

**Foreign Exchange Exposure and Management:  
Case study of two large Multinationals**

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By  
Coline Emadione Sume (emadione@yahoo.com)

Supervisor: Dr. Hong Wu  
Examiner: Dr. Yinghong Chen

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## Abstract.

With instability in financial markets and currency values, particularly the U.S dollar following the global financial crises, this paper seeks to examine how two large multinational firms conduct their currency risk management policies. Attention is paid to observe any discrepancies between what the firms do and what academic literature recommends.

Both firms actively manage all three forms of currency exposures with particularly higher involvements in economic exposure management in contrast to some academic literature. However one of the firms, Trelleborg AB does not manage its profit and loss translation exchange risk originating from translation of income statements of its subsidiaries. Even though most academics do not recommend management of translation exposure because it purportedly has no cash flow implications for the firm, findings here as shown in both case studies indicate that at least some multinationals manage translation exposure possibly because doing so reduces their stakeholder's perceived risk.

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# **Introduction**

## **Aim**

Exchange rate risk (currency risk) amongst other forms of risk is a growing concern of multinational firms and has drawn a lot of attention from the academic community. The aim of this paper is to look into agreements and discrepancies between theory and practice by examining the risk management processes of two large multinational firms with head offices in Sweden and Denmark.

## **Delimitation**

This study is only concerned with a single form of risk, currency risk, faced by multinational firms. Other forms of risk such as credit risk, market risk, inflation risk, etc are out of the scope of this paper.

## **Limitations**

The choice of two multinationals has two reasons: it was envisioned to use several case studies but this was made impossible because of time constraint. However the choice of two very large multinationals was made to ensure that all three forms of currency risk management might be observed.

Again because of time constraint and limitations to procedures of obtaining information from the firm's management, all findings are based on observations from the firm's annual reports; specifically their financial statements for the year 2008.

## **1.0 Prior literature.**

This section covers prior studies on the three forms of foreign exchange risk exposures: transaction, operating, and translation exposures.

The organisational structure of foreign exchange risk management differs amongst multinational firms but academic literature (Dhanani, A, 2003) recommends a centralised currency management approach. This is because centralisation increases and facilitates opportunities for leading and lagging, cash flow netting, economies of scale and also makes good use of the limited expertise in the firms risk management human resource.

Consistent with research studies by Batten et al. (1993) which showed that firms do not fully hedge their currency exposures, Bodnar, Marston and Hayt (1998) found that most firms hedge less than half of their perceived currency exposures, with a majority of them also preferring short term financial market hedges with maturities less than 3 months to long term hedges.

Prior studies (Loderer and Pichler, 2000; and Marshall, 1999) on the risk management objectives of multinational firms found most of them are risk averse and orientate their currency risk management policies solely towards hedging. However a few firms use their management policies for speculative purposes and hence seek to make profits. They found that firms that manage currency risk do so specifically to reduce the volatility of their cash flows, reduce taxes, and facilitate future financial planning and also to guarantee enough internal funds.

### **1.1.1 Transaction exposure**

Since transaction exposure has direct cash flow and market value implications on a firm, it should be actively managed (Srinivasulus, 1983). Besides the use of internal hedging methods such as cash flow netting to manage transaction exposure; amongst a basket of external hedging tools, firms overwhelmingly make use of forward contracts because they are cheap, and flexible (Duangploy et al., 1997).

Belk and Glaum (1990) found that a handful of firms engage in profit making when trying to hedge their foreign exchange transactions. However later studies (Belk and Glaum, 1992) showed that the use of forwards dwarfs that of other financial instruments such as options because financial managers want to avoid their speculative nature, higher premiums as well as their complexity.

### **1.1.2 Economic exposure**

Despite the large number of sophisticated financial market hedging instruments available to firms, measuring and managing economic exposure (Strategic exchange rate risk) has proven to be difficult because this exposure depends on an extensive number of factors (Dhanani, A. 2003). Moreover the practice of hedging forecasted operating cash flows is very limited in curbing economic exposure because only the nominal aspects of currency risk are taken into consideration.

This is consistent with studies by Froot et al. (1993) who showed that multinational firms do not have a general unified approach to manage their economic exposure because measuring economic exposure is difficult.

Studies by Marshall (1999) reveal that because of the complexity of managing economic exposure in the financial markets, firms resort to using internal hedging techniques such as their pricing strategies while others do not manage it at all.

Dhanani and Groves (2001) deciphered the inconsistency around economic exposure being the most important form of exchange risk, while at the same time being the least managed. They found that firms actually manage this exposure and they do so using their staff and other systems to optimize the management process.

### **1.1.3 Translation exposure**

Srinivasulus, (1983), recommends that firms should not manage translation exposure because it has no financial implications on the future cash flows of the firm and hence on the firm's market value. This is consistent with theoretical studies by Shapiro (1998) who argues that translation risk is purely an accounting phenomenon and therefore should not be hedged.

On the other hand empirical studies by Rodriguez (1978) on U.S. multinational firms showed that most managed translation exposure. Translation exposure affects multinational firms to the extent that gains and losses arising from translation exposure sometimes surpass those made from other economic activities of the firm (Eiteman et. al, 2007).

However translation exposure must be considered because of their negative effects on corporate gearing ratios<sup>1</sup> (Davis et. al., 1991) since in the calculation of these ratios based on home currency terms, exchange rates come into play.

