Universitetet
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Master's Thesis in Financial Economics:

An analysis of Competentia's foreign currency exposure and potential strategies

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Competentia
Providing skills

Universitetet i Stavanger

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Abstract

The purpose of this thesis is to analyze and to ascertain if our case firm, Competentia, should secure their foreign currency exposure and how they could implement strategies to deal with this exposure.

We begin by going through the relevant theoretical background in the field of foreign currency exposure. This will include the three different kinds of currency exposure, transaction exposure, translation exposure and operating exposure as well as the appropriate strategies for dealing with these currency exposures.

Furthermore, we will look into absolute and relative parity conditions as well as arbitrage relations before we move into strategy tools like hedging, forward/futures contracts and option contracts.

As my research design, I have chosen a causal design with the intention of giving a recommendation of what possible strategies Competentia could use to manage their currency exposure.

I have used interviews and accounting data as my main sources of information, which has been used to define the level of currency exposure applicable to Competentia as well as to run scenario analyses and simulations in order to determine the possible ramifications of this exposure on a significant level.

The scenario analyses and the simulations revealed that Competentia is indeed exposed to foreign currency fluctuations, especially in GBP, and should with their current risk tolerance level take action to secure at least some of their net exposed GBP position in the light of the projected future forecast of this currency's spot rate against the Norwegian currency, NOK.

This will be even more important as the GBP appreciate back to normal levels with respect to the NOK.

However, there are both structural (e.g validity and reliability) and empirical limitations (e.g type of analysis and simulations) to this study that needs to be taken into consideration before one concludes with a 100 % certainty. Foreign currency can be hard to measure.

Consequently, the above limitations will be discussed in a separate chapter at the end of this thesis.

Preface

This Master's thesis marks the end of 5 years of studies, culminating in a master's degree in economics and business administration.

By completing these 5 years of studies, I have gained insight in the world of international finance, especially in the last 2 years, which is the background and incentive for writing this thesis. The aim of the thesis is to present both relevant theory and practical examples of how a firm exposed to currency fluctuations can deal with the consequences of such fluctuations by adopting relevant strategies.

I have used the Norwegian owned recruiting company Competentia as the guide through the analysis and result sections, indicating that the results cannot be fully generalized to other institutions or organizations. However, my humble aim is to present insightful and relevant theories with a new practical angle, complementing other studies conducted in the field of currency hedging.

Throughout this process, there are people that have supported me and contributed in many ways.

First and foremost, I want to thank my advisor, Mr. Bård Misund, for his help and guidance throughout the process of writing this thesis.

I also want to thank the financial controller of Competentia, Mr. Sigbjørn Bratland, for providing all relevant data material needed to conduct this study and Mr. Bob Browning, business support manager of Competentia, for going through the material and provide helpful comments.

Finally, I want to thank my wife, Hildegunn, for her understanding, caring and support through these 5 intensive months, making my life brighter and more meaningful.

Stavanger, 11.06.12

Kjetil Anundsen

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1 Introduction

1.1 Background

This thesis is written as a part of the Master's degree in economics and business administration program (MBA) at the University of Stavanger.

Neither the institution, the advisor, nor the sensors are, through the approval of this thesis, responsible for neither the theories and methods used, nor the results and conclusions drawn in this work, but will be the student's responsibility alone.

1.2 Purpose and research question

The main purpose of this thesis has been to assess what firms can do in order to manage their foreign currency exposure and to determine the appropriate strategies to deal with this exposure.

Specifically, the Norwegian based recruiting company, Competentia, has been used as a case to address these issues in order to examine it from a practical point of view.

Hence, the focus will be on *this* organization, trying to understand *their* level of exposure and the possible strategies they can use into order to relate to this issue as optimally as possible.

In order to facilitate a recommendation to Competentia, based on the theoretical foundation of this branch of economic science, the following research question has been formulated:

Should Competentia secure their currency exposure?

The intention behind formulating this research question, has been to make it both practical yet demanding at the same time. Practical in the sense that we will use a case corporation to guide us through the empirical aspect of this field of economic science, and demanding due to the data collection procedures as well as the measurement issues.

In this thesis, the relevant variable[1] for measuring currency exposure, has been Competentia's net exposure in GBP, which means that they have more income than cost in GBP and need to sell this currency at the end of each accounting period.

Thus, one could say that our null hypothesis, H_0, is that the net position in GBP indeed affects the level of foreign currency exposure and potential strategies. The alternative hypothesis, H_A, would then be that it does not affect the level of foreign currency exposure and the potential strategies. However, we will not use tools to test these hypotheses on a statistical significant level.

The main sources of literature with respect to the research question, has been Moffett, M., Stonehill, A., & Eiteman, D. (2012), Bodie, Z., Merton, R. C., & Cleeton, D. L. (2009) and Korsvold, P. (2000).

After the presentation of the theoretical background, we will continue with the methodological chapter before we go into the scenario analyses and simulations.

Finally, the conclusions and the limitations to this study will be presented.

1.3 Why is this thesis relevant?

As the world becomes more and more global, every commercial organization is, either directly or indirectly, exposed to foreign currency exposure.

Hence, it should be relevant for the management in all types of organizations to have an understanding of the main aspects in the field of currency exposure, whether this knowledge is an in-house capability or an outsourced capability.

Foreign currency exposure works through three major channels, transaction exposure, translation exposure and operating exposure, which will be thoroughly investigated throughout this thesis.

[1] See a discussion about measurement issues in chapter 8.

1.4 About Competentia

Competentia is a Norwegian based recruiting company whose core business is the provision of teams of, or individual, highly qualified and experienced project management and engineering personnel to the oil and gas industry worldwide to augment their clients' in-house capabilities (Competenia, 2012).

They resource experienced project management, construction management, project controls and engineering personnel from all disciplines for all phases of a project from initial studies through design, construction, commissioning, start up and operations to decommissioning.

Competentia was established in Stavanger in 1998 and operates on a worldwide basis from offices in Australia, Norway and in the UK as well as having an unmanned office in Japan.

The plan is to open several new global offices in the near future to meet the market's demands over the next years.

Over the last three years, Competentia has experienced a fantastic growth[2], from having a total turnover of NOK 392,902,138 in 2009 to NOK 984,341,573 in 2011. This growth rate is expected to continue over the next five years, meaning that Competentia must increase their number of employees considerably in order to meet this growth.

The employees in question are mainly engineers and technical personnel who are hired on a contract for a limited period of time[3], with the possibility of an extension depending on the project they are working on.

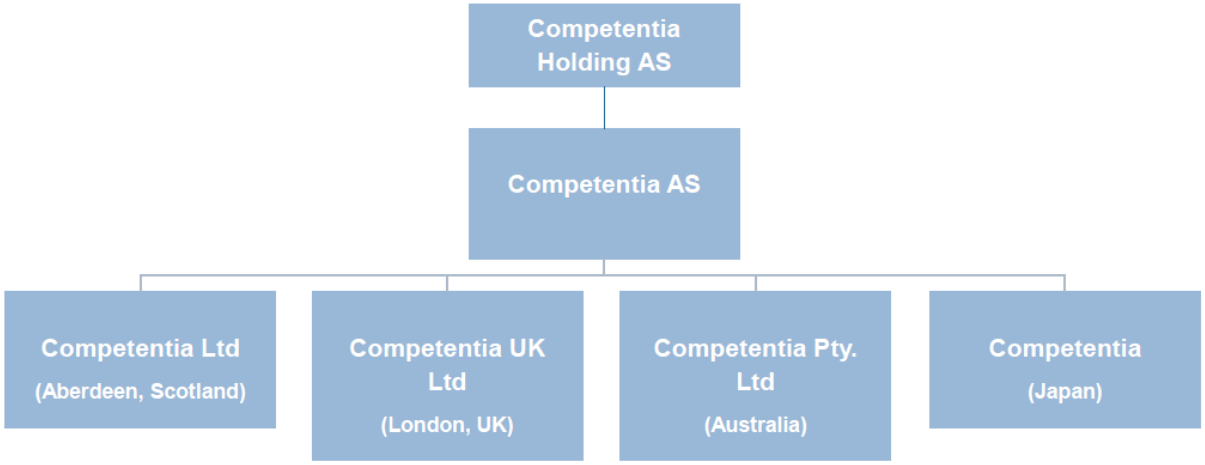
Their major clients are currently BP, ENI and BG, with other clients growing more and more important.

Competentia has currently about 15 people working as staff personnel at the Stavanger office, 4 people in the UK and 4 people in Perth, Australia. These numbers are expected to grow rapidly in the years to come.

[2] See appendices for income statements in the period 2009-2011.
[3] Typically 6 months up to 2 years. After this initial period, the contract may be extended.

In total, Competentia has got between 400 and 500 consultants working on locations worldwide.

In 2012, the Norwegian based investor group, Reiten & Co, bought the majority[4] of the shares in Competentia, making them an important supporter to facilitate Competentia's growth plans.



[4] 51 %

2 Theoretical Background

2.1 Overview

In this chapter, we will have a walk-through of the *main* theories of foreign currency exposure. We will discuss why firms hedge and have a closer look at the pros and cons of hedging. Furthermore, we will distinguish three types of currency exposure before we look into international parity conditions. Finally, we will describe some of the most relevant strategies for dealing with foreign currency exposure.

The main source of literature, has been Moffett, Stonehill and Eiteman's *Fundamentals of Multinational Finance* (Moffett, Stonehill, & Eiteman, 2012) with Pål Korsvold (Korsvold, 2000) and Bodie, Merton & Cleeton (Bodie, Merton, & Cleeton, 2009) as the main supporting literature.

2.2 Definitions and explanations

2.2.1 What is foreign currency exposure?

According to Moffett, Stonehill and Eiteman (Moffett, Stonehill, & Eiteman, 2012, p. 263), foreign exchange exposure is a measure of the potential for a firm's profitability, net cash flow and market value to change because of change in exchange rates.

As this brief definition demonstrates, change in exchange rates can *potentially* impact a firm's profitability, net cash flow and market value. That is, the level of exposure will depend upon the environment in which the firm is currently operating. In an open global economy, every corporation will be either directly or indirectly exposed.

Hence, it is a question of the level of exposure, not whether you are exposed or not. (Korsvold, 2000, p. 91).

In chapter 2.3, we will have a closer look at three distinct dimensions that will apply to a firm's currency exposure in two subcategories. These dimensions are transaction exposure, translation exposure and operation exposure.

2.2.2 What is hedging?

To understand the issue of hedging, one needs to understand the concept of risk first. We can begin by distinguishing between uncertainty and risk. Generally speaking, *uncertainty* exists whenever one does not know for sure what will occur in the future. *Risk* is uncertainty that "matters" because it affects people's welfare. (Bodie, Merton, & Cleeton, 2009, p. 268).

Consequently, uncertainty is a necessary but not a sufficient condition for risk. As an example, a firm may see a future project as uncertain.

However, this does not mean that they will change their strategy. Hence, one may say that the firm is exposed to uncertainty, but not necessarily to risk as the uncertainty does not change their future plans.

Hedging deals with risk management. A person or a company is said to hedge a risk, when the action taken to reduce one's exposure to a loss also causes one to give up of the possibility of a gain. (Bodie, Merton, & Cleeton, 2009, p. 276)

For example, a person or a corporation may want to hedge the risk of increased future prices for certain goods or services. Therefore, they may want to engage in future contracts of fixed prices in a predetermined time interval.

Thus, they are immune to an increase in prices. However, if the prices drop, they lose the gain of having lower prices because they have already signed a contract with fixed prices.

Conversely, one may also want to hedge the risk of a decrease in prices. For example, a farmer may want to hedge the risk of a decrease in wheat prices. He will therefore sign a forward contract for a certain time interval in order to secure his future cash flow. If the price of wheat decreases within the time interval, the farmer is protected and will get paid according to the terms in his signed contract. On the other hand, if the price of wheat increases, he is deprived of the opportunity of a gain.

2.2.2.1 Why hedge?

So the question remains; what is to be gained from hedging? Standard financial theory defines the value of a firm as the net present value of all *expected* future cash flows. Figure 2.1 illustrates the distribution of expected net cash flows of an individual firm.

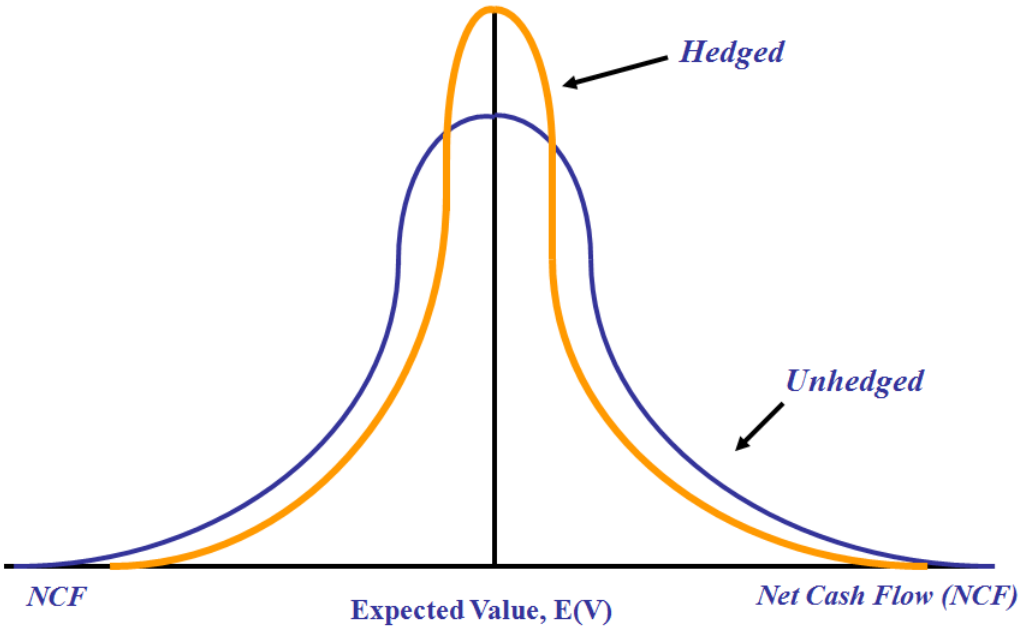


Figure 2.1 Hedged curve vs unhedged curve, source: Moffett, Stonehill and Eiteman

As we can see, hedging these cash flows narrows the distribution of the cash flows about the mean of the distribution (Moffett, Stonehill, & Eiteman, 2012, p. 265).

This implicates that currency hedging reduces risk. However, this is not the same as adding return or value. Only a rightward shift of the vertical expected value line will increase the value on the basis of hedging activities. One must also keep in mind that hedging indeed requires the use of organizational resources. Opponents of currency hedging also emphasizes that managers cannot outguess the market and that shareholders are more capable of diversifying risk than the firm's management. According to its opponent's arguments, hedging will only add cost.

2.2.2.2 Do firms hedge?

Despite the above arguments, firms still hedge their currency exposure. According to a Norwegian survey from 2005 (Børsum & Ødegaard, 2005, p. 83-99), 91 per cent of the firms that responded to the survey replied that they use one or more forms of currency hedging. This result is in line with previous international studies in the field of currency exposure and hedging.

One important thesis in this study, is that it is the *net exposure* (income minus cost) that is relevant when assessing how exposed you are.

If you have the same amount of income as cost in the same currency, you actually have a *natural hedge* and will not be exposed to currency spot rate fluctuations.

Furthermore, there are many arguments that can be made in favor of hedging regardless the cost of organizational resources.

