

Risk Hedging Strategies for Business Enterprises——A Case Study of Rio Tinto

Li Xuepei

Electronic Banking Center
Industrial and Commercial Bank of China
Guangzhou 510420
China

Che Siqi

College of Continuing Studies
Guangdong University of Foreign Studies
Guangzhou 510420
China

Abstract

This writing attempts to provide some risk hedging strategies for business enterprises by taking one of the world's biggest mining companies - the Rio Tinto Group as a case study. After talking about the company's potential risks like interest rate risk, foreign exchange risk, commodity risk and credit risk, it accordingly proposes some effective hedging strategies, such as a transference from fixed-rate borrowing to floating-rate borrowing, extension of AUD/USD future contracts to hedge the losses in case of Australian dollar depreciation, shortening of futures in aluminum and copper futures market to lock in the selling price in the future and signing of credit default swap (CDS) contracts to hedge the risk of default from its loans and bank deposits. Hopefully this research can contribute to the risk hedging of Rio Tinto and also shed some light on the risk hedging of other companies.

Keywords: potential risk; hedging strategy; mining company

1. Introduction

Rio Tinto is an international company with a management office in Melbourne, Australia. The main products include aluminum, copper, diamond, gold, and iron ore. Its production and business operation activities spread all over the world. Rio Tinto is committed to be a global leader in prospecting, mining and processing mineral resources. Under the current business environment, Rio Tinto has to manage and reduce some potential risks with effective hedging strategies. This writing first analyzes this company's potential risks like interest rate risk, foreign exchange risk, commodity risk, and credit risk and then accordingly puts forth some effective hedging strategies.

2. Risk analysis of Rio Tinto

2.1 Interest Rate Risk

The changes of market interest rate usually have a negative correlation to Rio Tinto's financial position. In other words, a higher interest rate would result in a higher cost to reduce the risk of the fluctuation of its cash flows or financial instruments for the company. According to Rio Tinto's 2012 annual report, the company has issued total value of US\$2.5 billion of fixed rate bonds with the weighted average of 2.97percent coupon rate and 11.6 years maturity time. Table 1 shows four different notes which were issued by Rio Tinto in March 2012.

The long-term debt is the main cause of Rio Tinto's interest rate risk. According to Morris (2012), the new bonds coupon rates would be equal or close to the prevailing market interest rate. There is an inverse relationship between the value of the bond and the prevailing market interest rate. According to a finance blog, "Observation" (2012), the forecast future interest rate would remain low in America. Thus, Rio Tinto might lose from the yield of the bonds if the interest rate goes down below the coupon rate. Additionally, the company's falling standard of credit level would increase the risk of having a higher interest rate (Garnaut and Murphy 2009).

1.2 Foreign Exchange Risk

Since Rio Tinto is an international company and its business covers many countries over the world, it has to deal with different kinds of currencies. According to Rio Tinto's annual report (2011), "Rio Tinto's shareholders' equity, earnings and cash flows are influenced by a wide variety of currencies due to the geographic diversity of the Group's sales, expenditure and the countries." However, both the internal and external financial results of the company are presented in US dollar. As to Rio Tinto's Australian branch, one of its major branches, it is exposed to the AUD/USD exchange rate risk. According to the prediction in Rio Tinto's financial statements 2011, with a 10% weakening of Australian currency in that year, the company is likely to suffer a loss of 536 million US dollars. Obviously the whole company is exposed to the foreign exchange risks. Table 2 below shows the influences of different currencies to the company.

1.3 Commodity Prices Risk

As a company that mainly produces various kinds of metal, Rio Tinto is exposed to the short-term volatilities of metal prices, which are well affected by the economic conditions of the world. Thus, the company will suffer from a loss if the commodity prices fall without risk management. Hedging methods can be taken to reduce the possible losses caused by the decrease of commodity prices.