According to empirical studies by Aabo (2001) on the exchange rate exposure strategies at Danish industrial firms, none of the firms expected hedging to add value through tax reductions, rather they expect hedging to add value by reducing stakeholders perceived risk which is achieved by evading financial distress and securing enough internal funds to pursue future investments.

This study is in line with that of Brown (2001) who also found that the main concern of financial managers for hedging translation exposure was the perception of stakeholders and internal agency problems.

This paper seeks to examine the risk management practices of two large multinational firms and also to examine any discrepancies between theory and practice.

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<sup>1</sup> A ratio such as debt-to-equity which compares the firm's owner's equity to borrowed funds

## 2.0 Financial risk management and hedging rational

Financial risk management involves creating value and/or preventing losses in a firm by using internal and external financial management tools. It is a process that involves identifying, quantifying, and managing (hedging) the risk (Kirt C. Butler, 2008. p.212).

Before deciding to manage any form of financial risk a firm has to evaluate the cost and benefits. The next subsection sets the stage for the motivation to hedge.

### 2.1 Hedging or not

According to the Miller-Modigliani (1958) irrelevance proposition, a firm's financial policies and strategies are irrelevant in perfect financial markets because investors are capable of making similar financial decisions on their personal accounts in the same way that the firms financial managers do and at the same cost. This landmark article formed the basis for conditions under which hedging strategies are irrelevant in the financial policies of firms.

Specifically if the spot and forward markets are perfect<sup>2</sup>, which he assumes to be the case, investors can change their foreign currency positions to alter any change in the hedging policies of the firm. The implication is that for hedging policies to be relevant they must increase the firms expected future cash flows or decrease the discount rate in ways that cannot be done by investors. On the contrary markets are not perfect and firms are subject to characteristics associated with imperfect markets such as agency and transaction cost, convex tax schedules and cost of financial distress. This makes hedging relevant.

Amongst a couple of empirical studies is that of Allayannis and Weston (2001). Using a sample of large multinational corporations they found a direct relation between the market values of the firms and their use of currency derivatives in hedging.

Similarly they also found that the values of firms which were engage in hedging increased relative to those that did not hedge meanwhile those firms which ceased to hedge realised a decrease in their market value relative to hedging firms.

Kenneth Froot et al., (1993) argue that for firms to be able to fund future projects with positive net present values they must engage in hedging in order to secure sufficient cash flows.

Because hedging leads to lesser uncertainty of future cash flows due to greater predictability, firms can improve planning and undertake investments which otherwise might not have been considered (David K. Eiteman et. al 2007).

In empirical studies carried out by Berkman and Bradbury (1996), the presence of market imperfections in the form of convex taxes schedules, cost of financial distress

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<sup>2 2</sup> No taxes, transaction cost or government interventions, No information asymmetry exist between investors and the firm's managers, investors and the firm have equal access to financial markets, there are no cost of financial distress i.e. the value of the firm is not affected when the firm defaults on its obligations

and agency cost explains why hedging is relevant in the financial policies of multinational firms.

### **Taxes**

In a quantitative approach to determine the percentage of tax savings of large U.S multinational firms with existing hedging policies, Graham and Smith (1999) modelled major provisions of the U.S tax code and simulated the tax savings obtained from hedging.

They found that for firms facing convex tax schedules, a 5% reduction in volatility of taxable income through hedging resulted in a 5.4 % reduction in expected taxable income. Their conclusion was that the incentive to hedge with respect to taxes is driven by the fact that hedging lowers the expected tax liabilities for firms facing convex tax functions. A progressive tax code which is used in most nations creates convex tax schedules. This makes it possible to achieve tax savings in other countries too.

In other studies by Graham and Rogers (2002) on the incentives for firms to hedge, they found that firms hedge to increase their capacity for debt and this increased debt capacity results in tax benefits averaging 1.1 percent of the firms value.

### **Financial distress and Bankruptcy Cost**

A firm is at a point of financial distress if its cash inflows are not sufficient to service debt payments and other fixed cost. The likelihood of bankruptcy to occur after a firm finds itself in a state of financial distress is high and firms would not always want to be in this position because in the event of bankruptcy, further cost both directly and indirectly associated with bankruptcy would be incurred. Piet and Raman (1995, page 457) point out that financial distress in itself would affect the operations and value of the firm. By ensuring low variability in a firm's cash flows hedging reduces the probability of the firm being in financial distress and hence increase its current value.

For firms which provide after-sales services for their products they need to gain customer confidence. The lower the likelihood of facing bankruptcy, the greater the confidence instilled in their customers. This translates to increased sales and higher firm value. Hedging provides for low volatilities in future cash flows and reduced susceptibility to bankruptcy.

### **Agency Cost**

Agency costs are cost associated with conflicts of interest between the managers of a firm and other stakeholders (shareholders and bondholders).

While managers seek to minimize the overall risk of their units, other stakeholders are concerned with the contribution of the unit to the total risk of their portfolios.

Managers therefore have an incentive to hedge irrespective of whether these risks could be diversified to other stakeholders because their prosperity depends on that of

their employers. The manager therefore reduces his exposure to currency risk through hedging.

