

**IMPLEMENTING DERIVATIVE TOOLS AS FOREIGN EXCHANGE RISK
MANAGEMENT FOR STEEL INDUSTRIES IN IMPORT ACTIVITIES**

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Abstract

This paper examines implementation of using derivative tools which are forward and call options for steel industries in Indonesia. Steel industries in Indonesia depend on importing such commodities and raw materials to fulfill the high consumption because local production is not enough. Therefore, importing which needs forex will face risk in forex itself. The implementation of both tools are described in three different scenario of hedging percentage which are 25:75, 50:50, and 75:25. The results of this study will be as recommendation to steel industries in Indonesia to import raw materials in four months ahead with best tool. This study has purpose to help steel industries in controlling foreign exchange risk based on its high fluctuation while importing raw materials. The researcher did data gathering from primary data which is obtained from a representative company of steel and secondary data from the internet. Researcher also provide rule of each methods which is given by a commercial bank. Using call options is better than forward from expected values consideration with specification from the same bank who provide the tools. Only limited in over-the counter derivative which are call options and forward. Direct comparison between call option and forward

Keywords: Derivative, over-the counter, foreign exchange risk

Category: Finance

Introduction

Indonesia is known as rich of natural resources country. Among those natural resources, there is iron ore that is also spread highly in Indonesia. In Java Island, sediment of iron ore can be found in sand and it is approximated about 83 million tons with 38-59% of Fe. Iron

need in Indonesia always increase annually. It is because Indonesia as developing country, need many sector of industry that provide country's development such as infrastructure, household, and automotive. Nowadays, Indonesia need of iron is approximately 9 million tons per year.

Unfortunately, demand of iron in Indonesia is higher than its production. Therefore, Indonesia has to import to fulfill this high demand. It is because the lack of technology in Indonesia to produce. Even the SEAISI (South East Asia Iron & Steel Institute) statistic shows that consumption of crude steel consists of iron ore, slab, and billet, always indicates higher than local production from year 2000 to 2010. Therefore, import must be committed. Imports is business activity which involve many countries who need particular commodities. Those companies do this to fulfill importer needs and to expand the exporter's business. The risk faced here is that across other countries, there must be foreign exchange rate that change daily. People will not know whether the rate will be up or down. And this volatility determine both parties, importer and exporter's saving or loss.

So, mitigation in foreign exchange and risk management in market sector are very important to companies who run export and import activities because there is no doubt that these companies must face market risk daily. In other words, these companies must know tools or ways to mitigate foreign exchange risk.

Literature Review

Foreign Exchange Risk

Exchange risk is simple in concept: a potential gain or loss that occurs as result of an exchange rate change. (Giddy and Dufey)

Derivative

Derivative is an instrument that involves two parties to make a contract about payment .

Over-the counter

Over – the counter derivative are traded and negotiated privately between two parties. Commonly, party who sell this type of derivative is a commercial bank. The products are swaps, forward rate agreements, and options. Forward method is contract deals about payment in specific date with today’s pre determined price or rate. Options is contract between two parties that give right to the option buyer, not obligation, to exercise the underlying asset on rate or price which has been determined (strike/exercise price) in the expiration date. Differ with forward method; the buyer should not exercise the contract if the spot rate or price is more satisfying to the buyer. Option is divided into two types which are call options and put options. Buyer of call option has right to buy such asset with strike price at expiration date. Buyer of put option has right to sell such asset with strike price at expiration date.

trading which results values of the underlying assets. The assets vary in reality such as security, commodity, foreign exchange, and other derivative instruments. This instrument is useful for hedging, provide leverage, and speculation. Practically, derivative instruments are traded in over - the counter (OTC) derivative and exchange - traded derivative (ETD).

applies the tools, and conclusion and recommendation after getting the comparison between both tools.

Data Analysis

In this section researcher implementing forward and call options method to accommodate dollar from rupiah in order to import 1.910.000 ton of iron ore with price USD 134.62/ton in 4 months ahead with signed contract, either call options or forward, on July 17th, 2012. The cost in dollar is USD 257.124.200. Both tool are depicted with three scenario of hedging percentage which are 25% hedged cost - 75% converted on spot rate, 50% hedged cost - 50% converted on spot rate, and 75% hedged cost - 25% converted on spot rate. The researcher also compares between the worse spot rate at maturity, better spot rate at maturity, and best spot rate at maturity. Those three rates are obtained from forecast using Crystal Ball application with predictor tool. The calculation based on those rates is compared later on.

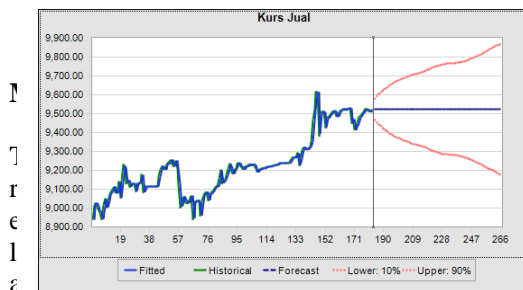


Figure 1 Forecasting of IDR/USD Rate Result Chart Using Crystal Ball

Forecast Result by Cristal Ball

From the forecast using Crystal Ball application, the IDR/USD rate of November 17th, 2012 is divided into 3 conditions, which are 10% confidence = IDR 9175,89/USD, fit and forecast = IDR 9524/USD, and 90% confidence = IDR 9872,86/USD.

