Enterprise Valuation of China Construction Bank Based on Discounted Cash Flow Model

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Abstract: In recent years, the rapid development of the financial industry plays an increasingly important role in optimizing capital and stabilizing society, which promotes the financial industry to achieve a pivotal position in the modern market economy quickly. But the capital market of our country is imperfect, and the stock price of each commercial bank is lower than the actual value, which causes inappropriate decisions made by investors, not only losing good investment income, but also restricting the development of the banking industry. Based on the above background, this paper takes China Construction Bank as the empirical analysis object, and selects discounted stock cash flow model to analyze its value. The evaluation results confirm that the stock price of China Construction Bank is underestimated, and revealed that China should strengthen the construction of financial market, and the banking industry is one of the more valuable investment objects of all stakeholders.

1. Introduction

Although CCB has been listed late, CCB has a history of more than more than 60 years. Through continuously improving the management level and extending business scope, CCB obtains the general consumer's approbation, and the enterprise value shows an increasing trend. However, the stock price of CCB is at a lower level since 2015, and relatively pessimistic in the future period. This fact not only makes investors lose good investment opportunities, but also restricts the development of financial industry and securities industry. The theory of enterprise value evaluation has been widely used in many developed countries. This theory is not only used by internal managers in various financial and business decisions, but also widely used in the decision-making of many stakeholders such as investors and creditors. In other words, the value of each enterprise evaluated by the enterprise value theory is an important reference factor for the decision of all stakeholders. This paper quantitatively evaluates the enterprise value of CCB by means of discounted stock cash flow model in the theory of enterprise value evaluation. By comparing the assessment results with the market value reflected in the capital market, the decision makers are given a reference. At the same time, the correct decision of the relevant decision-makers can boost the development of CCB.

2. Equity Cash Flow of CCB

2.1 Brief introduction of CCB

China Construction Bank(CCB)was founded in 1954.Chinese People's Construction Bank is the formerly name, and the present name was changed in 1996 and has been used so far. The bank was first established as a wholly state-owned enterprise. However, under the constant guidance of socialist market economy, CCB changed its nature from state-owned commercial bank to state-controlled shareholding commercial bank after being injected into capital by many enterprises. CCB was listed on the Stock exchange of Hong Kong in 2005. The main areas of business involve corporate banking, personal banking and capital operations. CCB has a broad customer base, maintains banking business links with a number of large business groups and leading enterprises in economic strategic industry. With continuous improvement of financial services and management

system, CCB ranks second in state-owned five major banks, and ranks 14 in the 2017 Global Top 500 brand list which released by Brand Finance.

Benchmark Day of assessment: December 31, 2016

Scope of assessment: CCB

Basis of assessment: China Construction Bank website and other related websites publicly released information

Methods of assessment: Discounted stock cash flow model

Assumptions of assessment: CCB can continue to operate, and the enterprise management strategy, the future macro-economic trend and the banking industry in China does not change dramatically.

2.2 Cost of equity capital

This paper uses capital asset pricing model to calculate equity capital cost. The calculation formula is $Ke = Rf + \beta \times (Rm - Rf)$, Ke represents the expected yield of the stock, Rf represents the risk-free interest rate, β represents the beta coefficient of a stock, and Rm represents market rate of return. First, the measurement of risk-free interest rates. Many scholars choose the interest rate of national debt as the best choice based on foreign advanced experience, But this paper chooses one-year term deposit rate for 2016 which has the same low risk as the risk-free rate, after considering the current situation of China's capital market development, $Rf = 1.5\%$; Secondly, the calculation of the beta coefficient. In order to improve the accuracy of the valuation, the developing countries with comparatively sound securities market usually take the correlation model to obtain the results. But considering that the data needed in the regression analysis is difficult to obtain and has lower credibility from our capital market, this paper chooses the data published by the RESSET database , $\beta = 0.5259$; Again, the calculation of the market Market rate of return, This paper also selected 2017 Shanghai Composite Index annual rate of return published by RESSET database , $Rm = 14.87\%$ .Finally, the cost of equity capital is calculated according to the formula.

$$\begin{aligned} Ke &= Rf + \beta \times (Rm - Rf) \\ &= 1.5\% + 0.5259 \times (14.87\% - 1.5\%) \\ &= 8.5\% \end{aligned}$$

2.3 Equity Cash Flow

Based on the relevant knowledge of financial management, combined with the actual situation of CCB, this paper selects a model to predict the annual equity cash flow of CCB. The model presents "Equity Cash Flow = Net income + Depreciation-Capital expenditure - Increased amount of operating capital - Repayment of principal debt - New Issue debt". In view of the small proportion of the operating expenses of the construction Bank, the net income forecast is based on the revenue and the operating expenses. Taking into account the small proportion of Non-operating expenses in the operating expenses of CCB, this paper considers the future net income only from the two aspects of operating revenue and operating expenditure.