Bond holders get at most a fixed return (price of lending) on their investments in a firm while share holders claim what is left after bond holders are paid in full. When a firm is close to or in financial distress share holders have a tendency to take on risky projects regardless of their net present values. Because share holder claims are equivalent to call options on the assets of the firm, these risky projects imply high volatilities for the firm's assets and the value of the share holders claims increases. This puts bond holders in relatively less well off positions. With these conflicts of interest during periods of financial distress in mind, bond holders respond by adjusting their price of lending to firms. Firms can reduce this cost of borrowing by hedging to ensure less variability in future cash flows and therefore less likelihood of financial distress setting in. This in turn reduces the possibility of conflicts of interest associated with financial distress and thereby reducing the cost of borrowing.

To avoid transaction cost and the discipline associated with raising funds from the financial market, managers prefer internal financing. The manager's incentive to hedge then depends on whether the effect of hedging (reducing cash flow variability and securing internal funds) can provide enough internal funds to finance future investment needs.

Tufano (1998) explains that managers would go to the extent of allowing shareholder wealth to decrease if avoiding financial market discipline is guaranteed.

Similarly the compensation packages and general performance of financial managers are directly related to accounting performance. Because potential changes in exchange rates lead to potential changes in financial accounting statements (translation exposure), managers always have a strong desire to minimize this exposure through hedging.

In conclusion, the theoretical case for hedging as investigated by many authors outweighs the case against it. This gives comfort in pursuing further studies.

### **3.0 Foreign Exchange risk and Exposure**

Kirt C. Butler (2008,p.44) defines foreign exchange risk as the risk associated with the unexpected changes in exchange rates and foreign exchange exposure as the extent to which unexpected changes in exchange rates affect the value of a firm's assets or liabilities.

According to the purchasing power parity the exchange rate is determined by the price levels in the domestic and foreign countries and changes in the spot rate are offset by changes in the price level in the domestic country relative to the foreign country; In other words by the inflation differential. (Piet and Raman, 1995, p.366)

Empirical studies (Piet and Raman, 1995, p 362-364) also show minimal support of the purchasing power parity theory in exchange rate determination, making the results consistent with the failure of fundamental models of exchange rate forecasting which

also uses macroeconomic variables. These results are also consistent with those obtained from empirical test of the unbiased expectations hypothesis<sup>3</sup>.

Although exchange rate determination using purchasing power parity yields reasonable results in the long run, financial managers typically have shorter horizons during which financial decisions must be made.

There exist marked deviations from the theory and as such firm's are exposed to real exchange risk.

Because of the failure of fundamental models of exchange rate forecasting, the unbiased expectations hypothesis and the purchasing power parity (at least in the short run) coupled with evidence suggesting that the value of firms increases with hedging, we are in a better position to conclude that firms should identify, measure, and manage their exposure to exchange rate. The following section is concerned with identification of these exposures.

## **3.1 Foreign Exchange risk identification**

The unpredictable characteristic of exchange rates generates three main types of exchange exposures for multinational corporations namely translation (accounting) exposure, transaction (transaction) exposure, and economic exposure. We now proceed to discuss each of these exposures.

### **3.1.1 Transaction Exposure**

As mentioned above, exchange exposure can be thought of as a measure of a firm's financial sensitivity to exchange rate fluctuations.

Transaction exposure measures the sensitivity (gains or losses) of realized values, measured in domestic currency, of the firm's transaction cash flows, denominated in foreign currency, to unexpected changes in the exchange rate (Cheol and Resnick, 2007, p. 192). More specifically it is the change in the financial position of the firm, measured in home currency per unit change in exchange rates

For instance a multinational firm having outstanding contracts where payments are made or received in foreign currency faces exchange risk exposure.

The value of the funds paid or received changes one-for-one with changes in exchange rate. In the case of foreign exchange risk exposure arising through international trade, the exporter most often bears the risk because sales prices are often quoted using the importers local currency.

Transaction exposure could arise from the buying or selling of credit goods or services with prices denominated in foreign currency, the borrowing or lending of funds when repayment has to be made in foreign currency, taking part in a foreign exchange forward contract, through the acquisition of assets or through incurring liabilities denominated in foreign currency.

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<sup>3</sup> The unbiased expectations hypothesis says the forward exchange rate is an unbiased estimator of the future spot rate

### **3.1.2 Economic exposure**

Economic exposure also referred to as competitive exposure or strategic exposure measures the impact of exchange rate fluctuations on the future operating cash flows of a firm. These exchange rate fluctuations affect operating cash flows via the sales price, sales volume, and production cost.

More specifically economic exposure is the change in operating cash flows of a firm per unit change in exchange rates.

Although economic exposure encompasses both transaction and economic exposure and both deal with future cash flows, it is important to note that we are referring to fluctuations in cash flows generated from operations as oppose to changes in cash flows from existing assets and liabilities as is the case in transaction exposure.

Sources of economic exposure include the effect of exchange rate fluctuations to the competitive position of the company, factors affecting future cash flows of the firm such as the political climate of the domestic country and investment policies all of which have direct implications on sales volume. Also acquiring assets or incurring liabilities denominated in foreign currency as well as cash flows from the buying of unfinished goods in one country and selling the finished good in another country. In this case profits fall if the currency of the country for unfinished goods appreciates against the currency of the country where finished goods are to be sold.

The process of identifying and measuring economic exposure to exchange rate risk is relatively difficult as it requires forecasting and analyzing all of the firm's future transaction exposures as well as exposures from all of the firm's competitors both present and future.

### **3.1.3 Translation exposure**

Translation or accounting exposure is the effect of changes in exchange rates on the translated (accounting) values of financial statements of the foreign subsidiaries of a multinational company.

