

Case Study: CSR & CNR Merged into CRRC in China

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Abstract

China South Railway (CSR) and China North Railway (CNR) are the dominating state-owned enterprises in domestic rolling stock market and major players in global market, each of which almost dominates half of domestic market. They were once the same company. After separation into two competing companies for several years, they merged again in 2015, becoming a new enterprise, China Railway Rolling Stock Corporation (CRRC). In this merger case, we will illustrate the business performance, business strategy and the competition between CSR and CNR, leading to demonstrate the reasons of this merger under the one belt one road big economic development environment. We will also use different valuation methods to analyze this case and its exchange method. Since this merger triggered huge reaction in the stock market, the analysis of its effect on stock market is inevitable.

Keywords: Merger, Acquisitions, Valuation, Financial Statement Analysis

1. Introduction

China CNR Corporation and CSR Corporation Limited, once one company, had been separated since 2000. Subject to approval by the Chinese government, CNR and CSR agreed to merge in late 2014. The merged business then be renamed China Railway Rolling Stock Corp (CRRC). Main reasons for the merger were increased efficiency, and the ability to better compete internationally with combined resources. The merger came into effect in June 2015, with each CNR share exchanged for 1.1 CSR shares. The CRRC became the largest railway rolling stock manufacturer in the world, and had a greater than 90% market share in Chinese railway market. Total employment of the CRRC was 175,700 persons, and the market capitalization was over RMB 27,000 million.

1.1 Pedagogical Objectives

The case is used in a module on the market for an advanced corporate finance course or merger & acquisition course. In preparation for the case, it facilitates students with a good understanding of valuation concepts and effect of corporate announcement on stock prices.

The case has four pedagogical objectives:

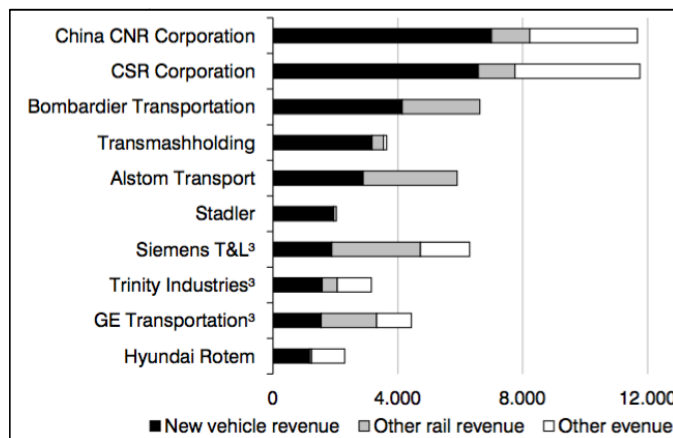
1. The case examines the business performance and business strategy of CSR and CNR as well as the market competition in China railway sector
2. The case also provides a calendar of major events in clear and illustrates the reasons for the merger
3. The case demonstrates how to estimate the equity value of two merged firms by various valuation methods e.g. DCF, DDM and price multiples
4. The case finally investigates the stock market reaction to the merger announcement

2. Industry and Company Background

2.1 Industry Overview

Before the merger, CNR and CSR were the two largest rolling stock manufacturers in the world in terms of annual revenue, the size of which was nearly twice that of Bombardier, the third place on the list (Figure 1.1).

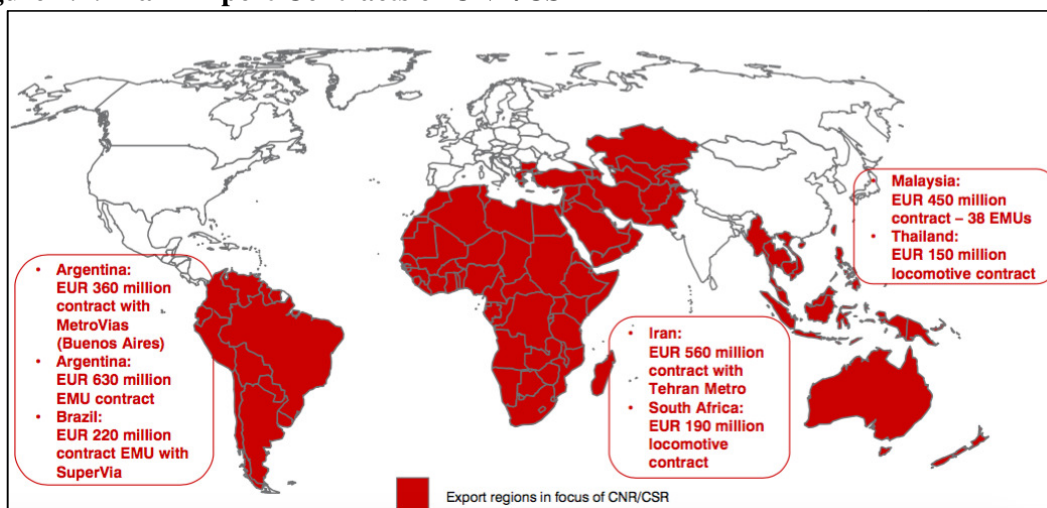
Figure 1.1: Top 10 Manufacturers of Rolling Stock Ranked by Annual Revenue 2013 [€ million]



(Source: SCI Verkehr)

The leading position of CNR and CSR was mainly due to the booming Chinese domestic market. As the only two suppliers of railway transit equipments in China, CNR and CSR received hundreds of orders from China Railway Corporation (called Ministry of Railways before March 2013) as China was promoting the construction of high-speed railways and urban rail transit networks. CNR and CSR also entered the international market several years ago. Up to 2014, their main target regions were Africa, South America, Middle East and Southeast Asia (Figure 1.2). Though CNR and CSR had become major players in emerging markets listed above, their market shares in Europe and North America were relatively lower. The reason behind was that the entry barriers protected the western markets. Customers in Europe and North America always preferred local suppliers such as Bombardier, Alstom and Siemens.

Figure 1.2: Main Export Contracts of CNR/CSR



(Source: SCI Verkehr)

According to Technavio, the market size of rolling stock was \$42.38billion in 2014. And this number will increase to \$48.73billion in 2019. Europe will account for 45.40% of the global market, followed by Americas of 24.49% and Asia Pacific of 20.79%. Therefore, it is crucial for CRRC to expand its market shares in Europe and Americas to maintain its high growth rate after the merger.

2.2 China South Locomotive & Rolling Stock Corporation Limited (CSR)

2.2.1 History

CSR is a limited liability company promoted by CSR Corporation in association with Beijing Railway Industry Economic and Trade Company with the approval of the State Council and the State-owned Assets Supervision and Administration Commission of the State Council SASAC. Founded on December 28, 2007, headquartered in Beijing, with a registered capital of 11.84 billion Yuan, CSR went public in Shanghai and Hong Kong in August 2008, has established 17 wholly-owned and shareholding subsidiaries in 10 provinces and cities, and has nearly 90,000 employees. Its boasts a complete system of independent development, massive manufacturing and standard service of railway locomotives, passenger trains, freight wagons, bullet trains, metro vehicles and relevant parts.

2.2.2 Recent performance

In 2014, the company adhered to the business principles of “continuity, in depth and breakthrough”, seized opportunities, overcame difficulties and strived to upgrade and promoted the reform and development, and completed the annual objectives and tasks. Revenue for the year amounted to RMB117.92 billion, representing an increase of 20.75% over last year while net profit attributable to owners of parent company increased by 27.61% to RMB5.315 billion as compared to the last year. In addition, BST, a joint venture of the company, recorded revenue of RMB2.56 billion and a net profit of RMB560 million.