2.3.1 Forecast of operating income

Firstly, this paper collects and collates the relevant data of operating income of CCB in 2008-2016. Secondly, based on the data of the operating income of the last 9 years, this paper analyzes the relationship between the business income and the year of CCB with the E-views software, and $Y = 197755475 + 4949752X$ (Unit: Million)is the relationships. In the formula, X represents the number of periods, and Y represents the construction bank operating income for the corresponding period. Finally, to improve the accuracy of the forecast results, this paper makes a reliability test for the relational model. The results are shown in table 1. We can see from table 1 that the model fits as high as 97.02% and passed the T-Test and F-Test. The test results show that the model has high credibility for operating income forecasting.

Table 1. Test data of E-views software forecast model

Statistic Test Index	R^2	T	F
Indicator data	0.9702	15.10	228.1174

2.3.2 Forecast of operating expenses

In order to simplify the calculation, this paper assumes that the generating incomes and paying costs are matched in the operating activities of CCB. In other words, the ratio of operating income to cost has changed less in each year in the condition that the operating environment has not changed dramatically. Therefore, to gain the radio of operating income to operating expenses, this paper collects and collates the relevant data of CCB and implements the related calculation. The results of the calculations are shown in table 2.

Table 2. Analysis of operating expenses of CCB in 2014-2016 Unit: Million

Year	2014	2015	2016
Operating income	57,047,000	60,519,700	60,509,000
Operating expenses	27,322,300	30,910,700	31,270,100
Ratio of operating expenses to operating income	47.89%	51.08%	51.68%
The average of ratio	50.22%		

We can see from table 2 that the ratio between operating income and operating cost is more stable of CCB from 2014 to 2016.In the past 3 years, the ratio has been less volatile, with a minimum of 47.89% and a maximum of 51.68%. Therefore, this paper selects the average value as the income cost ratio of CCB in the future period. The ratio is equal to 50.22% in the future period.

2.2.3 Forecast of depreciation amount and capital expenditure

This paper also forecasts the future annual growth rate of depreciation and capital expenditure based on historical data of CCB. The relevant data of the depreciation amount and capital expenditure of CCB in recent years as shown in table 3 and table 4.

Table 3. Analysis of depreciation amount of CCB in 2013-2016 Unit: Million

Year	2012	2013	2014	2015	2016
Depreciation Amount	1,388,900	1,541,600	1,781,100	1,973,600	1,601,700
Annual Growth rate	——	10.99%	15.54%	10.81%	-18.84%
Average	12.45%				

Table 4. Analysis of capital expenditure of CCB in 2013-2016 Unit: Million

Year	2013	2014	2015	2016
Capital expenditure	3,714,800	3,374,000	2,766,000	2,658,100
Annual Growth rate	——	-9.17%	-18.02%	-3.90%
Average	-10.37%			

We can see from table 3 that the annual growth rate of depreciation in the last 4 years is basically maintained between 10% and 15% in addition to 2016 years. The Annual growth rate of depreciation of CCB in 2016 is 18.84%, which may due to the scrap or sale of fixed assets. For this reason, this paper eliminates the special situation of 2016 years when predicting the annual growth

rate of depreciation in the future period, and selects the average value among 2013 to 2015 (50.22%) as the growth rate of depreciation in the future period. The ratio is equal to 50.22% in the future period. We can see from table 4 that there are small amplitude fluctuations of the annual growth rate of capital expenditure of CCB in recent three years, but it basically maintains a stable state. Therefore, this paper selects the average value (-10.37%) as the annual growth rate of capital expenditure of CCB in the future period.

2.2.4 Forecast of increased amount of operating capital

Operating Capital refers to the difference between current assets and current liabilities an enterprise. Since the capital occupied by the operating capital can only be used for the operation of the enterprise, the change of operating capital will affect the cash flow of the enterprise. The relationship between operating income and working capital is directly related. Therefore, when predicting the increased amount of operating capital, this paper first predicts the operating capital, then can obtain the increased amount of operating capital by subtracting the working capital of the year from the operating capital of the previous year. This paper collects and collates the data of operating capital of CCB in the last 4 years (as shown in table 5).The data shows that the working capital of CCB is negative for each year, which accords with the debt business model of banking industry.

Table 5. Analysis of operating capital of CCB in 2013-2016 Unit: Million

Year	2013	2014	2015	2016
Operating Capital	-179,058,000	-182,060,200	-222,855,900	-261,356,400
Operating income	50,860,800	57,047,000	60,519,700	60,509,000
Ratio of operating income to working capital	-28.40%	-31.33%	-27.16%	-23.15%
The average of ratio	-27.51%			

From table 5 we can see that the radio of operating income to operating capital is relatively stable of CCB in the last four years (2013-2016). This paper chooses the average of this ratio in the last four years (-27.51) as the basis of the working capital of CCB in the future period.