This exposure arises from the conversion of financial statements denominated in foreign currency to statements denominated in home currency and therefore depends on the exchange rate.

While transaction and economic exposures are concerned with cash flows and its impact on the economic or market value of the firm, translation exposure focuses solely on the firms accounting values.

The cash flows of the firm are not affected by changes in accounting value caused by translation except when their effects on income taxes are considered.

There are several relevant reasons why multinational firms need to translate the financial statements of their foreign subsidiaries. Take for instance the exceptional case where translation exposure has an impact on the cash flows of the firm via its effect on taxes and suppose there are capital gains due to fluctuations in exchange rates.

These capital gains maybe taxable and tax authorities would therefore want to know if there were capital gains or not. Therefore the foreign currency must be translated to home currency.

Tax authorities in the country of the parent company need to review the statements of the firm alongside all its subsidiaries. It is the duty of the firm to translate all statements reported in foreign currency to statements in domestic currency in order for tax authorities to be able to correctly establish a basis for tax.

Secondly to facilitate understanding amongst shareholders of a multinational firm, financial statements must be consistent. This means all financial statements from foreign subsidiaries must be consolidated into the financial statement of the parent company. This requires translation of the statement from all foreign subsidiaries.

Thirdly with the characteristic bonus system of many large multinational firms the performances of managers across all subsidiaries must be compared. To do this, financial statements must be uniform and therefore have to be translated into statements with a common currency.

Furthermore financial statements have to be translated in order to facilitate investment and financing decisions.

## **4.0 Foreign exchange risk measurement**

### **4.1 Transaction exposure measurement**

The degree of foreign exchange transaction exposure that a multinational firm faces can be measured through two widely known methods.

Through the variability of the currencies for which there are outstanding transactions and, using the value-at-risk method

As an example, suppose a multinational firm in Sweden has an account receivable in 90 days worth €100,000 and suppose the SEK/€ exchange rate is 10 SEK/€. The firm expects to receive  $€100,000 * 10 \text{ SEK/€} = 1,000,000 \text{ SEK}$  in 90 days. Transaction exposure arises because there is some risk that the firm might instead receive an amount different from the expected 1,000,000 SEK.

For instance if the € weakens and the SEK/€ exchange rate falls 9.5 SEK/€ at the time when payment is to be received the firm gets  $€100,000 * 9.5 \text{ SEK/€} = 950,000 \text{ SEK}$  which is different from the anticipated amount. Also if the € strengthens and the exchange rate rises to 11 SEK/€ then the firm receives  $€100,000 * 11 \text{ SEK/€} = 1,100,000 \text{ SEK}$  which is still different from the anticipated amount though desirable.

Value-at-risk method employs the historical simulation approach which makes use of historical data of transaction cash flows and simulation. Value-at-risk measures the potential losses over a certain time horizon using a certain confidence level or probability value (Kirt C. Butler, 2008, P.43). In other words with some probability, we are confident that we would not lose more than a certain amount over a certain time frame. This single amount is the value at risk. The method is widely used in transaction risk measurement.

## 4.2 Economic exposure measurement

According to Adler and Dumas (1983), economic exposure can be measured using simulations. To do this we need to calculate the exact values (in domestic currency) of the firm's cash flows from possible future values of the spot exchange rates. A cross-sectional regression<sup>4</sup> equation is obtained with the value of the firm's cash flows as a function of the spot exchange rates as shown below<sup>5</sup>.

$$\bar{V}_T(i) = K_{i,T} + \beta_{i,T} \bar{S}_T(i) + \bar{\varepsilon}_T(i),$$

where  $i = 1, 2, 3, \dots$

$\bar{V}_T(i)$ , is the value (in home currency) of the firm's cash flows corresponding to a future spot exchange rate,  $\bar{S}_T(i)$  on date  $i$ .

$\bar{\varepsilon}_T(i)$ , the error term measured in home currency is a white noise process<sup>6</sup>.

$K_{i,T}$ , is a constant (measured in home currency) while  $\beta_{i,T}$  is the slope coefficient.

$T$ , and  $t$  represent the final and initial dates between which exchange rates are measured.

The slope coefficient  $\beta_{i,T}$  represents an amount equal to the economic exposure of the firm to exchange rate risk. This is because it measures the change in cash flows per unit change in exchange rate.

A slope coefficient of zero implies the home currency value of the firm's cash flows is independent of exchange rate fluctuations and therefore there are no currency exposures. For instance suppose a firm in Sweden has an asset in Germany whose price moves together with the euro price of the Swedish kronor such that whenever the euro depreciates against the Swedish kronor, the local currency price of the asset goes up by the same proportion.

In such a situation there is no currency exposure in as much as changes in exchange rates are countered by changes in the price of the asset.

The slope coefficient is a measure of the covariance between the value of the firm's future cash flows and the exchange rate to the variance of the exchange rate.

That is,

$$\beta_{i,T} = \frac{\text{Cov}\left(\bar{V}_T(i), \bar{S}_T\right)}{\text{Var}\left(\bar{S}_T\right)}$$

The error term is neither correlated to the regression constant nor to the spot exchange rate.

<sup>4</sup> Regression in which the regressand and the regressor are associated with one period or point in time

<sup>5</sup> See Piet. S, and Raman. U, international financial markets and the firm p.495

<sup>6</sup> Process with expected mean of zero, has constant variance, has autocorrelation function equal to zero, and has normal and independent distribution.