First and foremost, hedging improves the planning capability of firms due to the fact that they can predict their cash flows more accurately. This will also help decrease the likelihood that the firm's cash reserves fall below the minimum cash level point and make them illiquid. (Moffett, Stonehill, & Eiteman, 2012, p. 266)

Secondly, hedging gives the managers more maneuverability in terms of which projects they can or cannot undertake. With the use of hedging tools and the reduction of cash flow risk, they can give the green light for projects that they otherwise might not consider.

Finally, one should not disregard the fact that hedging can reduce the management's stress levels and therefore increase the possibility of them making better decisions on the basis of higher predictability.

2.3 Three types of foreign currency exposure

Within the three types of foreign currency exposure, there are two subcategories; foreign currency exposure derived from accounting and economic competitiveness, respectively. We will start by examining foreign currency exposure derived from accounting.

2.3.1 Foreign currency exposure derived from accounting

2.3.1.1 Transaction exposure

Transaction exposure measures gains or losses that arise from the settlement of financial obligations whose terms are stated in a foreign currency (Moffett, Stonehill, & Eiteman, 2012, p. 287)

Specifically, it measures changes in the value of outstanding financial obligations incurred prior to a change in exchange rates but not due to be settled until after the exchange rates change.

A typical example would be a firm that is purchasing or selling goods or services on credit when the prices are stated in foreign currencies. Another example is firms that are borrowing or lending funds when the repayment is to be made in a foreign currency.

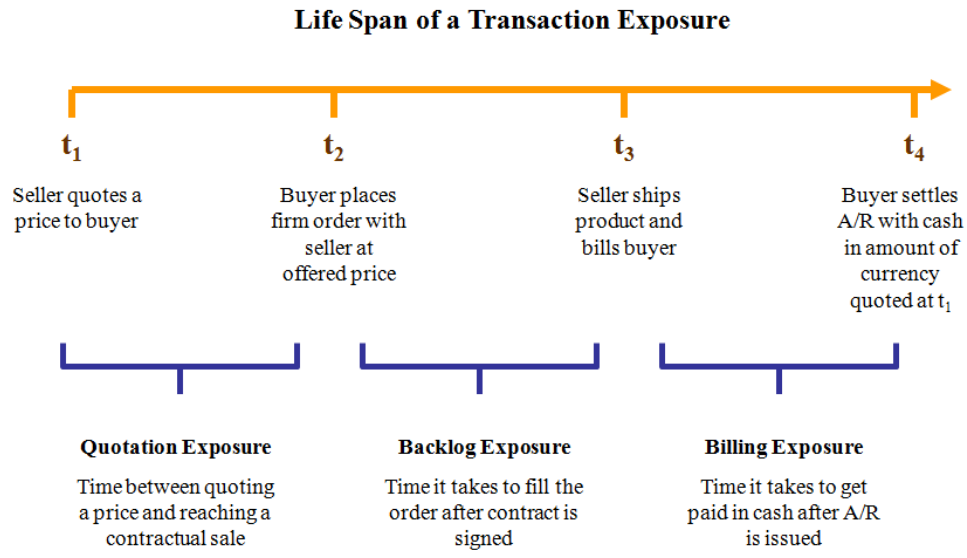


Figure 2.2, Life span of a transaction exposure. Source: Moffett, Stonehill and Eiteman

Figure 2.2 shows how a transaction exposure arises and is finally settled when the buyer pays the invoice issued by the seller.

As shown, transaction exposure can be subdivided into quotation exposure, backlog exposure and billing exposure. The seller quotes a price, either verbally or written, in a foreign currency to a customer. The time between quoting a price and signing a contract is called quotation exposure. Given that a contract is signed, the time between signing and shipping the order is called backlog exposure. Finally, billing exposure is the time that passes from when the seller ships the order to when the buyer pays for the goods or services sold.

2.3.1.1.1 How to measure transaction exposure

As shown in the above subchapter, transaction exposure measures gains or losses that arise from the settlement of financial obligations whose terms are stated in a foreign currency. The best way to explain this is through an example.

Let's say that a Norwegian export business is about to receive £800,000 from a UK client with the payment to be made in 45 days. The spot exchange rate on the date of the sale is NOK 9.00/£.

However, spot rates have recently fluctuated and two scenarios are possible:

Scenario 1: £ weakens to NOK 8.70/£

Transaction settlement:	£800,000 X NOK 8.70/£	= NOK 6,960,000
Transaction booked:	£800,000 X NOK 9.00/£	= NOK 7,200,000
Foreign exchange loss (disagio):		= (NOK 240,000)

Scenario 2: £ strengthens to NOK 9.30/£

Transaction settlement:	£800,000 X NOK 9.30/£	= NOK 7,440,000
Transaction booked:	£800,000 X NOK 9.00/£	= NOK 7,200,000
Foreign exchange gain (agio):		= NOK 240,000

As the example shows, the Norwegian export business has a transaction exposure because their future cash flow is uncertain. If their cash reserves were small, this could indeed represent a considerable challenge if the spot rate was as in scenario 1. Conversely, if the spot rate was as in scenario 2, the Norwegian firm could book NOK 240,000 as foreign exchange gain.

You could do the same exercise with scenarios for borrowing or lending money where the repayment is to be made in a foreign currency.

2.3.1.2 Translation exposure

Translation exposure arises because financial statements of foreign subsidiaries, which are stated in foreign currencies, must be restated in the parent's reporting currency for the firm to prepare *consolidated* financial statements (Moffett, Stonehill, & Eiteman, 2012, p. 278).

Hence, translation exposure is the potential for an increase or decrease in the parent's net worth and reported net income caused by a change in exchange rates since the last translation.

Both the *income statement* and the *balance sheet* must be translated in order to create consolidated financial statements. Consolidated cash flow statements do not need to be translated because they are constructed on the basis of the already consolidated income statement and balance sheet.

Each subsidiary will have their own *functional currency* which need to be *translated* into the parent's reporting currency.

2.3.1.2.1 How to measure translation exposure?

There are two dominating methods on this field today; the *current rate method* and the *temporal method*. However, we will only be using the current rate method as this method is the most relevant for our purposes.

Under the current rate method, all financial statement line items are translated at the "current" exchange rate with a few exceptions (Moffett, Stonehill, & Eiteman, 2012, p. 280).

This applies to:

- Assets and liabilities
- Income statement items
- Distributions
- Equity items

It's important to be aware that, under this method, foreign exchange gains or losses caused by the translation itself, are not included in the consolidated net income, but accrued in a separate equity account.

Let us now turn to an example that shows us how this can impact a corporation's consolidated income statement as well as the balance sheet items.

	Sales (millions in local currency)			Average exchange rate			Sales (millions in NOK)		
	2010	**2011**	**%change**	**2010**	**2011**	**%change**	**2010**	**2011**	**%change**
Norway	500	590	18,0 %	-	-		500	590	18,0 %
UK	80	89	11,3 %	9,8	8,8	-10,2 %	784	783,2	-0,1 %
Australia	70	82	17,1 %	6,5	5,7	-12,3 %	455	467,4	2,7 %
Total							**1739**	**1840,6**	**20,6 %**

	Earnings (millions in local currency)			Average exchange rate			Earnings (millions in NOK)		
	2010	**2011**	**%change**	**2010**	**2011**	**%change**	**2010**	**2011**	**%change**
Norway	40	42	5,0 %	-	-		40	42	5,0 %
UK	2,8	2,9	3,6 %	9,8	8,8	-10,2 %	27,4	25,5	-7,0 %
Australia	2,5	2,7	8,0 %	6,5	5,7	-12,3 %	16,3	15,4	-5,3 %
Total							**83,69**	**82,91**	**-0,9 %**

Table 2.1 Translation exposure for a corporation operating in countries with different currencies.

As table 2.1 shows, the corporation's total sales rose from 2010 to 2011. This applies for all subsidiaries in local currencies. The UK and the Australian subsidiaries rose with 11.3 % and 17.1 % in local currencies from 2010 to 2011, respectively.

However, if we have a closer look, the table shows that the corporation reported a consolidated negative change in the UK subsidiary and only a minor positive change in the Australia subsidiary from 2010 to 2011. This is due to the negative changes in the average exchange rates. The situation is even worse when we measure changes in the corporation's consolidated earnings.

Hence, translation exposure will indeed affect a corporation's consolidated income statement.

The effect will increase proportionally with the change in the average exchange rates. Similar effects occur when translating accounts on the balance sheet.

One way to minimize translation exposure on the balance sheet, is to use a *balance sheet hedge* where the main purpose is to match assets and liabilities so that the net translation exposure is zero.

However, this technique requires constant monitoring and prediction of future exchange rates (Moffett, Stonehill, & Eiteman, 2012, p. 286) and will consume considerable organizational resources.

2.3.2 Foreign currency exposure derived from economic competitiveness

2.3.2.1 Operating exposure

Operating exposure or economic exposure as it is sometimes called, measures any change in the present value resulting from changes in future operating cash flows caused by any *unexpected* change in exchange rates. It is important to emphasize that the changes in exchange rates must be *unexpected* in order to affect the cash flows because all *expected* exchange rate changes will already be anticipated in a well-functioning market (Korsvold, 2000, p. 90).

Both transaction exposure and operating exposure deal with future cash flows, but differ in terms of which cash flows management considers and why those those cash flows change when exchange rates change (Moffett, Stonehill, & Eiteman, 2012, p. 299).

Specifically, while transaction exposure and translation exposure deal with cash flows that are derived from accounting processes, operating exposure depends on estimates of future cash flow changes over an arbitrary time horizon.

Thus, operating exposure depends on strategies in finance, marketing, purchasing and production.

If we revisit our corporation in the previous subchapter, the Australian subsidiary is clearly AUD functional because all cash inflows and outflows are in AUD. The UK subsidiary is therefore GBP functional and the Norwegian parent company is NOK functional for the same reasons.

Operating exposure is considered to be far more important for the long-run health of a business than changes caused by transaction or translations exposure. This is because operating exposure will take the long-run fundamental economic and competitive drivers into account when assessing future cash flows[5]. This is also called dynamic exposure.

2.3.2.1.1 How to measure operating exposure

The operating exposure (the impact of unexpected changes in exchange rates on expected cash flows) of a firm can be measured at four levels: (Moffett, Stonehill, & Eiteman, 2012, p. 303).

[5] We will return to the fundamental economic conditions of currency exposure in chapter 2.4.

1. **Short Run:** In this category, prices and volumes are primarily fixed and no competitive market changes will occur. Realized cash flows will differ from those expected in the budget. The time frame in this category is less than a year.
2. **Medium Run: Equilibrium.** In this two to five years time frame, volumes begin a partial response to new prices because of the unexpected changes in the exchange rates and existing competitors begin partial responses[6]. Assuming equilibrium, this will implicate a complete pass-through of exchange rate changes.
3. **Medium Run: Disequilibrium.** In this case, assuming disequilibrium, prices and costs may not be easy to adjust according to the unexpected change in exchange rates. However, we will still experience a partial pass-through of exchange rate changes and also partial response of volumes and of existing competitors.
4. **Long Run:** In this case, the prices and volumes will be completely flexible and one could experience threats of new entrants and changing competitor responses. The time frame is more than five years in this category.

The impact and application of these different measurement levels, will be commented in the strategy section in chapter 6.

[6] Assuming equilibrium and that parity conditions hold among exchange rates, national inflation/interest rates.

2.4 Parity conditions

International parity conditions are the economic theories that link exchange rates, price levels and interest rates (Moffett, Stonehill, & Eiteman, 2012, p. 173). It is important to have an understanding of these issues before you implement currency exposure strategies which we will return to in chapter 2.5. If managers have a good understanding of these concepts, they can make important long-run predictions of future exchange rates and adjust their exposure strategies accordingly.

2.4.1 Purchasing power parity and the law of one price

The first important concept in terms of international parity conditions, is called purchasing power parity.

Closely related to this concept is the *law of one price*, which states that identical products or services sold in two different markets, should have the same price if we disregard restrictions on sales- and transportation costs. The reason why this is true, is that arbitrageurs[7] would otherwise buy goods in one market and sell it in the other market making a profit.

Consequently, prices will adjust so that this arbitrage opportunity is minimized when you take the cost of transportation and other market frictions into account.

The law of one price will apply even if the markets are in two different countries. We just need to convert the first currency into the other using the spot rate that links these two currencies.

As an example, a basket of goods in Norway should equal the price of a basket of similar goods bought in the UK, using only the spot rate to express the one currency in terms of the other.

The price of the basket in Norway, P^{NOK}, should then equal the price of the UK basket, $P^{£}$, where S is the spot rate linking the two currencies:

$$P^{NOK} \times S = P^{£} \text{ or } S = \frac{P^{NOK}}{P^{£}}$$

This would only be true if there were no transportation costs or other frictions between markets. Yet, we know such frictions exist, but the theory still has a major impact on the understanding of how prices are set in different markets.

[7] An arbitrageur is a person that takes advantage of price differences in two or more different markets.

2.4.1.1 Absolute purchasing power parity

The absolute version of this theory, absolute purchasing power parity, states that the spot exchange rate is determined by the relative prices of similar baskets of goods. As a super popular and very relevant example, we have the "Big Mac Index" which has been annually calculated by *The Economist* since 1986 (Economist, 2012).

Figure 2.3, "The Big Mac Index", Source: The Economist

Figure 2.3, shows how currencies are overvalued or undervalued with respect to U.S dollars. A "Big Mac" from McDonald's is the classic example of how *identical* goods can be used to assess whether a currency is overvalued or undervalued when compared to other currencies[8]. The other reason for the "Big Mac" to be the "perfect" candidate, is that the product is a result of predominantly local materials and input costs.

As we can see, the Swiss franc turns out to be the most overvalued currency and the Indian rupee the most undervalued currency versus the U.S dollar as at January 2012.

According to absolute purchasing power parity, this would indicate that the Swiss franc should weaken and that the Indian rupee should strengthen against the U.S dollar, respectively.

2.4.1.2 Relative purchasing power parity

The theory of absolute purchasing power parity has very strict and possibly not very realistic conditions which need to be met in order for the theory to be applicable.

The theory of *relative purchasing power parity*, however, states that absolute purchasing power parity cannot be used to determine what the spot rate should be today, but that the relative change in prices between two countries with different currencies over a period of time determines the change in the exchange rate over that period (Moffett, Stonehill, & Eiteman, 2012, p. 177). Another big problem in implementing absolute purchasing power parity, is that very little data is available for measuring it (Rogoff, 1996).

Hence, relative purchasing power parity is probably a better method for assessing future spot rates. This is done by studying relative inflation changes between two countries that use different currencies.

For example, if the American economy should experience higher inflation rates *relative* to Norwegian inflation rates, this tends to be offset over the long run by an equal but opposite change in the spot exchange rate.

Consequently, this would in general terms, indicate that the increased relative inflation rate of the American economy should offset a weakening of the American currency compared to the Norwegian currency in the long run.

In general, empirical tests have shown that therories about relative purchasing power parity hold up well over the very long run but poorly for shorter time periods. Furthermore, it has

[8] You can only compare one currency pair at a time.

been shown that the theory is more suitable for countries with relatively high rates of inflation and underdeveloped capital markets (Moffett, Stonehill, & Eiteman, 2012, p. 178).

2.4.2 International Fisher effect

The theory of the international Fisher effect, is the relationship between the percentage change in the spot exchange rate over time and the differential between comparable interest rates in different national capital markets.

