

**ANALYSIS OF HEDGING METHOD IMPLEMENTATION AS  
AN ACTION TO CONTROL CURRENCY RATE RISK  
WITH EXPOSURE PT. PAL FOREIGN TRANSACTION**

**THESIS**

**Diajukan sebagai salah satu syarat untuk memperoleh gelar Magister  
Manajemen**

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**UNIVERSITAS INDONESIA  
FAKULTAS EKONOMI  
PROGRAM STUDI MAGISTER MANAJEMEN  
KEKHUSUSAN MASTER OF BUSINESS ADMINISTRATION  
JAKARTA  
DESEMBER 2008**

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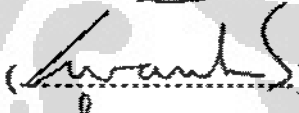
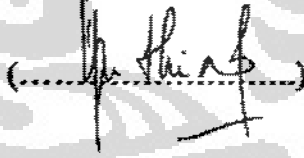
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## HALAMAN PERNYATAAN ORISINALITAS

**Tesis ini adalah hasil karya saya sendiri,  
dan semua sumber baik yang dikutip maupun dirujuk  
telah saya nyatakan dengan benar.**

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**Tanggal : 18 Desember 2008**

## PREFACE

First, I want to thank God for His guidance that I finally finished this final paper. In writing this paper, I have received much help, supports and guidance from many parties. Second, I would like to express my deep gratitude and appreciation to Mr. Dr. Moh. Muslich as my advisor, who's given some of his time for consultation and advices to the successful completion of this final paper. Third, With honour to Director of PT. PAL, thank you for the support and time given to me in completing data for this paper.

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I realize that there are many limitations in this final paper. Hence, I really appreciate for any constructive critics and recommendations to make this final paper better. Finally, I hope this final paper can contribute mutual benefit to me, PT. PAL. and readers.

Jakarta, 10 December 2008

Hans Wonowidjaja

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## ABSTRAK

Nama : Hans Wonowidjaja  
Program Studi : MM-MBA  
Judul : Analisa implementasi metode hedging sebagai tindakan mengendalikan resiko nilai tukar mata uang asing dengan exposure transaksi luar negeri PT. PAL.

Dengan pergerakan situasi ekonomi yang tidak stabil sekarang ini, dampak dari tingkat stabilitas ekonomi suatu negara terhadap fluktuasi nilai tukar mata uang asing semakin tinggi. Untuk menghindari resiko kerugian akibat fluktuasi ini, manajemen dari perusahaan harus membuat strategi yang bagus dengan tujuan meminimalkan ataupun menghilangkan resiko tersebut yang akan memberikan hasil terbaik bagi perusahaan. Tesis ini akan membahas fungsi metode-metode *hedging* sebagai strategi untuk melindungi perusahaan dari resiko fluktuasi nilai tukar mata uang asing yang akan mempengaruhi nilai dari suatu transaksi mata uang asing dan cara untuk memilih metode terbaik yang memberikan hasil tertinggi bagi perusahaan. Pada analisa ini, penulis menggunakan transaksi pada PT. PAL sebagai objek untuk menjelaskan dampak dari metode *hedging*. Analisis ini menggunakan metode kualitatif komparatif deskriptif. Data diperoleh dari *spot rate* nilai tukar mata uang asing pada tahun 2007, transaksi luar negeri PT. PAL dan interview dengan direksi PT. PAL. Hasil dari analisa ini adalah metode *hedging* berguna untuk mengendalikan *foreign exchange risk* pada transaksi mata uang asing dengan exposure PT. PAL dan metode terbaik bagi PT. PAL untuk mengendalikan *foreign exchange risk* adalah kontrak forward.

Kata kunci:  
*Hedging, foreign exchange risk*

## ABSTRACT

Name : Hans Wonowidjaja  
Study Program : MM-MBA  
Title : Analysis of hedging method implementation as an action to control currency rate risk with exposure PT. PAL foreign transactions.

With the unstable movement of economic situation nowadays, the impact of a country economic stability level towards the fluctuation in the foreign currency exchange rate has increasing. To avoid the risk of loss resulting from this fluctuation rate, the management of the company have to make a good strategy with the aim minimize or even eliminate the risk which will give the best value for the company. This thesis will discuss the function of hedging methods as the strategy to protect the company from the risk of foreign currency exchange rate fluctuation that will influence the value of foreign exchange transactions and the methods to choose the best strategy that will give the highest value for the company. In this analysis, writer used transaction in PT. PAL as the object to describe the actual effect of hedging method. This analysis is quantitative comparative interpretive. The data were collected from spot rate of exchange in 2007, PT. PAL foreign transactions and interview with PT. PAL director. The analysis result are hedging methods is useful to control the fluctuation of foreign exchange risk in foreign exchange transaction with exposure PT. PAL and the best method for PT. PAL to control the fluctuation of exchange rate risk is forward contract.

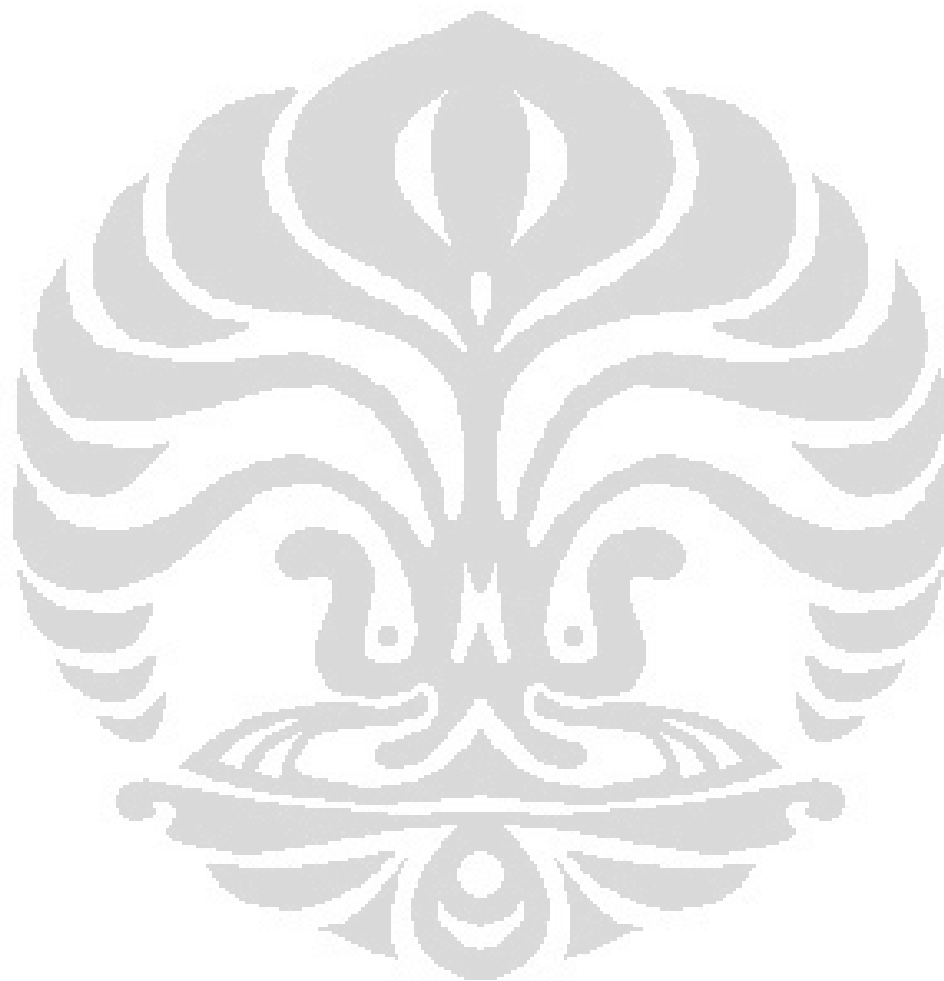
Key words:  
Hedging, foreign exchange risk



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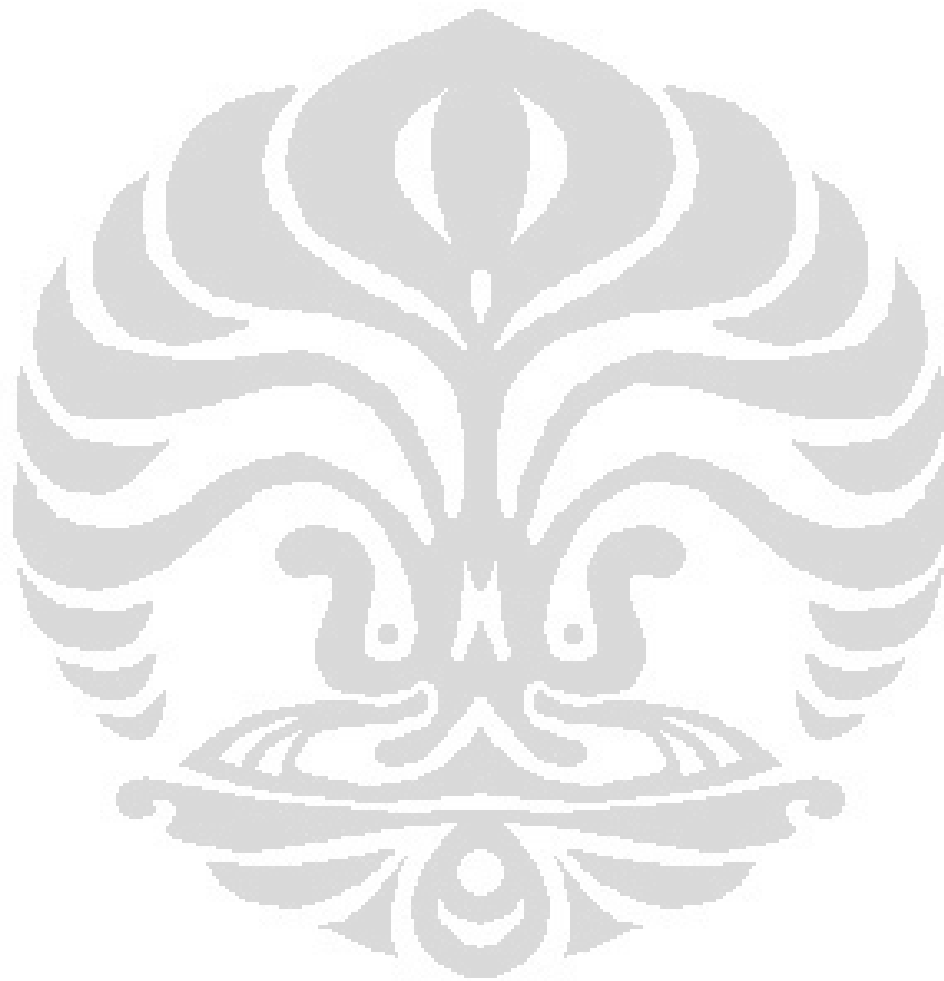
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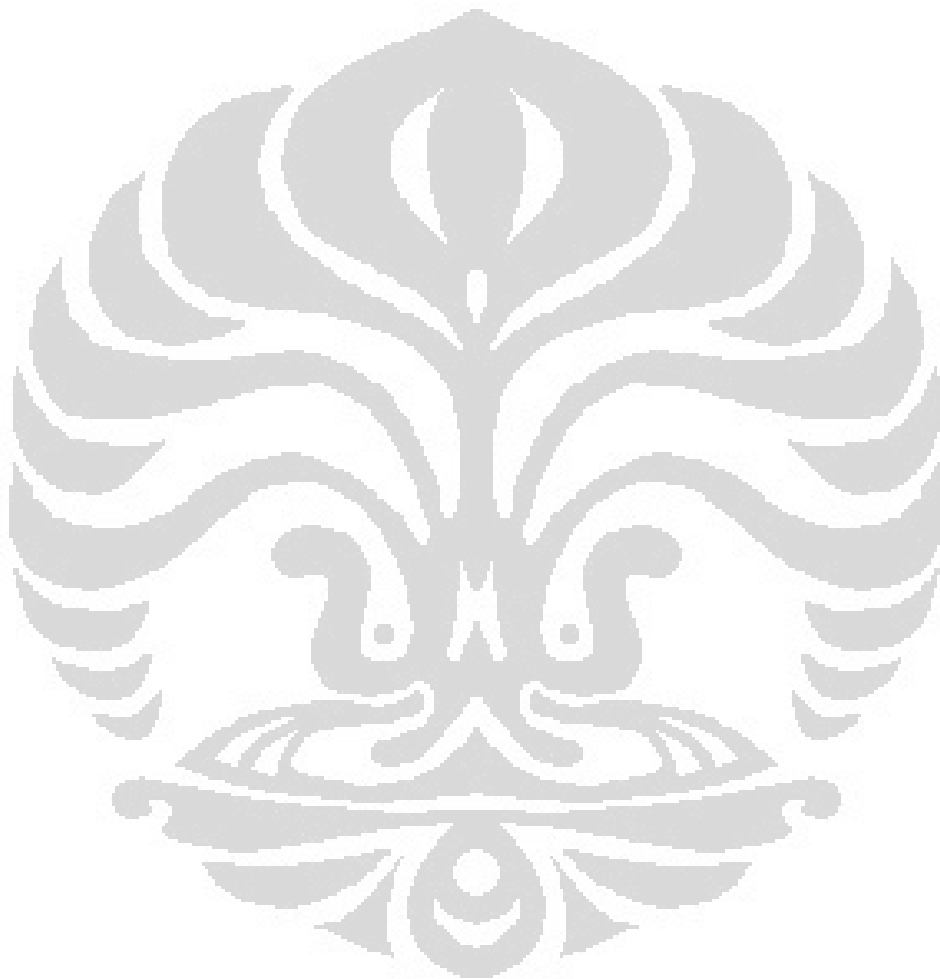
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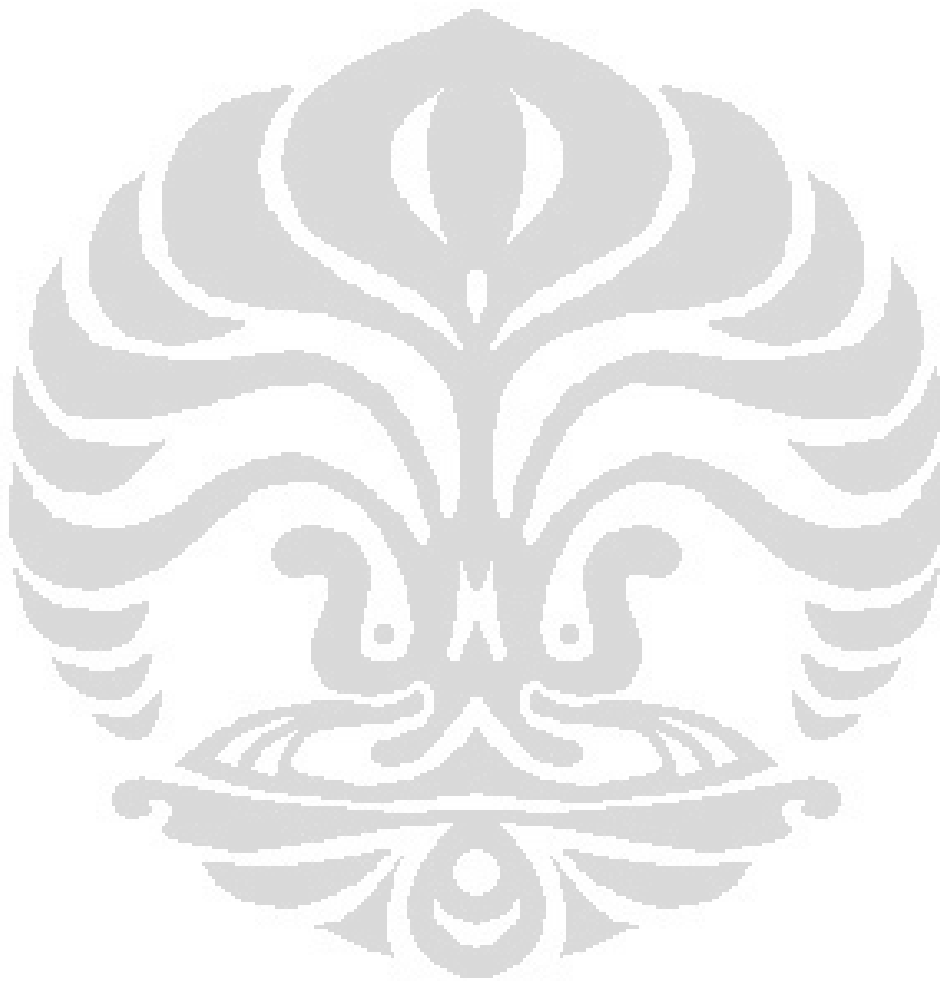
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# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Problem

The speed of economics development nowadays has made domestic market share increased to a saturated level and many companies had expand its market overseas begin with multinational scope until international scope. Along with the expansion, the volume of the international transaction also took part in increasing. The use of foreign currency that increased also could not be avoided where the currencies majority that was used was international currencies that have good level of the stability like the US dollar, Yen Japan and Euro.

The increase of foreign currency transaction in the market has made market holders become more aware and give an extra attention to the foreign exchange rate. The market condition increasingly changed uncertainly have gave an unsafe condition for the market holders in carrying out the transaction especially that be related with foreign country. One of the examples that could be seen was the fluctuation in the level of the interest that directly resulted in the change of foreign currency exchange rate that could result in the transaction that ought to give the profit to give the significant loss. So could be concluded when the transaction in a foreign manner where this transaction used foreign currency, happening then this transaction contained the risk from the fluctuation of foreign currency exchange rate where the local currency value could strengthen or weaken towards the foreign value currency that was used. This condition could give the impact that was positive or negative against the company.