1.4 Credit Risk

Rio Tinto may suffer losses stemmed from the default of its counterparties' inability or unwillingness to meet their commitments under customer contracts or financial instruments. According to the company's annual report (2011), the credit risk includes operational activities that are mainly related to customer receivables and financial activities, such as deposits with banks or financial institutions and financial instruments.

Table 3 demonstrates the account receivables of Rio Tinto for the past ten years. There is an upward trend in recent five years compared to the period from 2002 to 2006. Table 4 shows the top ten ranking of account receivables among fifty-one mining companies in 2012 and Rio Tinto ranks the second with 5.55 billion US dollar. From the data, it can be concluded that the company is exposed to the credit risk associated with account receivables. Moreover, the company does not require collaterals as securities for any trade receivables; this contributes to the significance of credit risk.

Table 5 and Table 6 respectively illustrate the company's position of cash and cash equivalent as well as financial assets in 2011 and 2010. The group may suffer potential losses when the banks, the financial institutions or the issuers of financial instruments default.

2. Hedging Strategies for Rio Tinto

2.1 Hedging Interest Rate Risk

Rio Tinto could hedge interest rate risk by entering interest rate swap contracts. It could deal with Bank of America to transfer the fixed coupon rates to the floating rates. Regardless of agency fee and day count convention, Rio Tinto should pay LIBOR to the bank and receive fixed interest rate from Bank of America. In this way, the group could effectively transfer the fixed-rate borrowings to floating-rate borrowings; thus, reduce the interest rate risk. For each of the following four swaps, there are three sets of cash flows:

Firstly, for 500 million three-year notes: (1) Rio Tinto pays 1.13% to the lender. (2) Rio Tinto pays LIBOR under the terms of the swap to Bank of America. (3) Rio Tinto receives 1% fix interest rate under the terms of the swap from Bank of America. Therefore, Rio Tinto finally nets out to pay LIBOR plus 0.13% floating interest rate.

Secondly, for 500 million five-year notes: (1) Rio Tinto pays 2% to the lenders. (2) Rio Tinto pays LIBOR under the terms of the swap to Bank of America. (3) Rio Tinto receives 1.8% fix interest rate under the terms of the swap from Bank of America. Thus, Rio Tinto finally nets out to pay LIBOR plus 0.2% floating interest rate.

Thirdly, for 1 billion 10-year notes: (1) Rio Tinto pays 3.5% to the lenders. (2) Rio Tinto pays LIBOR under the terms of the swap to Bank of America. (3) Rio Tinto receives 3.25% fix interest rate under the terms of the swap from Bank of America. Rio Tinto finally nets out to pay LIBOR plus 0.25% floating interest rate.

Lastly, for 500 million 10-year notes: (1) Rio Tinto pays 4.75% to the lenders. (2) Rio Tinto pays LIBOR under the terms of the swap to Bank of America. (3) Rio Tinto receives 4.4% fix interest rate under the terms of the swap from Bank of America. Rio Tinto finally nets out to pay LIBOR plus 0.35% floating interest rate.

Using swaps to hedge the interest rate fluctuation is more flexible than futures or options. There is no necessity for regular observing and monitoring if using swaps, thus it is easy to manage (Daigler 1988). Additionally, swaps are also cheaper; they have the lower premium and transaction costs (Whittaker 1987). However, swaps might not be effortless to trade with companies if Rio Tinto's credit ratings keep falling. It might also suffer from the lack of liquidity (Daigler 1988). Moreover, Rio Tinto might be subjected to uncontrolled default risk since swap contracts are traded over-the-counter (Mozumdar 1999).

2.2 Hedging Foreign Exchange Risk

Table 2's data shows that in 2011, if the AUD/USD exchange rate gets a 10% weakening, the net earnings of the company will suffer a loss of 536 million US dollars. So it is necessary for the company to use some financial instruments to hedge the risk. Here we suggest that the company lengthen future AUD/USD contracts to hedge the losses if Australian dollar depreciates in the foreseeable future.