Formally, the relationship can be represented as follows:

$$\frac{S_1 - S_2}{S_2} = \frac{i^{home\ currency} - i^{foreign\ currency}}{1 + i^{foreign\ currency}}$$

Where S_1 is the spot rate in the beginning of the period, S_2 is the spot rate in the end of the period and i is the interest rate.

In words, this means that the spot exchange rate should change in equal amount but in opposite direction to the difference in interest rates between two countries (Moffett, Stonehill, & Eiteman, 2012, p. 182).

2.4.3 Covered interest arbitrage

The theory of interest parity states that the difference in the national interest rates for securities of similar risk and maturity should be equal to, but the negative of, the forward rate discount or premium for the foreign currency, except for transaction costs.

Normally, this condition holds. However, the foreign exchange market and the international money market are not always in perfect equilibrium and arbitrage opportunities occur.

The covered interest arbitrage opportunity exists whenever an arbitrageur discovers that there is a disequilibrium and takes advantage by investing in whichever currency that offers the higher return. The term *covered* means that the arbitrageur would "lock" a forward contract that yields a certain profit. Hence, the outcome is guaranteed.

2.4.4 Uncovered interest arbitrage

Unlike the covered interest arbitrage, the uncovered interest arbitrage is *uncovered* in the sense that the arbitrageur does not "lock" the outcome of an investment by a forward contract, but chooses to take the currency risk.

Typically, investors taking advantage of uncovered interest arbitrage, borrow money in countries with low interest rates and convert the proceeds into currencies that offer much higher interest rates.

The investors in these type of investments, must typically bear the risk of an unfavorable change in the spot exchange rate at the end of the investment period, exposing themselves to potential losses.

2.5 Foreign currency exposure strategies

In the following, we will examine some of the most relevant strategies to cope with different types of currency exposure. As a guide through the different strategies, we will be using a fictive but relevant, Norwegian based corporation, *Hedge corporation*.

2.5.1 Strategies for managing transaction exposure

When you have a good understanding of how the theories of the above concepts work, it is time for the management to implement strategies that will optimize the firm's position in terms of their currency exposure. In the following, we will have a closer look at four relevant strategies for managing transaction exposure.

2.5.1.1 Remain unhedged

The first "strategy" is to do nothing. If this is the management's deliberate strategy, they should have done a thorough analysis of the firm's transaction exposure, *choosing* to bear the risk of currency spot rate fluctuations because the risk is considered to be acceptable.

Typically, if the firm has huge cash reserves, they may decide that the use of hedging tools is unnecessary. This would normally depend on the type and size of the exposure.

As an example, the Hedge corporation is about to sell goods worth £1,000,000 to a UK client. The payment is to be received in 90 days and the current spot exchange rate is 9NOK/£.

Consequently, Hedge corporation will need to book 9,000,000 in their accounts receivables. However, on the day of payment, the pound may have fallen to 8.7NOK/£. This would indicate that Hedge corporation must book 300,000 NOK as foreign exchange loss (disagio).

Hedge's management may consider their financial situation to be both solid and very liquid. Therefore, they may accept the risk of an unfavorable currency rate fluctuation. After all, the currency rate fluctuation could also work out favorably.

If we revisit to the study conducted by Børsum and Ødegaard (Børsum & Ødegaard, 2005), we remember that 91 per cent of the respondents said that they used one or more hedging techniques. This is in line with international studies on the field.

Nevertheless, Hedge corporation's decision may be totally justified regardless of what other firms do as long as this assessment is based on a thorough analysis.

2.5.1.2 Forward/Futures contracts

Instead of being exposed to currency fluctuations, the management in Hedge corporation could buy a forward or futures contract to hedge their currency exposure. A forward contract is any agreement between two parties that calls for delivery of an item on a specified future date for an agreed-upon price that is paid in the future (Bodie, Merton, & Cleeton, 2009, p. 378). A futures contract differs from the forward contract in the sense that it is a standardized contract that is traded on exchanges.

The management of Hedge corporation could very well use a forward contract to hedge their transaction exposure in the previous example.

Let's say that the 90 days forward rate was NOK 8.95/£ on the day that they sold their goods to the client.

Hedge corporation would then book 8,950,000 NOK in their accounts receivables and 50,000 NOK as foreign exchange loss.

Hence, the forward contract would eliminate all foreign exchange risk related to the tranaction, but as we have already discussed, they would also give up a potential gain if the spot exchange rate turned out to be above NOK 9.00/£ on the day of payment.

2.5.1.3 Hedging in the money market

According to Bodnar (Bodnar, 2011), this method utilizes the fact from covered interest parity, that the forward price must be exactly equal to the current spot exchange rate times the ratio of the two currencies' riskless returns. It can also be thought of as a form of financing for the foreign currency transaction.

To hedge in the money market, Hedge corporation will borrow pounds from a U.K bank at once and convert it to NOK. They will repay the loan in three month with the money received from their client.

Hedge corporation need to borrow just enough to repay the principal plus interest. If the current interest rate is 8.0 % per annum (2.0 % quarterly), they need to borrow:

$$\frac{£1{,}000{,}000}{1 + 0.02} = £980{,}392$$

With the £980,392, Hedge corporation would buy NOK and receive £980,392 ∗ 9 = NOK 8,823,528 at once. If the corporation's cost of capital is 10 % per annum (and if this is the relevant investment), we could calculate the 3 months future value as follows:

NOK 8,823,528 X 1.025 = NOK 9,044,116.20

This amount would be the relevant amount if one should compare the money market hedge with the forward market hedge.

2.5.1.4 Option market hedge

Another possibility for Hedge corporation, is to buy a put option.

An option is generally a contract that gives its owner the *right* to buy or to sell some asset at a pre-specified price per unit for a specified time period (until maturity date) (Bodie, Merton, & Cleeton, 2009, p. 401). An option to buy the specified item at a fixed price is a *call* and an option to sell is a *put*.

In essence, if you buy an option, you pay a *premium* which gives you the *right* to exercise your option if the price of the item you sell or buy evolves unfavorably relative to the starting point.

If Hedge corporation should want to buy a put option to secure their transaction exposure, the cost of this option with a premium cost of 2 % and a spot exchange rate of NOK 9.00/£ would be:

(Size of option) X (premium) X (spot rate) = £1,000,000 X 0.02 X 9 = NOK 180,000

If the spot rate falls below NOK 9.00/£ at the date of payment, Hedge corporation could exercise their option, and have only the cost of NOK 180,000.

However, the main feature of the option, is that there is no limit for the upside potential of the spot rate.

Hence, if the spot exchange would be NOK 9.50/£ on the day of payment, Hedge corporation would receive:

£1,000,000 X NOK 9.50/£ = NOK 9,500,000

The only cost would be the option cost of NOK 180,000. In order to make this cost comparable to the other hedging alternatives, the future value (using the cost of capital as interest rate) would be:

NOK 180,000 X 1.025 = NOK 184,500

You could also come to the same conclusion by subdividing the cash flow into two parts, one being the payoff from the sale and the other being the payoff generated by the option. The cost of the option would be as described above.

2.5.2 Strategies for managing translation exposure

As discussed under in chapter 2.3, the main technique to cope with your translation exposure, is to use a balance sheet hedge.

This technique requires an equal amount of *exposed* foreign currency assets and liabilities on a firm's consolidated balance sheet. If this can be achieved for each foreign currency, net translation exposure will be zero (Moffett, Stonehill, & Eiteman, 2012, p. 286).

If Hedge corporation is to borrow £1,000,000, this loan represents a *balance sheet hedge* against the pound-denominated account receivable.

Thus, their net translation exposure would be zero regarding this single transaction and the following translation process.

However, using balance sheet hedges cannot always be justified and also requires considerable organizational resources to manage. One needs to look at the business environment, functional currencies of the subsidiaries and the vulnerability of the business when deciding to use a hedging tool or not.

2.5.3 Strategies for managing operating exposure

The objective of both operating and transaction exposure management is to anticipate and influence the effect of unexpected changes in a firm's future cash flows, rather than merely hoping for the best (Moffett, Stonehill, & Eiteman, 2012, p. 308).

To manage operating exposure, the key is for the management to recognize a disequilibrium in parity conditions (discussed in chapter 2.4) as soon as it occurs and to react most appropriately.

To accomplish this, the firm needs to diversify both their operations and their financing bases.

2.5.3.1 Diversifying Operations

Diversifying operations means diversifying sales, location of production facilities and raw material sources.

For example, one could combine the production and exporting of a manufactured good with an importing operation that imports competitive consumer goods from foreign producers. This creates a natural operating hedge that keeps the home currencies' cash flows steady in light of real exchange rate movements (Bodnar, 2011).

If the management recognizes a temporary change in competitive conditions worldwide (disequilibrium), it permits them to make changes in their operating strategies and make corrections in sourcing raw material, components or finished products.

The main goal of this diversification process is to reduce the variability of the firm's cash flows. This is because, under disequilibrium and changing exchange rates, the competitiveness of the firm will increase in some markets and decrease in other markets.

Hence, one may accomplish to neutralize the firm's operating exposure by this diversification process.

2.5.3.2 Diversifying Financing

Diversifying the financing base, means raising funds in more than one capital market and in more than one currency.

If a firm diversifies its financing sources, it will be pre-positioned to take advantage of temporary deviations from the international Fisher effect (Moffett, Stonehill, & Eiteman, 2012, p. 308).

The main goal of diversifying your financing sources, is ultimately to lower the cost of capital and also increase the availability of capital.

Other management tools of operating exposure, is the matching of currency cash flows, currency clauses, credit swaps ans cross currency swaps which will not be discussed here.

3 Research methods and research design

3.1 Overview

The main purpose of this chapter is to describe and justify the methods and research design used to gather the necessary data material to conduct the analyses in chapter 4 and 5.

A research method is a procedure and a tool to solve problems in order to learn new knowledge.

According to Jacobsen (Jacobsen, 2005), the research method's main purpose is to assist giving as optimal description of the reality as possible. The research design is the plan for how we want to collect and analyze data

3.2 Design

The first thing to consider, is to ascertain how the main research question should be formulated and to assess what kind of research design that is suitable to use in order to answer the research question in the most appropriate manner.

Should the thesis's main focus be to describe, explain, predict or recommend and should one use an explorative, descriptive or causal design?

Such questions needed to be answered before one could go forward with the collection of data and choosing what theories that are most relevant.

As described in the introduction in chapter 1, the main focus was to try to understand Competentia's currency exposure and to see how they could position themselves to optimize their foreign currency exposure strategies.

This called for a causal design where the main focus was to give some recommendations of potential strategies that Competentia could use in order to handle their foreign currency exposure most efficiently with the current level of organizational resources.

Hence, the following simple, yet interesting, research question was selected in order to serve this purpose:

Should Competentia secure their foreign currency exposure?

To answer this research question, one must first establish the theoretical foundation that this answer must be built on in order to develop the appropriate recommendations that this question demands.

It is also necessary to establish the causal relationships that exist in the world of foreign currency exposure.

The operationalization in this thesis has been done by measuring the effect of the *net exposed position* in GBP on the foreign currency exposure.[9]

Consequently, a quantitative and causal research design has been chosen where the main focus has been to give some recommendations based on the research question.

3.2.1 Some pitfalls

In causal and quantitative research designs, there are some relevant pitfalls worth mentioning.

First, we have the concept of validity. Validity generally indicates whether the researcher measures what he actually intends to measure (Reve, 1985).

There are several types of validity. Some of the most relevant are:

- Construct validity: To what extent does the operationalization measure the concepts which it purports to measure?
- Statistical conclusion validity: Are the observed associations strong enough to be meaningful (sample size vs. Type I and Type II errors and wrong use of statistical methods)?
- Internal validity: Is A really the cause of B?
- External validity: Can the findings be generalized to other units, situations, times etc?

Secondly, we need to consider the concept of reliability.

Reliability means that a measurement does not vary because of the characteristics of how you measure it (Neumann, 2009, p. 122). In essence, your measurements need to be consistent and trustworthy.

These issues will be adressed in the chapter about limitations and applicability (chapter 8).

[9] See a discussion of this topic in chapter 8.

3.3 Population

Both the population and the sample are limited to Competentia. Hence, no attempts to generalize the results from the analyses are made. However, corporations in similar situations to Competentia, can probably use the same framework for the analysis and draw their own and probably similar conclusions.

3.4 Methods for the collection/analysis of data

The collection of data is done by:

- Interviews with the Financial controller of Competentia, Mr. Sigbjørn Bratland.
- Analysis of accounting data extracted directly from the accounting system.
- Analysis of annual accounting reports from Brønnøysundregisteret[10].

These data were used to test and measure Competentia's foreign currency exposure through scenario analyses as well as the Monte Carlo simulations and the sensitivity analysis with Crystal Ball.

The limitations as well as the validity and reliability of these methods will be discussed in chapter 8.

[10] Brønnøysundregisteret is the central Norwegian register for accounting data, vat, licenses etc.

4 Data description and analysis

4.1 Overview

This chapter will give us the basic understanding of the relevant data material at hand and a build-up of the relevant models that needed to be tested in order to draw significant conclusions about Competentia's current foreign currency exposure and possible strategies. First, today's situation will be presented before we move into the description of the data material and the analyses that will be conducted in chapter 5.

4.2 Today's situation

The financial controller of Competentia, Sigbjørn Bratland, has of today a board approved authority to sell or buy any net residual of each currency position at the end of each month.

Specifically, this means that every currency on the balance sheet should balance with regards to the total assets and liabilities of each currency at the end of each month.

Consequently, one must sell or buy currencies at the end of each month to achieve this.

Usually, because Competentia has far more income than cost in foreign currencies, they need to sell the foreign currency.

For the last couple of months, Competentia has as an example sold 3-5 millions GBP to achieve this each month, of course having to accept foreign exchange gains or losses and book this in their accounting system as foreign exchange gains or losses accordingly.

They do not, as of today, want to speculate on currency fluctuations. Therefore, they buy or sell their currencies regardless of the spot rate on the transaction date.

Table 4.1, shows us the operating income and cost in NOK, EUR and GBP for the years 2008 to 2011.

Year	2008		2009		2010		2011	
	Income	Cost	Income	Cost	Income	Cost	Income	Cost
GBP	203	88,6	298	147,4	359	189,7	719	251,4
EUR	20	4,1	22	5,1	21	5,8	12	4,4
NOK	50	152,3	73	204,2	98	242	192	598,5
Total	**273**	**245**	**393**	**356,7**	**478**	**437,5**	**923**	**854,3**

Table 4.1: Distribution of Operating income and Operating cost Competentia 2008-2011 in NOK (consolidated and translated into millions NOK using the spot rat on the day of conversion)

As we can see, Competentia has considerable net exposed currency positions. To visualize this, let us turn to figure 4.1.