The instability of economics condition from each country that directly or indirectly influenced the foreign currency exchange rate has made market holders to cover their foreign transaction value by using hedging strategy to minimize the risk of loss that possibly happen. The risk management with the hedging concept became the solution for the market players in facing the foreign currency exchange rate fluctuation. In the hedging strategy the company could carry out in short-term or long-term in accordance with the transaction type.

The strategy hedging that could be used to minimize the risk was as follows (Lumby and Jones, Chapter 26, 2003):

1. Do nothing
2. Natural hedging or netting
3. Swaps
4. Forward market hedging
5. Money market Hedge
6. Futures contracts
7. Options

Each hedging technique had his advantage accordance with the transaction that happened. To get best results, then the company must carry out the analysis before in each transaction to get results that were best for the company. In this research the company that will be used was PT. PAL, which trade in export and import where the risk from the currency fluctuation was very influential to the transaction value. The focus in this research was the control of the risk in the foreign transaction by using the hedging strategies.

### **1.2 Problems Formulation**

Based on the explanation in the background of the problem, then the problem that will be analysed in this paper was the application of the hedging strategy to control the risk of foreign transaction that covered:

1. What is the role of hedging strategies that which are: do nothing, natural hedging or netting, swaps, forward market hedging, money market hedging, futures contracts and options in reducing the risk of the foreign currency exchange rate fluctuation with exposure PT. PAL foreign transactions?
2. What is the best hedging strategy for PT. PAL foreign transaction type?



### 1.3 Problem Limitation

1. The hedging strategies that would thorough were the methods do nothing, natural hedging, swaps, forward market hedging, money market hedging, futures contract and options.
2. The debt and the company's debt that were caused by the characteristics of the foreign transaction to PT. PAL.
3. The analysis that was carried out was in one year.

### 1.4 Research Objectives

The aims of this research were to give a clear picture concerning the function of hedging strategy in facing the fluctuation of foreign currency exchange rate especially to PT. PAL. This Goal could be clarified as follows:

1. Explained concerning the use of the hedging strategies to reduce the risk of foreign currency exchange rate fluctuation for the company that had the transactions in the form of foreign currency.
2. Explained the best strategy for PT. PAL foreign transaction type.

### 1.5 Method of Analysis

This analysis will be carried out through the data collection that came from several sources in part:

1. The exchange rate data of foreign currency in 2007, [www.oanda.com](http://www.oanda.com).
2. The interest of the Indonesian Bank, [www.bi.co.id](http://www.bi.co.id).
3. Singapore Interbank Offered Rate (SIBOR), <https://secure.sgs.gov.sg>.
4. London Interbank Offer Rate (LIBOR), [www.moneycafe.com](http://www.moneycafe.com).
5. The report on the transaction export and import PT. PAL in 2007.

The data that was received was processed and analysed to explain the function from the hedging strategy especially to PT. PAL. Analysis was carried out by considering the risks, the cash flow, the costs and the exchange rate that happened.

The analysis stage covered:

1. Literature study to receive the general picture and the theory base concerning the research topic.
2. Field work to receive the data. The researcher received the data from website and the management from PT. PAL.
3. Data processing.
4. The report writing.

### **1.6 Report Outline**

Systematic discussion in the research is divided into five chapters.

Chapter I : Introduction, which contains background of the Problem, problem formulation, problem limitation, research objectives, method of analysis and report outline.

Chapter II : Review of literature, this chapter explains the theory and concepts, risk management, in general, implementation of hedging the risk management and other references to support the analysis of the problems.

Chapter III : Research methodology, this chapter describes the methods of research related to the use of data and analysis methods hedging strategies.

Chapter IV : The discussion and analysis, this chapter analysis the hedging strategy in overseas transactions through simulation and explain the impact of hedging strategy for the company to control the risk.

Chapter V : Conclusions and recommendations, this chapter gives conclusions based on the analysis has been done and suggestions as inputs for the company to control the risk of overseas transactions

## CHAPTER II

### REVIEW OF LITERATURE

#### 2.1 Foreign Exchange Transactions

Many theories that explained concerning the foreign currency transaction (foreign exchange) some of them are: *foreign exchange transaction is simply an exchange of one country's money for another's*, (Kubarych, 1983). "*Foreign exchange transaction is the transaction between two parties for the purchase by one party of an agreed amount in one currency against the sale by it to the other of an agreed amount in another currency, both such amounts being deliverable on the agreed date value*", (AFMA, 1999). *Foreign exchange market is a market where financial paper with a relatively short Traded Maturity*, (Riehl and Rodriguez, 1983). From the explanation above could be concluded that the foreign currency transaction was the contract to buy or sell an amount of foreign currency by using other currency when the transaction and the certain price or the exchange rate.

In the research this time, the meaning of the foreign currency transaction was the business transaction or the trade of a thing from a country to the other country. The foreign currency transaction happened in the foreign currency market where according to Eitman and Moffett, 2004, markets could be useful as the place to carry out the strategy hedging like forward market hedge, money market hedge and option market hedge.

The players in the foreign currency market divided into two levels that is interbank or wholesale market and the client or retail market. From the two levels was subdivided to five categories that is:

1. Bank and foreign exchange traders not the bank.

The Bank provides commercial rotation and large-scale speculative trading on daily activity.

2. Individual and corporate commercial or investment.

A transaction conducted by individual traders or retail only covers a small part of the total volume of transaction in the foreign exchange market. The retail traders can only participate indirectly through brokers or the bank. In the commercial companies generally foreign

currency transactions are conducted with the purpose of the financial activities related to the payment of goods or services. Number of transaction done also in the small capacity compared with the bank. In the investment transactions within foreign exchange market uses, media is used as a facility that provides transaction of overseas shares buying and selling and foreign exchange transactions are not intended to benefit.

### 3. Speculator and arbitration

Speculator and arbitration have the goal to seek profits from transactions undertaken in the market. Speculator has an important role in providing facilities to the hedger and diverts the risk from people avoiding the risk to people who play in the risk. Arbitration has a business profit from price differences between the two foreign exchange market, which is calculated differently from the difference between the bid price and offer price.

### 4. The central bank and treasuries.

Central bank has an important role in the foreign exchange market. They manage the money supply, inflation rate and maintain the interest rate that can directly affect the exchange rates of foreign currencies. Strategies used to maintain stability in exchange rates is to buy back the currency in the country at the time of the exchange rate is low and sell when the exchange rate is too high.

### 5. Foreign exchange traders

Traders of foreign exchange conduct transactions in large numbers, to facilitate trade between the banks and adjust the inter-parties with a small fee.

## 2.2 Risk of Foreign Currency Exchange Rate

The risk of foreign exchange is the uncertainty arises because the value of the exchange rate movement can not be predicted exactly. There are three types of risk of changes in foreign currencies exchange rates, which are (Lumby, 2007, cp26):

1. transaction risk;
2. translation risk; and
3. economical risk.

Transaction risk can be interpreted as the risk from exchange rate movements will affect the value of the currency cash flows of foreign currency in the future that occurred from transactions that have occurred from the companies concerned. The main factors that influence the value of transaction are from transactions of import and export that happened when the company has trade receivables or debt in foreign currency.

Transaction risk can also be found when a company has fixed assets investment, such as office buildings overseas. Where the value is calculated in foreign currency that is expected to provide added in the future. And the last, the transaction risk also appears when the company borrowing in foreign currency. In this there is a loan interest and principal debt must be paid at maturity where the company will face risks from the movement of foreign exchange.

The second type of risk, the risk of translation, occurs when the value of assets and debts in foreign currency must be changed into local currency, which will be included in the company's financial reports. Although the assessment of the impact this can have an affect the company's asset value, this risk is not a risk translation. Translation risk is the risk in terms of accounting, and has no relation to the value of the company, in this case does not have an impact on cash flow. The risk generally only occurs in the transaction which has a term from a medium to a long term which the transaction must be reported in the balance sheet at the end of each year.

The last type of risk is economical risk which is the risk of changes in exchange rates that emerged from the possibility of change of net present value in local currency which came from the foreign currency cash flows which will be received in the future time. So all export transactions to be conducted in the future and cash flows which have been predicted from the overseas transaction occur contain economical risk.

### 2.3 Hedging Strategy

Based on Eiteman, 2004, pp. 199, *Hedging is the Taking of a position, acquiring a cash flow, an asset, or a contract (including a forward contract) that will Rise (fall) in value, and a fall Offset Printing (Rise) in the value of an existing position.* Hedging strategies are useful to protect the assets of the owner from the losses caused by the uncertainty fluctuation of foreign exchange. Along with that, hedging also erases the possibility to obtain benefits that may be obtained from changes in foreign exchange.

The value of a company is the net present value of all cash flows in the future. This means that the value of cash flow in the future can not be precisely estimated. For companies that make hedging against the value of transactions conducted in foreign currency will reduce possibility or variance in the value of the cash flow that will occur in the future. The risk of fluctuations in foreign exchange can also be defined as the variance of cash flow that has been predicted that emerged from the exchange rates of foreign currencies that are not predicted.

To control the risk, where the risk is a transactional risk, according to the Lumby, 2007, there are seven strategies that can be used, namely do nothing, natural hedging or netting, swaps, forward hedging market, money market hedging, futures contracts and options contracts.

#### 2.3.1 Do Nothing or Not Doing the Hedging.

In this strategy, management will receive risk regardless of the risk of movement of foreign exchange at a certain period. This strategy is risky when the currency used is not strong and stable. This strategy can be accepted and used if the situation occurs as follows:

1. The number of transactions conducted relative small (seen in the business of the company).
2. The company predicted no significant change in the exchange rate in the direction of a company.

For example, a supplier to send invoices to consumers of \$2 billion and \$/¥ forward rate at premium position which depicts stronger \$ compare to ¥. In this movement of foreign exchange will be on the side of the supplier - they have an \$2 billion receivables, where the currency will become more valuable in the

future. In this condition Exporter better not do anything because the movement of the value of foreign currency is profitable.

In reality, forward rate is not an appropriate indicator to predict the future spot rate. Forward rate is determined by IRPT, while the future spot rate is determined by PPPT and power of market supply and demand at a certain time in the future. So if the level of forward rate is in the profitable (premium) position can not predicted at a certain time, dollars can get stronger from the spot rate.

### 2.3.2 Using Natural Hedging or Netting

This strategy can be implemented when there are two companies exporter and importer, which has assets and debts in the same currency and the same period of maturity. They must have a negative relationship so that they can complement each other in the transaction that occurs.

For example, Indonesia companies do export to the United States and send bills to consumers of \$2 billion which is maturing in one month. On the other hand they also import raw materials of \$1.8 billion which also matures in one month. In this case the company can balance the amount \$1.8 billion on debt maturing one month bills with a \$2 billion which will be received in the same period and revenue from the remaining \$0.2 billion can be done by using a another hedging strategy.

### 2.3.3 Swaps

Swaps strategy involves two companies that are generally from different states companies that will provide benefits to one another so that each company will receive payment in currency of their own. For example, the Indonesia company swaps with the American company for 3 years, the payments that they will mature within three years to come shall be paid by the currency of opponent. The Indonesia Company will receive in the form of IDR and the USA Company will receive the United States Dollars. In addition, each company to make interest payments in the method of fixed or float interest to the opponent in accordance with the agreement during a specified time. The swaps strategy will be done by the bank as a guarantor which will receive a commission in the amount of the relative small.

There are several types of swap strategies which are plain vanilla interest rate swaps and currency swaps. The type of strategy which is commonly used is plain vanilla interest rate swap. In this strategy company agrees to pay a fixed amount of interest from the value of the transaction for an agreed period of time and get the float interest rate from the same transaction value in the same period. The float interest rate which is generally used in the United States is the London Interbank Offer Rate (LIBOR) and in Indonesia using the Interest Rate of Bank Indonesia (SBI). In currency swap transactions is done in early period of agreements with the interest payment in accordance with the agreement and the number of transactions shall be received back at the end of the period. This strategy is quite a cheap alternative to guarantee the value of the currency to be accepted.

#### 2.3.4 Forward Market Hedging or Forward Contract

Forward contract is OTC (over the counter) derivative transactions. The contract forward was the transaction that was agreed to buy or sold totalling certain at the time of now that will be carried out in the period that will come with the price that was agreed to now. Generally in the OTC market the transaction happened between two financial institutions or between the financial institutions to their client. In the forward contract, the side that bought an amount certain when that was agreed to a time that will come with the price that was agreed to be mentioned long position and the side that sold a certain amount when that was the agreed to with the price that was agreed to was mentioned short position.

Forward contracts can be formulated as follows:

$$F_{t,T} = S_t e^{r(T-t)} \quad (2.1)$$

or

$$f^{SF} = \frac{\text{Spot} - \text{Forward}}{\text{Forward}} \times \frac{360}{\text{Hari}} \times 100 \quad (2.1a)$$

- $S_t$  = spot price
- $t$  = period
- $r$  = compounded rate



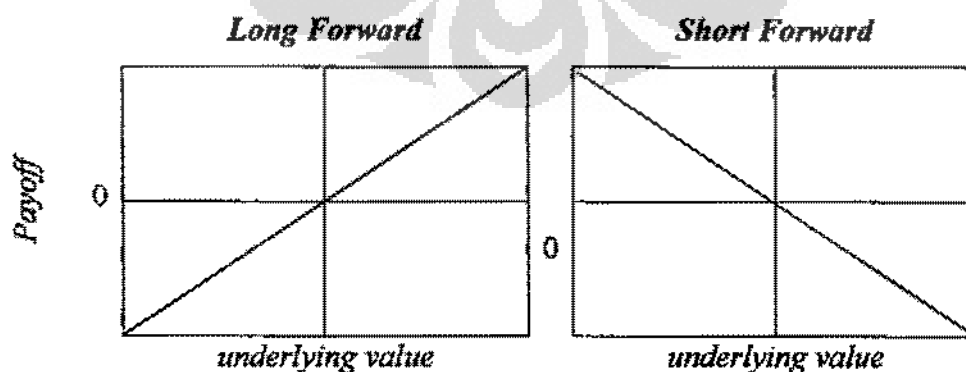
For more information we can use the previous example where companies do hedging against the \$0.2 billion from receiving payments in the period of one month by using a forward contract. This can be done by one month forward contract in short position that worth \$0.2 billion. Company will have the contract to sell \$0.2 billion within one month to be exchanged with the rupiah at a fixed exchange rate (one month forward rate). With this condition it will eliminate the uncertainty of the rupiah value of \$0.2 billion which will be received one month later.

Another example of where  $F_{t,T} > S_t e^{r(T-t)}$ , so investors can make a transaction at the time  $t$ :

1. borrowing a loan to the bank on with  $S_t$  amount at compounded rate  $r$ ,
2. with a loan from the bank's purchase of shares of with amount  $S_t$ ,
3. get into a short forward contract with the cost of 0. In short forward means investors have a debt to the other party at the time  $t$ ,
4. make a payment to the bank. The income obtained by is  $-S_t e^{r(T-t)}$ ,
5. complete the short forward contract by selling the stock with a price of  $F_{t,T}$ . The incoming cash at investor become  $F_{t,T}$ , because investors receive  $S_T$  from the buyer. So investors will receive  $F_{t,T} - S_t e^{r(T-t)}$ .

Total cash received become:  $F_{t,T} - S_t e^{r(T-t)}$ , where with this analysis the result is positive. A transaction like this is the arbitrage profit.

Figure 2.1 Payoff from forward contracts of a long or short position.



Source: McDonald (2005)

In Figure 2.1 depicts losses or profits on forward contracts. At market value is positive, the short party will pay a long party. And vice versa when the negative value, the long party will pay to the short party. The graph also explained that the higher exchange rate, the higher the return will also be accepted which make the value of forward contracts become more high and profitable for the contract buyers.

Forward contracts in the position long USD will get the benefits of interest rate with USD, likewise with currency of IDR. For example, IDR interest rate is 10% and USD interest rate is 5%. The exchange rate USD/IDR Rp.10,000.00 with investor capital Rp.1,000,000.00 or \$100.00. These funds can be invested in the IDR or USD. In the IDR will generate Rp.1,100,000.00 a year later. In the USD will generate \$ 105.00 a year later. Therefore the price of forward exchange rate can be calculated as follows:

$$\begin{aligned} \text{Rp.1,000,000.00} \times 1,10 &= \$100.00 \times 1.05 \times F_0 \\ F_0 &= \text{Rp.10,476.19} \end{aligned}$$

In general, can be formulated to become:

$$F_0 = S_0 \times \frac{(1+r)}{(1+r^*)} \quad (2.2)$$

$F_0$  = forward price in the period of 0

$S_0$  = Spot rate in the period of 0

$r$  = domestic interest rate

$r^*$  = the interest rate of foreign currency

Forward rate generally is known as delivery prices, which are usually referred as the forward prices. Forward prices fluctuated following the market conditions. At the time of entering into a forward transaction, the contract price will be equal to the price forward. The contract price will remain the same until the transaction is completed forward.

The hedger using forward contracts to reduce the risk by setting a price that will be paid or received for a certain amount. In a forward strategy also known as a forward contract option where in forward strategy option will provide insurance facilities to the value of transactions performed. Forward contract option provides security for investors if it happens to the price decrease and also provides the opportunity for investors to take profits when the price increase happens to be more profitable. One difference between forward contract and forward contract option is in the forward contract option the initial cost is required to be paid in the beginning and in the forward contract it is not necessary.