2.2.3 Business Strategy

In the face of opportunities and challenges for the rail transportation industry in the new period, innovation-oriented CSR is actively adjusting to the development requirements of economic globalization, extending resource allocation, market development, technical innovation and customer services to the world, accelerating the modernization of China’s rail transit equipment with opener mind and broader vision in cooperation and win-win, manufacturing first-class products with first-class technologies and offering customers most valuable green products, in a bid to build an industrial pioneer and a globalized multinational most responsible for the society.

2.3 China CNR Corporation Limited

2.3.1 History

China CNR Corporation Limited is a limited liability company promoted by China Northern Locomotive & Rolling Stock Industry (Group) Corporation in association with Datong Qianjin Investment Co., Ltd; China Chengtong Holdings Group Limited and China Huarong Assets Management Co., Ltd with the approval of the State Council and the State-owned Assets Supervision and Administration Commission of the State Council (SASAC).

2.3.2 Recent performance

In 2014, CNR’s operating results continued to grow. The revenue of the year reached RMB103.88 billion, an increase of RMB7.13 billion, or 7.36%, when compared with the previous year; profit before taxation reached RMB6.61 billion, an increase of RMB1.51 billion or 29.65%, when compared with the previous year; profit attributable to equity shareholders of the Company reached RMB5.49 billion, an increase of 33.03% on a year-on-year basis.

2.3.3 Business Strategy

CNR’s strategic plan for the “Join the World, Drawing the Future” mission is: Exploring three markets in railway transportation, related diversified and international business;

Implement the four strategies of innovation, integration, merger and internationalization; Build for the industries of railway equipment, electromechanical equipment, engineering equipment and modern service. As a world leading company, we work hard to ensure that CNR consistently merits the confidence of its customers, partners and stockholders around.

3 Reasons for the Merger

The merger was partly promoted by the China government. Domestically, the industry was mainly dominated by the two firms. Offenberg and Pirinsky (2015) provided some evidence on how decision of choice between mergers and tender offers were made. As stated-owned enterprises, CNR and CSR’s ultimate control shareholder was the Stated-owned Assets Supervision and Administration Commission (SASAC). Apart from the potential synergies, there are three major reasons why the government was committed to promote the merger between CNR and CSR:

3.1 To prevent hostile competition between CNR and CSR in overseas markets

In 2011, when the Turkey government was inviting open bidding of its locomotives project, CNR and CSR bid for the project under the risk of underpricing. A Korean company benefited from the competition between CNR and CSR, and thereby won the bidding. Similarly, in 2012, CNR submitted an offer of \$2.39m per unit to bid for Argentina government’s metro vehicle projects. Then CSR submitted it offer at a 50% lower price. Finally, CSR won the bidding at a price of \$1.21m per unit, which almost equaled the cost. To stop the hostile competition between two companies, the merger was put on the table.

3.2 To reduce duplicated R&D activities and optimize the use of resources

Before the merger, the R&D activities were conducted by CNR and CSR separately. The outcomes would be never shared between two companies. Therefore, the manpower and money invested in the R&D activities were more than necessary, which led to the waste of resources. If CNR and CSR merged together, the problem could be well-solved.

3.3 To create an “international giant”

Although CNR and CSR have been the two largest rolling stock manufacturers in the world, their overseas market shares were relatively low. After the merger, the new company CRRC would become an international giant with annual revenue more than 300 billion RMB and larger overseas market share. Complying with the “go global” strategy set by the China government, the new giant CRRC is responsible for enhancing the reputation of “Chinese high-speed trains.

4 Major Events

The major events during the development of CNR, CSR and CRRC are listed below:

Time	Event
September 2000	Geographically divided by the Yangtze River, China National Railway Locomotive & Rolling Stock Industry Corporation was split into two companies, CNR and CSR.
18 August 2008	The shares of CSR were listed in Shanghai Stock Exchange. (Code: 601766)
21 August 2008	The shares of CSR were listed in Hong Kong Stock Exchange. (Code: 01766)
29 December 2009	The shares of CNR were listed in Shanghai Stock Exchange. (Code: 601299)
22 May 2014	The shares of CNR were listed in Hong Kong Stock Exchange.

	(Code:06199)
27 October 2014	CNR and CSR announced that the shares were suspended for potential major events.
28 November 2014	CNR and CSR announced that the shares would continue to be suspended.
30 December 2014	CNR and CSR published the restructuring announcement that CNR and CSR would merged into CRRC.
31 December 2014	The shares of CNR and CSR were back on the lists.
6 March 2015	The merger plan was approved by the SASAC.
9 March 2015	The resolution on merger was passed on the general meetings of CNR and CSR.
7 May 2015	The shares of CNR and CSR were suspended for exchange of shares.
20 May 2015	The shares of CNR were delisted.
1 June 2015	CRRC was incorporated in Beijing.
6 June 2015	The shares of CRRC was listed in Shanghai Stock Exchange (Code: 601766) and Hong Kong Stock Exchange (Code:01766).

5 Valuation

5.1 Valuation Based on DCF Model

This valuation model is to compute the value of equity and the value of the firm by computing the present value of future cash flows distributed to equity holders or both equity and debt holders of the firm. We need to forecast the expected cash flows of the firm form two phases, growth phases of 5 years and the perpetual phase and discount them at cost of capital for the value of equity or at WACC for the value of the firm. The prediction is based on analysis of previous 5-years financial reports using horizontal analysis, vertical analysis and percentage of sales method.

5.1.1 Forecast of Sales Growth Rate

It is a common method to forecast the growth of the firm based on the sales growth.

Table 5.1 Sales Growth Rate for CNR

Year	2012	2013	2014	2015	2016	2017	2018	2019	Perpetual
Sales Growth Rate	3.35%	5.26%	7.38%	9.38%	11.38%	13.38%	15.38%	17.38%	2.00%

According to Table 5.1, based on the sales growth rate from 2012 to 2014, we predict that the sales growth rate will be 2% higher than a year ago. Because of the synergy effect of merger, the overall strength of the company will improve. Its product will be more competitive in global market without domestic vicious competition. Besides, next several years will be the peak time of completion of many high-speed rails in China, providing increasing market demand for rolling stock. So we think the 2% growth each year is reasonable and acceptable. According to a global rolling stock market report for 2015-2019, the average revenue growth rate is 2.83%, showing that the global rolling stock market is growing due to increasing global fundamental instruction. We assume the perpetual sales growth rates is 2% after the company goes into stable phase.

5.1.2 Forecast of Income Statement

The forecasting income statement is based on predicted revenue using predicted sales growth rate. Cost of revenue, operating income and expense, other non-operating net and minority interest are established by percentage of sales approach. Interest expense is based on cost of

short term debt, cost of long term debt, predicted short term debts and predicted long term debts that will be discussed later. Since the loss or gain on foreign exchange is changeable and unpredictable, and its amount is quite small, we ignore it in our prediction. Because of variable tax rates and preferential duty of CNR and its subsidiaries, we refer to past average tax rate. The forecasting income statement is in Appendix 1.

5.1.3 Forecast of Balance Sheet

Prediction of cash and cash equivalents, account receivable, inventory and account payable are based on turnover rate or turnover days analyzed from past 5-years data.