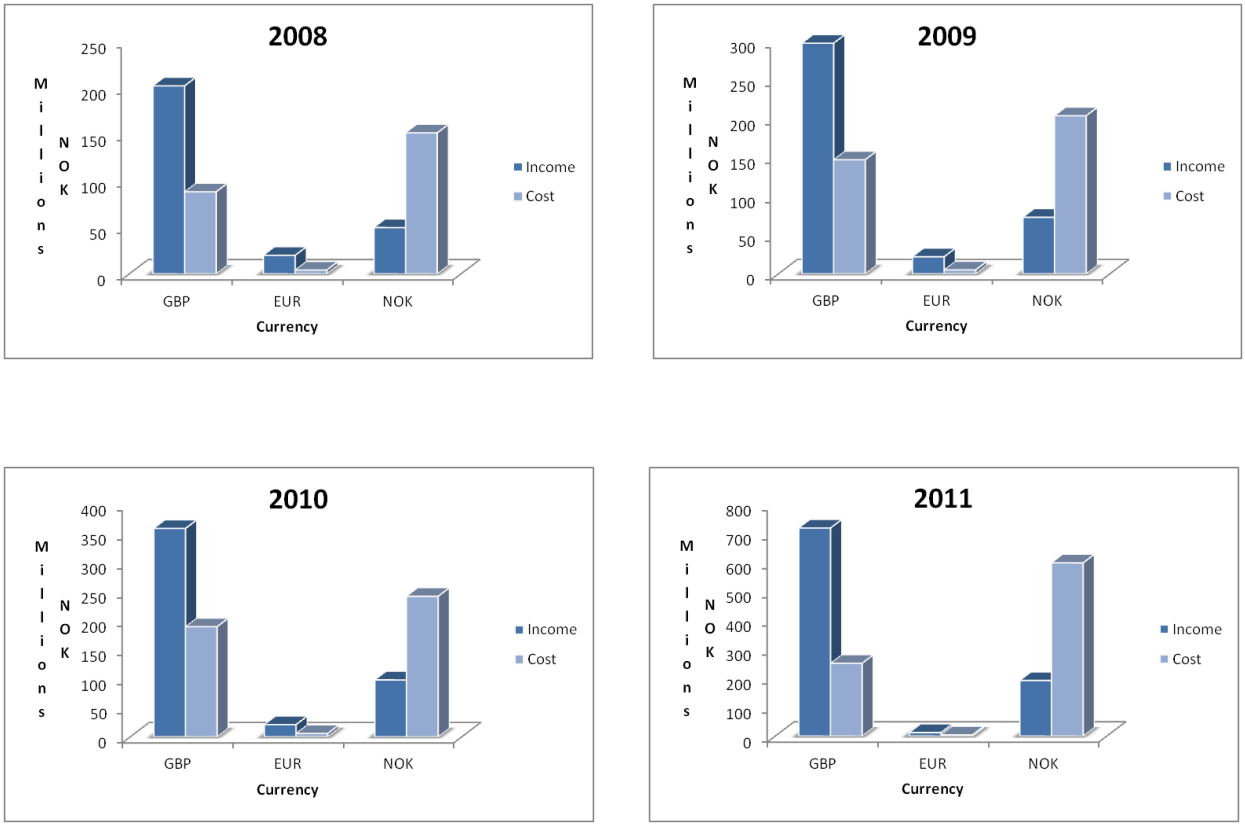


Figure 4.1 Operating income/cost 2008-2011 (translated into millions NOK)

When comparing the operating income vs. cost in each currency in the years 2008 to 2011, we can observe that Competentia has more income than cost in GBP and EUR, whereas they have more cost than income in NOK. This corresponds with the current procedure of selling currency at the end of each accounting period as previously mentioned.

However, as figure 4.1 and table 4.1 indicate, the EUR share of the operating income and cost is small relative to the total income and cost and the net exposure is also very small.

Thus, we will only take GBP into consideration when analyzing Competentia's foreign currency exposure and potential strategies.

Furthermore, we will only take the years 2010 and 2011 into consideration as the basis of our prognosis, as this is most relevant for the analysis in chapter 5.

In 2010, the net exposed position in GBP was 169.3 million NOK and in 2011 it was 467.6 million NOK (translated due to reporting currency format).

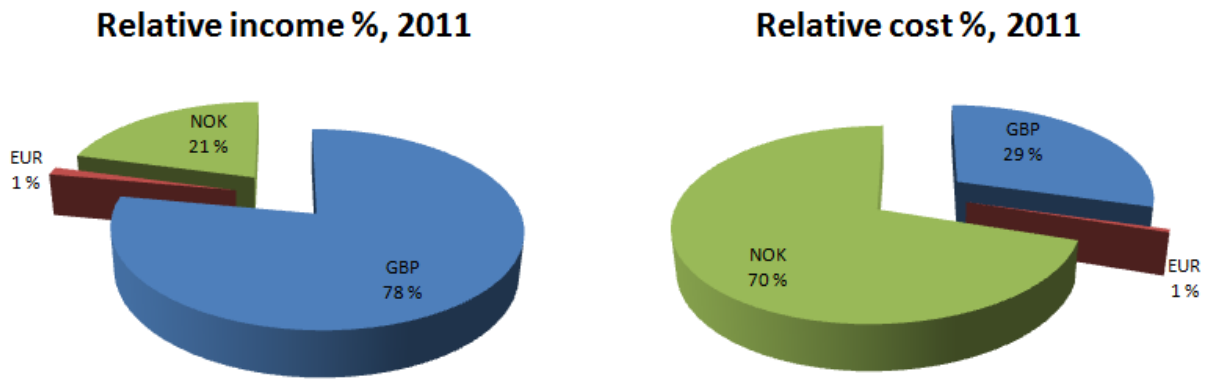


Figure 4.2 Relative income in currency vs. relative cost, Competentia 2011

4.3 Is Competentia exposed to foreign currency exposure?

If you look closely at table 4.1 as well as the figures 4.1 and 4.2, there is no doubt that Competentia is indeed exposed to foreign currency risk, having a considerable net position in GBP that will affect both profitability, net cash flow and market value (see chapter 2.2).

As we can see from figure 4.2, in 2011, Competentia had 78 % of its income in GBP and only 28 % of its costs in GBP.[11] This trend will likely continue in 2012 by looking at the accounting data from the first quarter of 2012 as well as at the historic accounting data.

Hence, if we factor in future growth using today's business structure (see figure 4.2), the net exposed position in GBP is expected to increase as the income in GBP increases.

4.3.1 Transaction exposure

If we look exclusively on transaction exposure, it is quite obvious that Competentia is having a significant transaction exposure in GBP because they need to sell GBP at the end of each month, exposing themselves to currency spot rate fluctuations. As of today, Competentia does not use any type of hedging instruments.

Specifically, they have a net position of 3-5 millions GBP each month which is exposed to spot rate currency fluctuations. This net currency position in GBP could as an example have been secured by forward contracts or option contracts as in the scenario analyses and the simulations in chapter 5.

4.3.2 Translation exposure

Competentia is also exposed to translation exposure, because they have foreign subsidiaries and need to restate and consolidate the subsidiaries financial statements into their reporting currency, NOK.

Consequently, this will affect the parent's net worth and reported net income caused by a change in the exchange rate since the last translation.

The problem is, though, that securing this translation exposure will require the use of balance sheet hedges that can be both costly to implement and require the use of considerable

[11] Both income and cost is translated from GBP to NOK due to the fact that NOK is Competentia's reporting currency.

organizational resources which is considered to be beyond Competentia's capability at the moment.

Hence, securing the translation exposure will not be considered as an option when testing currency exposure in the scenario analyses well as in the simulations.

4.3.3 Operating exposure

If we revisit chapter 2.3.2.1, we see that the operating exposure measures any change in the firm's present value caused by any unexpected change in the exchange rates.

Consequently, Competentia is indisputably exposed to operating exposure.

Moreover, it was established that operating exposure depends on estimates of future cash flow changes over an arbitrary time horizon and that operating exposure ultimately is depending on strategies in finance, marketing, purchasing and production.

Because all of these elements take account of the long-run economic and competitive drivers when assessing future cash flows (dynamic exposure), we need to have a close look at these dimensions when deciding which potential future strategies Competentia can use to deal with their operating exposure.

However, there will be no quantitative measurements of these complex relationships, but rather a discussion of these topics in the strategy section of chapter 6.

4.4 What could we expect of the future GBP/NOK spot rate?

The currency spot rates are constantly changing due to macroeconomic factors as described in chapter 2.4.

In this section, we will examine these economic drivers by using purchasing power parity, the international Fisher effect and prognosis from commercial establishments to assess how the currency spot rate would likely develop over the longer term.

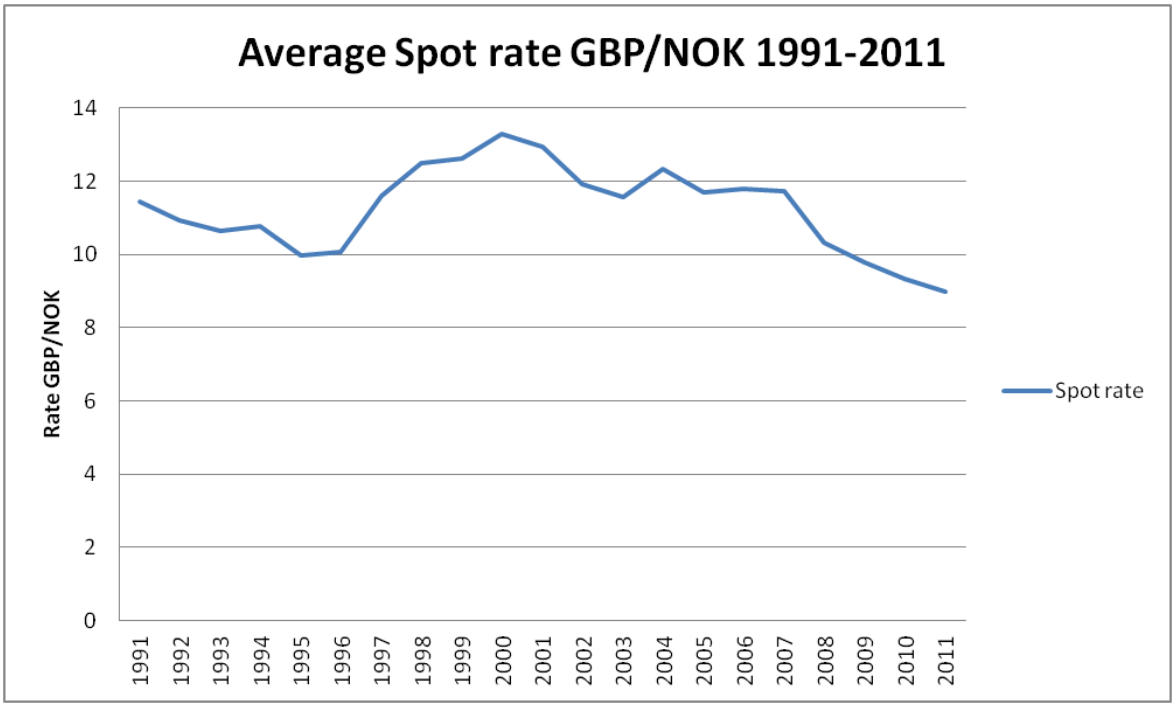


Figure 4.3 Average spot rate GBP/NOK 1991-2011. Source: www.norges-bank.no

If you base this assessment on historical data, as in figure 4.3, the NOK seems to be overvalued in today's market.

Hence, we should expect the Norwegian currency to depreciate against the British pound in the long run.

The problem, however, is to establish the relevant time horizon for this to happen in today's market with total chaos in many of the most important economies in the world.

Nevertheless, Competentia is clearly exposed to foreign currency exposure through spot rate fluctuations and should therefore be concerned about this issue.

Recall that, under the theory of relative purchasing power parity, the *relative change* in prices between countries with different currencies over a period of time determines the *change* in the exchange rate over that period (Moffett, Stonehill, & Eiteman, 2012).

Thus, if you compare the UK with Norway, you would expect that the NOK should depreciate against the GBP due to higher inflation rates in the UK.

Moreover, if we use the theory of the international Fisher effect, you come to the same conclusion.

$$\frac{S_1 - S_2}{S_2} = \frac{i^{home\ currency} - i^{foreign\ currency}}{1 + i^{foreign\ currency}}$$

By looking at the above formula, we can see that if $i^{home\ currency} - i^{foreign\ currency}$ is negative (as is the case now), you could expect the NOK to depreciate against the GBP as this means that $\frac{S_1 - S_2}{S_2}$ must decrease in order to equal $\frac{i^{home\ currency} - i^{foreign\ currency}}{1 + i^{foreign\ currency}}$.

Table 4.3 outlines a 3-months volatility projection (6.40) as well as a 95 % prediction interval prognosis, showing fairly high volatility in the GBP/NOK spot rate.

		Volatility %				95 % prediction inverval			
	Current spot rate	1M	3M	1Y	3Y	1M Low	1M High	3M Low	3M High
GBP/NOK	9,39	5,86	6,40	8,45	9,45	9,13	9,88	9,09	10,42

Table 4.3 GBP/NOK Volatility % and 95 % prediction interval prognosis. Source: Rates FX 31.05.2012

	Latest Value	<1 m	<3 m	<6 m	<12 m	< 24 m	<36 m
GBP/NOK	9,43	9,45	9,43	9,25	9,73	9,67	10,36

Table 4.4 GBP/NOK spot rate prognosis next 36 months. Source: Handelsbanken 31.05.2012

Table 4.4 illustrates a three-year GBP/NOK spot rate prognosis. As we can see, the GBP/NOK spot rate is expected to increase considerably over this period of time.

However, this prognosis is based on today's projection of future macroeconomic variables that are subject to change rapidly due to new financial crisis, unexpected events etc.

Hence, Competentia must interpret such a prognosis with the utmost caution, especially in the short term.

In the long run, however, the mechanisms described above will, according to the theory, ultimately take their toll and force the NOK into depreciation.

5 Scenario analysis and simulations.

5.1 Overview

In this section, the main analysis will be conducted. We will use scenario testing and Monte Carlo simulations with Crystal Ball to ascertain whether Competentia has something to gain by hedging their foreign currency exposure.

However, it is very important to mention, that both the scenario analyses and the simulations with Crystal Ball are built on assumptions and predictions of future GBP/NOK exchange rates and are therefore subject to errors. A discussion of these topics will be presented in chapter 8.

5.2 Scenario analysis

For the scenario testing, we will use the following four scenarios to test Competentia's net foreign GBP (GBP/NOK) exposure over the coming quarter: The GBP/NOK starting point is 9.4093 as at June 1st 2012.[12]

- Scenario 1: GBP appreciates with 1.5 % in three months.
- Scenario 2: GBP appreciates with 4 % in three months.
- Scenario 3: GBP depreciates with 1.5% in three months.
- Scenario 4: GBP depreciates with 4 % in three months.

Compared to table 4.3, these scenarios are within the projected three-months volatility for the GBP/NOK spot rate and should therefore be realistic. To begin with, we will only look at transaction exposure and the use of forwards and options, using today's situation as a starting point.

Later on, translation exposure and operating exposure will be discussed in a separate subchapter.

The time frame will be a three months projection. This limited time frame is chosen due to increasing uncertainty and projected volatility for simulations looking further into the future.

[12] Extracted from www.norges-bank.no June 1st 2012.

Furthermore, we will only look at the *projected net exposed position* in GBP to show the *impact* of the appreciations/depreciations of GBP on Competentia's resulting NOK cash flow the next three months[13] with or without the use of forward contracts and options.

The net exposed GBP position is calculated using accounting data from the first quarter of 2012 by subtracting the cost in GBP from income in GBP and adding 5 % growth which is in line with Competentia's budgets. The premium of the forward rate, NOK 0.0264, is derived by an analysis of historical data[14] for the last five years, comparing monthly average spot rates with average monthly 3-months forward rates.

Finally, the option price is derived by letting the strike price equal the forward price with a premium cost of 1.5 %. Also, in order to make the alternatives comparable, the cost of the option needs to be corrected due to the time value of money. Using a risk-free interest rate of 4 % per annum as the relevant interest rate, this would indicate that the option cost need to be corrected by 1 % on a quarterly basis.

