HELSINGIN KAUPPAKORKEAKOULU
Kansainvälisten toimintojen suuntautumisvaihtoehto
Kansantaloustiede

Real Exchange Rate and Competitive Exposure: A Study on Strategic Hedging in Finnish Multinational Companies

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Anna Karppinen
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HELSINGIN KAUPPAKORKEAKOULU

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Tiivistelmä

Tutkielman tavoitteet

Tutkielman teoriaosan tavoitteena oli täsmentää valuuttakurssiriskeihin liittyvää käsitteistöä sekä luoda katsaus kilpailukykyriskiä (competitive risk / exposure) käsittelevään tutkimukseen. Empiirisen tutkimuksen tavoitteena oli selvittää miten hyvin tämä reaalisen valuuttakurssin vaihtelun aiheuttama kilpailukykyriski tunnetaan ja ymmärretään, sekä miten siltä suojautumiseen suhtaudutaan suomalaisissa monikansallisissa yrityksissä: miten kilpailukykyriskipositiota hallitaan koordinoidusti. Toissijainen tavoite oli saada selkeä kuva siitä, mikä kilpailukykyriskin asema on muihin valuuttakurssiriskeihin nähden tutkittujen yritysten valuuttakurssiriskihallinnossa.

Tietoaineisto ja tutkimusote

Tutkittavat yritykset valittiin suurimpien ja kansainvälisimpien suomalaisten yritysten joukosta. Erityisiä ennaltamääriteltyjä valintakriteereitä ei ollut. Tutkittava yritysjoukko muodostui yhdestätoista yrityksestä. Tietoaineisto kerättiin henkilökohtaisilla haastatteluilla. Haastateltavat olivat lähinnä vanhempia toimihenkilöitä yhtymätason rahoitusfunktiossa. Heidän asemansa vaihtelivat hallituksen rahoitusasioista vastaavasta dealeriin.

Tulokset

Reaalisen valuuttakurssin merkitys kilpailukykyriskin kannalta tunnistettiin huonosti. Tämän vuoksi haastateltavien tuntema kilpailukykyriskikin oli käsitteenä lähempänä toiminnallista (operative) tai taloudellista (economic) valuuttakurssiriskiä kuin tässä tutkimuksessa määriteltyä kilpailukykyriskiä. Kilpailukykyriski koettiin kuitenkin tärkeäksi tai erittäin tärkeäksi yrityksen vuosittaisten voittojen heilahteluun vaikuttavaksi tekijäksi lähes kaikissa tutkituissa yrityksissä. Tästä huolimatta tutkimuksessa havaittiin, että koordinoitu kilpailukykyriskin mittaus- ja hallintaprosessi puuttuu suurimmalta osalta yrityksiä. Tosiasiassa vain viisi yritystä oli tehnyt päätöksen mittaamisesta ja (tai) hallinnasta: kolme yritystä oli päätynyt myönteiseen ratkaisuun kun taas kaksi oli päätynyt kielteiseen ratkaisuun. Yleisesti ottaen kilpailukykyriskiä pidettiin erittäin vaikeana määritellä, mitata ja hallita. Tutkittujen yritysten valuuttakurssiriskien hallintastrategiat keskittyivätkin lähes yksinomaan transaktio- ja translaatio- (muunnos-) riskin hallitsemiseen.

Avainsanat

Reaalinen valuuttakurssi, valuuttakurssiriski, kilpailukykyriski, toiminnallinen riski, taloudellinen riski, strateginen suojautuminen

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Anna Karppinen

ABSTRACT

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REAL EXCHANGE RATE AND COMPETITIVE EXPOSURE:

A Study on Strategic Hedging in Finnish Multinational Companies

Objectives

The study was aimed to clarify the state and status of competitive exposure management in Finnish multinational companies (MNCs). The objective of the study was to reveal the understanding of the concept of competitive risk, and the means by which competitive exposure is managed, in a co-ordinated manner, in Finnish MNCs. A secondary objective was to clarify the status of competitive exposure relative to the other foreign exchange exposure types in the overall foreign exchange management strategy in the studied companies. The theory presented in the study was primarily aimed to clarify the taxonomy of exchange rate exposures and to introduce a survey of research concerning competitive exposure.

Source of data and study method

The sample of companies was chosen among the biggest companies in Finland, with a large proportion of turnover realized abroad. No explicit criteria concerning turnover or scope of foreign operations were applied in the selection. The sample size was eleven companies. The data was collected by personal interviews with mainly senior members of the corporate finance or treasury function in the sample companies. The positions of the interviewees ranged from Chief Financial Officer to Dealer.

Results

The role of real exchange rate in the concept competitive exposure was seldom recognized. Therefore, the concept of competitive exposure, as understood by the interviewees, was closer to operating or economic exposure than to the definition of competitive exposure presented in this study. Competitive risk was perceived as an important or very important factor affecting the annual profitability of the company by ten out of eleven companies studied. However, there was very little evidence of a co-ordinated competitive exposure measurement and management process in the majority of the companies. In fact, only five companies had made a decision concerning the management of competitive exposure: three companies had decided to manage it while two companies had decided not to. Generally, competitive exposure was considered extremely difficult to define, measure and manage, and in the overall foreign exchange management strategy, competitive exposure was not recognized and the strategy concerned only the management of transaction and translation exposures.