Call Options Calculations for Worse Spot Rate at Maturity Scheme

Table 1 Worse Spot Rate at Maturity Scheme for Call Options

	Scenario 1	Scenario 2	Scenario 3
Notional	\$64.281.050	\$128.562.100	\$192.843.150
Premium in	2,60%	2,60%	2,60%
Premium (USD)	\$1.671.307	\$3.342.615	\$5.013.922
Spot Reff	9480	9480	9480
Premium (IDR)	Rp15.843.993.204	Rp31.687.986.408	Rp47.531.979.612
Strike	9645	9645	9645
Spot rate at maturity	9872,86	9872,86	9872,86
Exercise	Rp619.990.727.250	Rp1.239.981.454.500	Rp1.859.972.181.750
Unhedged (USD)	\$192.843.150	\$128.562.100	\$64.281.050
Unhedged (IDR)	Rp1.903.913.421.909	Rp1.269.275.614.606	Rp634.637.807.303
Total Budget (IDR)	Rp2.539.748.142.363	Rp2.540.945.055.514	Rp2.542.141.968.665
Saving	Rp14.647.080.053	Rp29.294.160.106	Rp43.941.240.159

Call Options Calculations for Better Spot Rate at Maturity Scheme

Table 2 Better Spot Rate at Maturity Scheme for Call Options

	Scenario 1	Scenario 2	Scenario 3
Notional	\$64.281.050	\$128.562.100	\$192.843.150
Premium in	2,6%	2,6%	2,6%
Premium (USD)	\$1.671.307	\$3.342.615	\$5.013.922
Spot Reff	9480	9480	9480
Premium (IDR)	Rp15.843.993.204	Rp31.687.986.408	Rp47.531.979.612
Strike	9645	9645	9645
Spot rate at maturity	9524	9524	9524
Exercise	None	none	None
Unhedged (USD)	\$257.124.200	\$257.124.200	\$257.124.200
Unhedged (IDR)	Rp2.448.850.880.800	Rp2.448.850.880.800	Rp2.448.850.880.800
Total Budget (IDR)	Rp2.464.694.874.004	Rp2.480.538.867.208	Rp2.496.382.860.412
Saving	Rp31.112.028.200	Rp31.112.028.200	Rp31.112.028.200

Call Options Calculations for Best Spot Rate at Maturity Scheme

Table 3 Best Spot Rate at Maturity Scheme for Call Options

	Scenario 1	Scenario 2	Scenario 3
Notional	\$64.281.050	\$128.562.100	\$192.843.150
Premium in	2,60%	2,60%	2,60%
Premium (USD)	\$1.671.307	\$3.342.615	\$5.013.922
Spot Reff	9480	9480	9480
Premium (IDR)	Rp15.843.993.204	Rp31.687.986.408	Rp47.531.979.612
Strike	9645	9645	9645
Spot rate at maturity	9175,89	9175,89	9175,89
Exercise	None	none	none
Unhedged (USD)	\$257.124.200	\$257.124.200	\$257.124.200
Unhedged (IDR)	Rp2.359.343.375.538	Rp2.359.343.375.538	Rp2.359.343.375.538
Total Budget (IDR)	Rp2.375.187.368.742	Rp2.391.031.361.946	Rp2.406.875.355.150
Saving	Rp120.619.533.462	Rp120.619.533.462	Rp120.619.533.462

From all calculations, the worse, better, and best spot rate condition, the researcher sees the tendency that higher notional, will affect to higher total budget that need to be provided by the steel company. This happens because higher notional needs higher premium. But the advantage is more saving for higher notional if the forward spot rate is worse than strike rate. Well, the better spot rate indicates that from each condition, they shows lower budget than the worse rate. It is indeed that people seek for better spot rate in the future if they want to buy dollar. The expectation is that in the future,

Rupiah will improve to the US Dollar but the forecast analyzes Rupiah will weaken, so applying derivative tool is needed. The expected values with formula $E(V) = 1/3 \times (\text{Saving/Loss Worse Spot Rate at Maturity}) + 1/3 \times (\text{Saving/Loss Better Spot Rate at Maturity}) + 1/3 \times (\text{Saving/Loss Best Spot Rate at Maturity})$, from those calculations are showed below.

- $E(O1) = \text{Rp}55.459.547.238$,
- $E(O2) = \text{Rp}60.341.907.256$, and
- $E(O3) = \text{Rp}65.224.267.274$.