Calculated as follows:

Cash and Cash Equivalents₁=Revenue ×Turnover Days× 2/ 365- Open Balance of Cash and Cash Equivalents₁

Account Receivable₁=Revenue ×Turnover Days× 2/ 365- Open Balance of Account Receivable₁

Inventory₁=Cost of Revenue×2/ Turnover Rate- Open Balance of Inventory₁

Account Payable₁=Cost of Revenue×2/ Turnover Rate- Open Balance of Account Payable₁

Other current assets, PPE, other assets, short term debt, other current liabilities and other liabilities are forecasted based on percentage of sales approach. From the past data, we found that the long term investment is usually about 3% of the total assets. We use the average percentage of 5 years, 2.41% as our predicting basis. Long term debt is used as adjustment of variables, meaning that long term debt equals to total assets subtract all other shareholder equity and liabilities. We assume that the common stock remains unchanged.

Retained Earnings₁=closing balance of last year retained earnings+ predicted net earnings- predicted net earnings× dividend payout ratio

The forecasting balance sheet is in the Appendix 2.

5.1.4 Calculation of predicted future cash flows

The first approach to estimate future cash flow is to use Free Cash Flow of Equity (FCFE) model, which only counts the cash flows available to equity holders. Forecast cash flows of a finite forecast horizon (5 years) and beyond the terminal year. After that, discount the cash flows at the cost of equity capital.

Cash Flows to equity holders= Net earnings+ Depreciation- Capital Expenditure- Change (investment) in Working Capital

The cash flow projection is given in Table 5.2

Year	2015	2016	2017	2018	2019	2020
Net Earnings	4,767	5,828	5,589	6,802	6,746	8,610
add: Depreciation	2,142	2,385	2,705	3,121	3,663	3,736
less: Capital Expenditure	649	6,117	7,702	10,343	13,180	1,381
Less: Change in Working Capital	17,810	-6,713	19,877	-2,734	25,087	-26,204
Cash Flows	-11,550	8,810	-19,285	2,314	-27,858	37,169

The second approach is to use Free Cash Flow to Firm (FCFF) model, which counts the cash flows available to both equity holders and debt holders. Forecast cash flows of a finite forecast horizon (5 years) and beyond the terminal year. After that, discount the cash flows at the weighted average cost of capital. The cash flow projection based on FCFF is shown in the Table 5.3.

Cash Flows to both equity holders and debt holders= (Net earnings+ Interest Expense) × (1- Tax rate) + Depreciation- Capital Expenditure- Change (investment) in Working Capital

Table 5.3 Projection of Cash Flows to Both Equity Holders and debt holders for CNR

All in ¥million						
Year	2015	2016	2017	2018	2019	2020
Net Earnings	5,829	7,104	6,853	8,323	8,310	10,514
Interest Expense	2,643	2,257	3,674	3,724	5,716	3,673
EBIT	8,472	9,360	10,527	12,048	14,025	14,187
EBIT (1 – Tax rate)	7,185	7,938	8,928	10,217	11,895	12,032
add: Depreciation	2,142	2,385	2,705	3,121	3,663	3,736
less: Capital Expenditure	649	6,117	7,702	10,343	13,180	1,381
Less: Change in Working Capital	17,810	-6,713	19,877	-2,734	25,087	-26,204
Cash Flows	-9,133	10,920	-15,946	5,729	-22,709	40,591

5.1.5 Estimating the Cost of Equity

CAPM model can be used to estimate the cost of equity as the formula below.

$$r_E = r_f + \beta (r_M - r_f)$$

r_f represents the risk free rate of the market. We use the average of long term (3 years and 5 years) RMB deposit rate over 10 years published by the People’s Bank of China, getting 4.55% as the risk free rate. RMB deposit rate published by the People’s Bank of China is in Appendix 3.

r_M represents expected return of market index as well as market risk premium. We use the Equity Risk Premium (ERP) by Country retrieved from a Country ERP research report, finding that ERP of China is 6.71%.

β represents the systematic risk of the equity, which reflects the sensitivity of the firm’s valuation to economy-wide market movements. Since more than 84% of stock of CNR is listed in Shanghai stock market, we take the Shanghai composite index and stock price of CNR over 5 years as the calculation base to calculate their monthly returns. After that, use the regression method to obtain CNR’s systematic risk β , 0.9666. Shanghai composite index, stock price of CNR and their monthly returns over 5 years are in Appendix 4

5.1.6 Estimating the Cost of Debt

Since CNR may sell multiple combination of the bonds and the structure of debt is not straightforward, so it’s hard to obtain the actual debt interest of the company. We use the average of short term (within 1 year) RMB loan interest rate over 10 years and the average of long term (exceed 1 year) RMB loan interest rate over 10 years published by the People’s Bank of China, obtaining 5.83% as short term debt interest and 6.43% as long term debt interest. RMB deposit rate published by the People’s Bank of China is in Appendix 5.

Interest expense= predicted short term debt× 5.83%+ predicted long term debt× 6.43%

Cost of debt= interest expense× (1- tax rate)/ (predicted short term debt+ predicted long term debt)

Predicted short term debt and predicted long term debt can refer to Appendix 2.

Cost of debt for each year is showed in table 5.4 below.

Table 5.4 Cost of Debt for CNR

Year	2015	2016	2017	2018	2019	2020
Cost of Debt	5.20%	5.12%	5.22%	5.19%	5.25%	5.14%

5.1.7 Estimating the Weighted Average Cost of Capital (WACC)

$$WACC = W_D \times r_D \times (1 - \text{tax rate}) + W_E \times r_E$$

Where $W_D = (\text{short term debt} + \text{long term debt}) / (\text{short term debt} + \text{long term debt} + \text{total equity})$

$W_E = \text{total equity} / (\text{short term debt} + \text{long term debt} + \text{total equity})$

$r_D = \text{cost of debt}$

$r_E = \text{cost of equity}$

Short term and long term debt and total equity can refer to the forecasting balance sheet in Appendix 2.

WACC for each year is showed in table 5.5 below.

Table 5.5 WACC for CNR

Year	2015	2016	2017	2018	2019	2020
WACC	8.45%	8.74%	8.21%	8.28%	7.82%	8.50%

5.1.8 Calculation of Equity Value

We add up the present value of cash flows to equity from 2015 to 2019 and the present value of after terminal value. Calculation is showed as Table 5.6 below.

Table 5.6 Calculation of Equity Value for CNR

Year	Present	2015	2016	2017	2018	2019	2020
Cash Flows to Equity		-11,550	8,810	-19,285	2,314	-27,858	37,169
Discount Factor	1.0000	0.9006	0.9006	0.9006	0.9006	0.9006	
Accumulated Discount Factor	1.0000	0.9006	0.8111	0.7305	0.6579	0.5925	
FCFE Present Value	-32,329	-10,402	7,146	-14,088	1,522	-16,507	
Extended Period PV	243,778					411,417	
Total Equity Value	211,449						
Equity Value per share	20.49						

PV of cash flows (2015-2019) = $CF_{2015} / (1 + r_E) + \dots + CF_{2019} / (1 + r_E)^5 = -32,329$ million Yuan

PV of extended period (after 2019) = $CF_{2020} / (r_E - \text{stable sales growth rate}) = 243,778$ million Yuan, where stable sales growth rate is assumed to be 2%.

The value of equity = PV of CFs (2015-2019) + PV of extended period = 211,449 million Yuan

The value of equity divided by stock outstanding can be translated into ¥20.49 per share.

5.1.9 Calculation of Firm Value

We sum up the present value of cash flows to both equity holders and debt holders from 2015 to 2019 and the present value of after terminal value. Calculation is showed as Table 5.7 below.