[13] With the period starting June 1st 2012.
[14] Extracted from www.norgesbank.no. See appendix 2 for details.

5.2.1 Scenario 1

Input			
Scenario	1		
GBP exchange rate change %	1,50 %		
Net exposed position GBP	15 600 000		
Starting GBP/NOK exchange rate	9,4093		
3 months forward premium	0,0264		
3M forward rate/option exercise price	9,3829		
Option premium	1,50 %		
3 months future value rate of option	1,00 %		
Output			
	Spot 3M	**Forward 3M**	**Option 3M**
Scenario exchange rate	9,5504	9,3829	9,5504
Cash flow GBP	15 600 000	15 600 000	15 600 000
Cost of option (NOK)			2 223 794
Cash flow NOK	**148 986 856**	**146 373 240**	**146 763 062**
Gains/losses by using forward compared to spot (NOK)	**-2 613 616**		
Gains/losses by the use of option compared to spot (NOK)	**-2 223 794**		
Gains/losses by the use of option compared to forward (NOK)	**389 822**		

Table 5.1 Scenario 1

5.2.1.1 Scenario 1 comments

In this very first scenario, the GBP appreciates with 1.5 % relative to the starting point, 9.4093 NOK/£, in the relevant time frame of three months.

As we can see from table 5.1, this means that the 3-months spot rate will be 9.5504 at the end of the period when Competentia will need to sell their foreign currency to cover costs in NOK. This spot rate will generate NOK 148,986,856 in positive cash flow derived from their net exposed position GBP for this purpose using the spot 3M alternative.

The 3-months forward rate contract will generate NOK 146,373,240, whereas the option contract will generate NOK 146,763,062.

Thus, in this scenario, Competentia will lose NOK 2,613,616 by signing the forward contract and NOK 2,223,794 (the option cost) by the use of an option contract. The cash flow will be NOK 389,822 higher in the option alternative than the forward alternative.

However, the concept of "losing" in this context must be interpreted in terms of Competentia's risk aversion and general vulnerability. The cash flows are computed in Excel using the net position, GBP 15,600,000, as the relevant starting point. The scenario exchange rate in scenario 1 is computed by multiplying the starting spot rate with the 1.5 % exchange rate change as follows:

$S_{Scenario}$ = S_0 * percent change in exchange rate = 9.4093* 1.015 = 9.5504

By multiplying this rate with the net GBP position, we find the resulting NOK cash flow for this scenario:

9.5504 NOK/£* £15,600,000 = NOK 148,986,856

The forward exchange rate is derived by subtracting the premium, NOK 0.0264, from the starting GBP/NOK:

(9.4093-0.0264) NOK/£ * £15.600.000 = NOK 146,373,240

The cash flow by using the 3-months option, is calculated as follows:

First, we need to find the cost of the option. In our analyses, we will use the option premium as described of 1.5 %.

The cost of the option is then calculated by multiplying the net exposed GBP position with the spot exchange rate and the option premium and time value corrected with 1 %

15,600,000 * 9.4093 * 1.5 % *1.01 = NOK 2,223,794

By using the assumption of a 1.5 % option premium, this will be the relevant cost of this option. The resulting NOK cash flow for the option in scenario 1, will be the same as the spot alternative less the option cost (because the scenario exchange rate is higher than the option exercise price).

NOK 148,986,856 - NOK 2,223,794 = NOK 146,763,062

Similar calculations will apply for the other three scenarios. The only difference will be the relevant option scenario rate in scenario 3 and 4, which will now be equal to the option exercise price.

5.2.2 Scenario 2

Input			
Scenario	2		
GBP exchange rate change %	4,00 %		
Net exposed position GBP	15 600 000		
Starting GBP/NOK exchange rate	9,4093		
3 months forward premium	0,0264		
3M forward rate/option exercise price	9,3829		
Option premium	1,50 %		
3 months future value rate of option	1,00 %		
Output			
	Spot 3M	**Forward 3M**	**Option 3M**
Scenario exchange rate	9,7857	9,3829	9,7857
Cash flow GBP	15 600 000	15 600 000	15 600 000
Cost of option (NOK)			2 223 794
Cash flow NOK	**152 656 483**	**146 373 240**	**150 432 689**
Gains/losses by using forward compared to spot (NOK)	**-6 283 243**		
Gains/losses by the use of option compared to spot (NOK)	**-2 223 794**		
Gains/losses by the use of option compared to forward (NOK)	**4 059 449**		

Table 5.2 Scenario 2

5.2.2.1 Scenario 2 comments

In scenario 2, the GBP is to appreciate by 4 %, giving us the end-of-period spot rate of 9.7857 NOK/£.

As we can see from table 5.2, this will generate an even higher cash flow to Competentia (because of their positive net exposure in GBP).

If this scenario materializes, Competentia will lose NOK 6,283,243 by signing a 3-months forward contract with their bank. The loss of signing an option contract will always be limited to the cost of the option, NOK 2,223,794, time value corrected.

Therefore, compared to the forward contract, the option contract will generate NOK 4,059,449 more than the 3-months forward, making it a good alternative if this scenario turns out to materialize and you still want to be hedged.

5.2.3 Scenario 3

Input			
Scenario	3		
GBP exchange rate change %	-1,50 %		
Net exposed position GBP	15 600 000		
Starting GBP/NOK exchange rate	9,4093		
3 months forward premium	0,0264		
3M forward rate/option exercise price	9,3829		
Option premium	1,50 %		
3 months future value rate of option	1,00 %		
Output			
	Spot 3M	**Forward 3M**	**Option 3M**
Scenario exchange rate	9,2682	9,3829	9,3829
Cash flow GBP	15 600 000	15 600 000	15 600 000
Cost of option (NOK)			2 223 794
Cash flow NOK	**144 583 304**	**146 373 240**	**144 149 446**
Gains/losses by using forward compared to spot (NOK)	**1 789 936**		
Gains/losses by the use of option compared to spot (NOK)	**-433 858**		
Gains/losses by the use of option compared to forward (NOK)	**-2 223 794**		

Table 5.3 Scenario 3

5.2.3.1 Scenario 3 comments

In scenario 3, the tide has turned, and our initial spot exchange rate of 9.4093 has depreciated by 1.5 % to 9.2682.

This implies decreased cash flows to Competentia because of their positive net position in GBP.

The best alternative will be the 3-months forward, generating NOK 146,373,240, followed by the spot rate and finally exercising the option contract.

Compared to the use of spot rates and the option contract, Competentia will gain NOK 1,789,936 and NOK 2,223,794, respectively, by signing a forward contract.

5.2.4 Scenario 4

Input			
Scenario	4		
GBP exchange rate change %	-4,00 %		
Net exposed position GBP	15 600 000		
Starting GBP/NOK exchange rate	9,4093		
3 months forward premium	0,0264		
3M forward rate/option exercise price	9,3829		
Option premium	1,50 %		
3 months future value rate of option	1,00 %		
Output			
	Spot 3M	**Forward 3M**	**Option 3M**
Scenario exchange rate	9,0329	9,3829	9,3829
Cash flow GBP	15 600 000	15 600 000	15 600 000
Cost of option (NOK)			2 223 794
Cash flow NOK	**140 913 677**	**146 373 240**	**144 149 446**
Gains/losses by using forward compared to spot (NOK)	**5 459 563**		
Gains/losses by the use of option compared to spot (NOK)	**3 235 769**		
Gains/losses by the use of option compared to forward (NOK)	**-2 223 794**		

Table 5.4 Scenario 4

5.2.4.1 Scenario 4 comments

In this last scenario, our initial spot rate has depreciated by 4 % to 9.0329, generating a cash flow of NOK 140.913.677 by using the spot alternative.

If Competentia signs a 3-months forward contract, they can in this scenario gain NOK 5,459,563 compared to the spot alternative. Another solution will be exercising their option that will generate NOK 144,149,446 in NOK cash flow, NOK 3,235,769 more than the spot alternative.

This can be a good alternative if Competentia wants to be hedged and have an unlimited upside potential, only needing to pay the option cost of NOK 2,223,794.

5.2.5 Some preliminary conclusions

In the light of the above analyses, it is clear that Competentia has a transaction exposure. Furthermore, this exposure is illustrated through four realistic scenarios that could very well turn out to materialize in the given time frame (see appendix 2 for historic volatility).

The main insights learned from the scenarios, are that Competentia is indeed exposed to currency spot rate fluctuations and can both gain or lose money by signing a forward contract depending on the development of the exchange rate. The option is a third alternative that can be of relevance when deciding which strategy to implement.

Ultimately, Competentia's management must select their strategy on the basis of their *risk tolerance* and on their *own views* or expectations of the direction of how the spot rate will move over the coming quarter.

We will return to the conclusions and implications of these scenario analyses in chapter 6.

5.3 What about translation and operating exposure?

As described in chapter 4.3, we will not go into the measurements of translation exposure at all due to the fact that the tools used to manage it consumes a lot of organizational resources and is very demanding to monitor.

With respect to the operating exposure, we will, in chapter 6, assess this qualitatively using relevant theory and empirical evidence in this field of science.

5.4 Monte Carlo simulations (Crystal Ball) and sensitivity analysis

In this section, we will examine what happens to the cash flow prediction (transaction exposure) based on the net exposed GBP position if there are changes in some relevant variables. The main goal of running these simulations, is to review the probability distributions of the cash flows and the sensitivity of the cash flows based on the input variables. The conditions (premiums of forward an option etc) as well as the resulting cash flow calculations are the same as in the scenario analyses with the exception that the exchange rate does not change because of deliberate manipulations, but are now normally distributed around the mean, 9.4093. Furthermore, we will experience minor deviations from what you could expect by merely calculating the NOK cash flow on the basis of the net GBP position and the exchange rate because these cash flows are now simulated using the three variables which will be described below. These small deviations will apply even when running the simulations with 5000 repetitions.

We will use an Excel add-on program called Crystal Ball, which is a simulation and forecasting tool that can build models based on changes in these variables, to run the simulations.

The first step, will be to define the assumptions needed to build the model.

The first variable will be the net exposed position itself. The net exposed position (prognosis) in GBP is 15,600,000 for the next quarter. This variable is based on historic data as well as on future budgets. However, one cannot be really sure if this is a correct estimate. Therefore, our first assumption in the Crystal Ball simulation, will be the projected net exposed position using a normal probability distribution with a standard deviation of 1 %. The reason for choosing 1 %, is that the net exposed position almost will be 100 % certain for the next 3 months due to the fact that both income and cost are already contracted for, only allowing small deviations from the mean value.

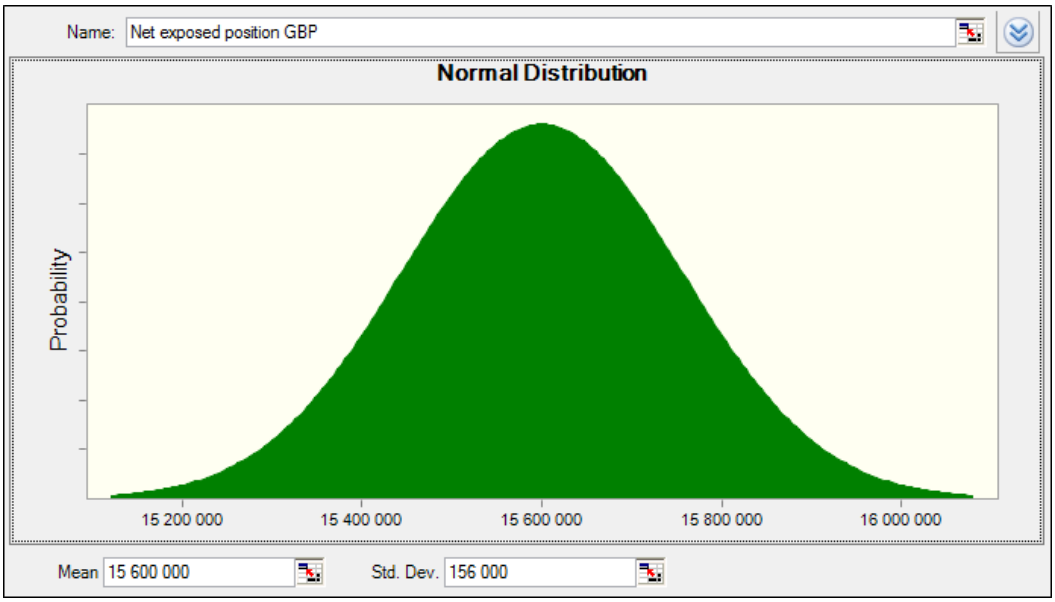


Figure 5.1 Normal distribution of net exposed position GBP. Standard deviation 1 %.

The second uncertain variable that needs to be defined, is the spot rate. We will use a normal distribution with a standard deviation of 4.30 % which is based on the historical data in appendix 2. The starting point of the spot rate (mean) is the same as in the scenario analyses.

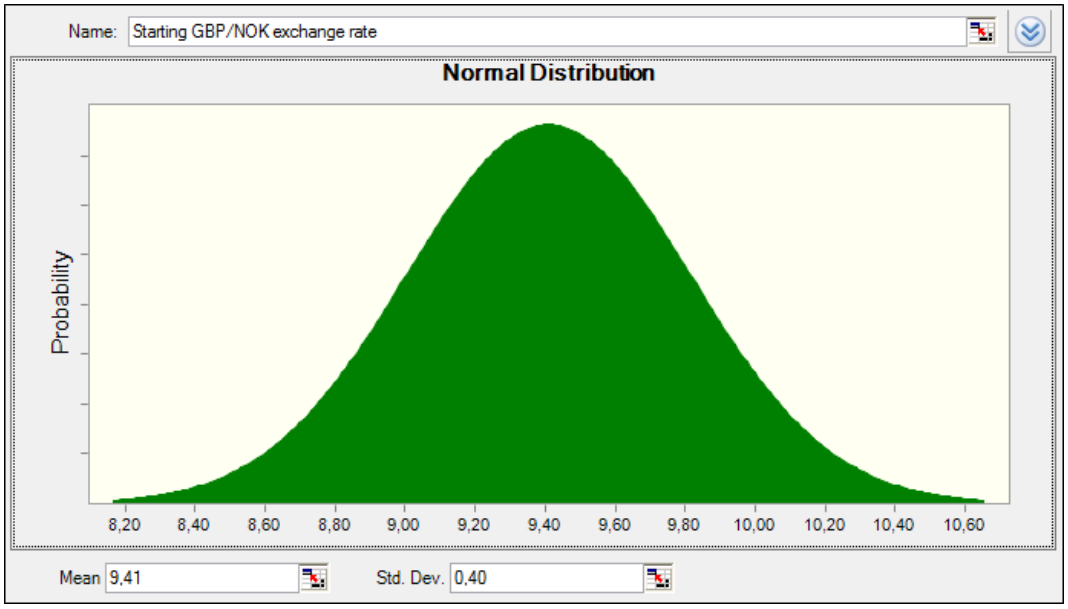


Figure 5.2 Normal distribution of spot rate. Standard deviation 4.30 %.

When conducting these tests, all simulations will run with 5000 repetitions and use a 95 % confidence interval, meaning that there is a 95 % probability that the conclusions drawn from these tests are correct.

Finally, the last variable that needs to be defined is the forward rate. We will assume normal distribution with a standard deviation of 4.19 %, also based on the historical data in appendix 2.