Since the company is a going concern entity, we suggest that the best contract type for it is the quarterly maturity futures and roll-over the hedge every three months. For its short maturity characteristic, it can minimize the risk in the change in the exchange rates in future time. Table 7 below shows the current AUD/USD future contract information. Each contract size is 100,000 Australian Dollars, so to decide how many contracts the company would buy, we can simply use the amount of Australian Dollars divided by 100,000 to work out.

Graph 1 includes the AUD/USD exchange rate's moving tendency of last one month and last one year respectively. From the one month graph we can see a trend that AUD is keeping on depreciating, while considering the whole last year's data, the exchange rate is more likely to rise in the near future. Hedging with futures can help lock the currency risk on a fixed level. It may bring benefits to Rio Tinto when the exchange rate of AUD/USD goes down, but on the other hand, it may bring losses to it if the rate goes up. Whether the foreign exchange risk should be hedged or not needs accurate and detailed analysis of the exchange market, and a wrong decision in it may bring no profit but loss to the company.

2.3 Hedging Commodity Prices Risk

According to Rio Tinto (2012), the company produces aluminum, copper and iron, as well as energy and diamonds. We mainly use aluminum and copper as the instances in analyzing the possible hedging strategies as these are the main products of the company. The company can shorten futures in aluminum and copper futures market to lock in the selling price in the future.

According to London Metal Exchange (2012), the contract size of aluminum is 25 tons and the spot price is \$2032.00 per ton by cash on 20/12/2012. The 3-months futures price is \$2070.00 per ton. The contract size of copper is 25 tons. The spot price is \$7825.50 per ton while the 3-months futures price is \$7852.00 per ton.

Let's see how sensitive the potential gain/loss on both aluminum and copper is with the change of price. If the price of aluminum goes up by 10%, the value of one aluminum contract will be \$55880. Thus there would be a loss \$4130 per contract if the company enters the future market. However, if the price goes down by 10% in 3 months, the company would have a profit of \$6030 per contract as it can sell aluminum at the locked-in price. Similarly if the price of copper goes up by 10%, the loss from the futures would be \$18091.45 per contract, but if the price goes down by 10%, the profit would be \$25626.75 per contract. The detailed calculation is shown in Table 8 and Table 9.

It should be noted that it is not essential to hedge the commodity risk as there are alternative methods to avoid the risk. In fact, Rio Tinto sells its products "at prevailing market prices" (Rio Tinto 2012), which is also reasonable. Comparing to the current strategy, the hedging method does not allow the company to gain extra profit if the price goes up. However, more negotiation can be expected to be taken when the company sells its commodity at prevailing price while hedging is much more accessible. It should also be noticed that hedging by the company itself would be more attractive to shareholders who are more risk averse while less to shareholders who are less risk averse.

2.4 Hedging Credit Risk

To hedge the credit risk, it is recommended to use credit default swap (CDS). It is an over-the-counter instrument that provides the buyer, who is usually the owner of the underlying credits, with protection from the seller against a default by a particular company, institution or country (Hull 2012).

The buyer gets default protection by providing a series of payments, which is similar to an insurance premium. In the event of default, the seller assumes the credit risk and is obligated to pay the principal and interest to the buyer.

The company could enter CDS contracts to hedge the risk of default from its loans and bank deposits. For instance, to hedge the loans to EUAs (US\$589 million in 2011), the company could buy a contract in a notional value of 600 million from the Commonwealth Bank. If the CDS trades at 200 basis points, the company should pay 2% of 600million, or \$12 million per annum in quarterly installment of 3 million to the bank. In the event of default of its loans, the losses of the company could be offset by the payments from the bank. By using CDS the company could get insurance via effectively transferring the credit risk to the third party and receive payment if any adverse event occurs. It is especially effective against concentration risk. However, the company still takes credit risk if the protection seller defaults.