### 2.3.5 Money Market Hedging or the Financial Hedge

Money market is where companies or individuals can borrow or lend money for a short period of time. A short period of time referred to here is from only one night only (from 3 pm until 3 pm the following day) until the longest 12 months. Each time period in the money market has its own interest rates and in this example the period that will be given for will loaning and borrowing is for a period of three months. It is important to note that the value of the interest shown in the money market, for a different period, is interest for a period of one year. So the amount of interest from loans and deposits does not represent the values that will be received or paid within three months. To get the correct value for the amount of interest during the three months, the value of the interest shown shall be divided by four. So the value of the interest shown to be 8% is  $8\% : 4 = 2\%$  and the interest savings with interest of 5% for three months is  $5\% : 4 = 1.25\%$ .

Money market hedge (Harvey, 2004) works for borrowing or lending transactions in foreign currency exchange rates to secure the currency in the country of origin on the overseas transaction. For example, the USA company export goods to Indonesia for \$ 1 billion with maturities of three months. Data can be seen in Table 2.1.

**Table 2.1** Spot exchange rate IDR/USD January 2007

IDR/USD spot	8,960.57 – 9,000.90
3 months forward	9,173.38 – 9,214.67

Source: [www.oanda.com](http://www.oanda.com)

**Table 2.2** Three-month money market interest rates January 2007

	Deposit	Loan
IDR	9.5 %	12%
USD	7%	9%

Source: [www.bi.co.id](http://www.bi.co.id)

Money market hedge uses matching principles or adjusting principles. Indonesian companies have receivables of \$ 1 billion maturing in 3 months. They do hedging risk for the dollar will be received by making a debt of \$ 1 billion with the same period of time. This debt created by borrowing dollars for three months. The company will borrow as much as \$ x for three months, with interest (9%: 4) 2.25%, so the amount become \$x, which is \$1 billion plus interest for 3 months. The amount of the loan can be calculated as follows:

$$\$X \times (1 + 0.0225) = \$1 \text{ billion}$$

$$\$X = \$1 \text{ billion} \div 1.0225 = \$977,995.11$$

Money market hedge process can be described as follows:

1. Company doing the billing to the consumer as much as \$ 1 billion period with a debt of 3 months.
2. Simultaneously make loans to the bank of \$ 977995.11 for three months.
3. After receiving the loan directly with the company's switch to the currency rupiah is \$ 977,995.11 x Rp9,000.90 = Rp.8,802,476,149.59. The amount of Rp.8,802,476,149.59 describe the revenues from these transactions export.
4. After three months they will receive a payment of \$1 billion from importers, and used to pay for their loans from the bank of \$1 billion after it has been accumulated with the interest cost.

In the example above, using the money market hedge, the supplier will get the money of Rp.8,802,476,149.59 now. Alternatively, companies can use the forward market Hedge by selling \$1 billion with a forward three months to get \$1 billion x Rp.9,214.67 which is Rp.9,214,670,000.00 that will be accepted three months later.

### 2.3.6 Futures Contract

Futures contract is the agreement between two parties to buy or sell a certain number in a specified time in the future (Hull p.6). Futures contracts traded in the exchange where the time, place and the price is already set. Futures transactions do not require both parties to meet and know each other. This transaction provides security to both parties to the transaction that has been agreed as guaranteed by the organized exchange. A holder of a future contract has the obligation to buy or sell and is not similar to a contract option that gives the right to buy or sell or cancel.

When compared between futures contracts and forward contracts, then we can see some of the characteristics of the futures contract clearer, those are:

1. The size of the futures contract has been standardized. For example a size of 1 U.S. dollars contract is \$100,000.00, the transaction can only be done in multiples of \$100,000.00. In other currency be faced with a different amount of Pounds Sterling £ 25,000 per contract, yen ¥ 1,000,000 yen per contract and euro € 50,000 per contract. Unlike forward contract where the amount per contract is in accordance with needs.
2. Time of maturity on the futures contract has been determined on the third Wednesday of January, March, April, June, July, September and December. Meanwhile, on the forward contracts in accordance with agreements freely made.
3. Not all types of currency that can be used on the futures contract (see Table 2.3), while in the forward currency contracts uses freely in accordance with the agreement between both parties.
4. Location trade on the futures contract has been determined that is in organized exchange which among them are Chicago Board of Trade (CBOT) in Chicago, Chicago Mercantile Exchange (CME) in Chicago and the Singapore International Monetary Exchange (SIMEX) in Singapore. And for forward contract, the trading can occur through the telecommunication facilities that do not require a special place for the transaction.

5. Prices in future contracts formed from the open auction process. Meanwhile, in a forward contract price formed from the process of bid and offer among the perpetrators of the market.
6. In the futures contract, contract buyers must deposit a number of assets as collateral, which functions as a performance bond. The amount of insurance is the initial margin plus the maintenance margin. Initial margin is calculated each day and what if less than 70%, the buyers must add accordance with the initial margin required. Unlike forward contracts the collateral is not required, depending on the trust of bank to its customers.
7. In the futures contract, the buyer is required to pay some commission on organized exchange. The Commission is a one-time pay to make the purchase and sale transaction (roundtrip). In a forward contract on the commission because there is no advantage gained from the difference between bid and offer prices at the time of transaction.
8. In the futures market, the trading hours only organized at the business hours of organized exchange, although some now open for 24 hours. In the forward market the trading is 24 hours through the global telecommunications network.
9. Actors in the futures market did not know each other because the actors interact with the exchange. Meanwhile, in a forward transaction of both parties, each directly related to the agreement.

**Table 2.3** List of currencies used in the futures contract

Negara	Code	Currency
Australia	AUD	Dollar
Brazil	BRL	Real
Britain	GBP	Pounds
Canada	CND	Dollar
China	CNY	Renminbi
Czech	CZK	Koruna
Europe	EUR	Euro
Hungary	HUF	Forint
Israel	ILS	Shekel
Japan	JPY	Yen
Korea	KRW	Won
Mexico	MXN	Peso
New Zealand	NZD	Dollar
Norwegian	NOK	Krone
Poland	PLN	Zloty
Russia	RUB	Ruble
South Africa	ZAR	Rand
Switzerland	CHF	Frank

Source: [www.cme.com](http://www.cme.com)

The above explanation can be seen that forward transactions more flexible compared with future transaction although the cost of futures contracts on the futures relatively cheaper compared with a forward contract.

### 2.3.7 Options

In the option transaction, contract holders have the right to buy or sell a certain number on the price that has been determined before the contract matures. Option transaction is traded in the OTC market and exchanges. There are two types of options, namely a call option and put option. Call option gives the holder the right to buy a certain number at a certain time and a certain price. And a put option

gives the holder the right to sell the contract at the time and a certain price. Price on contract is known as the option strike price or exercise price, where this contract can be traded without using the option rights. Based on the time period, the option is divided into two types: American options and European options. In American options, transactions can be done every time before the expiration date of the option. In European options contract, the transaction only can be done on the maturity date. Option that generally used in the market is the American exchange options.

**Table 2.4** Price option on ABC, 30 July 2007, the stock price = \$30.83

Strike Price (\$)	Buy or Call (\$)			Sell or Put (\$)		
	August	September	December	August	September	December
30.00	1.40	1.75	2.55	0.60	1.00	1.65
32.50	0.35	0.60	1.30	2.00	2.35	3.00

For example, the option strike price is \$30.00 and \$32.50 with a time limit in August 2007, September 2007 and December 2007. Option in August shall mature on 21 August 2007, option in September shall mature on 19 September 2007 and December 2007 option on the maturity date of 18 December 2007. ABC's share price on the closing date of 29 July 2007 is \$30.83.

When a shareholder give a commands to their broker to buy a call option in December 2007 on ABC shares with the strike price \$32.50, the broker will delivered it to the trader. Trader will search for other trader who wants to sell shares on the call contract ABC in December with the strike price \$32.50. Assumptions, the price for this transaction is \$1.30, according to the price on the table 2.4. And because in the United States one contract option worth for 100 shares, the investors must prepare cost of \$130 to be paid to the exchange through broker.

In the example above, the investor will be charged a premium of \$130 to buy 100 ABC shares with the price of \$32.50 per share. The counterpart will receive as much as \$130 as agreement to sell ABC shares for \$32.50 per share if investors use their rights to buy the shares. If investor does not use their rights to



buy ABC shares directly then investors will have losses for \$130. This condition can be calculated that investor can make profit if the price of ABC shares raised more than \$1.30 per sheet shares.

The second example is when investors buy a put option 1 September 2007 with the \$30.00 strike price. The cost of these transactions was 100 shares multiplied by \$1 is \$100. Same with the call option, if investors do not use their rights directly, the investor will have losses of \$100. In this case the investor can profit if the price of ABC shares down more than \$1 per sheet shares.

**Table 2.5** Option types

	Call	Put
Buyer	Has right to buy shares	Has right to sell shares
Seller	Has obligation to sell shares if buyer right is used.	Has obligation to buy shares if seller right is used.

Source: Hull (2006)

## CHAPTER III

### RESEARCH METHODOLOGY

Firstly, author will describe a general picture of PT. PAL and its activities related to foreign currency transactions. Secondly, it will also be described the method of research conducted in analysing the seven hedging strategies.

#### **3.1 Company Profile of PT. PAL**

PT. PAL was founded on 21 December 1994 in Jakarta. This company is involving in the field of general trading and services, emphasizing its business on the supply to local and international companies. PT. PAL has branch office in Singapore that specially helps in transactions with overseas companies. In supporting its position as a business partner of State Owned Enterprises (SOE), PT. PAL has received a certificate as a member of the chamber of commerce and industry in Indonesia and members of ARPENA (national energy and mining company Association) in the province of Jakarta since 2003 until now. Until 31 December 2007 assets of PT. PAL has reached Rp.13,568,517,091.70 with average sales of Rp.1.5 billion per month.

Business of PT. PAL is related with innovation and development of energy and the environment with a vision to improve the quality of energy supply and increasing the quality of the environment to various countries. Several other businesses in PT. PAL is the provision of chemicals, materials, electricity, instruments and services that are needed in the scope of the industry. One of the energy developments created by PT. PAL was the energy supply for the secondary industry in terms of saving energy (electricity). By using a combination of advanced technology from various countries, PT. PAL has been created its products that are more competitive with other companies with the same line of business. Some of them are as the findings of it own research on laboratory and has obtained a patent. Generally, the products marketed are not common products for the people because the products have the unique characteristics in accordance with the consumer's request. Some raw materials used for production are

generally imported from several countries such as Germany, United States, and Singapore.

Area business of PT. PAL includes domestic and international customers with major suppliers from Asia and from countries in Asia, America and Europe. Transactions are conducted with consumers generally using the currency with the USD and suppliers using the local currency of each country suppliers. The total number of sales in foreign currencies during the year 2007 is 12.9 billion rupiahs.

Some partners are a consumer company PT. PAL are:

- 1) Bakrie Pipe Industries,
- 2) PT. Amoco Mitsui PTA Indonesia,
- 3) PT. Newmont Minahasa Raya and Nusa Tenggara,
- 4) Santa Fe Energy Resources LTD.,
- 5) Japan Co. Altia., LT., (Certificated Agency)
- 6) PT. PLN in Jakarta and Tangerang areas.
- 7) Perum Peruri,
- 8) Lion Mentari Airlines,
- 9) Exxon Monil Oil Indonesia Inc.
- 10) Kaltim Pacific Ammonia,
- 11) Pama Persada Nusantara Kalimantan and Sumatra,
- 12) Inco Soroako, and
- 13) Thies Contractor Kalimantan.

In facing the business risk of foreign currency fluctuations, PT. PAL did not make hedging strategies that involve third parties. Strategy conducted by PT. PAL is to balance the transaction in the sales and purchases in the same currency, known as hedging strategies in the netting or use assets that are stored in the form of foreign currency (or savings deposits). And for the transactions where balance transaction can not be done, PT. PAL shall fully accept the risk.

### 3.2 Research Study

This research is used to analyse the functions of the hedging strategy in facing fluctuations in foreign currency exchange rates on company that have transactions in foreign currencies by using analytical methods based on historical data. Strategies that will be used is a do nothing, natural hedging, Swaps, forward hedging market, money market hedging, futures contract, and options. In analysing each strategy, each will be tested by implemented each strategy on foreign exchange transactions. Analysis presented with a comparison between each strategy and is described descriptively.

Transaction data used for the implementation of hedging strategy is PT. PAL transaction data, which uses foreign currency taken from the average transaction that occurred from 1 January 2007 to 31 December 2007. The exchange rate used was historical data on the average exchange rate for the currency USD/IDR and SGD/IDR at the spot market closing. The interest rate data was taken from the Bank of Indonesia interest rate (SBI), the Singapore Interbank Offered Rate (SIBOR) and the London Interbank Offer Rate (LIBOR). In choosing the best strategy, the factors that will be measured in the strategy is the capability to reduce the risk of foreign exchange fluctuations, costs occurs and the strategies that give value added to the company.

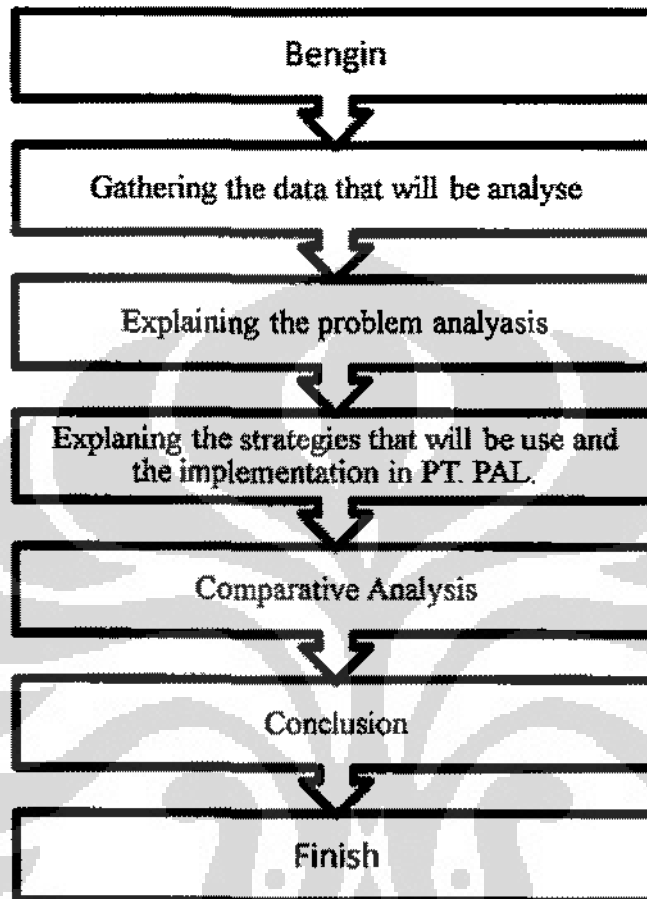
The following will be explained in more detail about the steps undertaken in conducting this analysis.

1. First step is to gather data to be analysed. Data that used are transactions data of PT. PAL, the foreign exchange rate during 2007 and rates of bank loan and saving interest. This research used three types of currencies which are Indonesia rupiah, U.S. dollar and Singapore dollar which mostly used in PT. PAL foreign transactions.
2. The second step in this analysis is explaining the problem of the foreign currency movement risk faced by company that have foreign currency transactions where in this analysis used the exposure PT. PAL foreign transactions. The problem explanation will show the transaction process to give a clear picture of the causes of the risks emerge and explain in detail the loss risk to the company from each transaction conducted.

3. The third step is explaining the strategies used to protect the company from the risk of fluctuations in exchange rates of foreign currencies. Strategies that will be used are do nothing, natural hedging or netting, swaps, forward hedging market, money market hedging, futures contracts and options. In making the explanation, each strategy is implemented in foreign currency transactions of buying and selling at PT. PAL.
4. In the fourth step, the results from each implementation will be compared to get the best strategy on several types of transactions. The strategy chosen will be seen from its functions in protecting the risks, costs that are required and which obtain more value for the company. For the assessment of the costs, it shall be firstly measured from the maximum cost it spent for the protection of the fluctuation risk. Secondly, it will be measured from the minimum cost spent in protecting the value of foreign currency exchange. And for added value that can be generated for the company, it will be measured from the flexibility of each strategy, ease of use for buyers in implementing the strategy. In determining the risk protection, can be assessed with certainty the exchange rate with a maximum limit of cost spent if the movement of foreign currency harms the company.
5. The last step is to make conclusions based on the results obtained. Here, it will described the role of hedging strategies to reduce the volatility risk of foreign currency exchange rates with exposure transactions on PT. PAL and choose the best hedging strategy for PT. PAL transaction type to get maximum results.

Sistematically, the reseacrh methodology can be seen in the flow chart below.

**Figure 3.1** Research flow chart



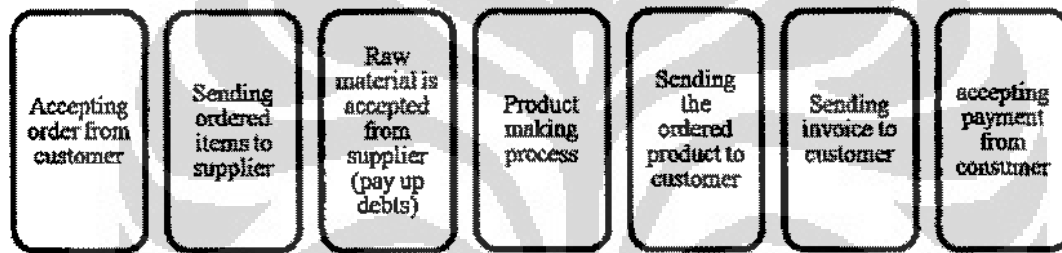
## CHAPTER IV

### ANALYSIS AND DISCUSSION

#### 4.1 Risk Foreign Currency Transactions in PT. PAL

First author will explain about the conditions in the transaction of PT. PAL, which generally occur from the start to get the purchase order (PO) until the completion of the payments from consumers.