Table 5.7 Calculation of Firm Value for CNR

Year	Present	2015	2016	2017	2018	2019	2020
Cash Flows of Firm		-9,133	10,920	-15,946	5,729	-22,709	40,591
Discount Factor (WACC)	1	0.9221	0.9196	0.9241	0.9235	0.9275	
Accumulated Discount Factor	1	0.9221	0.8480	0.7836	0.7237	0.6712	
FCFF Present Value	-22,754	-8,421	9,260	-12,496	4,146	-15,243	
Perpetual Period PV	419,374					624,791	
Firm Value	396,620						

PV of cash flows (2015-2019) = $CF_{2015} / (1 + WACC) + \dots + CF_{2019} / (1 + WACC)^5 = \text{¥} -22,754$ million

PV of extended period (after 2019) = $CF_{2020} / (WACC - \text{stable sales growth rate}) = \text{¥} 419,374$ million

, where stable sales growth rate is assumed to be 2%.

The value of debt = short term debt + long term debt = ¥ 29,133 million

5.1.10 Sensitivity Analysis on Sales Growth Rates

The future sales growth rate is difficult to predict accurately due to unpredictable changing economic environment and risk from every aspect. The difference of sales growth rate may have essential significant effect on the prediction of future cash flows. We should test the estimated firm value under different sales growth rate assumptions. Table 5.8 and table 5.9 list the effect on estimated firm value and intrinsic price based on the increase on previous year sales growth rate between -1% and 3%, and stable sales growth rate after 2019 among -2.5%, 0% and 2.5%.

Table 5.8 CNR Firm Value Sensitivity Analysis all in ¥million

		Increase on previous year sales growth rate (2015-2019)				
		-1%	0%	1%	2%	3%
Stable sales growth rate after 2019	2.5%	185,706	244,592	321,929	421,004	545,313
	0%	166,790	209,873	264,887	333,638	418,014
	-2.5%	155,753	190,279	233,623	287,007	351,709

Table 5.9 CNR Intrinsic Price Sensitivity Analysis all in Yuan

			Increase on previous year sales growth rate (2015-2019)				
			-1%	0%	1%	2%	3%
Stable sales growth rate after 2019	2.5%		15.17	20.88	28.37	37.97	50.02
	0%		13.34	17.51	22.84	29.51	37.68
	-2.5%		12.27	15.61	19.81	24.99	31.26

5.2 Dividend Discount Model (DDM)

In this part, we use Dividend Discount Model to evaluate the target company CNR's corporate value. The concept of dividend discount model (DDM) is crucial in the basic financial management class. It is claimed that the firm's value is equal to discounted dividend streams. Below is a new version of DDM which improves the accuracy of the stock price prediction.

$$P = \frac{DPS_0(1+g)}{1+r_E} + \dots + \frac{DPS_0(1+g)^5}{(1+r_E)^5} + \frac{DPS_0(1+g)^5(P/E)_{(industry)}}{(1+r_E)^5}$$

In this equation, DPS_t is dividend per share, $g = (1 - \text{payout ratio}) * ROE$, Payout ratio = DPS / EPS , $ROE = \text{Net income} / \text{equity}$, $D/E = \text{long-term debt} / \text{equity}$, $r_D = \text{interest rate on long-term debt}$, and r_E in the denominator is cost of equity capital.

As CNR was both public on the A-share and H-share markets and the A-shares occupies more than 80% of all shares of CNR, we compute P on the A-share market and RMB basis.

Entering information extracted from the 2014 Consolidated Financial Statements of CNR to DDM yields a stock price per share of ¥2.37. The computation is shown in Table 5.10.

Table 5.10 DDM Valuation

Computation of g		¥	Computation of P		¥
EPS ₂₀₁₄		0.48	DPS ₂₀₁₄		0.20
DPS ₂₀₁₄		0.20	G		6.5531%
Payout ratio		41.6667%	r _E		8.6896%
Net income		5,689,961,000	(P/E) _(industry)		39.3524
Asset total		72,571,992,000	P		8.06932
ROE		0.1123	Total shares		10,320,056,000
g		6.5531%	Valuation 2014		83,275,834,326

Using the DDM we find that the valuation for CNR 2014 totals RMB 24,436,933,000.

We can project DPS from 2015 to 2019 as shown in Table 5.11. Note that as with price multiples, we can experiment with the analysis by taking n-year average of dividend payout ratio, growth rate, and so on to smooth the year fluctuations. Of course there is no a priori number of years which produces the best estimates. It mainly depends on the experience and need, as in the price multiple case.

Table 5.11 Computation of Dividend Per Share (DPS)

Year	Growth Rate	EPS (¥)	Payout ratio	DPS (¥)
2014		0.48		0.20
2015	6.5531%	0.5115	0.4167	0.2131
2016	6.5531%	0.5450	0.4167	0.2271
2017	6.5531%	0.5807	0.4167	0.2420
2018	6.5531%	0.6187	0.4167	0.2578
2019	6.5531%	0.6593	0.4167	0.2747

5.3 Price Multiples

The value of CNR can be estimated by using price multiples of comparable companies in the same industry. However, since CNR and CSR were the only two suppliers of rail transit equipment in China, it is difficult to figure out identical company in this narrowly defined industry. Alternatively, we choose other four heavy industrial companies, which are all listed in A-shares that also manufacture mega-sized transportation vehicles like ships and airplanes. These four companies are China Shipbuilding Industry Corporation (CSIC), China State Shipbuilding Corporation (CSSC), AVIC Xi' An Aero-engine Ltd (XAEC) and AVIC Aircraft Co., Ltd (AAC). As shown in Table 5.12, the size varies across companies. So when calculating the industry averages, we give different weight on each company.

Table 5.12: Computation of Weight

Stock code	Company	Market capitalization	Weight
601299	CNR(中国北车)	¥87,044,440,151.30	0.173493987
601766	CSR(中国南车)	¥88,063,140,000.00	0.175524424
601989	CSIC(中国重工)	¥169,110,935,258.00	0.337066104
600150	CSSC(中国船舶)	¥50,797,414,662.00	0.101247661
600893	XAEC(中航动力)	¥56,434,895,000.00	0.112484093
000768	AAC(中航飞机)	¥50,263,625,600.50	0.100183731
		¥501,714,450,671.80	1

(Source: quotes.money.163.com)

5.3.1 Price-earnings Multiple

We compute the average P/E ratios for each company in 2014, including CNR and CSR. As shown in Table 5.13, the P/E ratios differ across companies. It is noticeable that the P/E ratio for CSSC fluctuated significantly in 2014, with maximum of more than 1,000 and minimum of less than negative 10,000. Therefore, we deem the P/E ratio of CSSC as an outlier and exclude it from the calculation of weighted P/E ratio for the industry.

Table 5.13: Computation of Price-earnings Multiple

		2014 Q1 P/E	2014 Q2 P/E	2014 Q3 P/E	2014 Q4 P/E	2014 Average P/E	Weighted P/E
601299	CNR	11.3171	9.6596	10.1346	14.7917	11.47575	1.990973616
601766	CSR	15.0333	13.2353	12.8293	16.359	14.364225	2.52127232
601989	CSIC	24.7619	25.3684	43.4437	70.8462	41.10505	13.85511906
600150	CSSC	-18,500.00	273.5065	303.3333	1228.666	-4,048.62338	0
600893	XAEC	65.125	83.129	80.3243	57.92	71.624575	8.056625366
000768	AAC	99.5266	145.2414	128.5831	142.8356	129.046675	12.92837738
							39.35236775

(Source: finance.ifeng.com)

Based on EPS of CNR in 2014, 2013 and 2012 respectively, we get three prices. To avoid fluctuation, we use the average of these three prices. So by multiplying the total shares outstanding with the average price per share, we reach the estimated value of CNR based on P/E ratio for the industry.