Furthermore，taking into account that the market and business environment have changed less, this paper assumes that the CCB's data of repayment of principal debt and new issue debt are not very different from recent years in the future period. Therefore, this paper calculates the average value of the data as the future data. The result is that the new issue debt of CCB is 37.93767 billion, and the repayment of principal debt of CCB is 12.342 billion yuan in the future.

2.2.5 Equity Cash Flow

Table 6. Forecast of equity cash flow of CCB in 2014-2016 Unit: Million

Project	2017e	2018e	2019e	2020e	2021e
Operating income	69,252,995	74,202,747	79,152,499	84,102,251	89,052,003
Minus: Operating expenses	34,778,854	37,264,620	39,750,385	42,236,150	44,721,916
Operating profit	34,474,141	36,938,127	39,402,114	41,866,101	44,330,087
Total profit	34,474,141	36,938,127	39,402,114	41,866,101	44,330,087
Minus:Income tax expenses	8,618,535	9,234,532	9,850,529	10,466,525	11,082,522
Net profit	25,855,606	27,703,596	29,551,586	31,399,575	33,247,565
Add: Depreciation	1,801,112	2,025,350	2,277,506	2,561,056	2,879,907
Minus:Capital expenditure	2,382,455	2,135,394	1,913,954	1,715,477	1,537,582
Minus:increased amount of operating capital	9,635,178	-17,991,390	-17,991,390	-17,991,390	-17,991,390
Minus:Repayment of principal debt	1,234,200	1,234,200	1,234,200	1,234,200	1,234,200
Add: New issue Debt	3,793,767	3,793,767	3,793,767	3,793,767	3,793,767
Equity Cash Flow	18,198,651	12,161,728	14,483,315	16,813,331	19,158,068

Based on the business income model of CCB and the forecast analysis of various projects in the equity cash flow model, this paper can calculate the equity cash flow of CCB in the next five years (2017-2012), the results are shown in table 6.

3. Enterprise Valuation of CCB Based on Discounted Cash Flow Model

3.1 Results of the assessment

This paper predicts that the CCB will be in an increasing condition in the next 5 years (2017-2020), and has entered the stable period since 2021.This paper expects the growth rate of the stable period to be equal to the national economic growth, and takes the value g equals 7%. Combined with the above-mentioned cash flow of CCB, the calculation result and process of each share value on December 31, 2016 are shown in table 7.

Table 7. Calculation of equity value of CCB Unit: Million

Project	2017e	2018e	2019e	2020e	2021e
Equity Cash Flow	18,198,651	12,161,728	14,483,315	16,813,331	19,158,068
Discount rate	8.5%				
Present value coefficient	0.9217	0.8495	0.7829	0.0846	0.8219
Present value of cash flow of equity in the forecast period	16,772,951	10,330,845	11,339,105	1,423,033	——
Present value of cash flow of equity in the stable growth period	108,098,962				
Equity value	147,964,894				
Equity	25,001,100				
Market price per share(Yuan)	6				

By analyzing table 6, we can get the following results. Based on the discounted cash flow model based, the value of each share of CCB equals 6 yuan/share on December 31, 2016. This result may be a certain gap with actual value per share of CCB, because of that there are many unavoidable factors to influence parameters in acquisition and calculation during the assessment process. But this is an unavoidable difference in any assessment or forecast outcome. Based on this, this paper considers that the result is relatively reliable.

3.2 Analysis of the results

This article inquires to the market price per share of CCB on December 31, 2016 is 5.44 yuan/share through the Sina Finance website. Compared with the results of the assessment, the market price is underestimated. The main reason of this result is that the stock market in China is in the stage of development. The information provided by the stock market may differ from reality, and may have a certain lag. The direct result of Non-effective information is that all the stakeholders to make the wrong decision, and the share prices are even more depressed. The results reveal that investors should seize the opportunity to make appropriate investments in commercial banks to earn forward spreads. At the same time, in order to profit in our capital market investors should strengthen their investment ability. In addition, China should vigorously develop and perfect capital market, and create a good environment for business stakeholders.

4. Conclusion

Based on the low market price of CCB, this paper makes an empirical analysis on the enterprise value of CCB. On the basis of collecting and collating the relevant financial data of valuation, this paper chooses the discounted stock cash flow model to evaluate the value of each share of CCB on December 31, 2016. The evaluation result is 6 Yuan/share. However, the market price per share on the day of CCB is 5.44 yuan/share. Compared with the results of the assessment, the market price is

underestimated. Based on the above evaluation results, this paper argues that business stakeholders should seize the opportunity to make appropriate investments in commercial banks to earn forward spreads while upgrading their professional knowledge, and the State should adopt relevant measures to improve the capital market and create a good investment environment for business stakeholders.

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