### **4.3 Translation exposure measurement**

Since exchange rates change from time to time, the values (in home currency) of the assets and liabilities of the subsidiaries of a multinational corporation also change from time to time when considered by managers of the parent firm. This gives rise for a need to appropriately translate the income statements and items in the balance sheet to the currency used by the parent firm.

In the current rate method of translation accounting which is the simplest of all methods, the current exchange rate is used to translate all balance sheet items such as account receivables and payables, short and long term debts and inventory and plant equipments with the exception of common stock which is translated at historical exchange rates. However items in the income statement can be translated using any of three different rates. These include the current rate, an average or weighted average exchange rate over the reporting period, or the actual exchange rates paid or received on for example dividends and interest payments.

The Monetary/Non monetary methods of translation accounting translates all monetary assets and liabilities such as short term debts at current exchange rates and all non monetary assets and liabilities such as equipments and machinery at historical exchange. This method thus assumes that only monetary assets are exposed to exchange risk. Non monetary assets are not exposed because according to the purchasing power parity theory the effect of exchange rate fluctuations would be balanced by the inflation differential between both countries in the long run. Similar to the Monetary /Non monetary method is the temporal method. Here all monetary accounts are also translated at current exchange rates. However non monetary accounts such as inventory maybe translated at current exchange rates if prices in the balance sheet are current prices or at historical exchange rates if prices in the balance sheet are historical prices. In the latter case the exchange rate on the date the inventory was recorded in the books.

Another method, the current / non current method translates assets and liabilities according to their maturities.

Assets and liabilities with maturities less than a year are conventionally referred to as current while those longer with maturities are referred to as non current.

Current assets and liabilities, for example short term debts are translated at current exchange rates while non current assets and liabilities such as long term debts and machinery are translated at historical exchange rates. Thus only current assets and liabilities are assumed to be exposed to exchange risk.

## **5.0 Foreign exchange risk management**

After making a case for hedging against exchange rate risk and following up on how to measure the exposure to these risk, we now proceed with the various methods used by multinational firms in minimizing (hedging) transaction, operating, and translation exposures.

The methods used in foreign exchange risk management are broadly classified under operational techniques, also known as internal or natural hedging techniques and the use of financial contracts otherwise referred to as external hedging.

An internal hedging technique encompasses all activities used by a multinational firm and its subsidiaries to minimize risk without requiring outside parties. The most used techniques include netting, leading and lagging, long term structural changes, price adjustments, asset-liability management and pre-payment.

External hedging techniques mainly involve the use of financial derivatives.

According to a study by, Kurt Jesswein et al (1995) to determine the most commonly used products in hedging foreign exchange risk; forward contracts, currency swaps, options and futures were the most reported. They also found a direct relation between the use of these products and the number of foreign subsidiaries a multinational firm has.

Generally firms exhaust all possibilities to implement internal hedging before considering external hedging because the latter is relatively more expensive than the former.

## **5.1 Internal or natural hedging**

### **5.1.1 Netting**

Within the multinational firm the number of transactions that the firm makes is curtailed by consolidating and netting the exposures of all the firms operating units or subsidiaries. It is the most commonly used natural hedging method for most firms. A centralised unit such as the firm's treasury takes responsibility for identifying cash inflows and out flows denominated in the same currency between subsidiaries. Thus transactions are reduced to ones that involve only payment of the difference between cash inflows and outflows.

The most straight forward and easiest application of multinational netting involves transactions denominated in the same currency between two units; referred to as bilateral netting. Suppose a Swedish firm with subsidiaries in Cameroon and Nigeria. Both subsidiaries have outstanding transactions entailing the transfer of 100 million XAF<sup>7</sup> from the subsidiary in Cameroon to the subsidiary in Nigeria and 150 million XAF from the subsidiary in Nigeria to the subsidiary in Cameroon. Netting ensures that only the difference (50 million XAF) between these two payments is made. The multinationals treasury has thus facilitated the reduction of exposure by reducing the number of transactions from two to one.

In a situation involving cash flows between more than two subsidiaries (multilateral netting) in different countries, the same basic principle applies. Only netted payments are effected by the treasury. Netting is very effective in hedging transaction exposures.

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<sup>7</sup> XAF is the currency code for Cameroon

### **5.1.2 Leading and lagging**

Intra-company cash flows of a multinational firm can be delayed (lagging) or accelerated (leading). Leading and lagging is effective if management of the firm's foreign subsidiaries can correctly predict an appreciation or depreciation of a currency. If foreign currency is expected to appreciate and there is an outstanding payment to be made in that currency, then accelerating the payment (leading) would prevent losses which could have been incurred. The opposite action (lagging) is taken if foreign currency is expected to depreciate. Across many nations there are limits to the extent of using leading and lagging.

This currency exposure minimization procedure essentially causes a change in the rates of return earned by the various units of the multinational firm. A delayed and accelerated payment within the firm also creates loans from one subsidiary to another.

### **5.1.3 Long term structural changes**

Long term structural changes within a multinational firm are effective in management of economic exposure. However its application is inherently difficult and any changes can not readily be reversed.

The firm achieves these changes by geographically relocating its plants toward low cost labour, capital and other resources. These long term structural adjustments are more effective in reducing exposure to currency risk than other internal hedging methods as well as financial hedging methods.

According to an extensive study of 424 multinational firms by Kim et al, (2006) to determine the role of operational hedging vis-à-vis financial hedging, they found these multinationals preferred using operational hedging to financial hedging in their efforts to minimize economic exposure.

