	21,826.80	**23,572.94**	25,458.78	27,495.48	29,695.12	32,070.73
EVA	4,875.62	5,265.67	5,686.93	6,141.88	6,633.23	7,163.89
PV	**4,875.62**	5,112.30	5,360.48	5,620.69	5,893.54	6,179.64
EVA Growth rate		3.34%	3.34%	3.34%	3.34%	3.34%
Second Stage, PV from 2010 to 2014		**28,166.65**				
Long term EVA growth rate	2%					
Required return	12%	75,220.86				
Third Stage, terminal value PV		**62,996.29**				
Sum of three stages value		**96,038.56**	million			
Shares outstanding		3,105.43	shares			
Intrinsic value per share		**￥30.93**				

Appendix 6 Variables raw data for all the 14 banks

Ticker	601169	601988	601328	601009	002142	601998	601939	600036	600016	600015	601398	601166	600000	000001
TA	417021	8751943	3309137	149565.81	163351.9	1187837	9623355	2067941	1054350	845456.4	11785053	1332162	1622718	587811.1
ΔTA	17.73%	25.82%	23.56%	62.73%	58.19%	17.46%	27.37%	31.57%	14.75%	15.56%	20.78%	30.49%	23.93%	23.90%
ΔNI	61.79%	27.20%	5.81%	6.02%	9.44%	60.68%	15.29%	-14.18%	24.47%	22.45%	16.10%	16.66%	5.60%	719.28%
Interest/Non-	1230.01%	232.04%	682.92%	894.85%	789.64%	1153.56%	471.35%	430.05%	994.48%	1814.62%	471.76%	904.27%	1415.92%	819.10%
Priv./Comp.	10.03%	39.19%	20.21%	13.84%	34.86%	16.45%	32.48%	160.78%	22.85%	8.89%	30.49%	33.41%	21.58%	37.27%
Per. NI	99.38%	30.78%	38.01%	73.51%	42.72%	60.74%	35.40%	45.20%	39.65%	30.57%	32.99%	60.36%	60.41%	44.49%
Non-perf. Ratio	1.55%	2.64%	1.36%	1.25%	0.81%	1.46%	1.63%	0.72%	1.36%	1.38%	1.71%	0.56%	0.84%	0.68%
Non-perf. Mobility	58.04%	25.60%	24.22%	6.93%	74.24%	6.94%	5.74%	11.89%	16.47%	21.04%	9.90%	8.84%	20.41%	48.99%
Provision Cover	61.84%	20.06%	43.57%	43.76%	65.39%	71.24%	35.28%	30.70%	82.29%	52.30%	26.25%	13.72%	42.66%	64.45%
ROAA	1.20%	0.95%	0.87%	0.87%	0.92%	1.23%	0.87%	0.99%	0.81%	0.53%	0.99%	1.15%	0.73%	0.98%
ROAE	16.40%	14.90%	17.80%	10.80%	14.90%	17.20%	15.20%	22.50%	19.40%	14.80%	17.40%	25.80%	17.70%	28.30%

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