**Figure 4.1** General descriptions PT. PAL. transaction flow



Source: PT. PAL transaction data

1. Receiving orders from consumer on the first day.
2. An order of raw materials to supplier and make payment by 20% as a down payment. Payment is on the same day with at the time of receiving the order.
3. Raw materials will be accepted after 30 days through the delivery of the sea and the remaining 80% of the debt is paid off.
4. After the raw materials are received, it will be a process to make the products that will take 14 days. Products that have been finished are sent directly to consumer. Up to this point means that the products is completed and delivered on the 44<sup>th</sup> day.
5. Billing will be sent 1 day after the goods have been received by consumer.

6. Payment of consumer shall be conducted after the 30-day bill (invoice) is received. This means that the payment from the consumer will be accepted on the 75<sup>th</sup> day.

In explanation of the above we can see that there was a risk of transactions that can occur on time which takes an average of 75 days until the transaction is completed. Under this, it will be explained more about the risk of foreign exchange that occurs in such transactions.

**Table 4.1 Overview of cash movement in PT. PAL foreign transaction**

Date	Note	SGD/IDR	SGD/USD	USD/IDR	Acceptance	Spending
29/07/07	PO - 20% acceptance	6.031,16	0,6598	9.140,77	\$9.323,62	-
28/08/07	Settlement and pay up	6.185,62	0,6582	9.398,50	-	SS41.561,69
11/09/07	product making	6.181,66	0,6560	9.422,70	-	Rp.77.175.000,00
12/09/07	Invoice sending	6.188,23	0,6570	9.418,80	-	-
12/10/07	80% acceptance	6.191,70	0,6830	9.064,90	\$37.294,46	-
					\$46.618,08	

Source: PT. PAL transaction cash flow data



Table 4.2 Result of foreign exchange transaction in PT. PAL

(in rupiah)

Prediction		
Acceptance	Capital	Profit
426.125.147,12	327.840.174,27	98.284.972,85
Realization		
Acceptance	Capital	Profit
423.295.616,14	334.259.792,19	89.035.823,95
	Profit/Loss	(9.249.148,90)

Source: financial data of PT. PAL, processed.

### 1. Transactions PT. PAL with Consumers

Starting from the receipt of orders from customers in Indonesia on 29 July 2007 with total sales \$ 46,561.69, PT. PAL to make agreements with the request payment of 20% as advance where repayment can be completed at the latest 30 days after the invoice is received. Payment of consumers conducted in the currency USD where PT. PAL see that the value of the USD currency is international currency which strong that more secure in facing the risk of fluctuations in foreign exchange.

For revenue by 20%, or \$9,323.62 as an advance when the exchange rate of IDR / USD is Rp.9,140.77, so the total value of the rupiah is Rp.85,225,029.42, PT. PAL did not have the risk of fluctuation because the transaction completed on the same day with the start date of the contract (with the assumption that there was no currency fluctuations on the same day).

While for the remaining receivables are billed on 12 September 2007 with the term of 30 days for \$37,294.46 (80%) which shall be received within 75 days after receiving the order on 12 October 2007, PT. PAL faced the risk of fluctuations in foreign exchange. Where the movement occurred when the USD appreciated against the IDR, the benefits of this transaction will be increased. This is because the exchange

rate of USD received from consumers will become more valuable. For example, on 29 July 2007 exchange rate of IDR/USD is Rp.9,140.77 with the transaction, the value of the transaction will be received is  $\$37,294.46 \times \text{Rp.}9,140.77 = \text{Rp.}340,900,117.70$ . When the exchange rate of IDR/USD Rp.9,300.00 become stronger, the transaction value to be received by PT. PAL to  $\$37,294.46 \times \text{Rp.}9,300.00 = \text{Rp.}346,838,515.20$ , which means PT. PAL gain from foreign exchange transactions of  $\text{Rp.}346,838,515.20 - \text{Rp.}340,900,117.70 = \text{Rp.}5,938,397.50$ .

But this also happens when the USD currency weakened against the IDR as the actual transaction occurred at PT. PAL is the exchange rate IDR/USD into Rp.9.064, 90 on the maturity date of 12 October 2007. This causes the reception PT. PAL to  $\$37,294.46 \times \text{Rp.}9,064.90 = \text{Rp.}338,070,586.71$ , which means PT. PAL experience the loss of  $\text{Rp.}340,900,117.70 - \text{Rp.}338,070,586.71 = \text{Rp.}2,829,530.98$  from foreign currency transactions.

## 2. Transactions PT. PAL with Suppliers

On 29 July 2007, PT. PAL directly ordered goods to Singapore with a settlement period of 30 days since the goods is delivered. Duration of shipping from Singapore to Jakarta takes 30 days via sea routes, which means that PT. PAL will make repayment on the same day at the raw materials acceptance. PT. PAL to make payments using SGD currency means that the suppliers directly move the risk of fluctuations in foreign exchange to the buyers.

In general, PT. PAL purchase foreign currency used to settle debts to suppliers at maturity, which means the payment of PT. PAL is extremely vulnerable to the risk of movement of foreign exchange. When the currency appreciating SGD compared with the IDR, PT. PAL will have losses caused by the high prices of currencies that must be purchased.

On 29 July 2007, where the exchange rate IDR/SGD is Rp.6,031.16, which means the estimation of the payment will be made by PT. PAL is  $\text{S\$}41,561.69 \times \text{Rp.}6,031.16 = \text{Rp.}250,665,174.27$ . At maturity, on 28 August 2007 the IDR exchange rate weakened against SGD into

Rp.6.191,70, which means that the price of SGD must be purchased by PT. PAL is the more expensive  $S\$41,561.69 \times Rp.6,191.70 = Rp.257,084,792.19$ . This causes PT. PAL experience the loss of  $Rp.257,084,792.19 - Rp.250,665,174.27 = Rp.6,419,617.92$  from foreign currency transactions.

As before this is also otherwise occur when the SGD currency weakened against IDR, PT. PAL will gain from foreign exchange transactions. For example, if at maturity the exchange rate of SGD / IDR become Rp.5,800.00, the amount of rupiah, which must be paid by PT. PAL to buy  $S\$41,561.69$  is  $S\$41,561.69 \times Rp.5,800.00 = Rp.241,057,775.08$ . This will provide benefits to PT. PAL is  $Rp.250,665,174.27 - Rp.241,057,775.08 = Rp.9,607,399.19$ , from foreign currency transactions.

At the time of receipt of raw materials, then directly is to be processed into the product that requires a process term for 14 days. On 11 September 2007, products have been completed and are sent directly to the consumers who received the product on the same day. Cost for making a product paid on the same day in the currency of rupiah amounting Rp.77,175,000.00. In this process, PT. PAL did not have the risk of fluctuations in exchange rates because the currency of rupiah.

#### **4.2 Hedging Techniques to Manage Foreign Exchange Transaction Risk**

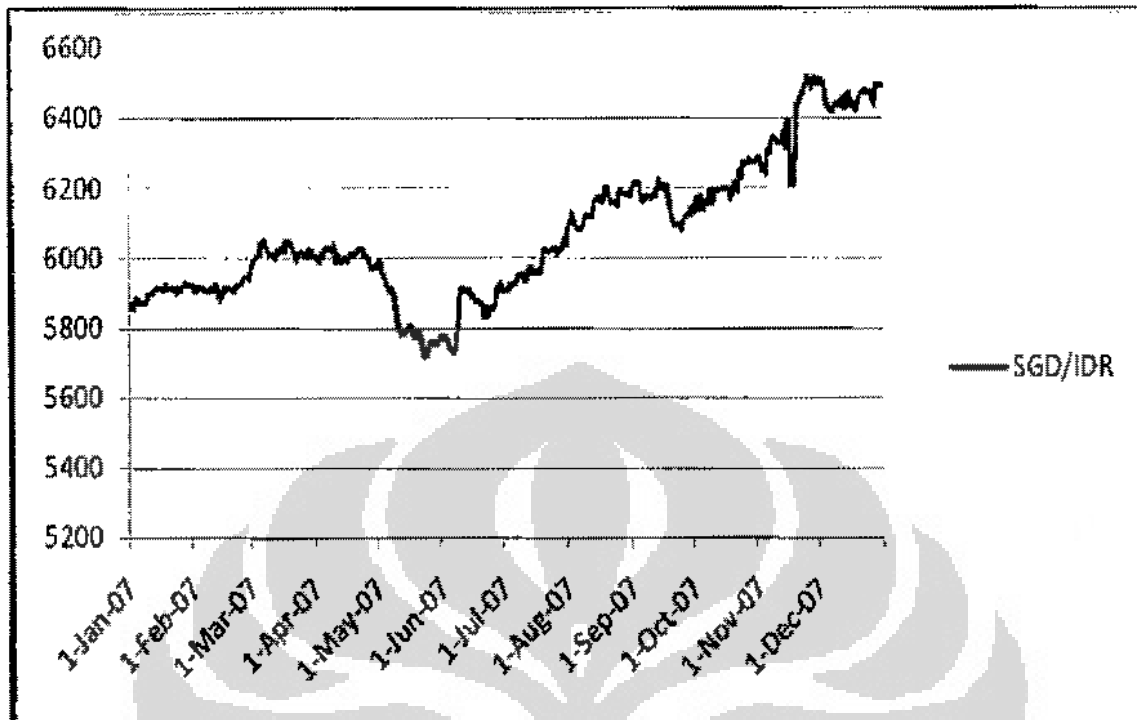
After the explanation of the risks that occur above, the next stage will analyse and discuss the implementation of the strategy in hedging transactions to reduce the risk of foreign exchange. The hedging strategy which will be analysed is do nothing, natural hedging or netting, swaps, forward hedging market, money market hedging, futures contracts and options contracts. Analysis of this strategy will be described in terms of risk and cost in its implementation to tackle the risk of transactions in foreign exchange. The elected strategy is to be the best assessed from the efforts to reduce the risk and cost spent. Firstly shall be described strategies that will be done from the company's internal, do nothing and natural hedging strategies after that it is outlined 5 others from the external side.

#### 4.2.1 Do Nothing

When PT. PAL using this strategy, PT. PAL did not do anything to overcome the risk of fluctuations in foreign exchange risk and accept all that will happen. This is not a good strategy for PT. PAL with the market that continues to change, especially in this era where the global market has started to open. For this discussion will use one of transaction PT. PAL, which occurred in July 2007 where market conditions at that time are:

1. Seen from 3 months backward May 2007 to July 2007 (see graph 4.1) IDR exchange rate against SGD (supplier currency) are not stable moving. In general, in May 2007 IDR move significantly stronger against the SGD and in June and July rupiah generally continued to weaken against SGD. When IRD conditions return stronger against the SGD, it will be profitable for PT. PAL as the buyers because the amount of rupiah needed for purchasing SGD will decrease. But the conditions that occur outside the prediction at the time of the transaction dated on 24 July 2007, where the exchange rate of SGD / IDR is Rp.6,031.16, the value of IDR was in general continue to move from July until the maturity date, 24 August 2007, where the exchange rate of SGD / IDR is Rp.6,185,62. This condition means that the cost must be paid for the purchase of SGD would increase to Rp.6,419,617.92, and will directly reduce company profits

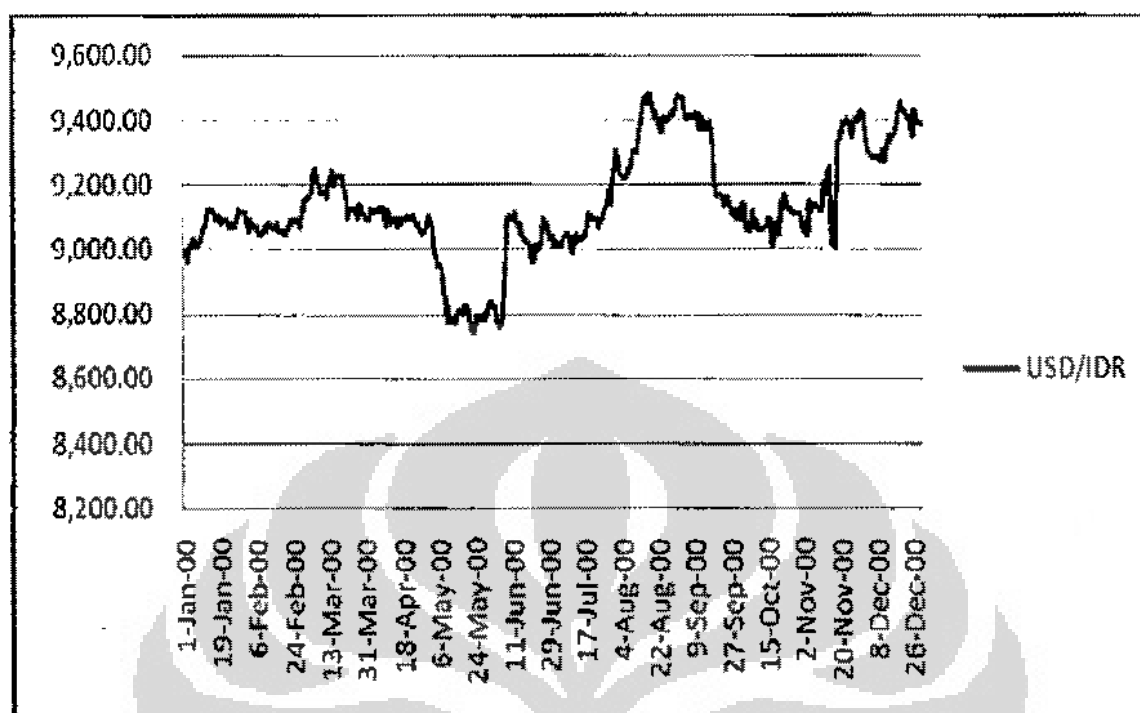
Graph 4.1 SGD/IDR movements in 2007



Source: [www.oanda.com](http://www.oanda.com)

- On the exchange rate USD/IDR from May 2007 to July 2007 (see graph 4.2) there was significant movement of the IDR getting stronger in May and eventually return to weaken in June 2007. In July 2007 IDR exchange rate moving weakens against the USD. From this condition PT. PAL made speculation action with expectation the exchange rate continues to weaken which will increase profits from foreign currency transactions. Exactly PT. PAL should secure the foreign exchange rate because of the significant movements from Rp.8,748.91 to the highest Rp.9,132.42 in the past three months. When the exchange rate appreciating IDR against USD, it will harm PT. PAL, although that occurred at maturity the exchange rate USD/IDR was not moving too far from the initial transaction Rp.9,140.77 to Rp.9,064.90 at the end of the transaction because of the occurrence of rupiah strengthening against the USD significantly in mid-September 2007. This strengthening cause losses to PT. PAL was Rp.2,829,530.98.

Graph 4.2 USD/IDR movements in year 2007



source: [www.oanda.com](http://www.oanda.com)

From the above explanation, that with this strategy is risky because it can cause significant losses with the movement of the exchange rate that is not stable. This is not true, because of the elements speculation that did not limit the risk of loss from the transaction exchange foreign currency. This strategy is also dangerous with a large number of transactions where the movement of exchange rates that small can cause big losses to the company. These techniques will become effective when the movement of exchange rates considered stable or there was no a significant movement.

#### 4.2.2 Natural Hedging / Netting

Natural hedging strategy is highly effective and efficient strategy which is directly balance spending and revenue in foreign currency and did not require a fee. Companies can make adjustment from the transaction with the same currency, the same amount and maturity date. This strategy is rarely found because of the possibility for transactions that have a maturity date of the same is very small. For example, PT. PAL to make import of U.S. \$ 50,000.00 with the term of payment

30 days and at the same time make sales of U.S. \$ 80,000.00 with the term of payment 30 days. The amount can be done with natural hedging strategy is U.S. \$ 50,000.00 and the remaining U.S. \$ 30,000.00 hedging can be done using other hedging strategies. The strategy is to maintain transaction of PT. PAL is U.S. \$ 50,000.00 from the risk of fluctuations in foreign exchange without spending cost.

#### 4.2.3 Swaps

By using the swap strategy, each company will receive payment in the currency of their own, which means the risk of uncertainty, foreign exchange received will be protected. In the transaction, this strategy involves the bank as a guarantor where the bank will get a commission in a small number of yields in general about 3 or 4 basis points (0.03% or 0.04%) on plain vanilla interest rate swap and 0.2 % on the currency swap. pairs from each transaction. Examples in the plain vanilla interest rate swap where PT. PAL has a business partner with PT. X with a transaction value of \$45,000.00 for 75 days.