Also by diversifying or shifting production to countries with the lowest political risk, multinationals minimize their currency exposure.

### **5.1.4 Price adjustments**

Price adjustments follow directly from a devaluation of the currency of a subsidiary. Currency devaluation creates currency risk for the multinational firm at large. To counter this, the subsidiary increases prices to appropriately old prices. Considering the response of other local competitors makes price adjustments difficult to implement. Similarly if the subsidiary engages in exports then price adjustments would be made even more complex because of a larger pool of competitors which now includes other foreign firms.

Price adjustment techniques are not uncommon for subsidiaries located in countries whose currencies are relatively more susceptible to devaluation.

### **5.1.5 Asset-liability management**

Multinational firms can respond to an expected appreciation or depreciation of currencies for which their subsidiaries business dealings are denominated. Asset-liability management involves increasing assets by increasing investments and reducing short term debts (liability) if currency appreciation is expected and doing the reverse if currency depreciation is expected. This currency risk management procedure is particularly effective in minimizing translation exposure.

### **5.1.6 Pre-payment**

If management of a multinational firm expect a foreign currency to appreciate against home currency, they can negotiate an option to prepay their financial commitments (payments to imports and other to external parties). Pre-payment becomes beneficial if the foreign currency actually appreciates. A depreciation of the foreign currency leaves the firm worse off than it would have been without negotiating for an option to prepay its financial obligations.

## **5.2 External Hedging**

When all efforts by the multinational treasury to minimize currency exposure using operational techniques fail to curb risk to manageable levels, the firm turns to the financial market which provides additional hedging tools or products.

Financial market hedging products, known as derivative securities<sup>8</sup> are relatively costly for the firm but are very effective in hedging for instance against transaction exposure. It is this effectiveness that makes them desirable for use in hedging currency exposure of multinational firms.

On the other hand the cost of derivative securities is relatively lower in comparison to the cost of implementing long term structural adjustments also used by multinational firms to hedge economic exposure. The down side to these relatively low cost derivative products is that they are not as effective in hedging against economic exposure as they are in hedging against transaction exposure. This is because the hedging mechanism is such that the economic exposure is not actually hedged but is offset with a derivative security that has an opposite exposure to currency risk.

Derivative securities e.g. currency options used for hedging foreign exchange exposure can allow the firm to ripe profits in cases where there is a favourable movement of the exchange rate while others such as currency forwards and futures do not allow for this possibility.

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<sup>8</sup> Derivative securities are financial instruments whose values are derived from the value of their underlying assets.

### 5.2.1 Currency forwards

When multinational firms use currency forwards for hedging against exchange risk they buy or sell a forward contract that has an opposite currency position to the position the firm has in the spot market.

Suppose the firm has an account receivable in foreign currency say in six months and the firm is concerned about the effect of a change in exchange rates on the home currency value of this receivable. It then hedges its currency exposure with a six month currency forward contract by selling forwards typically to banks or other parties in the market. In this contract the firm agrees to sell the foreign currency at a predetermined forward exchange rate (six month forward rate today) and receives the home currency equivalent.

Firms buy and sell currency forwards in the over-the counter market<sup>9</sup>

The buyer of the currency is in a long position because it anticipates an appreciation of the underlying currency (foreign currency) while the firm is in a short position because it wants to avoid a loss in case the foreign currency depreciates. Therefore regardless of the spot rate the firm has secured a specific amount of home currency to receive at the maturity date of the forward contract.

In a survey of U.S non financial firms by Bodnar, Hayt, and Marston (1998), they found that the multinationals typically do not hedge completely their transaction exposures to currency risk using forward contracts. This is in part because treasury anticipates an appreciation or a depreciation of the underlying currency.

Forward contracts are used to effectively hedge transaction exposures and are also used to hedge against operational and translation exposures. They are not placed on the firms balance-sheet accounts.

### 5.2.2 Swaps

When firms anticipate periodic cash flows over an extended period of time, the financial hedging instrument of choice is a swap. A single swap replaces a set of forward contracts written for every cash flow. This makes a swap similar to a portfolio of forward contracts with varying maturities.

A swap between two counterparties involves an agreement to buy (swap) foreign currency using home currency at today's spot exchange rate and a simultaneous agreement to buy back home currency with the same foreign currency at some particular future date and at a specified exchange rate. Thus the parties agree to swap a stream of cash flows with another stream of cash flows.

Swaps used by firms can be of two types: a currency swap in particular is a swap of cash flows with fixed or floating interest payments with another foreign cash flows

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<sup>9</sup> Over-the-counter market is a trade in derivative securities and other financial instruments directly between trading partners.

having fixed or floating interest payments while an exchange rate swap involves swapping exclusively cash flows without the associated interest payments.

Swaps are frequently used by multinational firms because they are flexible in terms of amount and maturity and are inexpensive.

### **5.2.3 Foreign currency futures**

Currency futures can be used for hedging currency exposure in much the same way that currency forwards are used. However by their design they differ from forwards in that they are marked-to-market<sup>10</sup> where as gains or losses arising from a forward contract are settled on the maturity date.

Secondly because currency futures are exchange traded, they are standardized with respect to the underlying currency type, amount of currency, and maturity date. This makes it difficult to tailor them according to individual needs of firms to hedge exposures of varying maturities, currency types, and currency volumes.

Despite these disadvantages currency forwards are still highly desired by multinational firms because since they are exchange traded, clearing houses guarantee their transactions and therefore there is almost no risk of default.