Table 5.14 shows more details about the calculation:

Table 5.14: Valuation Based on Price-earnings Multiple

	P/E (industry)	EPS	Price per share	Average price per share	Shares outstanding	Valuation
	39.35236 775					
2014		¥0.53	¥20.86	¥16.66	A shares 10,126,080,000 .00	¥204,237,747,08 5.82
2013		¥0.40	¥15.74		H shares 2,133,700,000. 00	
2012		¥0.34	¥13.38		Total 12,259,780,000 .00	

(Source: Bloomberg)

5.3.2 EBIT Multiples

There are two methods to apply the EBIT multiples. The simple one uses the computation of $MVE/EBIT_{(industry)}$, while the rigorous one uses $(MVE+debt)/EBIT_{(industry)}$. In this paper, we use both two methods to estimate the price of CNR. And it is noticeable that we include both short-term debt and long-term debt during the calculation (Table 5.15).

Table 5.15: Computation of EBIT Multiple

	MVE (Market value of equity)	Debt	EBIT	Weight by MVE	[(MVE+debt) /EBIT]*weight	(MVE/EBIT) *weight
601299 CNR	¥87,044,440,151.30	¥98,502,600,000.00	¥8,195,800,000.00	0.173493987	3.927779556	1.842612915
601766 CSR	¥88,063,140,000.00	¥99,043,300,000.00	¥8,613,800,000.00	0.175524424	3.812690116	1.794473047
601989 CSIC	¥169,110,935,258.00	¥144,101,035,559.35	¥5,583,467,236.71	0.337066104	18.9081684	10.20899052

600150 CSSC	¥50,797,414,662.00	¥32,193,802,925.96	¥532,173,588.54	0.101247661	15.78933426	9.664364287
600893 XAEC	¥56,434,895,000.00	¥28,354,122,069.23	¥1,287,221,025.10	0.112484093	7.409306955	4.931575745
000768 AAC	¥50,263,625,600.50	¥21,129,298,313.82	¥689,076,332.90	0.100183731	10.37970563	7.307749968
				1	60.22698491	35.74976649

(Source: Bloomberg)

Thus, $MVE/EBIT_{(industry)} = 35.74976649$ and $(MVE+debt)/EBIT_{(industry)} = 60.22698491$. MVE_1 of CNR equals $[EBIT_{2014} \times MVE/EBIT_{(industry)}]$, while MVE_2 equals $\{[EBIT_{2014} \times (MVE+debt)/EBIT_{(industry)}] - debt\}$. Taking into account the total shares outstanding (Table 5.14), we can get the price/share. The results are shown in Table 5.16.

Table 5.16: Valuation Based on EBIT Multiple

	EBIT	Debt	MVE_1	Price/sha re ₁	MVE_2	Price/sha re ₂
6012 99 CNR	¥8,195,800,000.00	¥98,502,600,000.00	¥292,997,936,159.19	¥23.90	¥395,105,722,902.19	¥32.23

As we can see, because the amount of debt in selected companies is significantly large, two methods produce different results: Price/share₂ is nearly ¥10 higher than price/share₁.

5.3.3 Sales Multiples

Like EBIT multiples, sales multiples can be used to estimate the value of CNR following similar procedures. Table 5.17 shows the computation of $(MVE+debt)/sales_{(industry)}$ and $MVE/sales_{(industry)}$, while Table 5.18 shows the valuation based on sales multiples.

Table 5.17: Computation of Sales Multiple

	MVE	Debt	Sales	Weight by MVE	$[(MVE+debt)/sales]*weight$	$(MVE/sales)*weight$
6012 99 CNR	¥87,044,440,151.30	¥98,502,600,000.00	¥103,751,600,000.00	0.173493987	0.310272764	0.145556183
6017 66 CSR	¥88,063,140,000.00	¥99,043,300,000.00	¥117,920,000,000.00	0.175524424	0.278508736	0.13108236
6019 89 CSIC	¥169,110,935,258.00	¥144,101,035,559.35	¥60,972,048,815.88	0.337066104	1.731500594	0.934880248
6001 50 CSSC	¥50,797,414,662.00	¥32,193,802,925.96	¥28,323,665,892.27	0.101247661	0.29666593	0.181583819
6008 93 XAE	¥56,434,895,000.00	¥28,354,122,069.23	¥26,764,401,652.28	0.112484093	0.356347054	0.237181764
0007 68 AAC	¥50,263,625,600.50	¥21,129,298,313.82	¥21,198,084,487.00	0.100183731	0.337408292	0.23754965
				1	3.31070337	1.867834024

(Source: Bloomberg)

Table 5.18: Valuation Based on Sales Multiples

	Sales	Debt	MVE ₁	Price/sh are ₁	MVE ₂	Price/sh are ₂
601299 CNR	¥103,751,600,000.00	¥98,502,600,000.00	¥193,790,768,58.30	¥15.81	¥244,988,171,805.21	¥19.98

It shows that the difference between price/share₁ and price/share₂ using sales multiples is much smaller than that using EBIT multiples.

5.3.4 Market to Book Ratios

Table 5.19 lists the MVE and BVE of each selected company. After Calculation, the estimated MVE of CNR is ¥145,245,058,146.50 and price per share is ¥11.85 (Table 5.20).

Table 5.19: Computation of Market to Book Ratio

	MVE	BE	Weight by MVE	(MVE/BVE) *weight
601299 CNR	¥87,044,440,151.30	¥50,649,700,000.00	0.173493987	0.298159455
601766 CSR	¥88,063,140,000.00	¥51,521,700,000.00	0.175524424	0.300014012
601989 CSIC	¥169,110,935,258.00	¥62,404,166,272.46	0.337066104	0.913425617
600150 CSSC	¥50,797,414,662.00	¥9,186,425,074.59	0.101247661	0.559860814
600893 XAEC	¥56,434,895,000.00	¥15,621,868,107.41	0.112484093	0.406355241
000768 AAC	¥50,263,625,600.50	¥12,917,620,696.05	0.100183731	0.389823921
			1	2.867639061

Table 5.20 Valuation Based on Market to Book Ratio

	BVE	(MVE/BVE)industry	MVE	Price per share
601299 CNR	¥50,649,700,000.00	2.867639061	¥145,245,058,146.50	¥11.85

As the selection of comparable companies is based on our subjective judgment, the estimated price of CNR varies when using different price multiples, ranging from ¥145,245,058,146.50 to ¥395,105,722,902.19. Because of our limited knowledge, it is difficult to answer the question that which price is more reliable.

6 Financial Package

The merger is operated by stock exchange instead of by cash. Table 6.1 summarizes the financial package of this merger.

Table 6.1 Financial Package

Stock Exchange Ratio	1:1.10				
	A-share		H-share		
	CSR(Acquirer)	CNR	CSR(Acquirer)	CNR	
Exchange Price per share	5.63	6.19	Exchange Price per share	7.32	8.05
Stock outstanding (in million)	11779	10126.08	Stock outstanding (in million)	2024	2133.7

In this merger case, CSR issued new shares in both A stock market and H stock market to exchange all the share of CNR. The stock exchange ratio is 1:1.10, meaning that 1 share of CNR can exchange for 1.1 new shares issued by CSR. The takeover premium offered by CSR was consistent with the arguments made by Dimopoulos and Sacchetto (2014). Since more than 80% shares of CNR is listed in A stock market. We use the A shares of CNR to conduct

the value analysis under stock exchange approach for this merger.