**Table 4.3** Interest rate flow of PT. PAL transaction in 75 days interest rate swap with payment in fixed interest rate 5.50% and receive in LIBOR or floating rate

Date	1 Month LIBOR	Receive floating rate	Payment fixed rate	Total
29-Jul-07	5.3195%			
29-Aug-07	5.3200%	0.4433%	-0.4583%	-0.0150%
29-Sep-07	5.7200%	0.4433%	-0.4583%	-0.0150%
12-Oct-07		0.2066%	-0.1986%	0.0079%

Source: LIBOR data, processed

**Table 4.4** Cash flow of PT. PAL transaction, \$45,000.00 for 75 days interest rate swap with payment in fixed interest rate 5.50% and received in floating rate  
(in thousand)

Date	1 Month LIBOR	Receive floating rate	Payment fixed rate	Total
29-Jul-07	5.3195%			
29-Aug-07	5.3200%	0.19948	(0.20625)	(0.00677)
29-Sep-07	5.7200%	0.19950	(0.20625)	(0.00675)
12-Oct-07		45.21450	(45.20625)	0.00825

Source: LIBOR data, processed

From Table 4.3 and Table 4.4 it is described flow from the payment of PT. PAL with a fixed interest rate of 5.50% on the initial transaction, interest rate of LIBOR is lower than the fixed interest rate at -0.0150%, which means PT. PAL to pay \$6.77 to PT. X, from the total payment of \$206.25 reduced with revenue by \$199.48. In August 2007 PT. PAL still pay \$6.75 from total revenue from \$199.50 and \$206 due to LIBOR interest rate is still lower than the fixed interest rate. At the end of the period of PT. PAL receive and pay \$45,000.00 from principal transactions and received from the total interest because of increased interest rates of LIBOR above fixed interest rate at \$ 8.25.

**Table 4.5** Benefit or loss from plain vanilla interest rate swap transaction

	Interest rate relatively increase against preliminary expectation	Interest rate relatively decrease against preliminary expectation
Acceptance with fixed interest rate	Swap become out the money	Swap become in the money
Acceptance with floating interest rate	Swap become in the money	Swap become out the money

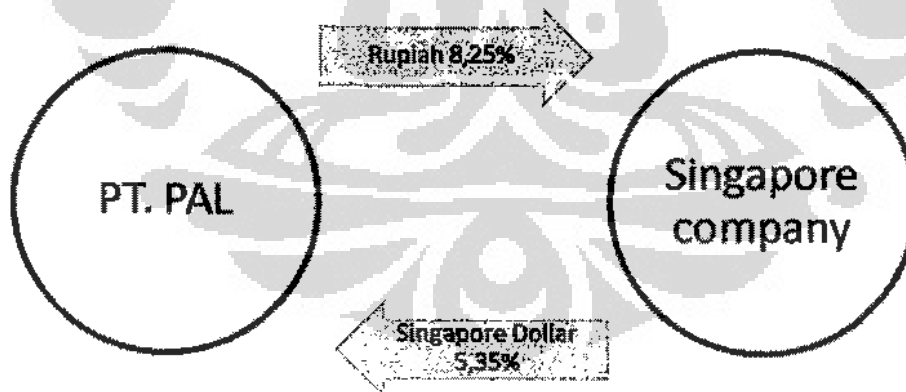
Source: Sunaryo (2007)



Gains or losses from this strategy can be seen from the two sides of PT. PAL and PT. X as described in Table 4.5 where the recipient of the interest rate will remain at loss when interest rates LIBOR relatively above fixed interest and will profit when LIBOR interest rates fall relatively below fixed interest rates. This condition is applicable otherwise to the recipient with the interest rate float. When interest rates LIBOR relatively above fixed interest rates, swap become profit /in the money and will be loss/ out the money when at an interest rate of LIBOR is relatively lower than fixed interest rate. Explanation of the above, we can see that the cash flow movement in every transaction is the receipt of float interest and payment of fixed interest to protect the value of receipts and payments in foreign currency values.

Examples of the implementation of currency swap PT. PAL with the company's Singapore business partners in the transaction of selling / buying with the term of payment 30 days in which PT. PAL will make a payment with SGD currency of S\$ 41,561.69, and receive payment in the currency IDR at Rp.250,665,174. 27 (the exchange rate of SGD/IDR Rp.6,031.20).

Figure 4.2 Currency Swap



Source: SBI and SIBOR data

**Table 4.6** PT. PAL cash flow using currency swap

Date	IDR Cash flow	SGD Cash flow
29-Jul-07	(250,665,174.27)	41,561.69
28-Aug-07	252,388,497.34	(41,746.99)

Source: SBI and SIBOR data, processed

Table 4.6 describes the initial transaction where each party will make a payment (outset) with the local currency respectively. And at the maturity each party will get back with their own currency of payment with compensation of interest as approved. When it is in the long period of time, in each period before the due time, each party will pay interest to the other party. For example if in 3 years and the annual interest payment is applied, on the first and second year, both parties will pay interest to their respective parties in accordance with the agreement and at the end of the period will pay principal and interest to their respective parties.

Which needs to be noticed on the swap strategy is the long of time that is needed to maturity because there will be a calculation of the amount of interest that should be paid to each party opponent as the compensation that we also know as the interest rate swap in which each company will pay a number of with a particular interest is applied, such as floating rate or fix the rate in accordance with the agreement of both parties.

This strategy is quite effective when there is transaction with outside parties with mutual or two ways transactions. But because PT. PAL generally conducts with one way transaction, namely to sell or buy, then to apply this strategy of PT. PAL, or the bank must obtain the appropriate opponent in the market.

#### 4.2.4 Forward Market Hedging or Forward Contract

By using the forward market hedging or forward contracts, the company will obtain the certainty of foreign exchange in the future in accordance with a specified time. The risk of movement of foreign exchange will be protected during the period. This strategy is an effective strategy that can be used at the time and place that flexible with a relatively small cost.

**Table 4.7** Forward rate transactions PT. PAL in July 2007

Period	IDR Rate	USD Rate	SGD Rate	F. IDR/USD	F. IDR/SGD
30 days	0.6875%	-	0.2033%	-	6,060.30
75 days	1.7188%	1.1083%	-	9,195.96	-

Source: SBI and LIBOR data, processed

**Table 4.8** Results of PT. PAL transaction by using forward contract

Prediction		
Acceptance	Capital	Profit
426,125,147.12	327,840,174.27	98,284,972.85
Realization using forward contract		
Acceptance	Capital	Profit
428,183,247.64	329,051,348.77	99,131,898.87
	Profit / Loss	846,926.02

Source: financial data PT. PAL, processed

Table 4.7 describes the forward price of USD for 75 days is Rp9,195.96/USD and SGD during the 30 days is Rp.6,060,.30/SGD accordance with the time period required in transactions of PT. PAL. Forward prices obtained using equation (2.1).

From the forward prices can be calculated the forward strategy influence to the value of PT. PAL foreign exchange transactions. The results of the transaction calculation of PT PAL in Table 4.8 show that by using a forward strategy will provide benefits to companies of Rp.846,926.02 and the most

important is to protect the transactions from exchange rate fluctuations that will happen. This strategy is useful for companies that have the purpose to protect the transaction from losses that caused by currency movements. Although this strategy with the company can also gain because of currency movements when moving to the positive direction for the company as we see in the transaction PT. PAL above.

In implementing this strategy the bank generally does not charge to the company because the bank will get commission from the difference between bid and ask prices.

#### 4.2.5 Money Market Hedging

In the money market strategies, hedging instrument used are interest debt s and interest on deposits of financial institutions that is used to protect the value of foreign currency exchange. In the implementation the company will receive the payment to be due in the future now with the value deducted with interest rates and debt interest savings. For example, PT. PAL has trade receivables on 29 July 2007 at \$ 37,294.46, which will mature in 75 days. PT. PAL will make a debt of \$ x, where the number of \$x and interest will be paid on maturity is the amount of the payment will be accepted, which is such USD 37,294.46.

Table 4.9 The interest rate IDR and USD

Currency	Deposit Interest	Debt Interest
IDR	8.25%	13.82%
USD	5.32%	8.25%

Source: SBI and LIBOR data

$$\text{\$}x \times (1 + ((75/360) \times 8.25\%)) = \text{\$}37,294.46$$

$$\text{\$}x = \text{\$}37,294.46 / 1.0171875$$

$$\text{\$}x = \text{\$}36,664.29$$

From the above calculation, the amount will be accepted now by PT. PAL is \$36,664.29 which at maturity the loan debt will be paid equal to the amount that

will be received 75 days ahead which is \$37,294.46. Here can be calculated that the direct losses bear by PT. PAL is  $\$37,294.46 - \$36,664.29 = \$630.17$  or Rp.5,760,216.42 (calculated from exchange rate at the beginning transaction - 9,140.77). On the other by obtaining cash in the current time, PT. PAL can increase profits as put in the forward market for over 75 days, use in the company capital with estimation of 15% income margin or deposited as the most secure allocation with 8.25% interest rate ( $8.25\% \times (75/360) \times (\$36,664.29 \times \text{Rp}9,140.77) = \text{Rp}5,760,216.03$ ) with the calculation of 75 days period.

Another example, PT. PAL has a trade debt of S\$ 41,561.69, which mature in 30 days. PT. PAL will make deposits of S\$ x, where the number of S\$ x, and the interest received will be used to pay debts of S\$ 41,561.69 at maturity. And for the costs required by PT. PAL for S\$ x will be obtained from the spot price of SGD/IDR at the time is Rp.6,031.16/S\$.

**Table 4.10 IDR and SGD Interest Rate**

Currency	Deposit Interest	Debt Interest
IDR	8.25%	13.82%
SGD	2.44%	5.35%

Source: SBI and SIBOR data

$$\text{S\$}x \times (1 + ((30/360) \times 2.44\%)) = \text{S\$}41,561.69$$

$$\text{S\$}x = \text{S\$}41,561.69 / 1.0244$$

$$\text{S\$}x = \text{S\$}41,477.35$$

The calculation of the above explains that to pay the debt of PT. PAL of S\$41,561.69, PT. PAL must prepare S\$41,477.35 or Rp.250,156,534.23 to be deposited for 30 days with 2.44% interest per year. So for the preparation of these funds PT. PAL will be burdened by the cost of the interest calculation with 5.35% with calculation  $\text{S\$}41,477.35 \times ((30/360) \times 5.35\%)$  is S\$ 184.92 or Rp1,143,843.88 (calculation of the rate at the time payment is Rp6,185.62).

From the above explanation concluded that the risk of exchange rate movement of foreign currency is protected. In the first instance, although the

exchange rate move up or down it will not affect the profit as calculated by the interest cost difference between the value of debts and spot rate. Payments to the bank (the borrower) will be done by receiving payments from consumers at maturity with the same currency (SGD) and PT. PAL does not face the risk occurred when the fluctuation of foreign exchange. In the second instance, the payment of receivables will be due has been prepared by deposits in the period with the same value payment equal to the value of core deposits plus interest received.

#### 4.2.6 Future Contracts

The concept of the futures contract has many similarities with forward contracts only on the forward contract more flexible. Functions of the futures also have similarities with the forward. By using futures, the transaction will be limited by the size of the transaction, the maturity date, place and transaction costs. The first example, PT. PAL transaction with consumers where payment of \$37,294.46 will be accepted 75 days later, then to use futures, PT. PAL must buy one of transaction of \$50,000.00 because one transaction in the futures contract is multiplier of \$50,000.00. For the time, the transaction must be in accordance with the rules on the futures in the third week of each month in which PT. PAL is not always consistent with the time. By using this strategy, the cost need to be spent is cost of maintenance margin is a cost that is issued for exchange party to maintain the level of initial margin to be stable not below 75%. In the transaction \$50,000.00 is \$100 or Rp.914,077.00 (100 X IDR/USD Rp.9,140.77). PT. PAL also faces the possibility of adding to the initial margin when necessary. With the exchange rate Rp.9,195.96, the revenue of PT. PAL increased 55.19 per dollar with total Rp.2,058,281.25.

The second example is PT. PAL debt with amount S\$41,561.69 in 30 days grace period. Period of time that may be taken is 30 days in accordance with the maturing debt. With this transaction, the cost is cost of maintenance margin is a cost that is spent to the exchange party to maintain the level of initial margin to stable not below 75%. At S\$75,000.00 transaction is \$100 or Rp.914,077.00 (100 X IDR/USD Rp.9,140.77). PT. PAL also faces the possibility of adding to the

initial margin when necessary. With the level of exchange rate futures Rp.6,060.30 therefore PT. PAL spending increase to Rp.29.14 per the Singapore dollar which is Rp.1,211,107.51.

**Table 4.11 Results of PT. PAL transaction by using futures contract**

Prediction		
Acceptance	Capital	Profit
426,125,147.12	327,840,174.27	98,284,972.85
Realization using futures contract		
Acceptance	Capital	Profit
427,269,351.37	329,965,358.78	97,303,992.59
	Profit / Loss	(980,980.26)

The results of the transaction calculation of PT PAL in Table 4.9 show that by using a futures strategy it will cost Rp.846,926.02 to the companies but the purpose in protect the transactions from exchange rate fluctuations is still happen.

#### 4.2.7 Options

Option strategy is a strategy that is now widely used. This strategy provides flexibility to the buyers of to protect or to make speculation (for profit). Basically, the function of the option contract is to provide hedging in the future without a time bound for its execution of the contract before maturity. With the flexibility can be seen that the contract option has a higher cost compared with other contracts in which the buyer must pay a premium option that is high enough. The option premium is calculated from the value of a put or a call transaction set at the time.

Examples of the USD transaction implementation on PT. PAL,, where the trade receivables equal to \$37,294.46 will be paid within 75 days from the date of 29 July 2007. So that fluctuations in foreign exchange can be protected, then PT. PAL makes a put option whereby PT. PAL to ensure the exchange rate IDR/USD shall not harm the transaction.

**Table 4.12** Details of the calculation of put option price

Domestic Currency	Rupiah
Foreign Currency	US Dollar
Call/Put (on Foreign)	Put Option
Exercise Type	American
Trade Date	29/07/2007
Expiry Date	12/10/2007
Spot FX Rate	9.140,77
Strike	9.200,00
Domestic Int. Rate	8,25%
Foreign Int. Rate	5,32%
Volatility	0.5165%
Forward Rate	9.192,45
Option Price	59,23

Source: SBI, LIBOR data and [www.oanda.com](http://www.oanda.com), processed

Volatility is calculated based on exchange rate movements during the last 6 months can be found in Appendix 1. With transactions of \$37,294.46 the amount of premium that must be paid in advance is  $\$37,294.46 \times \text{Rp}59.23 = \text{Rp}2,208,950.87$ . So by using the contract option, PT. PAL will limit the risk of loss from fluctuations in exchange rates, when the rupiah appreciated (the amount of rupiah, which is received become less), as much as the value of the option premium. And simultaneously also give possibility to received benefit from exchange rate fluctuations when the rupiah weakened (the amount of rupiah received will be higher) to the value that is unlimited. To benefit from the weakening of the rupiah, PT. PAL did not make the execution of the contract (cancel), where the exchange rate IDR/USD should exceed  $\text{Rp}9,259.23$  ( $9,200.00$  strike price +  $59.23$  option price) in order to cover the cost of the premium charged in the initial period of the transaction.



**Table 4.13** Description of PT. PAL transaction with put option contract

Transaction Value (\$)	Strike (Rp.)	Total (Rp.)	Premium price (Rp.)	Spot Rate (Rp.)	Total (Rp.)	Result (Rp.)
37,294.46	9,200.00	343,109,032.00	(2,208,950.87)	9,064.90	338,070,550.45	(2,208,950.87)
37,294.46	9,200.00	343,109,032.00	(2,208,950.87)	9,200.00	343,109,032.00	(2,208,950.87)
37,294.46	9,200.00	343,109,032.00	(2,208,950.87)	9,259.23	345,317,982.87	-
37,294.46	9,200.00	343,109,032.00	(2,208,950.87)	9,300.00	346,838,478.00	1,520,495.13

Source: PT data, PAL, SBI, LIBOR and www.oanda.com, processed

From the Table 4.13 we can see if the exchange rate IDR/USD to weaken at maturity into Rp.9,300.00 above the value of BEP. PT. PAL will take advantage of Rp.1,520,495.13, which is calculated from the difference between profit of exchange rates is deducted with the cost of the premium. And when the exchange rate of IDR/USD Rp.9,064.90 become stronger (such as the actual event), the loss of PT. PAL will be limited to the cost of the option premium Rp.2,208,950.87. Where if it is calculated normally (without option), PAL will suffer losses Rp.2,829,530.68 from the difference between the value of the initial spot with a value at maturity and also will not close the possibility of greater loss when the value of the rupiah appreciates. On the other strategies also have the weakness when the rupiah movement appreciates not more than Rp.9,081.54 (where the amount of losses equal to the cost of the premium), the value obtained without doing anything will be more profitable although it has risks that are not protected.

**Table 4.14** Description of PT. PAL transaction without put option contract

Transaction value (\$)	Preliminary Spot (Rp.)	Total (Rp.)	Premium price	Spot in Due Time (Rp.)	Total (Rp.)	Result (Rp.)
37,294,46	9,140,77	340,900,081,13	-	9,064,90	338,070,550,45	(2,829,530,68)
37,294,46	9,140,77	340,900,081,13	-	9,081,54	338,691,130,27	(2,208,950,87)

Source: PT. PAL data and www.oanda.com, processed

The next examples in transaction SGD where PT. PAL has a trade debt to suppliers of S\$ 41,561.69 paid within 30 days from the date of 29 July 2007. To protect the risk of fluctuation, PT. PAL do a call option to make sure that the buy value of SGD do not harm the transaction.

**Table 4.15** Details of call option price calculation

Domestic Currency	IDR
Foreign Currency	SGD
Call/Put (on Foreign)	Call Option
Exercise Type	American
Trade Date	29/07/2007
Expiry Date	28/08/2007
Spot FX Rate	6.031,16
Strike	6.000,00
Domestic Int. Rate	8,25%
Foreign Int. Rate	2,44%
Volatility	0,5018%
Forward Rate	6.060,30
Option Price	58,19

Source: SBI, SIBOR data and [www.oanda.com](http://www.oanda.com), processed

Volatility is calculated based on exchange rate movements during the last 6 months can be found in Appendix 2. With transactions of S\$41,561.69 the amount of premium that must be paid in advance is S\$41,561.69 X Rp.58.19 = Rp.2,418,474.74. So by using the call option contract, PT. PAL will limit the risk of loss from fluctuations in exchange rates, when the rupiah weakened (the amount of rupiah required is more), is the value of the option premium. And simultaneously also likely to benefit from exchange rate fluctuations, when the rupiah stronger (the amount of rupiah needed is less) until the value is limited. To benefit from the appreciation in the rupiah exchange IDR/SGD should be less than Rp.5,941.81 (6,000.00 strike price - 58.19 option price) in order to cover the cost of the premium charged in the initial period of the transaction.