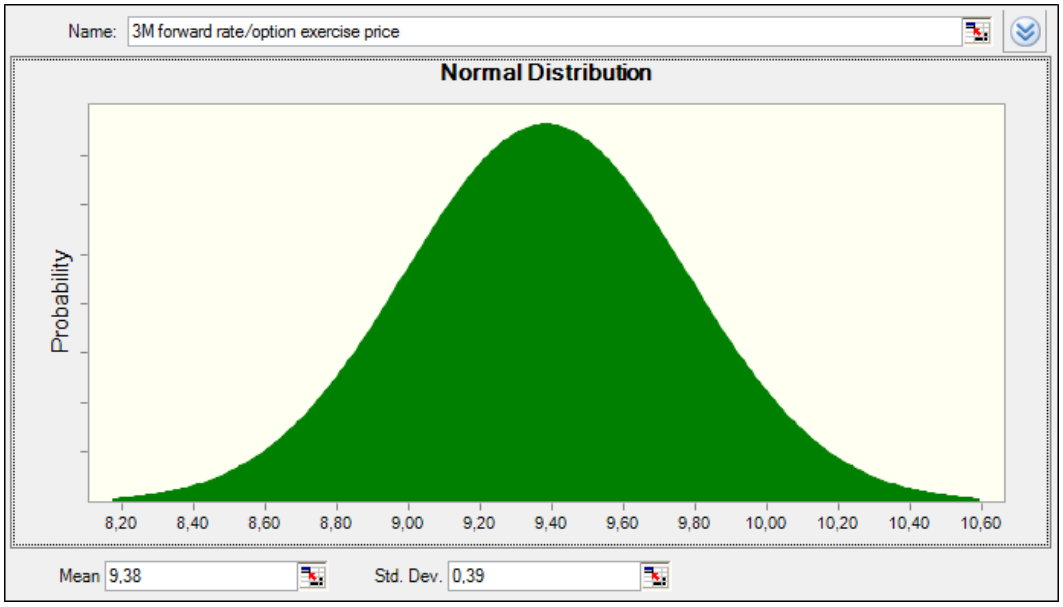


Figure 5.3 Normal distribution of forward rate. Standard deviation 4.19 %

5.4.1 Simulation of cash flow net GBP position (in NOK) with spot rate

The first simulation that will be conducted, is a simulation of the NOK cash flow based on the variables net GBP position (in NOK), the spot rate and the forward rate as well as the parameters mean and standard deviation (4.30 % as above). Figure 5.4 and 5.5 shows a representation of the result of this simulation.

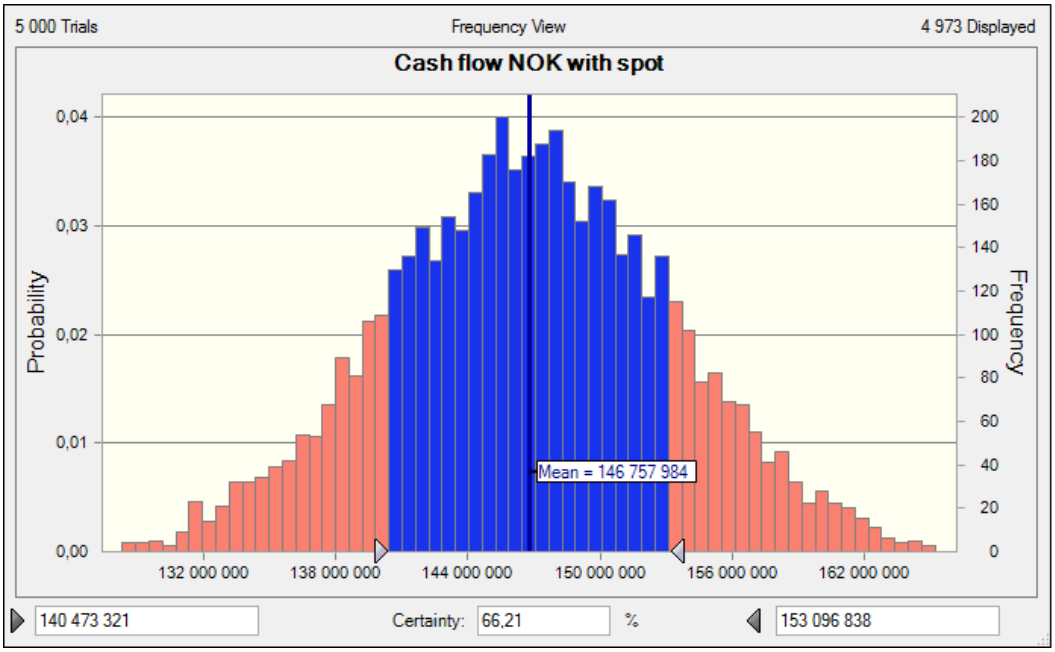


Figure 5.4 Frequency distribution of simulation: cash flow NOK with spot.

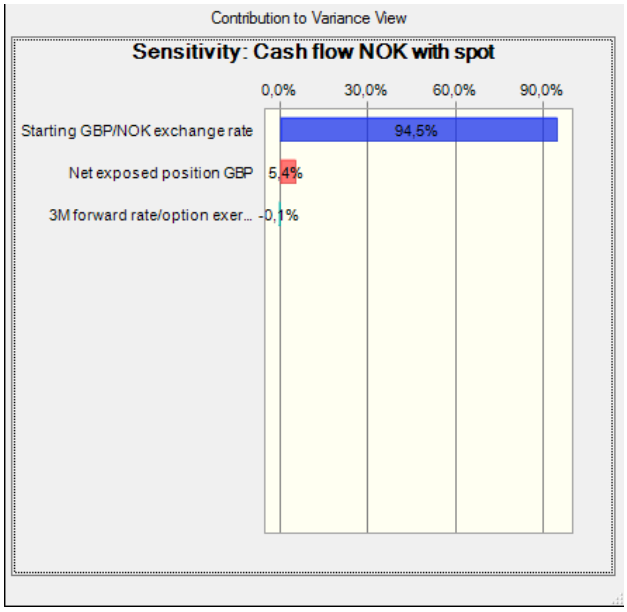


Figure 5.5 Sensitivity chart: cash flow NOK with spot.

5.4.1.1 Comments

Figure 5.4 shows the frequency distribution of the simulation with the NOK cash flow using the spot alternative.

The vertical axis on the left hand side, shows the probabilities of the distribution of the cash flow. On the right hand side on the vertical axis, we can see which frequencies that dominate the distribution of the cash flow. The horizontal axis illustrates the values of the cash flow distribution.

The main feature of this simulation, is to give an assessment of the variance of the data material, thereby providing key variables that can account for this variance.

Thus, Crystal Ball is asked to give us the probability of the resulting NOK cash flow within 4.3 % (same as the standard deviation) of the mean value, simulated to be NOK 146,757,984.

By reviewing figure 5.4, we can see that the probability for this to happen for the spot alternative, is 66.21 %.

Also, by reviewing figure 5.5, we can see that the starting GBP/NOK exchange rate contributes to 94.5 % of the variance in the data material, whereas the net GBP position's contribution of the variance is 5.4 %. As expected, the forward rate/option exercise price contribution is 0 % with respect to using the spot alternative.

5.4.2 Simulation of cash flow net GBP position (in NOK) with forward.

The second simulation, shows the resulting NOK cash flow with a forward contract using the same variables and parameters as above.

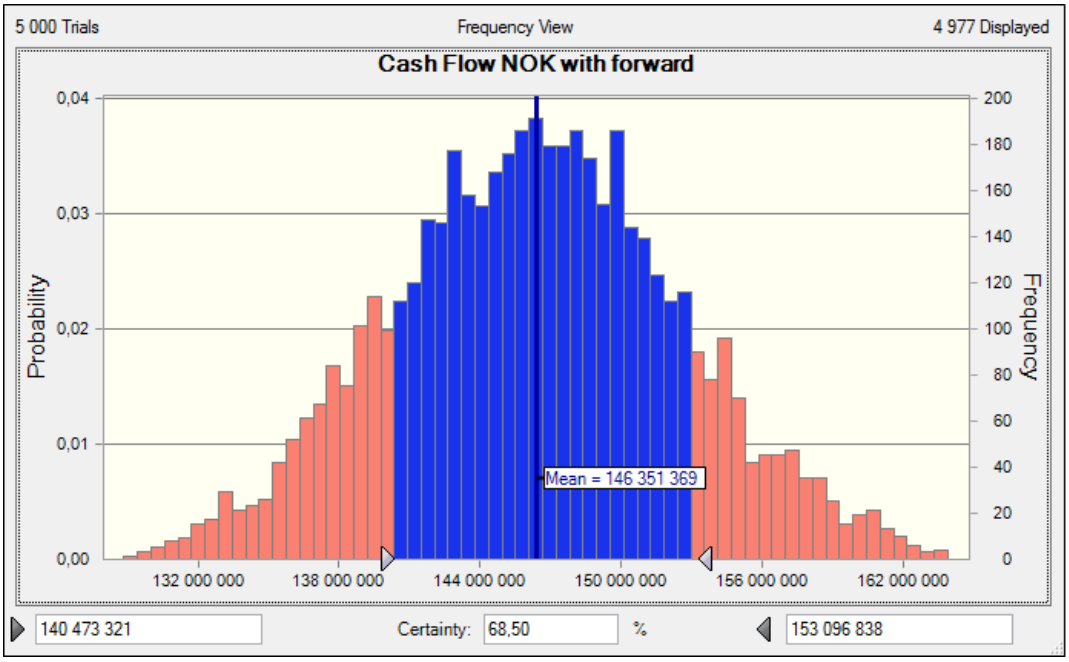


Figure 5.6 Frequency distribution of simulation: cash flow NOK with forward.

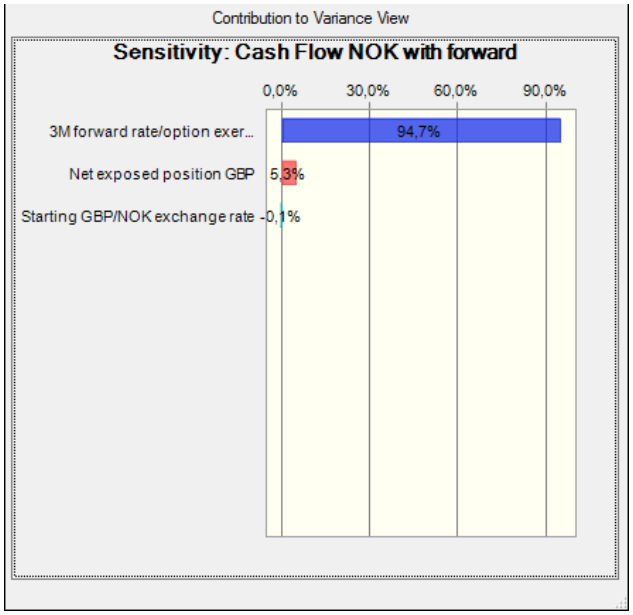


Figure 5.7 Sensitivity chart: cash flow NOK with forward.

5.4.2.1 Comments

In the second simulation, we will simulate the resulting NOK cash flow using a forward contract. Figure 5.6 illustrates the resulting distribution when using a forward contract.

Using the same interval (4.3 % around the mean) as with the spot simulation, this results in a probability of 68.50 %, slightly higher than with the spot alternative and in line with the theories about hedging in chapter 2.

Specifically, this indicates that the forward contract alternative has a narrower distribution around the mean.

Furthermore, the mean value by using the forward alternative, is NOK 146,351,369, NOK 406,615 less than with the spot alternative.

Finally, the 3M forward rate contributes to 94.7 % of the variance of the cash flow, whereas the starting GBP/NOK exchange rate contributes 5.3 %.

5.4.3 Simulation of cash flow net GBP position (in NOK) with option.

The last simulation shows the resulting NOK cash flow using an option contract, also using the same variables (net GBP position, spot rate and forward rate) and parameters (mean and standard deviation) as above.

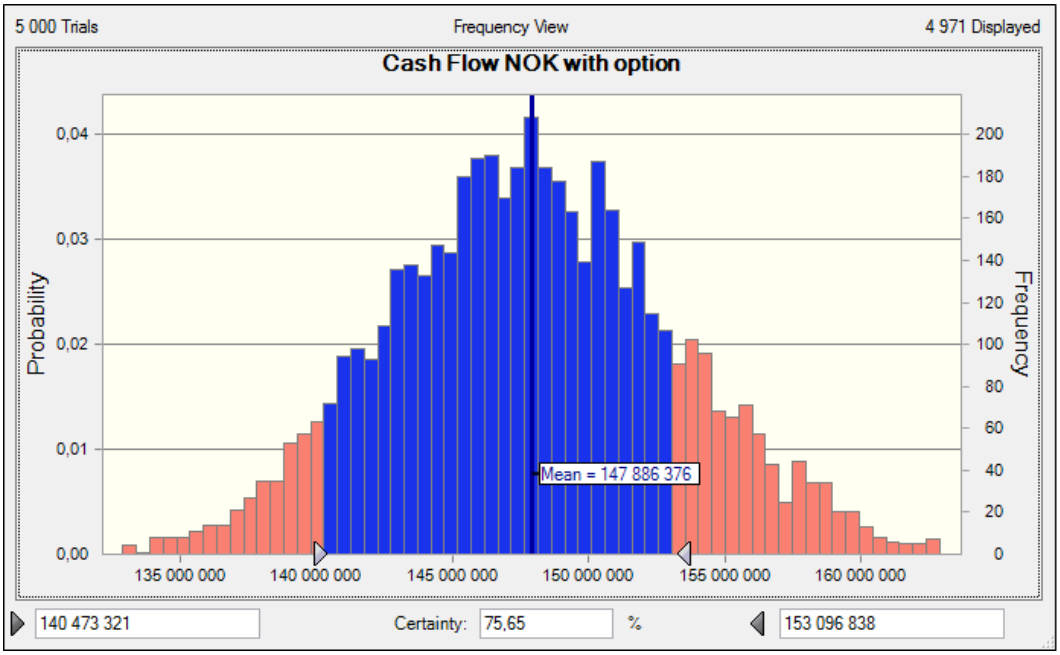


Figure 5.8 Frequency distribution of simulation: cash flow NOK with option.

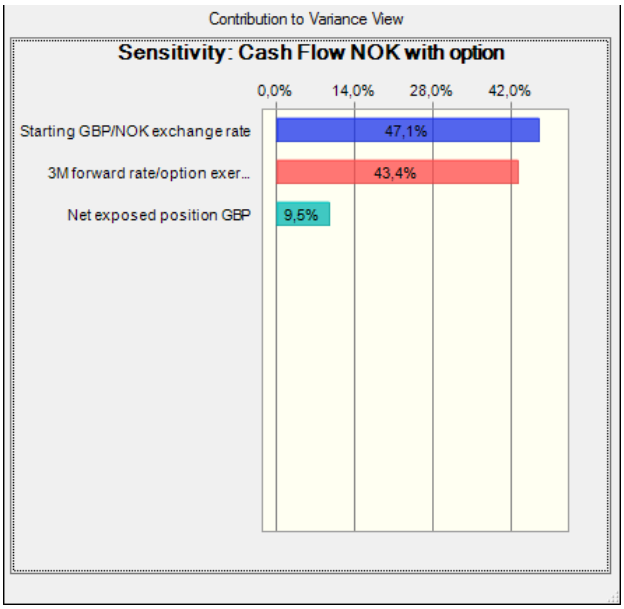


Figure 5.9 Sensitivity chart: cash flow NOK with option.