### **5.2.4 Money market contracts**

Currency forwards and futures are good for hedging exposures to the most traded currencies. In cases where the firm needs to hedge against currency exposure involving thinly traded currencies it becomes expensive to secure these contracts. In such circumstance the firm utilizes the money market to hedge its cash flows.

Money market contracts involve borrowing funds from the money market; lock-in the funds the firm will receive in home currency at the spot rate, and investing the home currency value of the loan in the money market.

### **5.2.5 Currency Options**

Unlike currency forwards, futures and swaps which are used to reduce the variability of a hedged position due to their symmetry about the forward rate, options have asymmetric payoffs and thus allow the firms to benefit from an opposite movement in exchange rates.

A currency call option gives the holder the right but not the obligation to buy an underlying currency at a particular predetermined price known as the strike price (in this case the exchange rate) on or before the maturity date while a currency put option

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<sup>10</sup> Settlements of gains and losses are made following daily changes in exchange rates.

gives the holder the right but not the obligation to sell an underlying currency at a particular predetermined price known as the strike price on or before maturity.

It is possible for firms to incur zero cost in their use of currency options to hedge currency exposure. Typically a firm would write (sell) a currency call option and use the premium it receives to buy a currency put option. In this way the strike prices (exchange rates) of the options contracts are known by the firm and hence they form the limits of its spot rates.

Firms can trade options in the over-the-counter market or via organised exchanges.

## 6.0 Case studies: Trelleborg Group

### 6.1 Description of the firm

Trelleborg group was founded in 1905 by Henry Dunker who was managing director of then, Helsingborg's Gummifabriks AB and Johan Kock as a rubber production company. Its head office is in Trelleborg, a small town in southern Sweden. The group employs about 23,000 people in 45 countries with the US hosting the largest number of employees.

Trelleborg is a global engineering company and the world's leading industrial rubber supplier in terms of sales. The group's activities are concentrated in four business areas: Trelleborg engineered systems, Trelleborg automotive, Trelleborg sealing solutions, and Trelleborg wheel systems.

The group is listed on the NASDAQ OMX stock exchange since 1964 when it was initially the Stockholm stock exchange.

Below is a table showing some financial key figures for the year 2008.

Net sales SEK(million)	Net profits SEK (million)	Earnings per share (SEK)	Debt/Equity Ratio (%)
31263	-258	-2.95	124

Figure 1: key financial figures. Source: Trelleborg.com

### 6.2 Currency risk management policy

Trelleborg group has established an enterprise risk management process (ERM) which emphasizes systematic risk management by assigning appropriate priorities to risk levels with the aim of managing risk as efficiently as possible.

The group treasury is responsible for the currency risk management policies and its management activities are generally centralized. A number of advantages cited for this centralization policy which includes economies of scale, low cost of financing, better internal control and hence better currency risk management. In addition because the group's treasury uses hedging for speculative purposes, a centralized policy

facilitates this activity. Speculative currency trading led to profits of 10 million SEK for the year 2008.

Despite the benefits of this centralization policy, academic theory (Lee et al., 2001) warns that there could be risk of loss of knowledge and lack of incentives for local managers to take advantage of particular situations which only they may be familiar with, as well as reducing performance monitoring of subsidiaries.

Due to its extensive operations outside Sweden Trelleborg group encounters extensive operating and transaction risk. The organizational structure for managing these risks could be referred to as semi-centralized. The group treasury outlines strict guidelines to deal with operating and transaction exposure from within all of its subsidiaries; however decisions regarding the hedging of cash flows from these exposures are made by the relevant business units. Subsidiaries are entrusted with the power to hedge up to 100% of all transaction and operating cash flows whose value exceeds one million Euros. Foreign exchange forwards, currency swaps, and currency options with maturity horizons of twelve months are used for this purpose.

Besides the use of these derivative instruments the group treasury is uses netting by matching cash inflows with cash outflows. Combined transaction and operating currency exposure of the group for the year 2008 stood at approximately 2400 million SEK of which approximately 750 million SEK (30%) was hedged. The Euro and currencies that covary with it accounted for close to half of the group's total currency exposure.

Trellebog group uses the current rate method of foreign currency translation. This means income and expenses on the subsidiaries income statements are translated at the average exchange rates of the applicable year (2008). Using this method of measurement resulted in a negative effect on the group's earnings (earnings before interest and tax deductions) totalling 69 million SEK which after interest and tax deductions amounted to a net loss of 61 million SEK. However the groups policy is that translation risk associated with translation of subsidiary income statements (income and loss translation exchange risk) shall not normally be hedged.

With regard to balance sheet items such as receivables and payables, translation is done at exchange rates prevailing on the balance sheet dates while assets and share holders equity are translated at the closing exchange rates.

The group's policy is to hedge up to a maximum of 70% of translation risk, associated with translation of balance sheet items of its subsidiaries. 48% or 9,356.16 million SEK of a total net investment of 19,492 million SEK for the year 2008 was hedged.

## 7.0 Case studies: A. P. Moller-Maersk Group

### 7.1 Description of the firm

A. P. Moller-Maersk Group was founded in 1904 by A. P. Moller and his father with its head office in Copenhagen Denmark. Today the group employs about 120,000 people in around 130 countries and became the world's leading product tanker shipping company as of January 2009.