**Table 4.16** Description of PT. PAL transaction with call option contract

Transaction Value (\$\$)	Strike (Rp.)	Total (Rp.)	Premium price (Rp.)	Spot Rate (Rp.)	Total (Rp.)	Hasil (Rp.)
41,561.69	6,000.00	249,370,140.00	(2,418,474.74)	5,900.00	245,213,971.00	1,737,694.26
41,561.69	6,000.00	249,370,140.00	(2,418,474.74)	5,941.81	246,951,665.26	-
41,561.69	6,000.00	249,370,140.00	(2,418,474.74)	6,000.00	249,370,140.00	(2,418,474.74)
41,561.69	6,000.00	249,370,140.00	(2,418,474.74)	6,185.62	257,084,820.90	(2,418,474.74)

Source: PT. PAL, SBI, SIBOR data and www.oanda.com, processed

From the Table 4.16 it is explained that when the exchange rate IDR/SGD appreciation at maturity into Rp.5,900,00 under the BEP. PT. PAL will take advantage of Rp.1,737,694.26, which is calculated from the difference between exchanges rates is deducted with the cost of the premium. And when the exchange rate of IDR/SGD is weakened into Rp. 6,185.62 (such as the actual event), the loss of PT. PAL will be limited to the cost of the option premium Rp. 2,418,474.74. Where is calculated normally (without option) PT. PAL will suffer losses Rp. 10,133,155,.64 from the difference between the value of the initial spot with a value at maturity and also will not close the possibility of greater loss when the value of the rupiah even getting weaker. On the other side of the strategy also has the gap if movement of rupiah is not weakened more than Rp. 6,089.35 (where the amount of losses equal to the cost of the premium), the value obtained without doing anything will be more profitable. This is also the risk that is not protected.

**Table 4.17** Description of PT. PAL transaction without call option contract

Transaction Value (\$\$)	Preliminary Spot (Rp.)	Total (Rp.)	Premium price	Spot in Due Time (Rp.)	Total (Rp.)	Result (Rp.)
41.561,69	6.031,16	250.665.202,26	-	6.089,35	253.083.677,00	(2.418.474,74)
41.561,69	6.031,16	250.665.202,26	-	6.185,62	257.084.820,90	(6.419.618,64)

Source: PT. PAL data and www.oanda.com, processed

### 4.3 Analysis Comparison Hedging Strategies

From the explanation of each strategy which is implemented on foreign currency transactions of PT. PAL we can see in Table 4:18, where each strategy has a different function. Unless unhedged strategy, the strategy has other functions to protect the exchange rate at a certain position. Below are described the results of a comparison of the implementation of the strategy in hedging transactions in foreign currency of PT. PAL, which we can see in Table 4.19.

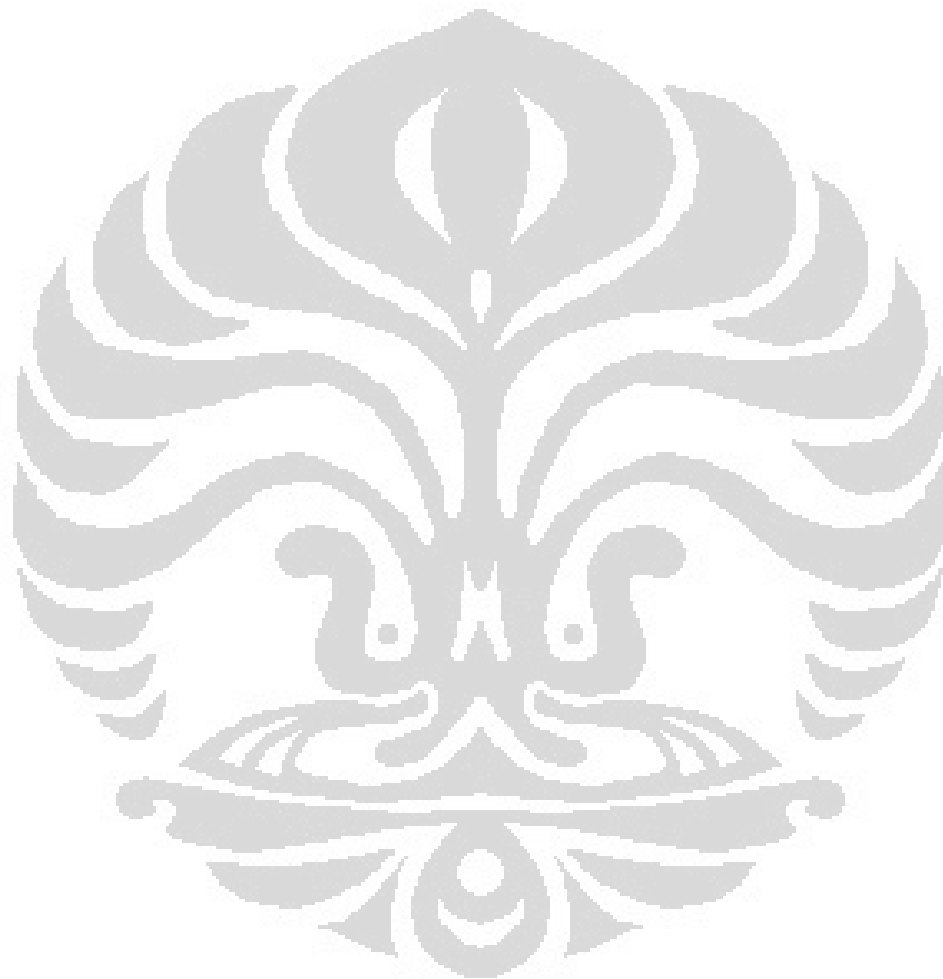


Table 4.18 Details of hedging strategies comparison

	Unhedged	Netting	Swap	Forward	Money Market	Future	Option
Exchange rate risk	Not protected	Protected	Protected	Protected	Protected	Protected	Protected
Interest rate risk	Not protected	Not protected	Protected	Not protected	Not protected	Not protected	Not protected
Size of transaction	Free	Same with opponent	Free	Free	Free	Certain	Free
Time of Transaction	Free	Same with opponent	Free	Free	Free	Certain	Free
Guarantee	None	None	None	None	None	Exist	None
Guarantor	None	None	Exist	Exist	Exist	Exist	Exist
Commission	None	None	Exist	None	None	Exist	Exist
Opponent	None	None	Direct	Direct	Bank	Clearing house	Bank
Location of Transaction	None	None	OTC	OTC	Bank	Organized exchange	OTC
Price	None	None	Premium	Bid / Ask	Interest rate	Open outcry process	Premium
Transaction Execution	Free	Free	Due time	Due time	Due time	Due time	Due To Transaction Period
Profit Possibility	Unlimited	None	Limited	Limited	Limited	Limited	Unlimited
Loss Possibility	Unlimited	None	Limited	Limited	Limited	Limited	Limited
Transaction	-	2 ways (sell & buy) internal	2 ways (sell & buy) external	1 way (sell/buy) external	1 way (sell/buy) external	1 way (sell/buy) external	1 way (sell/buy) external

Source: Hull (2006), processed

**Table 4.19 Details of results using hedging strategies in PT. PAL**

	Unhedged	Forward	Money Market	Future	Option
Transaction					
Value in USD	37,294.46	37,294.46	37,294.46	37,294.46	37,294.46
Transaction					
Value in USD	(2,829,530.98)	2,058,100.52	-	1,144,204.25	(2,208,950.87)
Transaction					
Value in SGD	41,561.69	41,561.69	41,561.69	41,561.69	41,561.69
Transaction					
Value in SGD	(6,419,617.92)	(1,211,174.50)	(1,143,843.88)	(2,125,184.51)	(2,418,474.74)
Total	(9,249,148.90)	846,926.02	(1,143,843.88)	(980,980.26)	(4,627,425.61)

Source: financial data of PT. PAL, processed

The first strategy is not doing anything, LTD. PAL experienced losses from the transaction to receive payment in USD because of Rp. 2,829,530.98 because the rupiah appreciated against the USD and debt payment transactions in SGD Rp. 6,419,617.92 because of weakening of the rupiah against SGD. Of course, the first strategy is not profitable for PT. PAL and the lack of protection against the risk of fluctuations in foreign currency. This strategy contains a lot of speculation on the movement of foreign currency exchange that is not in accordance with the business of PT. PAL. If compares with other strategies, the strategy did not have action in protecting against foreign exchange transactions fluctuation risk.

In the second strategy is to do with the netting. This strategy is very simple and effective not only for all appropriate currency transactions and on the amount equal, so the company is still must protect against the value that is not protected. In PT. PAL average receiving payments from consumers is in the form of USD, but will purchase raw materials using the currency that varied according to where PT. PAL to do the import. If compared with other hedging strategies, this strategy is a strategy that is the cheapest and easiest because it did not require the cost of this strategy to be carried out by internal of company.

The third strategy is the swap strategy. This strategy has the function of the effective practice of protecting the value of the cash to be accepted because it is already in the form of domestic currency that is not necessary to be exchanged again. Cost is also required from the relatively small difference between interest rates on the value of the transaction will be protected, and that the administration is very little value to the institutions that assist in the transaction. If compared with other strategies swap strategy is a strategy that has the certainty of income without the exchange rate changes. As with the forward, futures and options strategies, exchange rate changes on the market can affect the calculation of income from the company views at the end of the period. On the other side, the swap strategy also requires the two positions that have the same value of the transaction with the appropriate currency. This condition is one of the constraints in swap strategy because on where between the two companies that has same transaction condition is not many.

The fourth strategy is forward contract. Forward contract is a strategy that is used quite often because it can be implemented anytime directly and has the value protected because it is guaranteed by the exchange. Forward strategy also in accordance with the conditions of PT. PAL businesses where does not provide the opportunities for speculative practices. From the implementation of the forward strategy in PT. PAL on the transaction receipt of payment in USD, PT. PAL had benefit of Rp.2,058,100.52 because the forward has a value higher than the value of the exchange rate USD / IDR, which occurred at the end of the period and debt payment transactions SGD, PT. PAL experienced loss of Rp.1,211,174.50, which is caused by exchange rate weakening of SGD/IDR. Nevertheless with the forward strategy, the benefits of the transaction which has been calculated at the beginning of the transaction did not change without being influenced by foreign exchange movement. Compared with the other strategies, forward strategy is the strategy with the certainty of value and with relatively low cost.

The fifth strategy is money market hedging. In this strategy, the company use market instruments to protect the risk of exchange rates. Basically, this strategy use present value calculation or today value in receiving payment or debt

payment. The implementation of this strategy will generate cost, although if the company can manage the cash which is acquired now with a higher return level, the use of this strategy will be the right thing to do. When you see the results of the transactions USD, PT. PAL did not experience losses due to the value of USD debt for interest equal to the value of deposits IDR. And the transactions SGD, PT. PAL requires the cost of interest Rp.1,143,843.88 due to interest debt from the value needed to be deposited for 30 days. Compared with other strategies, money market hedging has more value addition to protect the exchange rate risk also get the opportunity to provide capital to be used. This strategy is better used when the difference between the values of debt interest rates not too high. Strategy money market is very vulnerable to interest rate movements when used to floating interest rates.

The sixth strategy is future. Principles of a future strategy is same with forward in the future where in the future requires some conditions that are required as collateral in accordance with the transaction value, time to transaction and that certain things that distinguish the risk of cost which is characteristic of futures if it is compared with other strategies are futures have daily calculation to maintain the initial margin when market conditions are not advantageous position of the futures contract. This can maintain the position of the company if the situation until the point that significant. On the other side, when the movement towards benefiting the company, then it becomes an advantages for the company. Daily counting will also add jobs to the company because of the adjustment works. Implantation results from the transaction for payment USD in 75 days, causing gain to PT. PAL Rp.1,144,204.25 which calculated from the administration costs and the currency rate level difference. SGD debt transaction, PT. PAL must bear the cost of Rp.2,125,184.51 calculated from the cost of administration and the currency rate level difference.

The seventh strategy is the option. The Option strategy is the most expensive compared with other strategies. This is because buyers have the right or freedom to choose between cancelling the agreement or not. And for the type of American option, buyers have the freedom to use their rights at any time during

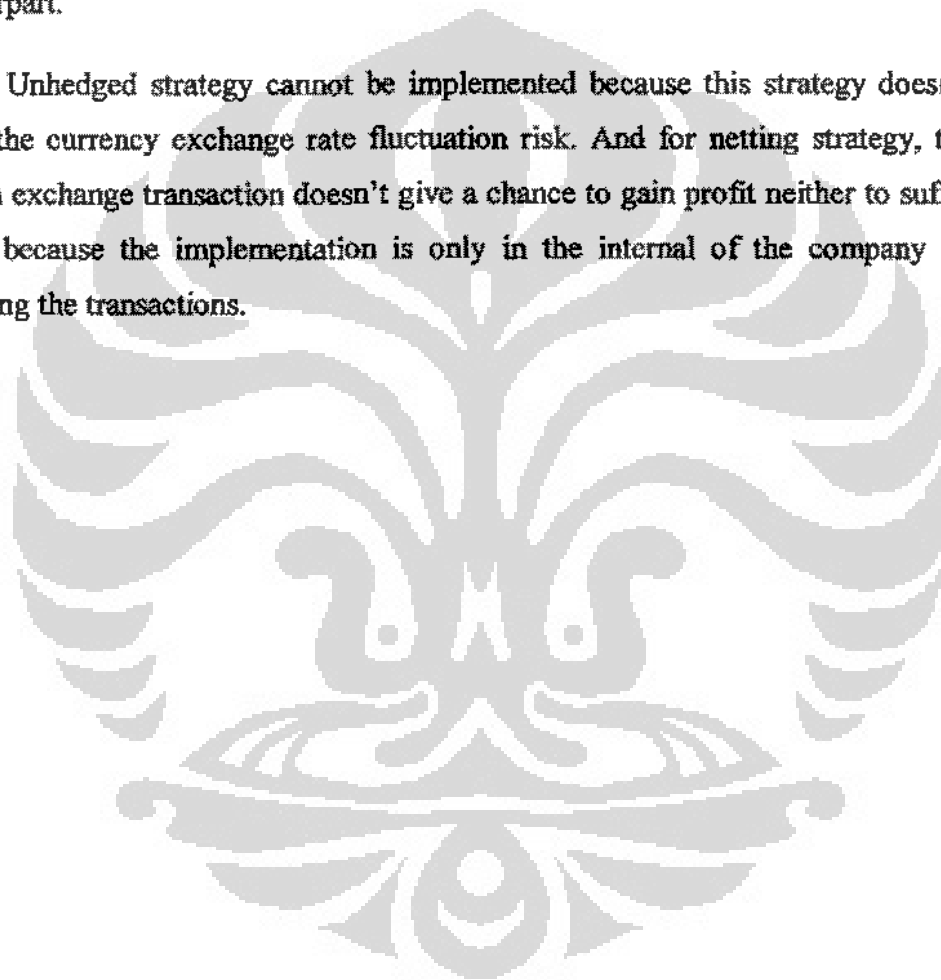


the contract which have not yet due. With this feature it suitable for buyers who want to make the practice of speculation for gain. From the example in the implementation of PT. PAL seen that the cost of USD transaction is Rp.2,208,950.87, and on the transaction SGD is Rp.2,418,474.74, which is calculated from both the price of the option. In this transaction PT. PAL suffers losses the maximum cost when PT. PAL does not use its right, the losses will be even higher although compared with other strategy cost of this strategy is still higher. When viewed from fluctuations in exchange rates that occurred during the period the transaction, PT. PAL has the opportunity to benefit by using the right option. As we look at the value of USD on 19-20 August and 2 September 2007 in which the rupiah weakening in the value of the highest Rp.9,478.67, which can provide significant benefits in such transactions as Rp.8,183,896.30. In the transaction SGD transactions during the period, the exchange rate of SGD/IDR never under Rp.6,000.00, which is the maximum value of the loss. This condition causes PT. PAL will always suffer maximum loss. Nevertheless, this strategy has performed its function to limit the loss caused by the movement of foreign currency. Viewed from the value of the transaction and the type of business of PT. PAL this strategy is not a right choice.

In Table 4.20 below, is explain and conclude from the hedging strategies comparison to see when the strategies are right to be use to give maximize company value and when the strategy is not right to be use because it can cause losses to the company. When the implementation base on the rate of currency exchange, it can be conclude that forward contract, future contract and option have some similarity which are when the movement of exchange rate of domestic currency against foreign currency is getting weaker, company use buying position because the beginning value is cheaper than when it due date. And vice versa when the domestic currency relatively move stronger to foreign currency, company can use sell position because the beginning value is higher than when it due date time. The differences between these three strategies are the transaction procedures and the transaction cost.

When the implementation base on interest rate, in swap strategy, if fixed interest rate smaller than risk free rate (LIBOR/SIBOR), than company will received benefit form the difference rate because company will pay with the fixed rate that cheaper than the received risk free rate from the counterpart. And the other way if fixed interest rate bigger than risk free rate (LIBOR/SIBOR), than company will suffer losses form the difference rate because company will pay with the higher fixed rate and the received lower risk free rate from the counterpart.