5.4.3.1 Comments

In the last simulation, we see how the NOK cash flow results if we are hedged through an option contract.

Again, we see from figure 5.8, that the probability of having a NOK cash flow within 4.3 % around the mean, is 75.65 %, meaning that the option alternative has the narrowest distribution around the mean value and thus the safest alternative with respect to the described interval.

The simulation, results in a mean value of NOK 147,886,376. This is NOK 1,128,392 higher than with the spot alternative and NOK 1,535,007 higher than with the forward contract.

The reason for that the option mean value is the highest in our model, is because in *each step* in the simulation, the model will automatically pick the highest value of the spot rate (unlimited potential less option cost) and the option exercise price (which in this model is the same as the forward rate), thereby generating the highest mean value using 5000 repetitions.

As for the contribution to variance, the starting GBP/NOK exchange rate contributes to 47.1 % of the variance. The 3M option exercise price contributes to 43.4 % of the variance, whereas the net exposed GBP position contributes to 9.5 % of the variance.

5.4.4 Some preliminary conclusions

In section 5.4, we have used simulations with Crystal Ball to test Competentia's transaction exposure comparing the resulting NOK cash flow using spot, forward contract or an option contract.

The results showed that the option alternative generated the most desirable cash flow with a mean value of NOK 147,886,376 [15], followed by the spot contract generating NOK 146,757,984 and finally the forward contract generating NOK 146,359,369.

However, these alternatives with respect to the mean values do not differ significantly from each other and cannot be used to exclude either of the alternatives for long run predictions.

As it has been previously underscored, this depends not only on our assumptions and conditions used in the scenario analyses and the model used in the Crystal Ball simulations, but mainly on Competentia's risk tolerance and own assessments of how they see the spot rate evolving in the future.

These issues will be further addressed in chapter 8.

[15] See explanation on page 61

6 Results/interpretations

6.1 Overview

In this section, we will review all of the relevant results from the analyses and the simulations in chapter 4 and 5 and interpret them on the basis of Competentia's current situation. We will have a closer look at all of the relevant challenges facing Competentia's management in the future with respect to how they should handle their foreign currency exposure.

6.2 Types of exposure that Competentia is exposed to and possible strategies

As stated in chapter 4.3, Competentia is indeed exposed to all three types of foreign currency exposure; transaction exposure[16], translation exposure and operating exposure.

6.2.1 Transaction exposure

Competentia has a considerable net exposed position in GBP because of a much higher income than cost in this currency, which makes them vulnerable in terms of transaction exposure.

In Competentia's current situation, they sell GBP using their bank's spot rate at the day of the sale each month in order to match this currency's total assets and liabilities on the balance sheet at the end of each accounting period.

Thus, they are vulnerable to currency spot rate fluctuations and must book foreign exchange gains or losses each month.

Specifically, in 2011, the relative income in GBP was 78 % of their total income, whereas the cost in GBP was only 29 % of their total cost. If we investigate this matter in the years 2008 to 2010, the situation is about the same with GBP dominating with respect to relative income.

6.2.1.1 Test-results

If we revisit the scenario analyses that was conducted in the previous chapter, we remember that the transaction exposure was tested using four realistic scenarios of how the spot rate could possible evolve over the next quarter.

[16] Translation exposure will not be commented in the strategy section.

The main goal of the scenario analyses was to ascertain which of the alternatives, spot rate, forward contract or option contract, that was the best alternative with respect to generate the highest possible cash flow in NOK.

Table 6.1 is a summary table which gives us the main results from the scenario analyses:

	Spot 3M	Forward 3M	Option 3M
Scenario 1	148 986 856	146 373 240	146 763 062
Scenario 2	152 656 483	146 373 240	150 432 689
Scenario 3	144 583 304	146 373 240	144 149 446
Scenario 4	140 913 677	146 373 240	144 149 446

Table 6.1 Summary table for the scenario analyses: Cash flow NOK

In the simulations, using 5000 repetitions, the mean values of the three alternatives and the probabilities of having a resulting NOK cash flow within 4.3 % around the mean value were as follows:

	Spot 3M	Forward 3M	Option 3M
Mean value	146 757 984	146 359 369	147 886 376
Probability of cash flow +- 4.3 % of mean	66,21 %	68,50 %	75,65 %

Table 6.2 Summary table for the simulations: CF NOK and probability CF +- 4.3 of mean

As we can see, the variance of the simulated cash flow values is small, which makes the alternatives fairly equal using the context as described in chapter 5.

However, it is interesting that both the hedging alternatives have narrower distributions than the spot alternative, which is both expected and in line with the theory of hedging.

6.2.1.1.1 Possible strategies

Using the above test results as an indicator of how Competentia's future strategy should be with respect to managing their transaction exposure, is not straightforward.

One the one hand, we see from the scenario analyses that Competentia's cash flows on the basis of their net exposed position in GBP, are very sensitive to currency spot rate fluctuations and that they should indeed secure some of this cash flow either by forward contracts or option contracts.[17]

On the other hand, we have concluded that the NOK is possibly overvalued with respect to GBP, which makes it difficult to give a crystal clear recommendation in the short run.

Competentia could very well choose to remain unhedged[18] in the shorter term.

However, as the GBP/NOK spot rate slowly appreciates back to "normal" levels, Competentia should implement hedging strategies.

To secure their transaction exposure, Competentia could use both forwards and options, with the option being the "middle" alternative with a predetermined downside potential, but an unlimited upside potential.

[17] Hedging in the money market has not been investigated further due to Competentia's current organizational capabilities.
[18] This would correspond to the "choose to accept risk" alternative in Børsum's and Ødegaard's study.

6.2.2 Operating exposure

As described in section 5.3, Competentia's operating exposure will only be commented upon using a qualitative description and some guidelines on how to implement strategies dealing with this kind of foreign currency exposure.

First and foremost, Competentia is exposed to operating exposure because their present value will be affected by unexpected changes in the GBP/NOK exchange rate. This will further affect Competentia's cash flows.

Secondly, as described in section 2.3.2.1, operating exposure depended on strategies in finance, marketing, purchasing and production.

Because Competentia delivers only services, production will not be commented in this thesis.

6.2.2.1 Potential strategies

As discussed in chapter 2, the key is for the management to recognize a disequilibrium in parity conditions as soon as it occurs and to react in the most appropriate manner.

The question is, though, if Competentia's current organizational structure permits allocating resources to this type of monitoring activities that would be required if they would like to achieve this.

Competentia has undergone a period of huge growth (see appendices for more information) , with their financial department occupied in running the business on a day-to-day basis.

However, as the organization grows, it could be worthwhile to allocate some resources in order to implement an overall strategy for managing foreign currency exposure, operating exposure included.

Consequently, Competentia could undertake a process where the basic strategies for managing operating exposure were implemented.

Diversify operations

One strategy to reduce its operating exposure would be to diversify its operations internationally to a higher extent as this would ultimately reduce the variability of the firm's cash flows.

In the light of Competentia's current business strategy, this would indicate opening recruiting offices in all of the global locations where this is feasible, thereby achieving diversification and reduced vulnerability to exchange rate changes.

However, it is important not to disregard the fact that, in the current market, many of the new consultants would probably be recruited in other countries than the subsidiary's home country, thereby diluting this effect somewhat.

Diversify financing base

If we recall from chapter 2.5.3.2, we remember that diversifying the financing base, means raising funds in more than one capital market and in more than one currency.

If Competentia could achieve this in the future, they would benefit from a lower cost of capital and an increased availability of capital.

Moreover, they would be prepositioned to take advantage of the international Fisher effect.

However, the applicability of the above strategies, will ultimately depend on Competentia's future plans and business strategy.

7 Conclusions/Recommendations

In the introductory chapter, the following research question was asked:

Should Competentia secure their currency exposure?

As we have seen, it is difficult to give a crystal clear recommendation with respect to this question, as this would ultimately rest on the following premises:

1. What is Competentia's risk tolerance?

2. What are the management's own views or expectations of the direction the exchange rate will move over in the relevant period of time?

As of today, Competentia does not have explicit strategies for dealing with these kinds of questions.

However, based on the projected cash flows and future growth plans, one could make the argument that the risk tolerance of Competentia is low as they would need to increase their overdraft facility because of low cash reserves in order to deal with major foreign exchange losses.

Furthermore, there is reason to believe that Competentia would gain valuable insight by allocating some resources (either internally or externally) to look into future exchange rate projections as they are heavily exposed due to their net GBP position.

As described in the scenario analyses, Competentia is very sensitive to spot rate currency fluctuations, and with a potential low risk tolerance, this would indicate that they should hedge at least parts of their transaction exposure either with the use of forward contracts or option contracts.

Regarding the translation exposure hedge, this would require the use of balance sheet hedges which are both complex to implement and monitor.

Hence, I would not recommend any hedging of the translation exposure with the current organizational resources at hand.

Finally, with respect to the operating exposure, Competentia is not in a position where diversifying operations and financing bases are very feasible at the moment.

However, this very well may change in the near future as Competentia grows and opens more global recruiting offices and their staff and capabilities increases.

8 Limitations/Applicability

8.1 Overview

In this section, we will have a look at some of the relevant limitations to this study. Both structural limitations (methods etc) and the empirical limitations by conducting the scenario analyses and the simulations will be discussed.

However, we will begin by addressing the issue of applicability.

8.2 Applicability

By conducting this study, there was no intention that the results from the study could be applicable to other firms.

This is due to the fact that firms have unique risk tolerances, capital structures, net exposures, future projections and organizational capabilities which make comparison to other firms difficult with respect to foreign currency exposure.

Hence, this study is only applicable to Competentia. However, very similar firms could probably draw many of the same conclusions.

8.3 Limitations

8.3.1 Structural limitations

In chapter 3, some of the most relevant research designs and the associated pitfalls were mentioned.

Consequently, one needed to select a design which was sufficient with respect to answer the research question.

Hence, a causal design was selected in order to establish a causal relationship between Competentia's foreign currency exposure and whether they should hedge this exposure or not.

The issue of external validity has already been established and rejected as one could not recommend to generalize the findings to other firms. The other concepts that need to be discussed are:

- Construct validity: The operationalization in this thesis is done by measuring the net exposed position in GBP's *effect* on the foreign currency. The question that needs to be asked, is if this kind of operationalization measures the concepts which it purports to measure? The selected method is very practical, but may suffer under the fact that the relative net exposed position in GBP may change drastically from year to year, making it difficult to derive a firm's value on the basis of changes in its cash flows. However, Competentia's relative net position in GBP has been relatively stable over the last couple of years. Another limitation related to this, is the time frame in which one can project future exposure. The operationalization may not be feasible for very long term future predictions.
- Statistical conclusion validity: Is there a reason to believe that the observed associations are not strong enough to be meaningful (e.g. sample size, Type I and Type II errors and wrong use of statistical methods)? For example, we could wrongfully reject the fact that the net exposed position in GBP indeed affects the level of exposure and possible strategies, thereby making a Type I error.
- Internal validity: Within this type of validity, one must make sure that A is the cause of B and not the other way around. One possible issue here could be the conclusion that the GBP must appreciate versus the NOK because of past historical levels. This does not necessarily need to be true in the short run. However, the theory of parity relations gives this argument support both theoretically and empirically.

- Reliability: The final concept which will be discussed in this section, is the concept of reliability, which is about the consistency and credibility of your measurements. The concepts of measurements have been relatively simple in this study and should also be relatively easy to verify. Therefore, the level of reliability should be within the acceptable boundaries in this study.

8.3.2 Empirical limitations

This final section, is about the tools used to measure Competentia's foreign currency exposure. Specifically, the scenario analyses and the simulations will be discussed.

8.3.2.1 Scenario analysis

In the scenario analyses, four scenarios were used in order to test Competentia's foreign currency exposure.

One could always make the argument that other values could have been used and that more scenarios should have been used to get a more detailed picture of the possible *effects* to the resulting NOK cash flows.

However, in order to reduce complexity, fewer scenarios have been chosen. Also, it is worth mentioning that the appreciation and depreciation levels are within the projected volatility for the GBP/NOK exchange rate.

8.3.2.2 Simulations

In the simulations section, the variables *net exposed position in GBP*, the *GBP/NOK spot* rate and the *forward rate/option exercise price* were chosen as assumptions in the model, all normally distributed and with standard deviations of 1.0%, 4.3 % and 4.19 %, respectively.

One could probably argue in favor of other distribution methods or standard deviations. However, within the given time frame of a quarter, these distributions and standard deviations based on the historical data in appendix 2 were tested thoroughly and seemed like the best representations of the reality. [19] Also, Crystal Ball tested the historical exchange rate material in appendix 2 and came up with normal distributions as acceptable fits regarding the properties of these data series.

[19] See also page 61 for a discussion around the option mean value.

8.3.3 Final comments

Finally, it is important to mention that this study by no means is exhaustive with respect to Competentia's currency exposure issues. More research on this topic should be conducted in order to increase the significance of the results and conclusions drawn on the basis of the analyses.

Moreover, in many ways, this study is a "snap shot" of the reality as of today, experiencing an exceptionally volatile world economy with the NOK appreciating to levels of historic proportions. As the relevant economies go back to "normal", so will the exchange rates according to the presented theory.

Hence, with this reality in mind, it is possible that the recommendations in this study would have been even clearer if it was conducted during a period with normalized economic levels, using Competentia's current unhedged position as the point of relevance.