New Shares issued by CSR= Stock Exchange Ratio× Shares of CNR= 11,138.69 million shares

Merger Price per Share of CSR= Exchange Price per Share of CSR× Stock Exchange Ratio= ¥ 6.193

Total Market Value of new CRRC (estimated by market) = ¥ 300,000 million

Market Value of new CRRC distributed to A shares= ¥ 252,000 million

Merger Actual Price= Market Value of new CRRC× New Issued Shares/ (Original Shares of CSR+ New Issued Shares) = ¥ 122,479.63 million

Merger Premium= Merger Actual Price- Market Value of CNR (exchange price per share× shares) = ¥ 59,799.17 million

Merger NPV= Market Value of CSR (exchange price per share× shares) - Merger Premium= ¥ 6,516.6 million > 0

Since the merger NPV is positive, meaning that this is a reasonable deal. Compare merger actual price with estimated firm value of CNR under different sales growth rate in table 5.8. Merger actual price is less than the minimum estimated firm value even under decreasing sales circumstance. We may say that the acquirer CSR doesn't overpay in this deal.

There are some advantages by using stock exchange for merger deal. Firstly, the acquirer CSR don't need to pay a mass of cash, so CSR won't have future cash flow pressure because of this merger. Secondly, under stock exchange, no goodwill will be created, releasing the amortizing pressure of goodwill for acquirer. Thirdly, shareholders of target firm remain shares in new firm and obtain increment of value from the merger. Fourthly, different from cash deal, CNR don't need to pay additional tax.

One disadvantage is that the new issued shares will dilute the EPS of the new firm, leading to higher risk of drop of stock price. Usually, another disadvantage of stock exchange is time-costing, which allows the target firm to arrange defenses. However, in this case, it is an equal merger under the control of government. There is no hostile and defense problem. So the stock exchange approach is decent in this case.

7 Analysis of the Effects of Corporate Announcement

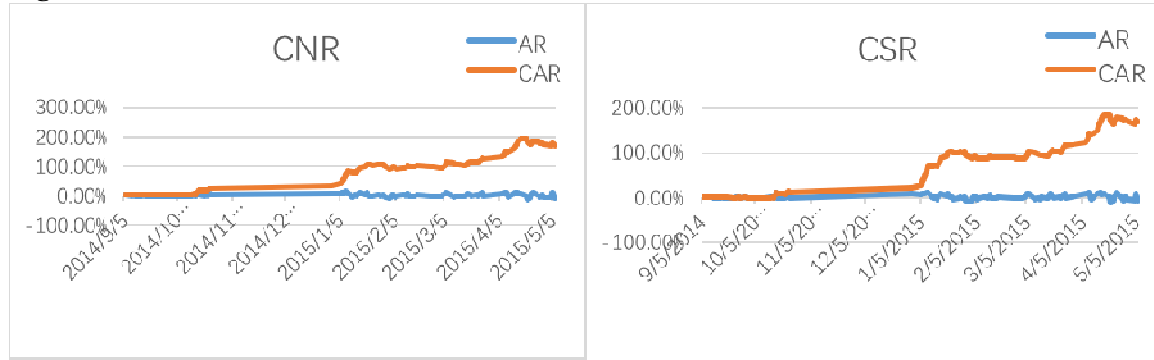
To understand the announcement effect, we need to compute the abnormal returns to remove the element of market movements. The abnormal returns are constructed as the residual of the market model which is used to estimate β of the capital asset pricing model (CAPM): $r_{it} = \alpha + \beta r_{Mt} + \varepsilon_t$.

Abnormal returns $(AR)_t = r_{it} - \alpha - \beta r_{Mt}$, Cumulative Abnormal Returns $(CAR) = \sum AR_t$, where r_{it} is the stock return of the i^{th} firm at time t , $r_{it} = (\text{the closing share price for the current day} - \text{the closing share price for the previous day}) / \text{the closing share price for the previous day}$, r_{Mt} is the market return (CSI 300 Index) at time t . In this case, we can assume α to be zero to avoid a re-run of the market model since it's trivial if we run the market model using daily returns).

As discussed in 5.1.5 - Estimating the Cost of Equity, CNR's systematic risk β is 0.9666 (Appendix 4).

We calculate the stock return and market return from 2014/9/5 till 2015/5/6. As there was a few suspension during the selected period, 2014/10/27—2014/12/30, 2015/3/9, 2015/3/31—2015/4/7, we could not see the effects of the announcement on those days.

Figure 7.1 AR and CAR for CNR/CSR



2014/9/4: a rumor was flying that China’s SASAC, was seeking the merger of the two companies to boost exports of high-speed railway technologies. After that, shares in CSR and China CNR had surged. The two companies denied at the time that no plans had been submitted. (Source: <http://english.caixin.com/2014-09-04/100725217.html>) This was the first piece of information that leaked to the public which boosted the changes of the two companies’ stock prices. That’s why we choose 2014/9/5 as the first day of our CAR analysis.

2014/10/27—2014/12/30: shares in CSR and CNR were suspended. Since the merger announcement on Oct 30, 2014, shares in the two companies surged more than fivefold before suspension on May 7.

2014/12/30: CSR and CNR announced they had agreed to enter a merger agreement. The stock price of CSR (A-shares) rose by 10% on 12/31 from 5.80 RMB to 6.38RMB; CAR for CSR has rocketed from 12.58% the prior day to 20.46% the next day. CNR witnessed similar effects.

On the whole, the AR of CSR and CNR were mostly found to be positive, which led the two companies to have a persistent, positive and increasing CAR (from 1.62% on 2014/9/5 to 171.88% on 2015/5/6). This means that after the unofficial announcement of the merger, investors perceived the merger between CSR and China CNR to be a positive NPV project which would benefit the shareholders’ earnings. In fact, the CAR is the return that shareholders earn.

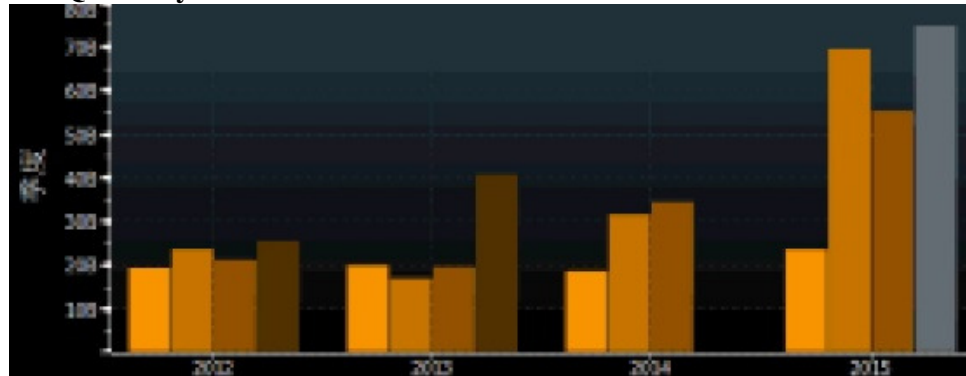
8 Aftermath

After CSR absorbed CNR, CSR became the new enterprise CRRC. The resources, equipment, human resources, technology, management and capital were integrated. This merger triggered huge reactions on both fundamental and stock market level.