Unhedged strategy cannot be implemented because this strategy doesn't cover the currency exchange rate fluctuation risk. And for netting strategy, the foreign exchange transaction doesn't give a chance to gain profit neither to suffer losses because the implementation is only in the internal of the company by matching the transactions.



**Table 4.20** Details of profit/loss position in each hedging strategies

Strategy	Risk	Hedging cost	Maximum Loss Result	Maximum Profit Result
Unhedged	Not protected	0	Unlimited	Unlimited
Netting	Protected	0	0	0
Swap	Protected	0.03% (commission fee)	Interest fix rate > LIBOR	Interest fix rate < LIBOR
Forward (buy)	Protected	0	Forward rate > Spot rate	Forward rate < Spot rate
Forward (sell)	Protected	0	Forward rate < Spot rate	Forward rate > Spot rate
Money Market (buy)	Protected	0	Foreign exchange debt interest	0
Money Market (sell)	Protected	0	Foreign exchange debt interest > Deposit interest	Foreign exchange debt interest < Deposit interest / Capital margin
Future (buy)	Protected	Initial Margin	Forward rate > Spot rate	Forward rate < Spot rate
Future (sell)	Protected	Initial Margin	Forward rate < Spot rate	Forward rate > Spot rate
Option (buy)	Protected	Option Premium	Strike Price > Spot rate	Strike Price < Spot rate
Option (sell)	Protected	Option Premium	Strike Price < Spot rate	Strike Price > Spot rate

Source: Lumby (2007), processed

## CHAPTER V CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusion

Based on the analysis, it concluded that:

1. Hedging strategy plays an important role in protecting the fluctuation risk of foreign currency exchange rates for PT. PAL. Without the use of hedging strategies or do nothing then the overseas transaction of PT. PAL will receive a direct risk of losses caused by fluctuations in foreign exchange. From this analysis PT. PAL suffered losses of Rp.2,829,530.98 in USD transaction, and Rp.6,419,617.92 in SGD transaction. By using hedging strategy, the loss or the cost of which was endured by PT. PAL will be limited to a certain limit which therefore can limit the infinite amount of losses which may occur.

In netting strategy, the fluctuation risk of foreign exchange rate was covered because the receivable and payment are in the same value and maturity date. This strategy need no transaction cost and its less used by PT.PAL because there are only few transaction which have the same criterias.

In swap strategy, the value of foreign currency exchange also protected because each company will receive payment in their own currency at the maturity date. This strategy will be balanced if the level of interest rates between the respective parties is on the same level.

In forward contract strategy, the value of foreign currency exchange rate shall be protected with a maximum value of loss which will suffer loss only in value of the bid/ask. In the USD transactions PT. PAL above, PT. PAL is benefiting from forward because the value is higher than the spot rate is  $(Rp\ 9,195.96 - Rp\ 9,140.77) \times \$37,294.46 = Rp.\ 2,058,100.52$ . In a transaction to buy SGD PT. PAL above, PT. PAL experienced a loss because the forward value is higher than the spot with a rate that is  $Rp\ 6,060.30 - Rp\ 6,031.16) \times S\$ 41,561.69 = Rp\ 1,211,174.50$ . In the second

transaction above can be seen the function in a forward contract to provide certainty against the value of foreign exchange.

In money market hedging strategy, the value of foreign currency exchange is protected because the money will be received or paid in the future is done on the same day at the beginning of the transaction. The company will suffer losses up to the limit of the interest of foreign loans reduced by interest rates on domestic deposits at selling position and will suffer losses from interest rate loan from the principal which will be purchased with the calculation of the *time value of money*. In the transactions over USD, PT. PAL is not experienced losses because of the interest rate of foreign loans with interest rates of deposits in the country at the same level. And the purchase transaction over the SGD, PT. PAL suffers losses of Rp 1,143,843.88, which is caused by a foreign loan interest done in early transaction.

Future strategy essentially is the same as forward strategy in protect the value of forward exchange rate. The differences among them are the size of the transaction, the time of maturity, transaction locations, procedures and costs. In the implementation of USD selling transaction, PT. PAL experienced loss of around Rp.2,248,172.72 which is caused by the cost of the deposit, administration, maintenance margin and the cost of time value of money. In SGD buying transaction, PT. PAL suffered losses of Rp.2,385,655.23, which is caused by deposit and administration of maintenance margins.

At option strategy, buyer is given the right to conduct the transaction on the particular level of exchange rate that makes the uncertainties of the exchange rate covered. In USD transactions, PT. PAL suffers losses of Rp. 2,208,950.87 which is the premium cost as the maximum limit of losses because of the spot rate at maturity is cheaper than the strike price. In SGD buying transactions, PT. PAL suffered losses of Rp. 2,418,474.74 which is caused by the spot rate at maturity is greater than the strike price. When viewed on the option strategy, PT. PAL is clearly seen protected from

losses because the greater the value that occurs in the market if done without a contract option will be far greater.

2. With PT. PAL foreign transaction type which has average 30 days of payable and average 75 days of receivable, forward contract was been the best strategy to be used. Compared to the other strategy, forward contract have give the highest value for the company where in USD transaction PT. PAL has gain profit Rp.2,058,100.52 that was caused by IDR has weakened to USD in the settlement time which made the receivable become higher and in SGD transaction PT. PAL has loss Rp.1,211,174.50 that was caused by IDR has weakened to SGD in the settlement date which made the payment become higher to suppliers.

## **5.2 Recommendation**

From the above conclusions, the recommendations that submitted by the author is:

- For PT. PAL with the transaction characteristics in foreign exchange transactions to receive payment and to make payment with the term which is long enough, it is advisable to conduct a forward contract to protect the value of the transaction from losses due to fluctuations of foreign exchange.

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## GLOSSARY OF TERMS

- American-Style Option** An option contract that may be exercised at any time between the date of purchase and the expiration date. Most exchange-traded options are American-style.
- Arbitrage** A trading strategy that takes advantage to two or more securities being mispriced relative to each other.
- Bid** The price that a buyer is willing to pay to purchase a given currency and sell another at a particular time.
- Bid/Ask Spread** The difference between the prevailing bid and ask price. Generally, option contracts that are more liquid tend to have a tighter Bid/Ask Spread while option contracts that are less liquid and are thinly traded tend to have a wider Bid/Ask Spread.
- Call Options** Options which gives the holder the right to buy the underlying security at a specified price for a certain, fixed period of time.
- CBOE** The Chicago Board Options Exchange; the first national exchange to trade listed stock options.
- Central Bank** A Government institution in control of the nation's monetary policy and the printing of that nation's currency.
- Close** Period at the end of a trading day where final prices for the day are calculated.
- Currency** means money denominated in the lawful currency of a country.
- Currency Swap** An exchange of equal initial principal amounts of two currencies at the spot exchange rate. Over the term of the agreement, the counterparties exchange fixed or floating rate interest payments in their swapped currencies. At maturity, the principal amount is reswapped at a predetermined exchange rate so that the parties end up with their original currencies.
- Derivatives** A type of financial instruments whose value is derived from the price of some underlying asset (e.g. an interest level or stock market index). They are designed to help companies "hedge" (protect themselves against the risk of price changes) or as speculative investments from which great profits can be made. The rapid growth in derivatives trading has played a major part in the growing volatility of the global financial system.
- Discount Rate** The interest a private bank pays for a loan from the US Federal Reserve System.
- European Style Option** An option that can be exercised only on the expiration date. If investors do not want to wait until the expiration date, they can close the position with an offsetting trade.

**Exchange rates** The price of one country's currency relative to another (e.g. \$1 Cdn = \$.67 US.) Exchange rates can be managed according to three basic systems - floating, fixed or pegged.

**Fixed Exchange Rate** Official rate set by monetary authorities for one or more currencies

**Floating Exchange Rates** Floating exchange rates refer to the value of a currency as decided by supply and demand.

**Foreign Exchange** The exchange of foreign currency. On the foreign exchange market, foreign currency is bought and sold for immediate (spot) or forward delivery

**Forward Contract** A forward contract fixes the exchange rate for future delivery at a date to be agreed by both participants. A deposit (or a minimum margin) is usually required in forward transactions. For example, if I want to lock in today's rate to buy \$10,000 USD at 1.5820 Canadian for the next 4 months, I will have the ability to purchase up to \$10,000 USD at this rate.

**Futures Contracts** A contract that obligates the holder to buy or sell an asset at a predetermined delivery price during a specified future time period. The contract is market to market daily.

**Hedging** A hedging transaction is a purchase or sale of a financial product, having as its purpose the elimination of loss arising from price fluctuations. With regards to currency transactions it would protect one against fluctuations in the foreign exchange rate. (see Forward Contract)

**Interbank Rates** The Foreign Exchange rates at which large international banks quote other large international banks.

**Interest Rate Swap** The exchange between counterparties of a fixed interest rate and a floating interest rate in a single currency.

**LIBOR** ("London Interbank Offer Rate") The rate of interest offered on deposits from other banks in euro currency markets.

**Initial Margin** The cash required from a futures traders at the time of trade.

**Money Markets** Refers to financial investments that are generally under one year in duration and generally only open to banks and other financial institutions

**Offer** The price, or rate, that a willing seller is prepared to sell at.

**Option** The right to buy or sell specific securities at a specified price within a specified time. A put gives the holder the right to sell the stock, a call the right to buy the stock.

**Option Premium** The price of an option-the sum of money that buyer pays and the option seller receives for the rights granted by the option.

**Over-the-Counter Market** A market where traders deal by phone. The traders are usually financial institutions, corporations, and fund managers.

**Point (or Pip)** The term used in currency market to represent the smallest incremental move an exchange rate can make. It is one one-hundredth of a percent  
For example, when a currency moves from 1.5720 to 1.5725 it has moved 5 points.

**Premium** The total price of an option contract is made up of the sum of the intrinsic value and the time value premium. Even though most people refer to the price of an option contract as the "Premium", it is actually an inaccurate expression. The Premium of an option contract is the part of the price that is not intrinsic.

**Puts Option** An option that gives the right to the buyer to deliver to the seller the underlying instrument at a predetermined price within a specified period. The seller of a put option has the obligation to accept delivery if the option is exercised.

**Settlement** (1) The final stage of a transaction, actual physical exchange of one currency for another (2) is the process by which available funds have been instructed by a client of Cambridge for transfer via wire, draft or deposit to a multi-currency account and a designated receiver of such funds.

**Spot** Generally describes a transaction which will come to settlement in two days.

**Spot Price** The current market price for a spot transaction.

**Spot Rate** The current rate for a spot transaction.

**Spread** The difference between the bid and offer prices. This is usually used for Interbank trade of currencies.

**Strike Price** The price at which the buyer of a call can purchase the stock during the life of the option or the price at which the buyer of a put can sell the stock during the life of the option.

**Swap** An agreement to exchange cash flows in the future according to a prearranged formula.

**Translation Risk** An accounting or financial reporting risk. It is the risk that the consolidated earnings of a company will be negatively impacted due to the method of accounting for foreign operations.

**US Prime Rate** The rate at which US banks will lend to their prime corporate customers

**Volatility** A measure of price fluctuations. The standard deviation of a price series is commonly used to measure price volatility.

## ATTACHMENT

## Volatility of foreign exchange rate

No.	Date	USD	Value Changes		Volatility	SGD	Value Changes		Volatility
1	29-Jan-07	9,115.77	(8.32)	-0.09%	0.0001%	5926.26	(5.56)	(0.00)	0.0001%
2	30-Jan-07	9,115.77	-	0.00%	0.0000%	5921.83	(4.43)	-0.07%	0.0001%
3	31-Jan-07	9,115.77	-	0.00%	0.0000%	5926.18	4.35	0.07%	0.0000%
4	1-Feb-07	9,090.91	(24.86)	-0.27%	0.0008%	5915.21	(10.97)	-0.19%	0.0004%
5	2-Feb-07	9,057.97	(32.94)	-0.36%	0.0013%	5902.53	(12.68)	-0.21%	0.0003%
6	3-Feb-07	9,090.91	32.94	0.36%	0.0013%	5922.03	19.50	0.33%	0.0010%
7	4-Feb-07	9,074.41	(16.50)	-0.18%	0.0003%	5912.9	(9.13)	-0.15%	0.0003%
8	5-Feb-07	9,074.41	-	0.00%	0.0000%	5912.82	(0.08)	0.00%	0.0000%
9	6-Feb-07	9,074.41	-	0.00%	0.0000%	5914.4	1.58	0.03%	0.0000%
10	7-Feb-07	9,057.97	(16.44)	-0.18%	0.0003%	5908.77	(5.63)	-0.10%	0.0001%
11	8-Feb-07	9,041.59	(16.38)	-0.18%	0.0003%	5901.74	(7.03)	-0.12%	0.0002%
12	9-Feb-07	9,049.77	8.18	0.09%	0.0001%	5904.27	2.53	0.04%	0.0000%
13	10-Feb-07	9,066.18	16.41	0.18%	0.0003%	5915.09	10.82	0.18%	0.0003%
14	11-Feb-07	9,057.97	(8.21)	-0.09%	0.0001%	5909.39	(5.70)	-0.10%	0.0001%
15	12-Feb-07	9,082.65	24.68	0.27%	0.0007%	5925.53	16.14	0.27%	0.0007%
16	13-Feb-07	9,074.41	(8.24)	-0.09%	0.0001%	5907.67	(17.86)	-0.30%	0.0010%
17	14-Feb-07	9,066.18	(8.23)	-0.09%	0.0001%	5882.2	(25.47)	-0.43%	0.0019%
18	15-Feb-07	9,066.18	-	0.00%	0.0000%	5894.37	12.17	0.21%	0.0004%
19	16-Feb-07	9,082.65	16.47	0.18%	0.0003%	5916.77	22.40	0.38%	0.0014%
20	17-Feb-07	9,057.97	(24.68)	-0.27%	0.0007%	5909.12	(7.65)	-0.13%	0.0002%
21	18-Feb-07	9,057.97	-	0.00%	0.0000%	5916.8	7.68	0.13%	0.0001%
22	19-Feb-07	9,057.97	-	0.00%	0.0000%	5916.8	-	0.00%	0.0000%
23	20-Feb-07	9,049.77	(8.20)	-0.09%	0.0001%	5909.21	(7.59)	-0.13%	0.0002%
24	21-Feb-07	9,049.77	-	0.00%	0.0000%	5904.66	(4.55)	-0.08%	0.0001%
25	22-Feb-07	9,074.41	24.64	0.27%	0.0007%	5917.8	13.14	0.22%	0.0003%
26	23-Feb-07	9,090.91	16.50	0.18%	0.0003%	5927.47	9.67	0.16%	0.0002%
27	24-Feb-07	9,082.65	(8.26)	-0.09%	0.0001%	5925.57	(1.90)	-0.03%	0.0000%
28	25-Feb-07	9,090.91	8.26	0.09%	0.0001%	5941.65	16.08	0.27%	0.0007%
29	26-Feb-07	9,090.91	-	0.00%	0.0000%	5941.77	0.12	0.00%	0.0000%
30	27-Feb-07	9,082.65	(8.26)	-0.09%	0.0001%	5941.42	(0.35)	-0.01%	0.0000%
31	28-Feb-07	9,066.18	(16.47)	-0.18%	0.0003%	5938.65	(2.77)	-0.05%	0.0000%
32	1-Mar-07	9,132.42	66.24	0.73%	0.0053%	5974.99	36.34	0.61%	0.0036%
33	2-Mar-07	9,149.13	16.71	0.18%	0.0003%	5989.73	14.74	0.25%	0.0006%
34	3-Mar-07	9,157.51	8.38	0.09%	0.0001%	5998.12	8.39	0.14%	0.0002%
35	4-Mar-07	9,165.90	8.39	0.09%	0.0001%	6003.34	5.22	0.09%	0.0001%
36	5-Mar-07	9,174.31	8.41	0.09%	0.0001%	6009.64	6.30	0.10%	0.0001%
37	6-Mar-07	9,233.61	59.30	0.65%	0.0042%	6043.93	34.29	0.57%	0.0031%
38	7-Mar-07	9,250.69	17.08	0.18%	0.0003%	6050.28	6.35	0.11%	0.0001%
39	8-Mar-07	9,216.59	(34.10)	-0.37%	0.0014%	6032.63	(17.65)	-0.29%	0.0009%
40	9-Mar-07	9,191.18	(25.41)	-0.28%	0.0008%	6020.17	(12.46)	-0.21%	0.0005%
41	10-Mar-07	9,174.31	(16.87)	-0.18%	0.0003%	6009.83	(10.34)	-0.17%	0.0003%
42	11-Mar-07	9,174.31	-	0.00%	0.0000%	6010.11	0.28	0.00%	0.0000%
43	12-Mar-07	9,174.31	-	0.00%	0.0000%	6010.07	(0.04)	0.00%	0.0000%
44	13-Mar-07	9,157.51	(16.80)	-0.18%	0.0003%	5998.08	(11.99)	-0.20%	0.0004%
45	14-Mar-07	9,199.63	42.12	0.46%	0.0021%	6021.29	23.21	0.39%	0.0014%
46	15-Mar-07	9,225.09	25.46	0.28%	0.0008%	6016.53	(4.76)	-0.08%	0.0001%
47	16-Mar-07	9,242.14	17.05	0.18%	0.0003%	6028.84	12.31	0.20%	0.0004%
48	17-Mar-07	9,199.63	(42.51)	-0.46%	0.0021%	6019.28	(9.56)	-0.16%	0.0003%
49	18-Mar-07	9,225.09	25.46	0.28%	0.0008%	6049.24	29.96	0.50%	0.0024%
50	19-Mar-07	9,225.09	-	0.00%	0.0000%	6049.12	(0.12)	0.00%	0.0000%
51	20-Mar-07	9,225.09	-	0.00%	0.0000%	6046.98	(2.14)	-0.04%	0.0000%
52	21-Mar-07	9,191.18	(33.91)	-0.37%	0.0014%	6023.8	(23.18)	-0.38%	0.0015%
53	22-Mar-07	9,157.51	(33.67)	-0.37%	0.0014%	6008.9	(14.90)	-0.25%	0.0007%
54	23-Mar-07	9,099.18	(58.33)	-0.64%	0.0041%	5993.6	(15.30)	-0.25%	0.0007%