3. Conclusion

To summarize, through an analysis of Rio Tinto's potential risks, we have suggested some risk hedging strategies such as, a transference from fixed-rate borrowing to floating-rate borrowing, extension of AUD/USD future contracts to hedge the losses in case of Australian dollar depreciation, shortening of futures in aluminum and copper futures market to lock in the selling price in the future and signing of credit default swap (CDS) contracts to hedge the risk of default from its loans and bank deposits. We hope, in today's changeable situation of business, our proposed risk hedging strategies can be a reference to the risk hedging of other companies in the world.

Table 1

Nominal principal	INTEREST RATE	Maturity Date
500M three-year notes	1.13%	20-Mar-15
500M five-year notes	2%	22-Mar-17
1B 10-year notes	3.50%	22-Mar-22
500M 30-year notes	4.75%	22-Mar-42

Source: Rio Tinto financial statements 2012

Table 2

At 31 December 2011

Gains/(losses) associated with a 10% weakening of the currency

Currency Exposure	Closing exchange rate US cents	Effect on net earnings US\$m	Of which amount impacting Underlying earnings US\$m	Impact directly on equity US\$m
Australian dollar	101	(536)	78	(1)
Canadian dollar ^(a)	98	(1,190)	41	-
South African rand	12	(4)	(5)	-
Euro	130	239	(22)	(1)
New Zealand dollar	77	52	4	-

Source: Rio Tinto financial statements 2011

Table 3

Rio Tinto Account Receivable from 2002 to 2012	
Date	Account Receivable
30-Jun-12	5.55B
31-Dec-11	6.058B
30-Jun-11	6.51B
31-Dec-10	5.582B
30-Jun-10	5.396B
31-Dec-09	4.447B
30-Jun-09	4.587B
31-Mar-09	4.304B
31-Dec-08	5.401B
30-Jun-08	7.778B
31-Dec-10	6.479B
30-Jun-07	2.84B
31-Dec-07	2.938B
30-Jun-06	2.727B
31-Dec-06	2.488B
30-Jun-05	2.064B
31-Dec-05	2.559B
30-Jun-04	2.435B
31-Dec-04	2.483B
30-Jun-03	2.286B
31-Dec-03	2.239B

Source: Ycharts website: http://ycharts.com/companies/RIO/accounts_receivable

Table 4: Top Ten Ranking of Account Receivables among Fifty-one Mining Companies in 2012

Rankings for 51 companies as of Dec 21, 2012

Rank	Symbol	Company	Accounts Receivable
1	VALE	Vale	6.511B
2	RIO	Rio Tinto	5.55B
3	BHP	BHP Billiton	4.723B
3	BBL	BHP Billiton	4.723B
5	TCK	Teck Resources	1.271B
6	CNX	CONSOL Energy	869.89M
7	BTU	Peabody Energy Corporation	682.20M
8	ANR	Alpha Natural Resources	455.24M
9	ACI	Arch Coal	348.75M
10	CCJ	Cameco Corporation	321.08M

Source: Ychart website:
http://ycharts.com/companies/RIO/accounts_receivable

Table 5

18 Trade and other receivables				
	Non-current 2011 US\$m	Current 2011 US\$m	Non-current 2010 US\$m	Current 2010 US\$m
Trade receivables	11	3,721	10	3,939
Provision for doubtful debts ^(a)	-	(35)	-	(37)
Trade receivables – net	11	3,686	10	3,902
Amounts due from equity accounted units	318	422	337	217
Other receivables ^(b)	1,025	1,368	300	1,017
Pension surpluses (note 47)	88	-	110	-
Prepayment of tolling charges to jointly controlled entities ^(c)	634	-	787	-
Other prepayments	289	582	282	446
	2,365	6,058	1,826	5,582

(a) At 31 December 2011, trade and other receivables of US\$35 million (2010: US\$37 million) were impaired. The majority of these receivables were more than 90 days overdue.

(b) Non-current receivables include a US\$700 million prepayment for an intangible asset, following signing of the agreement for the Simandou iron ore project. The prepayment is shown as a purchase of intangible assets in the cash flow statement.