Forward Calculations for Worse Spot Rate at Maturity Scheme

Table 4 Worse Spot Rate at Maturity Scheme for Forward Method

	Scenario 1	Scenario 2	Scenario 3
Forward Rate	9654	9654	9654
Spot rate at maturity	9872,86	9872,86	9872,86
Hedged (USD)	\$64.281.050	\$128.562.100	\$192.843.150

Unhedged (USD)	\$192.843.150	\$128.562.100	\$64.281.050
Hedged (IDR)	Rp620.569.256.700	Rp1.241.138.513.400	Rp1.861.707.770.100
Unhedged (IDR)	Rp1.903.913.421.909	Rp1.269.275.614.606	Rp634.637.807.303
Total Budget (IDR)	Rp2.524.482.678.609	Rp2.510.414.128.006	Rp2.496.345.577.403
Saving (IDR)	Rp14.068.550.603	Rp28.137.101.206	Rp42.205.651.809

Forward Calculations for Better Spot Rate at Maturity Scheme

Table 5 Better Spot Rate at Maturity Scheme for Forward Method

	Scenario 1	Scenario 2	Scenario 3
Forward Rate	9654	9654	9654
Spot rate at maturity	9524	9524	9524
Hedged (USD)	\$64.281.050	\$128.562.100	\$192.843.150
Unhedged (USD)	\$192.843.150	\$128.562.100	\$64.281.050
Hedged (IDR)	Rp620.569.256.700	Rp1.241.138.513.400	Rp1.861.707.770.100
Unhedged (IDR)	Rp1.836.638.160.600	Rp1.224.425.440.400	Rp612.212.720.200
Total Budget (IDR)	Rp2.457.207.417.300	Rp2.465.563.953.800	Rp2.473.920.490.300
Loss (IDR)	(Rp8.356.536.500)	(Rp16.713.073.000)	(Rp25.069.609.500)

A. Forward Calculations for Best Spot Rate at Maturity Scheme

Table 6 Best Spot Rate at Maturity Scheme for Forward Method

	Scenario 1	Scenario 2	Scenario 3
Forward Rate	9654	9654	9654
Spot rate at maturity	9175,89	9175,89	9175,89
Hedged (USD)	\$64.281.050	\$128.562.100	\$192.843.150
Unhedged (USD)	\$192.843.150	\$128.562.100	\$64.281.050
Hedged (IDR)	Rp620.569.256.700	Rp1.241.138.513.400	Rp1.861.707.770.100
Unhedged	Rp1.769.507.531.654	Rp1.179.671.687.769	Rp589.835.843.885

(IDR)			
Total Budget (IDR)	Rp2.390.076.788.354	Rp2.420.810.201.169	Rp2.451.543.613.985
Loss (IDR)	(Rp30.733.412.816)	(Rp61.466.825.631)	(Rp92.200.238.447)

In applying the forward method, the more percentage of hedged funds will give better budget if the forward spot rate is worse than the forward rate given by the bank. It means that if the steel company sure that in four months ahead, rupiah will weaken even worse than the forward rate given by the bank and it happens, there is more saving for the company because most of the fund is hedged. But, if the prediction is wrong, which means the spot rate at maturity indicates better than forward rate given by the bank, the steel company will face loss higher if they hedge higher fund. And the cost of more hedged fund to pay tends to become higher if the spot rate at maturity indicates better. The good news is lower budget or cost to be paid if the spot rate at maturity better than forward rate given. It is shown from each conditions of hedging percentage. The expected values with formula $E(V) = 1/3 \times (\text{Saving/Loss Worse Spot Rate at Maturity}) + 1/3 \times (\text{Saving/Loss Better Spot Rate at Maturity}) + 1/3 \times (\text{Saving/Loss Best Spot Rate at Maturity})$, from those calculations are showed below.

- $E(F1) = (\text{Rp}8.340.466.238)$
- $E(F2) = (\text{Rp}16.680.932.475)$
- $E(F3) = (\text{Rp}25.021.398.713)$

Conclusion and Recommendation

From the first method, call options, researcher concluded that higher notional, which means higher percentage of hedged fund, will affect to higher cost to be paid by a steel company in order to import raw materials. The reason of this occurrence is the determination of premium. A commercial bank must prepare premium for all kind of options method, call and put options, because it must not be exercised by the due date. This premium will become higher if the notional also becomes higher. The premium also becomes higher if the maturity date is longer. In this case, 4 months maturity make the premium to be paid is 2,6% for the best strike rate given by the bank. In this case, forward method indicates more

advantageous to importer or the steel company from total budgeting aspect but it is not valid if call options and forward are compared in best spot rate at maturity condition. The tendency from forward method is that higher fund to be hedged and the spot rate at maturity results worse than strike rate make the importer will need lower budget and enhance higher saving. But if the spot rate at maturity better than strike rate, lower hedged fund makes more advantageous. But, after calculate the expected values from both methods, call option give positive value while forward results negative. It is because forward need both parties to lock the rate based on contract, so loss may occur. Differ to call option, because the buyer of option has right to choose, buyer must not face loss. The recommendation for the importer or steel company who plans to hedge its fund in order to import, is using call option is better for four months ahead consider to the positive expected values. One thing that should be considered that what will the percentage of hedging be. If the company is very sure that in the future, rupiah will really weaken; the company should hedge more even until 75% of its fund to enhance more saving. If not, importer better hedge less to avoid high budgeting and high loss. So, forecasting may help the importer’s decision.

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