The group comprises six business units namely the container shipping and related activities unit, APM terminals unit which develops and operates container terminals and related activities, the tankers, offshore and other shipping activities units, the oil and gas activities units, the retail activities units which comprises hypermarkets and supermarkets, and the shipyards and other industrial companies units.

A. P. Moller-Maersk Group is listed on the Copenhagen stock exchange and has 63,000 registered shareholders and with a total market capitalisation of 100 billion Danish kronor as of march 5<sup>th</sup> 2009<sup>11</sup>.

The figure below highlights some financial key figures of the group for the year 2008.

Revenue in DKK(Million)	Profits in DKK(Million)	Total assets in DKK(Million)	Return on equity after tax	Earnings Per share	Dividend per share
311,821	17,532	343,110	11.6%	4.122	650

Figure 2: key financial figures. Source: fact sheet Maersk.com

### 7.2 currency risk management policy

Consistent with academic literature recommendations (Dhanini, A. 2003), the groups currency risk management policy is centralised.

Translation exposure is managed within the group using currency forwards and options, and the Danish krona is referred to as the presentation currency while currencies used by its six business units are referred to as functional currencies. The U.S dollar is used as the functional currency for two units: the container shipping and related activities unit, and the oil and gas activities unit.

For other units the local currencies of the countries in which the business activities take place are used.

The group uses the current rate method of foreign currency translation to translate income statements and balance sheet items denominated in functional currencies to

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<sup>11</sup> See fact sheet at Maersk.com

ones denominated in the presentation currency. Specifically, income statements are translated at average exchange rates and balance sheet items are translated at the exchange rates at the balance sheet dates.

For other currencies different from the functional and presentation currencies, the currencies are translated at the exchange rates prevailing at the transaction dates. All foreign exchange gains and losses are recorded in the income statement as financial income or expense.

Management of transaction exposure is simple and straightforward. Based on revenue, approximately 75% of the group's transaction activities use U.S dollars as their functional currency. Forward contracts are used to partly hedge all net transaction receivables denominated in currencies other than the U.S dollar. Forward exchange and options contracts are also used to hedge currency risk pertaining to recognised and unrecognised transactions.

The table below shows the volume of use of forward exchange and options contracts for currency risk management.

Currency Type	Principal purchase/sale,(-), Net (DKK million)	Fair Value
USD united states Dollars	495	-212
EUR Euro	1,169	-153
DKK Danish Kronor	22,008	309
CNY Chinese Yen	2,614	-111
SEK Swedish Kronor	3,281	-152
Other Currencies	9,299	-1,240
Net	38,866	-1559

Figure 2: Use of forward exchange and options contracts. Source: 2008 annual report.

The group's management of economic exposure is extensive. Both internal hedging methods and financial market hedges are used to manage the groups operating activities. Netting is used and Pre-payment is also used to hedge any foreseeable appreciation of a foreign currency. Also all income and expenses are denominated in the same currency. For instance for its two units in shipping and oil related activities, income is in U.S dollars while related expenses are in DKK, EURO, and British pound, GBP. For the other four units whose activities are locally based, income and expenses are mainly denominated in the same currency so that exposures to these currencies are reduced.

Secondly because the groups net income is in U.S dollars, financing decisions are also made in U.S dollars and hence its loans are also in U.S dollars.

The group's financial market hedges mainly involve the use of forwards and options. For future investments in currencies other than the U.S dollars both forwards and foreign exchange options are used. Other operating costs denominated in currencies different from the U.S dollar are hedged with forward contracts having a maturity of 12 months.

## Conclusions

From most of the findings of this paper, there is considerable consistency between the currency risk management practices of the multinationals under case study and recommendations from academic literature.

First both multinationals use a centralised currency risk management approach inline with prescriptions from academic literature. While academic literature provides several (speculative reasons, tax reductions, curbing cash flow volatility, provide enough internal funds) incentives why multinational firms hedge, the only incentive for A. P. Moller-Maersk's hedging activities is its ability to secure enough internal funds for future investments. However in addition to securing enough internal funds for future investments, Trelleborg AB also uses its hedging activities for speculative purposes.

Internal hedging is used by both groups to hedge against economic exposure with A. P. Moller-Maersk using the method of pre-payment and cash flow netting while Trelleborg AB uses principally cash flow netting. Of particular interest is the way the groups reduce their number of transactions by making sure all income is denominated in a single currency and all expenses also in a single currency (cash flow matching).

Amongst other derivative securities forwards and options contracts are the financial instruments of choice consistent with a survey by Kurt Jesswein et al (1995) and both multinationals uses them to hedge both transaction and economic exposures. Contrary to earlier studies by Batten et al. (1993) which showed that multinational firms prefer short term financial market hedges with maturities less than 3 months, both multinationals use forwards and options with maturities of 12 months.

In consolidating the financial statements of its units both multinationals use the current rate method such that income statements are translated at average exchange rates and balance sheet items are translated at the exchange rates at the balance sheet dates.

Again in opposition to earlier studies by Marshall (1999) limiting the management of economic exposure to the use of internal hedging methods at best and sometimes of it not being managed at all, and in support of the article by Dhanani and Groves (2001) in which they found that even though economic exposure is extensive and relatively complex to manage, some firms still endeavour to manage it; our studies have also shown that besides the management of transaction and translation exposure, Trelleborg AB and A.P. Moller-Maersk manage their economic exposure using not only internal hedging methods in the form of pre-payment, netting and cash flow matching but also external hedging techniques using options and forwards.

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