(c) Rio Tinto Aluminium has made certain prepayments to jointly controlled entities for toll processing of bauxite and alumina. These prepayments will be charged to Group operating costs as processing takes place.

There is no material element of trade and other receivables that is interest bearing.

Due to their short-term maturities, the fair value of trade and other receivables approximates their carrying value.

As of 31 December 2011, trade and other receivables of US\$159 million (2010: US\$292 million) were past due but not impaired. The ageing of these receivables is as follows:

	2011 US\$m	2010 US\$m
less than 30 days overdue	104	162
between 30 and 60 days overdue	29	67
between 60 and 90 days overdue	22	17
more than 90 days overdue	4	46
	159	292

22 Cash and cash equivalents				
	Note	2011 US\$m	2010 US\$m	
Cash at bank and in hand		2,167	1,785	
Other short term deposits		7,503	8,163	
Balance per Group statement of financial position		9,670	9,948	
Bank overdrafts repayable on demand (unsecured)	23	(16)	(7)	
Cash and cash equivalents included in Assets held for sale		-	18	
Balance per Group cash flow statement		9,654	9,959	

Cash and cash equivalents include US\$305 million (2010: US\$398 million) for which there are restrictions on remittances.

Source: Rio Tinto financial statements 2011

Table 6

21 Other financial assets						
	Non-current 2011 US\$m	Current 2011 US\$m	Total 2011 US\$m	Restated Non-current 2010 US\$m	Current 2010 US\$m	Restated Total 2010 US\$m
Loans to EAUs	468	121	589	227	110	337
Currency and commodity contracts: designated as hedges	11	75	86	-	-	-
Derivatives and embedded derivatives not related to net debt: not designated as hedges	5	40	45	19	124	143
Derivatives related to net debt	342	5	347	137	6	143
Equity shares and quoted funds	549	153	702	585	365	950
Other investments, including loans	547	191	738	629	26	655
	1,922	585	2,507	1,597	631	2,228

Source: Rio Tinto financial statements 2011

Table 7

Quotes				Time & Sales		Volume		Settlements		Trade Date: 12/22/2012	
Globex Futures Open Outcry Futures						Market Data is delayed at least 10 minutes					
										Turn Auto-refresh <input type="checkbox"/> OFF About this Report	
Month	Charts	Last	Change	Prior Settle	Open	High	Low	Volume	Updated		
Mar 2013 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	1.0345 a	-0.0072	1.0417	1.0413	1.0420	1.0330	89,697	4:44:08 PM CT 12/21/2012		
Jun 2013 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	1.0277 b	-0.0074	1.0351	1.0290	1.0303	1.0265 a	26	4:44:09 PM CT 12/21/2012		
Sep 2013 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	-	-	1.0288	-	-	-	0	4:44:09 PM CT 12/21/2012		
Dec 2013 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	1.0200	-0.0023	1.0223	1.0200	1.0200	1.0200	1	4:44:09 PM CT 12/21/2012		
Mar 2014 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	-	-	1.0159	-	-	-	0	4:44:08 PM CT 12/21/2012		
Jun 2014 <small>OPT</small>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	-	-	1.0092	-	-	-	0	4:44:09 PM CT 12/21/2012		

Icon Key: OPT Options Price Chart Volume Chart [Market data explanation/disclaimer](#)

Source: CME website,
<http://www.cmegroup.com/trading/fx/g10/australian-dollar.html>

Table 8

Spot price of aluminum per contract	$\$2032 * 25 = \50800
3-months futures price	$\$2070 * 25 = \51750
Price goes up by 10%	$\$2032 * 1.1 * 25 = \55880
Price goes down by 10%	$\$2032 * 0.9 * 25 = \45720
Risk-free rate	3.00%
Profit if price goes up	$\$55880 - \$50800 * e^{0.25 * 3\%} = \4697.57
Difference	$\$55880 - \$51750 = \$4130$
Profit if price goes down	$\$45720 - \$50800 * e^{0.25 * 3\%} = -\5462.43
Difference	$\$45720 - \$51750 = -\$6030$