9 References

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10 Appendices

Appendix 1 Income statements and balance sheet 2009-2011

Competentia AS

Resultatregnskap

Morselskap 2010	Morselskap 2011	Note		Note	Konsern 2011	Konsern 2010
			Driftsinntekter			
478 740 413	925 365 646	2	Salgsinntekter	2	984 341 573	480 832 724
478 740 413	**925 365 646**		**Sum driftsinntekter**		**984 341 573**	**480 832 724**
			Driftskostnader			
125 985 718	315 271 201		Innleide tjenester		166 445 379	73 038 234
287 386 230	502 130 271	3	Lønn og sosiale kostnader	3	696 940 807	342 501 615
193 284	99 426	7	Ordinære avskrivninger	7	160 355	203 264
0	212 734		Nedskrivninger		212 734	0
23 893 865	36 534 888	5,17	Andre driftskostnader	5,17	43 640 307	24 508 204
437 459 097	**854 248 520**		**Sum driftskostnader**		**907 399 582**	**440 251 316**
41 281 316	**71 117 126**		**Driftsresultat**		**76 941 991**	**40 581 407**
			Finansposter			
793 945	1 543 216		Annen renteinntekt		899 852	644 417
12 105 627	41 766 301	9	Annen finansinntekt		41 766 449	12 105 627
659 577	1 921 509		Annen rentekostnad		1 978 785	666 769
6 941 706	32 706 801	9	Annen finanskostnad		32 816 092	6 941 725
5 298 289	**8 681 207**		**Netto finanskostnader**		**7 871 424**	**5 141 550**
46 579 605	**79 798 333**		**Ordinært resultat før skatt**		**84 813 415**	**45 722 957**
13 109 135	22 390 946	6	Skattekostnad på ordinært resultat	6	23 204 556	13 182 142
33 470 470	**57 407 387**		**Ordinært resultat**		**61 608 859**	**32 540 815**
			Disponering og overføring:			
28 000 000	0	16	Foreslått utbytte	16	0	28 000 000
5 470 470	57 407 387	16	Overført annen egenkapital	16	61 608 859	4 540 815
33 470 470	**57 407 387**		**Sum overført**		**61 608 859**	**32 540 815**

Competentia AS

Balanse pr 31. desember

Morselskap 2010	Morselskap 2011	Note		Note	Konsern 2011	Konsern 2010
			EIENDELER			
			ANLEGGSMIDLER			
			Immaterielle eiendeler			
281 002	334 325	6	Utsatt skattefordel	6	334 325	281 002
281 002	**334 325**		**Sum immaterielle eiendeler**		**334 325**	**281 002**
			Varige driftsmidler			
308 216	78 207	7	Driftsløsøre, inventar, ol.	7	385 940	410 402
308 216	**78 207**		**Sum varige driftsmidler**		**385 940**	**410 402**
			Finansielle driftsmidler			
1 000	142 940	8	Aksjer i datterselskaper		0	0
7 588 591	35 380 143	11,1	Lån til foretak i samme konsern		0	0
7 589 591	**35 523 083**		**Sum finansielle driftsmidler**		**0**	**0**
8 178 809	**35 935 615**		**SUM ANLEGGSMIDLER**		**720 265**	**691 404**
			OMLØPSMIDLER			
			Fordringer			
112 653 930	229 626 013	10	Kundefordringer		250 139 965	114 463 323
483 020	8 921 578		Andre fordringer		16 639 255	967 421
113 136 950	**238 547 591**		**Sum fordringer**		**266 779 220**	**115 430 745**
767 364	**0**	**13,1**	**Bankinnskudd, kontanter**	**13,1**	**27 132 521**	**5 152 897**
113 904 314	**238 547 591**		**SUM OMLØPSMIDLER**		**293 911 741**	**120 583 642**
122 083 123	**274 483 206**		**SUM EIENDELER**		**294 632 006**	**121 275 046**

Competentia AS

Balanse pr 31. desember

Morselskap 2010	Morselskap 2011	Note		Note	Konsern 2011	Konsern 2010
			EGENKAPITAL			
			Innskutt egenkapital			
150 000	150 000	15,2	Aksjekapital	15,2	150 000	150 000
150 000	**150 000**		**Sum innskutt egenkapital**		**150 000**	**150 000**
			Opptjent egenkapital			
15 674 407	73 081 794	16	Annen egenkapital	16	78 003 676	16 355 773
15 674 407	**73 081 794**		**Sum opptjent egenkapital**		**78 003 676**	**16 355 773**
15 824 407	**73 231 794**		**SUM EGENKAPITAL**		**78 153 676**	**16 505 773**
			GJELD			
			Kortsiktig gjeld			
0	9 836 712		Gjeld til kredittinstitusjoner		9 836 712	0
28 243 411	62 445 927	11	Leverandørgjeld		58 573 882	24 284 620
34 479 883	101 190 381		Skyldige offentlige avgifter		107 383 837	36 678 794
12 893 137	22 444 577	6	Betalbar skatt	6	23 644 689	12 965 663
28 000 000	0		Skyldig utbytte		0	28 000 000
2 642 285	5 333 815		Annen kortsiktig gjeld		17 039 211	2 840 195
106 258 716	**201 251 412**		**Sum kortsiktig gjeld**		**216 478 331**	**104 769 273**
106 258 716	**201 251 412**		**SUM GJELD**		**216 478 331**	**104 769 273**
122 083 123	**274 483 206**		**SUM GJELD OG EGENKAPITAL**		**294 632 006**	**121 275 046**

31. desember 2011
Stavanger, 23 mars 2012

John Smith
Styrets leder

Odd-Arne Kleveland
Styremedlem

Rune Arnold Hagen
Varamedlem/Daglig leder

Competentia AS

Morselskap 2010	Morselskap 2011		Konsern 2011	Konsern 2010
		Kontantstrøm fra operasjonelle aktiviteter		
46 579 606	79 798 333	Ordinært resultat før skattekostnad	84 813 415	45 722 958
193 284	312 160	Ordinære avskrivninger	373 089	203 264
-11 571 148	-12 893 137	Betalt skatt	-12 965 663	-11 748 265
-48 059 889	-116 972 083	Endring i kundefordringer	-135 676 641	-49 869 282
8 543 768	34 202 516	Endring i leverandørgjeld	34 289 262	11 447 639
4 640 610	60 963 778	Netto endring i andre tidsavgrensninger	69 619 024	2 085 063
0	0	Effekt av valutakursdifferanser	39 043	-89 684
326 231	**45 411 567**	**Netto kontantstrøm fra operasjonelle aktiviteter**	**40 491 529**	**-2 248 307**
		Kontantstrøm fra investeringsaktiviteter		
0	-141 940	Investering i aksjer i datterselskaper	0	0
-5 259 341	-27 791 552	Lån til foretak i samme konsern	0	0
-225 000	-82 151	Investering driftsmidler	-348 617	-336 955
-5 484 341	**-28 015 643**	**Netto kontantstrøm fra investeringsaktiviteter**	**-348 617**	**-336 955**
		Kontantstrøm fra finansieringsaktiviteter		
-26 000 000	-28 000 000	Utbetalt utbytte	-28 000 000	-26 000 000
-26 000 000	**-28 000 000**	**Netto kontantstrøm fra finansieringsaktiviteter**	**-28 000 000**	**-26 000 000**
-31 158 110	**-10 604 076**	**Netto endring fra kontanter og kontante ekvivalenter**	**12 142 912**	**-28 585 262**
767 364	-9 836 712	Kontanter og kontante ekvivalenter ved periodens slutt	17 295 809	5 152 897
31 925 475	767 364	Kontanter og kontante ekvivalenter ved periodens begynnelse	5 152 897	33 738 159

Competentia AS

Resultatregnskap

Morselskap 2009	Morselskap 2010	Note		Note	Konsern 2010	Konsern 2009
			Driftsinntekter			
392 902 138	478 740 413	2	Salgsinntekter	2	480 832 724	392 902 138
392 902 138	**478 740 413**		**Sum driftsinntekter**		**480 832 724**	**392 902 138**
			Driftskostnader			
91 707 941	125 985 718		Innleide tjenester		73 038 234	50 568 054
243 549 519	287 386 230	3	Lønn og sosiale kostnader	3	342 501 615	283 359 490
67 241	193 284	7	Ordinære avskrivninger	7	203 264	67 241
21 404 570	23 893 865	5,17	Andre driftskostnader	5,17	24 508 204	21 707 647
356 729 271	**437 459 097**		**Sum driftskostnader**		**440 251 316**	**355 702 432**
36 172 867	**41 281 316**		**Driftsresultat**		**40 581 407**	**37 199 706**
			Finansposter			
1 384 308	793 945		Annen renteinntekt		644 417	1 384 308
5 174 659	12 105 627	9	Annen finansinntekt		12 105 627	5 174 659
804 714	659 577		Annen rentekostnad		666 769	943 194
403 185	6 941 706	9	Annen finanskostnad		6 941 725	403 425
5 351 068	**5 298 289**		**Netto finanskostnader**		**5 141 550**	**5 212 348**
41 523 935	**46 579 605**		**Ordinært resultat før skatt**		**45 722 957**	**42 412 054**
11 713 148	13 109 135	6	Skattekostnad på ordinært resultat	6	13 182 142	11 889 784
29 810 787	**33 470 470**		**Ordinært resultat**		**32 540 815**	**30 522 270**
			Disponering og overføring:			
26 000 000	28 000 000	16	Foreslått utbytte	16	28 000 000	26 000 000
3 810 787	5 470 471	16	Overført annen egenkapital	16	4 540 816	4 522 270
29 810 787	**33 470 471**		**Sum overført**		**32 540 816**	**30 522 270**

Competentia AS

Balanse pr 31. desember

Morselskap 2009	Morselskap 2010	Note		Note	Konsern 2010	Konsern 2009
			EIENDELER			
			ANLEGGSMIDLER			
			Immaterielle eiendeler			
497 000	281 002	6	Utsatt skattefordel	6	281 002	497 000
497 000	**281 002**		**Sum immaterielle eiendeler**		**281 002**	**497 000**
			Varige driftsmidler			
276 500	308 216	7	Driftsløsøre, inventar, ol.	7	410 402	276 500
276 500	**308 216**		**Sum varige driftsmidler**		**410 402**	**276 500**
			Finansielle driftsmidler			
1 000	1 000	8	Aksjer i datterselskaper		0	0
2 329 250	7 588 591	11,12	Lån til foretak i samme konsern		0	0
2 330 250	**7 589 591**		**Sum finansielle driftsmidler**		**0**	**0**
3 103 750	**8 178 809**		**SUM ANLEGGSMIDLER**		**691 404**	**773 500**
			OMLØPSMIDLER			
			Fordringer			
64 594 041	112 653 930	10	Kundefordringer		114 463 323	64 594 041
204 957	483 020		Andre fordringer		967 421	204 957
64 798 998	**113 136 950**		**Sum fordringer**		**115 430 745**	**64 798 998**
31 925 475	**767 364**	**13,14**	**Bankinnskudd, kontanter**	**13,14**	**5 152 897**	**33 738 159**
96 724 473	**113 904 314**		**SUM OMLØPSMIDLER**		**120 583 642**	**98 537 157**
99 828 223	**122 083 123**		**SUM EIENDELER**		**121 275 046**	**99 310 657**

Competentia AS

Balanse pr 31. desember

Morselskap 2009	Morselskap 2010	Note		Note	Konsern 2010	Konsern 2009
			EGENKAPITAL			
			Innskutt egenkapital			
150 000	150 000	15,16	Aksjekapital	15,16	150 000	150 000
150 000	**150 000**		**Sum innskutt egenkapital**		**150 000**	**150 000**
			Opptjent egenkapital			
10 203 936	15 674 407	16	Annen egenkapital	16	16 355 773	11 904 641
10 203 936	**15 674 407**		**Sum opptjent egenkapital**		**16 355 773**	**11 904 641**
10 353 936	**15 824 407**		**SUM EGENKAPITAL**		**16 505 773**	**12 054 641**
			GJELD			
			Kortsiktig gjeld			
19 699 643	28 243 411	11	Leverandørgjeld		24 284 620	12 836 981
28 174 737	34 479 883		Skyldige offentlige avgifter		36 678 794	31 213 268
11 571 148	12 893 137	6	Betalbar skatt	6	12 965 663	11 747 784
26 000 000	28 000 000		Skyldig utbytte		28 000 000	26 000 000
4 028 759	2 642 285		Annen kortsiktig gjeld		2 840 195	5 457 983
89 474 287	**106 258 716**		**Sum kortsiktig gjeld**		**104 769 273**	**87 256 016**
89 474 287	**106 258 716**		**SUM GJELD**		**104 769 273**	**87 256 016**
99 828 223	**122 083 123**		**SUM GJELD OG EGENKAPITAL**		**121 275 046**	**99 310 657**

31. desember 2010
Stavanger, 4. april 2011

John Smith
Styrets leder

Odd-Arne Kleveland
Styremedlem

Rune Arnold Hagen
Varamedlem/Daglig leder

Competentia AS

Kontantstrømanalyse

Morselskap 2009	Morselskap 2010		Konsern 2010	Konsern 2009
		Kontantstrøm fra operasjonelle aktiviteter		
41 523 935	46 579 606	Ordinært resultat før skattekostnad	45 722 958	42 412 054
67 241	193 284	Ordinære avskrivninger	203 264	67 241
-7 891 215	-11 571 148	Betalt skatt	-11 748 265	-8 215 087
-10 231 634	-48 059 889	Endring i kundefordringer	-49 869 282	-10 231 634
11 632 947	8 543 768	Endring i leverandørgjeld	11 447 639	7 064 200
1 812 105	4 640 610	Netto endring i andre tidsavgrensninger	2 085 063	3 413 478
0	0	Effekt av valutakursdifferanser	-89 684	0
36 913 379	**326 231**	**Netto kontantstrøm fra operasjonelle aktiviteter**	**-2 248 307**	**34 510 252**
		Kontantstrøm fra investeringsaktiviteter		
0	-5 259 341	Lån til foretak i samme kosern	0	0
-324 841	-225 000	Investering driftsmidler	-336 955	-324 841
-324 841	**-5 484 341**	**Netto kontantstrøm fra investeringsaktiviteter**	**-336 955**	**-324 841**
		Kontantstrøm fra finansieringsaktiviteter		
-12 000 000	-26 000 000	Utbetalt utbytte	-26 000 000	-12 000 000
-12 000 000	**-26 000 000**	**Netto kontantstrøm fra finansieringsaktiviteter**	**-26 000 000**	**-12 000 000**
24 588 538	**-31 158 110**	**Netto endring fra kontanter og kontante ekvivalenter**	**-28 585 262**	**22 185 411**
7 336 937	31 925 475	Kontanter og kontante ekvivalenter ved periodens slutt	33 738 159	11 552 748
31 925 475	767 365	Kontanter og kontante ekvivalenter ved periodens begynnelse	5 152 897	33 738 159

Appendix 2 Spot rate vs forward rate

3-months average monthly forward rate vs average monthly spot rate may 2007 to may 2012

	Spot	Forward
mai.12	9,4106	9,4400
apr.12	9,2107	9,2400
mar.12	9,0255	9,0600
feb.12	9,0244	9,0600
jan.12	9,2241	9,2600
des.11	9,1777	9,2100
nov.11	9,0820	9,1300
okt.11	8,9020	8,9500
sep.11	8,8614	8,9100
aug.11	8,8841	8,9400
jul.11	8,7976	8,8400
jun.11	8,8202	8,8600
mai.11	8,9218	8,9700
apr.11	8,8448	8,8900
mar.11	9,0358	9,0800
feb.11	9,2407	9,2800
jan.11	9,2320	9,2800
des.10	9,3231	9,3800
nov.10	9,5280	9,5700
okt.10	9,2556	9,3000
sep.10	9,4263	9,4700
aug.10	9,6317	9,6700
jul.10	9,5978	9,6400
jun.10	9,5528	9,6000
mai.10	9,2127	9,2600
apr.10	9,0706	9,1100
mar.10	8,9138	8,9500
feb.10	9,2433	9,2800
jan.10	9,2672	9,3100
des.09	9,3468	9,3900
nov.09	9,3607	9,3900
okt.09	9,1321	9,1700
sep.09	9,6483	9,6800
aug.09	10,0409	10,0800
jul.09	10,3952	10,4200
jun.09	10,4491	10,4700
mai.09	9,9390	9,9700

apr.09	9,7951	9,8300
mar.09	9,6155	9,6500
feb.09	9,9044	9,9400
jan.09	10,0438	10,0800
des.08	10,4156	10,4500
nov.08	10,6079	10,6500
okt.08	10,9243	10,9500
sep.08	10,2078	10,2300
aug.08	10,0568	10,0800
jul.08	10,1490	10,1600
jun.08	10,0966	10,1100
mai.08	9,9295	9,9400
apr.08	10,0191	10,0300
mar.08	10,2817	10,2900
feb.08	10,5850	10,5900
jan.08	10,6487	10,6500
des.07	11,1235	11,1100
nov.07	11,2162	11,2000
okt.07	11,0558	11,0400
sep.07	11,3708	11,3400
aug.07	11,7663	11,7300
jul.07	11,7708	11,7400
jun.07	11,9281	11,8900
mai.07	11,9466	11,9100
Average	**9,8277**	**9,8541**
Std deviation, five-year	**85,92 %**	**83,74 %**
Std deviation 3-months	**4,30 %**	**4,19 %**
Forward premium	**0,0264**	

Source: Norges Bank