55	24-Mar-07	9,124.09	24.91	0.27%	0.0007%	6011.87	18.27	0.30%	0.0009%
56	25-Mar-07	9,124.09	-	0.00%	0.0000%	6015.79	3.92	0.07%	0.0000%
57	26-Mar-07	9,124.09	-	0.00%	0.0000%	6013.79	-	0.00%	0.0000%
58	27-Mar-07	9,124.09	-	0.00%	0.0000%	6013.93	(1.86)	-0.03%	0.0000%
59	28-Mar-07	9,099.18	(24.91)	-0.27%	0.0008%	6000.75	(13.18)	-0.22%	0.0005%
60	29-Mar-07	9,140.77	41.59	0.46%	0.0021%	6024.92	24.17	0.40%	0.0015%
61	30-Mar-07	9,132.42	(8.35)	-0.09%	0.0001%	6018.62	(6.30)	-0.10%	0.0001%
62	31-Mar-07	9,115.77	(16.65)	-0.18%	0.0003%	6009.2	(9.42)	-0.16%	0.0003%
63	1-Apr-07	9,099.18	(16.59)	-0.18%	0.0003%	6001.94	(7.26)	-0.12%	0.0002%
64	2-Apr-07	9,090.91	(8.27)	-0.09%	0.0001%	5996.6	(5.34)	-0.09%	0.0001%
65	3-Apr-07	9,090.91	-	0.00%	0.0000%	5990	(6.60)	-0.11%	0.0001%
66	4-Apr-07	9,124.09	33.18	0.36%	0.0013%	6009.61	19.61	0.33%	0.0010%
67	5-Apr-07	9,115.77	(8.32)	-0.09%	0.0001%	6013.32	3.71	0.06%	0.0000%
68	6-Apr-07	9,115.77	-	0.00%	0.0000%	6023.63	10.33	0.17%	0.0003%
69	7-Apr-07	9,124.09	8.32	0.09%	0.0001%	6031.54	7.89	0.13%	0.0001%
70	8-Apr-07	9,132.42	8.33	0.09%	0.0001%	6031.42	(0.12)	0.00%	0.0000%
71	9-Apr-07	9,115.77	(16.65)	-0.18%	0.0003%	6020.39	(11.03)	-0.18%	0.0004%
72	10-Apr-07	9,132.42	16.65	0.18%	0.0003%	6017.01	16.62	0.28%	0.0007%
73	11-Apr-07	9,074.41	(58.01)	-0.64%	0.0041%	5988.33	(48.68)	-0.81%	0.0067%
74	12-Apr-07	9,124.09	49.68	0.55%	0.0030%	6012.74	24.41	0.41%	0.0016%
75	13-Apr-07	9,099.18	(24.91)	-0.27%	0.0008%	5992.61	(20.13)	-0.33%	0.0012%
76	14-Apr-07	9,082.65	(16.53)	-0.18%	0.0003%	5989.26	(3.35)	-0.06%	0.0000%
77	15-Apr-07	9,090.91	8.26	0.09%	0.0001%	5996.29	7.03	0.12%	0.0001%
78	16-Apr-07	9,090.91	-	0.00%	0.0000%	5996.17	(0.12)	0.00%	0.0000%
79	17-Apr-07	9,074.41	(16.50)	-0.18%	0.0003%	5992.91	(3.26)	-0.05%	0.0000%
80	18-Apr-07	9,099.18	24.77	0.27%	0.0007%	6012.17	19.26	0.32%	0.0010%
81	19-Apr-07	9,082.65	(16.53)	-0.18%	0.0003%	6007.65	(5.12)	-0.09%	0.0001%
82	20-Apr-07	9,090.91	8.26	0.09%	0.0001%	6015.17	8.12	0.14%	0.0002%
83	21-Apr-07	9,090.91	-	0.00%	0.0000%	6017.16	1.99	0.03%	0.0000%
84	22-Apr-07	9,107.47	16.56	0.18%	0.0003%	6032.04	14.88	0.25%	0.0006%
85	23-Apr-07	9,099.18	(8.29)	-0.09%	0.0001%	6026.53	(5.49)	-0.09%	0.0001%
86	24-Apr-07	9,107.47	8.29	0.09%	0.0001%	6023.9	(2.65)	-0.04%	0.0000%
87	25-Apr-07	9,090.91	(16.56)	-0.18%	0.0003%	6003.16	(18.74)	-0.31%	0.0010%
88	26-Apr-07	9,074.41	(16.50)	-0.18%	0.0003%	6001.53	(3.61)	-0.06%	0.0000%
89	27-Apr-07	9,082.65	8.24	0.09%	0.0001%	5998.95	(2.60)	-0.04%	0.0000%
90	28-Apr-07	9,057.97	(24.68)	-0.27%	0.0007%	5972.67	(26.28)	-0.44%	0.0020%
91	29-Apr-07	9,049.77	(8.20)	-0.09%	0.0001%	5972.34	(0.33)	-0.01%	0.0000%
92	30-Apr-07	9,057.97	8.20	0.09%	0.0001%	5977.83	5.49	0.09%	0.0001%
93	1-May-07	9,074.41	16.44	0.18%	0.0003%	5974.29	(3.54)	-0.06%	0.0000%
94	2-May-07	9,107.47	33.06	0.36%	0.0013%	5991.93	17.66	0.30%	0.0008%
95	3-May-07	9,090.91	(16.56)	-0.18%	0.0003%	5963.75	(28.20)	-0.47%	0.0023%
96	4-May-07	9,066.18	(24.73)	-0.27%	0.0007%	5949.8	(13.95)	-0.23%	0.0006%
97	5-May-07	9,017.13	(49.05)	-0.54%	0.0029%	5932.75	(17.05)	-0.29%	0.0009%
98	6-May-07	8,976.66	(40.47)	-0.45%	0.0020%	5917.18	(15.57)	-0.26%	0.0007%
99	7-May-07	8,952.55	(24.11)	-0.27%	0.0007%	5901.29	(15.89)	-0.27%	0.0008%
100	8-May-07	8,952.55	-	0.00%	0.0000%	5911.69	10.40	0.18%	0.0003%
101	9-May-07	8,944.54	(8.01)	-0.09%	0.0001%	5904.26	(7.43)	-0.13%	0.0002%
102	10-May-07	8,865.25	(79.29)	-0.89%	0.0079%	5847.29	(56.97)	-0.96%	0.0095%
103	11-May-07	8,818.34	(46.91)	-0.53%	0.0028%	5814.97	(32.32)	-0.55%	0.0032%
104	12-May-07	8,779.63	(38.71)	-0.44%	0.0019%	5781.4	(33.57)	-0.58%	0.0033%
105	13-May-07	8,787.35	7.72	0.09%	0.0001%	5790.71	9.31	0.16%	0.0002%
106	14-May-07	8,779.63	(7.72)	-0.09%	0.0001%	5785.53	(5.16)	-0.09%	0.0001%
107	15-May-07	8,771.93	(7.70)	-0.09%	0.0001%	5788.23	3.20	0.06%	0.0000%
108	16-May-07	8,802.82	30.89	0.35%	0.0012%	5805.37	16.82	0.29%	0.0008%
109	17-May-07	8,818.34	15.52	0.18%	0.0003%	5803.97	0.40	0.01%	0.0000%
110	18-May-07	8,810.57	(7.77)	-0.09%	0.0001%	5784.86	(21.11)	-0.36%	0.0014%
111	19-May-07	8,802.82	(7.75)	-0.09%	0.0001%	5778.18	(14.68)	-0.25%	0.0007%
112	20-May-07	8,826.13	23.31	0.26%	0.0007%	5786.43	16.27	0.28%	0.0007%
113	21-May-07	8,826.13	-	0.00%	0.0000%	5786.48	0.03	0.00%	0.0000%

114	22-May-07	8,810.57	(15.56)	-0.18%	0.0003%	5776.06	(10.42)	-0.18%	0.0004%
115	23-May-07	8,756.57	(54.00)	-0.61%	0.0038%	5718.61	(57.45)	-0.99%	0.0101%
116	24-May-07	8,748.91	(7.66)	-0.09%	0.0001%	5716.86	(1.75)	-0.03%	0.0000%
117	25-May-07	8,748.91	-	0.00%	0.0000%	5727.26	10.40	0.18%	0.0003%
118	26-May-07	8,795.07	46.16	0.53%	0.0028%	5755.94	28.68	0.50%	0.0074%
119	27-May-07	8,787.35	(7.72)	-0.09%	0.0001%	5755.02	(0.92)	-0.02%	0.0000%
120	28-May-07	8,795.07	7.72	0.09%	0.0001%	5759.97	4.95	0.09%	0.0001%
121	29-May-07	8,787.35	(7.72)	-0.09%	0.0001%	5752.76	(7.21)	-0.13%	0.0002%
122	30-May-07	8,787.35	-	0.00%	0.0000%	5752.8	0.04	0.00%	0.0000%
123	31-May-07	8,818.34	30.99	0.35%	0.0012%	5766.64	13.84	0.24%	0.0003%
124	1-Jun-07	8,833.92	15.58	0.18%	0.0003%	5775.2	8.56	0.15%	0.0002%
125	2-Jun-07	8,841.73	7.81	0.09%	0.0001%	5780.08	4.88	0.08%	0.0001%
126	3-Jun-07	8,826.13	(15.60)	-0.18%	0.0003%	5766.71	(13.37)	-0.23%	0.0006%
127	4-Jun-07	8,825.30	(0.83)	-0.01%	0.0000%	5766.21	(0.50)	-0.01%	0.0000%
128	5-Jun-07	8,777.00	(48.30)	-0.55%	0.0030%	5737.76	(28.45)	-0.49%	0.0025%
129	6-Jun-07	8,764.24	(12.76)	-0.15%	0.0002%	5729.35	(8.41)	-0.15%	0.0002%
130	7-Jun-07	8,771.93	7.69	0.09%	0.0001%	5728.53	(0.82)	-0.01%	0.0000%
131	8-Jun-07	8,833.92	61.99	0.71%	0.0050%	5759.59	30.86	0.54%	0.0028%
132	9-Jun-07	8,968.61	134.69	1.52%	0.0032%	5826.8	67.41	1.17%	0.0135%
133	10-Jun-07	9,099.18	130.57	1.46%	0.0212%	5910.4	83.60	1.43%	0.0203%
134	11-Jun-07	9,107.47	8.29	0.09%	0.0001%	5915.82	5.42	0.09%	0.0001%
135	12-Jun-07	9,099.18	(8.29)	-0.09%	0.0001%	5901.05	(14.77)	-0.25%	0.0007%
136	13-Jun-07	9,090.91	(8.27)	-0.09%	0.0001%	5904.68	3.63	0.06%	0.0000%
137	14-Jun-07	9,115.77	24.86	0.27%	0.0007%	5910.39	5.71	0.10%	0.0001%
138	15-Jun-07	9,082.65	(33.12)	-0.36%	0.0013%	5890.25	(20.14)	-0.34%	0.0012%
139	16-Jun-07	9,082.65	-	0.00%	0.0000%	5894.92	4.67	0.08%	0.0000%
140	17-Jun-07	9,041.59	(41.06)	-0.45%	0.0021%	5880.52	(14.40)	-0.24%	0.0006%
141	18-Jun-07	9,033.42	(8.17)	-0.09%	0.0001%	5875.21	(5.31)	-0.09%	0.0001%
142	19-Jun-07	9,025.27	(8.15)	-0.09%	0.0001%	5873.53	(1.68)	-0.03%	0.0000%
143	20-Jun-07	9,025.27	-	0.00%	0.0000%	5870.13	(3.40)	-0.06%	0.0000%
144	21-Jun-07	9,009.01	(16.26)	-0.18%	0.0003%	5866.58	(3.55)	-0.06%	0.0000%
145	22-Jun-07	8,960.57	(48.44)	-0.54%	0.0029%	5829.72	(36.86)	-0.63%	0.0041%
146	23-Jun-07	8,968.61	8.04	0.09%	0.0001%	5833.01	3.29	0.06%	0.0000%
147	24-Jun-07	9,017.13	48.52	0.54%	0.0029%	5861.79	28.78	0.49%	0.0023%
148	25-Jun-07	9,000.90	(16.23)	-0.18%	0.0003%	5851.2	(10.59)	-0.18%	0.0004%
149	26-Jun-07	9,009.01	8.11	0.09%	0.0001%	5859.25	8.05	0.14%	0.0002%
150	27-Jun-07	9,025.27	16.26	0.18%	0.0003%	5869.14	9.89	0.17%	0.0003%
151	28-Jun-07	9,099.18	73.91	0.82%	0.0067%	5914.9	45.76	0.78%	0.0059%
152	29-Jun-07	9,074.41	(24.77)	-0.27%	0.0007%	5908.43	(6.47)	-0.11%	0.0001%
153	30-Jun-07	9,082.65	8.24	0.09%	0.0001%	5930.13	21.70	0.37%	0.0013%
154	1-Jul-07	9,033.42	(49.23)	-0.54%	0.0030%	5904.7	(25.43)	-0.43%	0.0019%
155	2-Jul-07	9,041.59	8.17	0.09%	0.0001%	5910.19	5.49	0.09%	0.0001%
156	3-Jul-07	9,017.13	(24.46)	-0.27%	0.0007%	5908.11	(2.08)	-0.04%	0.0000%
157	4-Jul-07	9,025.27	8.14	0.09%	0.0001%	5926.99	18.88	0.32%	0.0010%
158	5-Jul-07	9,009.01	(16.26)	-0.18%	0.0003%	5919.15	(7.84)	-0.13%	0.0002%
159	6-Jul-07	9,009.01	-	0.00%	0.0000%	5924.91	5.76	0.10%	0.0001%
160	7-Jul-07	9,025.27	16.26	0.18%	0.0003%	5935.76	10.85	0.18%	0.0003%
161	8-Jul-07	9,049.77	24.50	0.27%	0.0007%	5953.56	17.80	0.30%	0.0008%
162	9-Jul-07	9,049.77	-	0.00%	0.0000%	5953.64	0.08	0.00%	0.0000%
163	10-Jul-07	9,049.77	-	0.00%	0.0000%	5955.84	2.20	0.04%	0.0000%
164	11-Jul-07	9,009.01	(40.76)	-0.45%	0.0020%	5936.9	(18.94)	-0.32%	0.0011%
165	12-Jul-07	8,992.81	(16.20)	-0.18%	0.0003%	5931.65	(3.25)	-0.05%	0.0000%
166	13-Jul-07	9,033.42	40.61	0.45%	0.0020%	5960.96	27.31	0.46%	0.0020%
167	14-Jul-07	9,049.77	16.35	0.18%	0.0003%	5974.16	13.20	0.22%	0.0004%
168	15-Jul-07	9,025.27	(24.50)	-0.27%	0.0007%	5957	(17.16)	-0.29%	0.0009%
169	16-Jul-07	9,033.42	8.15	0.09%	0.0001%	5962.38	5.38	0.09%	0.0001%
170	17-Jul-07	9,033.42	-	0.00%	0.0000%	5958.49	(3.89)	-0.07%	0.0001%
171	18-Jul-07	9,049.77	16.35	0.18%	0.0003%	5965.65	7.16	0.12%	0.0001%
172	19-Jul-07	9,041.59	(8.18)	-0.09%	0.0001%	5958.45	(7.20)	-0.12%	0.0002%

173	20-Jul-07	9,111.20	69.61	0.77%	0.0055%	6016.57	58.12	0.98%	0.0093%
174	21-Jul-07	9,107.47	(3.73)	-0.04%	0.0000%	6076.69	10.12	0.17%	0.0002%
175	22-Jul-07	9,090.91	(16.56)	-0.18%	0.0003%	6014.49	(12.20)	-0.20%	0.0005%
176	23-Jul-07	9,090.91	-	0.00%	0.0000%	6014.49	-	0.00%	0.0000%
177	24-Jul-07	9,090.91	-	0.00%	0.0000%	6023.7	9.21	0.15%	0.0002%
178	25-Jul-07	9,066.18	(24.73)	-0.27%	0.0007%	6023.64	(0.06)	0.00%	0.0000%
179	26-Jul-07	9,090.91	24.73	0.27%	0.0007%	6028.89	5.25	0.09%	0.0001%
180	27-Jul-07	9,090.91	-	0.00%	0.0000%	6011.23	(17.66)	-0.29%	0.0009%
181	28-Jul-07	9,124.09	33.18	0.36%	0.0013%	6023.89	12.66	0.21%	0.0004%
182	29-Jul-07	9,140.77	16.68	0.18%	0.0003%	6031.16	7.27	0.12%	0.0001%
Summarize		1,645,285.66			0.1783%	1,079,129.96			0.1683%
Mean		9,040.03			0.00098%	5,929.29			0.00092%

Std Dev	0.3130%
CL 95%	1.65
Volatility	0.5165%

Std Dev	0.3041%
CL 95%	1.65
Volatility	0.5018%