Table 9

Spot price of copper per contract	$\$7825.5 * 25 = \195637.5
3-months futures price	$\$7852 * 25 = \196300
Price goes up by 10%	$\$7825.5 * 1.1 * 25 = \215201.25
Price goes down by 10%	$\$7825.5 * 0.9 * 25 = \170673.75
Risk-free rate	3.00%
Profit if price goes up	$\$215201.25 - \$195637.5 * e^{0.25 * 3\%} = \18091.45
Difference	$\$215201.25 - \$196300 = \$18901.25$
Profit if price goes down	$\$170673.75 - \$195637.5 * e^{0.25 * 3\%} = -\26436.55
Difference	$\$170673.25 - \$196300 = -\$25626.75$

The risk-free rate is the official interest rate released by the Reserve Bank of Australia on December 4, 2012 (Bloomberg 2012).

Graph 1

source: X-rate website,

<http://www.x-rates.com/graph/?from=AUD&to=USD&amount=1>

References

- Bloomberg, (2012), Australia RBA Cash Rate Target. [Online] Available:
<http://www.bloomberg.com/quote/RBATCTR:IND> (Dec 21, 2012)
- CME Group 2012, Foreign Exchange, AUD/USD Futures, [Online] Available:
<http://www.cmegroup.com/trading/fx/g10/australian-dollar.html> (Nov 22, 2012)
- Daigler, R. T. and Steelman, D. (1988), Interest rate swaps and financial institutions, Florida International University, Unite State.
- Garnaut, J. and Murphy, K., China envoy flies home, (2009), [Online] Available:
<http://www.theage.com.au/national/china-envoy-flies-home-20090819-eqm3.html> (Dec 20, 2012)
- Hull, J. C. (2012), Risk management and financial institutions, (3rd ed.), John Wiley & Sons, Inc., Hoboken.
- Morris, C. (1989), Managing stock market risk with stock index futures, Economic Review, vol. 5, no.3, pp. 3-16.
- Mozumdar, A. (1999), Default Risk of Interest Rate Swaps: Theory & Evidence. [Online] Available:
<http://www.nvc.vt.edu/abon/p6one.pdf> (Dec 27, 2012)
- Observations (2012), Interest Rate Forecast for 5-Year Treasury Notes, web blog, [Online] Available:
<http://observationsandnotes.blogspot.com.au/2012/07/5-year-treasury-interest-rate-forecast.html> (Dec 27, 2012)
- Rio Tinto (2012), Financial Statements 2011, Rio Tinto, [Online] Available:
http://www.riotinto.com/annualreport2011/pdf/financial_statements.pdf (Dec 20, 2012)
- Rio Tinto (2012), Rio Tinto Finance (USA) plc prices US\$2.5 billion of fixed rate bonds, Rio Tinto, [Online] Available: http://www.riotinto.com/media/18435_media_releases_21850.asp (Dec 27, 2012)
- Whittaker, J. G. (1987), 'Interest rate Swaps: Risk and Regulation', Economic Review, vol. 3, no.2, pp. 3-13.
- X-rate (2012), graphs, USD per 1 AUD Graph, [Online] Available:
<http://www.x-rates.com/graph/?from=AUD&to=USD&amount=1> (Dec 22, 2012)
- Ychart (2012), Accounts Receivable Rankings for Industrial Metals & Minerals Industry, [Online] Available:
http://ycharts.com/rankings/industries/Industrial%20Metals%20&%20Minerals/accounts_receivable (Dec 20, 2012)
- Ychart (2012), Rio Tinto historical account receivable data, June 2012, [Online] Available:
http://ycharts.com/companies/RIO/accounts_receivable (Dec 20, 2012)