8.1 Fundamental Level

From fundamental level, CRRC owns a positive and imaginable future. Because, in the predictable future, the market demand grows sustainably. Based on government’s 13th Five Year Plan, domestic demand for locomotive will remain strong. Global high-speed railway planning reaches 42 thousand kilometers, meaning that investment of overseas high-speed railway will have potential 2.3 trillion US dollars market. This merger is very likely to bring positive impact on overseas market expansion for Chinese rolling stock enterprises. From this perspective, it is reasonable to believe that CRRC will have sustainable growth for quite some time. Figure 8.1 shows the latest quarterly revenue of CRRC. We can see that there is a trend of growth in its business.

Figure 8.1 Quarterly Revenue of CRRC



(Source: Bloomberg)

8.2 Stock Market level

After the resumption of trading on June 8th, 2015, there was a persistent drop of the stock price for a few months. After hitting the highest point as 39.47 Yuan at April 20th in A-stock market, it kept dropping until it dropped to around 10 Yuan as stable level. We think stock bubble is the proper explanation of this dramatic drop. The positive attitude for this merger triggered speculative behaviors and irrational investment, pushing the stock price to an irrational point. The highest point 39.47 Yuan is even much higher than the intrinsic price calculated in our evaluation, showing that the price was irrational. Now, the price keeps at smooth level. The previous drop was market adjustment, adjusting the price to rational level. Appendix 6 shows the price trend of CRRC from September 2014 to March 2016.

Questions

1. Globally, how did the industry drive this merger?
2. Based on the financial information in the Section 5.15-5.17, compute the cost of equity for CNR.
3. Based on the financial information in the Section 5.18-5.19, compute the value of firm for CNR and its equity value.
4. Explain if there is large scale of layoff after the deal.
5. How could the estimation of cost of equity capital of the merged firm be improved?
6. Calculate the present value of terminal value of the merged firm after year 2020.
7. Does dividend growth model provide a good estimation of the merged firm value? Why?

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Appendix

Appendix 1 Forecasting Income Statement

all numbers in million

	2014/12/3 1	2015	2016	2017	2018	2019	2020
Revenue	103,752	113,488	126,408	143,327	165,377	194,127	198,009
- Cost of Revenue	84,624	94,656	105,432	119,543	137,935	161,914	165,152
Gross Profit	19,127	18,832	20,976	23,783	27,442	32,213	32,857
+ Other Operating Revenue	374	341	304	259	200	118	1
- Operating Expense	11,950	11,380	12,675	14,372	16,583	19,466	19,855
Operating Profit	7,551	7,793	8,605	9,671	11,059	12,865	13,004
- Interest Expense	1,585	2,643	2,257	3,674	3,724	5,716	3,673
- Loss on Foreign Exchange	60	-	-	-	-	-	-
- Other non-operating net	-705	-678	-756	-857	-988	-1,160	-1,184
Net Income before Taxes	6,611	5,829	7,104	6,853	8,323	8,310	10,514
- Taxes	921	885	1,079	1,041	1,264	1,262	1,597
Net Income Before Extraordinary Items	5,690	4,943	6,025	5,812	7,059	7,047	8,917
- Total Extraordinary Items	-	-	-	-	-	-	-
- Minority Interest	198	176	196	223	257	301	307
Net earnings	5,492	4,767	5,828	5,589	6,802	6,746	8,610

Appendix 2 Forecasting Balance Sheet		all numbers in million					
	2014/12/31	2015	2016	2017	2018	2019	2020
Assets							
+ Cash And Cash Equivalents	28,067	30,248	34,706	38,941	46,036	53,714	48,031
+ Short Term Investments	-	-	-	-	-	-	-
+ Net Receivables	27,966	30,439	34,615	39,146	45,963	53,942	47,961
+ Inventory	28,965	27,441	35,387	35,850	46,346	50,139	48,276
+ Other Current Assets	12,494	13,355	14,875	16,866	19,461	22,844	23,301
Total Current Assets	97,492	101,482	119,583	130,803	157,806	180,639	167,569
+ Long Term Investments	6,346	3,710	4,294	4,751	5,652	6,520	6,238
+ Property Plant and Equipment	40,242	42,588	47,437	53,786	62,061	72,850	74,307
+ Other Assets	5,072	6,011	6,695	7,591	8,759	10,282	10,487
Total Long Term Assets	51,660	52,309	58,426	66,128	76,471	89,651	91,032
Total Assets	149,152	153,791	178,009	196,931	234,277	270,290	258,601
Liabilities and Stockholder Equity							
+ Accounts Payable	33,966	18,746	39,967	26,605	50,209	39,958	52,012
+ Short/Current Long Term Debt	24,199	21,729	24,203	27,442	31,664	37,168	37,912
+ Other Current Liabilities	30,166	31,565	35,159	39,865	45,998	53,994	55,074
Total Current Liabilities	88,331	72,041	99,329	93,912	127,870	131,121	144,998
+ Long Term Debt	4,934	21,398	13,153	32,255	29,205	55,172	22,749
+ Other Liabilities	5,238	6,014	6,699	7,595	8,764	10,287	10,493
Total Long Term Liabilities	10,172	27,412	19,852	39,850	37,969	65,460	33,242
Total Liabilities	98,503	99,453	119,180	133,762	165,839	196,580	178,240
+ Preferred Stock	-	-	-	-	-	-	-
+ Minority Interest	1,856	2,032	2,228	2,451	2,707	3,009	3,316
+ Common Stock and Capital Reserves	12,260	12,260	12,260	12,260	12,260	12,260	12,260
+ Retained Earnings and Other Stockholder Equity	36,534	40,047	44,341	48,459	53,471	58,442	64,785
Total Stockholder Equity	50,650	54,338	58,829	63,170	68,438	73,710	80,361
Total Liabilities and Stockholder Equity	149,152	153,791	178,009	196,931	234,277	270,290	258,601

Appendix 3 Financial Institution RMB Deposit Rate (%)

Adjustment Time	Current Deposit	Fixed Deposit					
		3 months	half year	1 year	2 years	3 years	5 years
2006.08.19	0.72	1.8	2.25	2.52	3.06	3.69	4.14
2007.03.18	0.72	1.98	2.43	2.79	3.33	3.96	4.41
2007.05.19	0.72	2.07	2.61	3.06	3.69	4.41	4.95
2007.07.21	0.81	2.34	2.88	3.33	3.96	4.68	5.22
2007.08.22	0.81	2.61	3.15	3.6	4.23	4.95	5.49
2007.09.15	0.81	2.88	3.42	3.87	4.5	5.22	5.76
2007.12.21	0.72	3.33	3.78	4.14	4.68	5.4	5.85
2008.10.09	0.72	3.15	3.51	3.87	4.41	5.13	5.58
2008.10.30	0.72	2.88	3.24	3.6	4.14	4.77	5.13
2008.11.27	0.36	1.98	2.25	2.52	3.06	3.6	3.87
2008.12.23	0.36	1.71	1.98	2.25	2.79	3.33	3.6
2010.10.20	0.36	1.91	2.2	2.5	3.25	3.85	4.2
2010.12.26	0.36	2.25	2.5	2.75	3.55	4.15	4.55
2011.02.09	0.4	2.6	2.8	3	3.9	4.5	5
2011.04.06	0.5	2.85	3.05	3.25	4.15	4.75	5.25
2011.07.07	0.5	3.1	3.3	3.5	4.4	5	5.5
2012.06.08	0.4	2.85	3.05	3.25	4.1	4.65	5.1
2012.07.06	0.35	2.6	2.8	3	3.75	4.25	4.75
2014.11.22	0.35	2.35	2.55	2.75	3.35	4	—
2015.03.01	0.35	2.1	2.3	2.5	3.1	3.75	—
2015.05.11	0.35	1.85	2.05	2.25	2.85	3.5	—
2015.06.28	0.35	1.6	1.8	2	2.6	3.25	—
2015.08.26	0.35	1.35	1.55	1.75	2.35	3	—
2015.10.24	0.35	1.1	1.3	1.5	2.1	2.75	—
						4.19	4.91
							4.55
							average deposit rate

(Source: <http://www.pbc.gov.cn/>)

Appendix 4 Shanghai Composite Index, CNR Stock Price and their Monthly Returns

CNR			Shanghai Composite Index		
Date	Closing	Returns	Date	Closing	Returns
2010/2/26	5.61		2010/2/26	3051.94	
2010/3/31	5.50	-1.96%	2010/3/31	3109.1	1.87%
2010/4/30	5.35	-2.73%	2010/4/30	2870.61	-7.67%
2010/5/31	4.91	-8.22%	2010/5/31	2592.15	-9.70%
2010/6/30	4.84	-1.43%	2010/6/30	2398.37	-7.48%
2010/7/30	5.36	10.74%	2010/7/30	2637.5	9.97%
2010/8/31	5.08	-5.22%	2010/8/31	2638.8	0.05%
2010/9/30	5.30	4.33%	2010/9/30	2655.66	0.64%
2010/10/29	5.66	6.79%	2010/10/29	2978.83	12.17%
2010/11/30	6.24	10.25%	2010/11/30	2820.18	-5.33%
2010/12/31	7.09	13.62%	2010/12/31	2808.08	-0.43%
2011/1/31	9.61	35.54%	2011/1/31	2790.69	-0.62%
2011/2/28	8.27	-13.94%	2011/2/28	2905.05	4.10%
2011/3/31	7.40	-10.52%	2011/3/31	2928.11	0.79%
2011/4/29	7.00	-5.41%	2011/4/29	2911.51	-0.57%
2011/5/31	6.63	-5.29%	2011/5/31	2743.47	-5.77%
2011/6/30	6.70	1.06%	2011/6/30	2762.08	0.68%
2011/7/29	5.59	-16.57%	2011/7/29	2701.73	-2.18%
2011/8/31	4.68	-16.28%	2011/8/31	2567.34	-4.97%
2011/9/30	4.52	-3.42%	2011/9/30	2359.22	-8.11%
2011/10/31	5.22	15.49%	2011/10/31	2468.25	4.62%
2011/11/30	4.86	-6.90%	2011/11/30	2333.41	-5.46%
2011/12/30	4.25	-12.55%	2011/12/30	2199.42	-5.74%
2012/1/31	4.40	3.53%	2012/1/31	2292.61	4.24%
2012/2/24	4.74	7.73%	2012/2/29	2428.49	5.93%
2012/3/30	4.11	-13.29%	2012/3/30	2262.79	-6.82%
2012/4/27	4.49	9.25%	2012/4/27	2396.32	5.90%
2012/5/31	4.38	-2.45%	2012/5/31	2372.23	-1.01%
2012/6/29	4.01	-8.45%	2012/6/29	2225.43	-6.19%
2012/7/31	3.67	-8.48%	2012/7/31	2103.63	-5.47%
2012/8/31	3.45	-5.99%	2012/8/31	2047.52	-2.67%
2012/9/28	3.64	5.51%	2012/9/28	2086.17	1.89%
2012/10/31	3.99	9.62%	2012/10/31	2068.88	-0.83%
2012/11/30	4.23	6.02%	2012/11/30	1980.12	-4.29%
2012/12/31	4.51	6.62%	2012/12/31	2269.13	14.60%
2013/1/31	4.55	0.89%	2013/1/31	2385.42	5.12%
2013/2/28	4.79	5.27%	2013/2/28	2365.59	-0.83%
2013/3/29	3.98	-16.91%	2013/3/29	2236.62	-5.45%
2013/4/26	4.03	1.26%	2013/4/26	2177.91	-2.62%
2013/5/31	4.67	15.88%	2013/5/31	2300.59	5.63%
2013/6/28	3.76	-19.49%	2013/6/28	1979.21	-13.97%
2013/7/31	4.33	15.16%	2013/7/31	1993.8	0.74%

2013/8/30	4.36	0.69%	2013/8/30	2098.38	5.25%
2013/9/30	4.16	-4.59%	2013/9/30	2174.67	3.64%
2013/10/31	5.43	30.53%	2013/10/31	2141.61	-1.52%
2013/11/29	5.65	4.05%	2013/11/29	2220.5	3.68%
2013/12/31	4.92	-12.92%	2013/12/31	2115.98	-4.71%
2014/1/30	4.30	-12.60%	2014/1/30	2033.08	-3.92%
2014/2/28	4.35	1.16%	2014/2/28	2056.3	1.14%
2014/3/31	4.64	6.67%	2014/3/31	2033.31	-1.12%
2014/4/30	4.49	-3.23%	2014/4/30	2026.36	-0.34%
2014/5/30	4.37	-2.67%	2014/5/30	2039.21	0.63%
2014/6/30	4.54	3.89%	2014/6/30	2048.33	0.45%
2014/7/31	4.95	9.03%	2014/7/31	2201.56	7.48%
2014/8/29	5.00	1.01%	2014/8/29	2217.2	0.71%
2014/9/30	5.27	5.40%	2014/9/30	2363.87	6.62%
2014/10/24	6.45	22.39%	2014/10/31	2420.18	2.38%

(Source: <http://business.sohu.com/>)

Appendix 5 Financial Institution RMB Loan Interest Rate (%)

Adjustment Time	Within 6 months	6 months-1 year	1-3 years	3-5 years	>5years
2006.04.28	5.4	5.85	6.03	6.12	6.39
2006.08.19	5.58	6.12	6.3	6.48	6.84
2007.03.18	5.67	6.39	6.57	6.75	7.11
2007.05.19	5.85	6.57	6.75	6.93	7.2
2007.07.21	6.03	6.84	7.02	7.2	7.38
2007.08.22	6.21	7.02	7.2	7.38	7.56
2007.09.15	6.48	7.29	7.47	7.65	7.83
2007.12.21	6.57	7.47	7.56	7.74	7.83
2008.09.16	6.21	7.2	7.29	7.56	7.74
2008.10.09	6.12	6.93	7.02	7.29	7.47
2008.10.30	6.03	6.66	6.75	7.02	7.2
2008.11.27	5.04	5.58	5.67	5.94	6.12
2008.12.23	4.86	5.31	5.4	5.76	5.94
2010.10.20	5.1	5.56	5.6	5.96	6.14
2010.12.26	5.35	5.81	5.85	6.22	6.4
2011.02.09	5.6	6.06	6.1	6.45	6.6
2011.04.06	5.85	6.31	6.4	6.65	6.8
2011.07.07	6.1	6.56	6.65	6.9	7.05
2012.06.08	5.85	6.31	6.4	6.65	6.8
2012.07.06	5.6	6	6.15	6.4	6.55
2014.11.22	5.6	5.6	6	6	6.15
2015.03.01	5.35	5.35	5.75	5.75	5.9
2015.05.11	5.1	5.1	5.5	5.5	5.65
2015.06.28	4.85	4.85	5.25	5.25	5.4
2015.08.26	4.6	4.6	5	5	5.15
2015.10.24	4.35	4.35	4.75	4.75	4.9
Average short term loan interest rate		5.83	Average long term loan interest rate		6.43

(Source: <http://www.pbc.gov.cn/>)

Appendix 6 Stock Price Trend of CRRC



(Source: Bloomberg)

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