Key words

Real exchange rate, competitive exposure, operating exposure, economic exposure, strategic hedging.

CONTENTS

FIGURES AND TABLES

1 INTRODUCTION

1.1 Importance of Foreign Exchange Risk Management

The need of active management of financial exposures has become evident during recent years: The financial markets have become increasingly integrated and the exploitation of market imperfections has become more and more difficult due to the increasingly efficient functioning of financial markets as the fluidity of capital flows has grown. But, the pressure to identify and exploit the existing market imperfections, including those presented by government financial intervention, has also increased.

The greater extent of integration in the financial markets compared to the markets for goods and real factors of production has resulted in high volatility in interest rates, as well as in nominal and real exchange rates. This has meant sharp swings in competitiveness of production facilities based in different countries. And the continuous globalization of competition in many industries leaves very little margin for the strategic error of neglecting management of the threats and opportunities that might alter a company's competitive position. (Lessard in Vernon-Wortzel 1991, 218-221; reprint from Porter (ed.), 1986)

The concrete result of the turbulence in the companies' operating environment is often thinner margins. Many types of traditional competitive advantage have eroded; labor costs, natural resources and technology access have lost in importance. Companies face a rapidly changing business environment, where the best margins are attainable by being the first on a new promising market. But, securing the profits means rigorous management of risks. And one of the most important risks that a company faces in its business environment is the foreign exchange risk.

In fact, since the abandonment of the Bretton Woods system of fixed exchange rates in 1973, sizeable and unanticipated fluctuations of exchange rates have been common, and the attempts to stabilize these fluctuations have been unsuccessful. For example, in 1992 many member countries of the European Community (EC) had to leave the Exchange Rate Mechanism (ERM) and "the Snake", because of strong devaluating pressures on these currencies in the foreign exchange markets. In consequence, in August 1993, the bands in which ERM currencies are allowed to fluctuate against the Ecu were widened to +/- 15 %, whereas prior to this they were allowed to fluctuate by +/- 2.25% .

Further, the issue of the Economic and Monetary Union (EMU) is still open: will it be formed, who will be in, who will be out, which will be the exchange rates used in fixing - and will it succeed in increasing co-ordination and flexibility in the markets for goods and real factors of production in the member countries?

In addition, we must remember that even if the members of the European Union (EU) succeed in forming the EMU, and in stabilizing their bilateral exchange rates by synchronizing their economies, most importantly their inflation rates, the US dollar and the Japanese yen continue to be very important currencies in the world markets. And, the importance of the unstable currencies of the emerging markets (e.g. Russia, Eastern Europe and China) is growing; the center of world trade growth is no longer in Europe, North-America or Japan, but in Southeast Asia and China.

Indeed, despite the fact that the USD and the JPY are national currencies, which is likely to increase the use of a non-national currency like the ECU (or Euro) in the world markets, the forming of the EMU cannot be regarded as the solution for exchange rate problems even in members of the European Union.

1.2 Identifying Competitive Risk

In order to consider the real influences of exchange rate changes on a company's competitive position, the concept of the real exchange rate has to be defined.

The real exchange rate is the nominal exchange rate adjusted for changes in the relative purchasing power (PPP) of each currency since some base period (Shapiro 1994, 153). For a technical definition, see section 1.5.

More specifically, whenever the change in the nominal exchange rate does not totally offset the difference in the inflation levels, the real exchange rate appreciates or depreciates. This has important effects on the competitive position of a company, even on a totally domestic one, if the effects of the change in the real exchange rate on the competitors significantly differ from the effects on the company in question. For a multinational company (MNC), this means changes in the future costs of inputs, revenues from sales, and finally, on the operating margin measured in the home currency.

In particular, even if the nominal (actual, observable) exchange rate is unchanged, the real exchange rate changes, if the inflation rates of the countries in consideration differ.

The competitive exposure is the sensitivity of the local currency cash flows to changes in the real exchange rates.

An example of the workings of the real exchange rate and competitive risk is given by the pattern that has been familiar to the Finnish export sector. The pattern originates from the stabilization of the external value of the Finnish markka (FIM) against a basket of currencies, and later against the Ecu, a policy that was abandoned first in 1992. While the nominal exchange rates stayed somewhat stable, the inflation was constantly faster than in the major trading-partner countries, and thus the real exchange rate appreciated when the nominal exchange rate could not offset the devaluation need created by the higher inflation rate. In consequence, the exporting industries lost in competitiveness, until the nominal exchange rate was again revised, when the competitiveness of the exporters was suddenly restored. This led to higher pay demands by the workers in the sector, and gradually in the whole economy, which, in turn, led to accelerating inflation - and the vicious circle continued.

Since exporting from a country with a strong currency (in real terms) to a country with a weak currency is difficult and the reverse is easy, the appropriate location of production, sourcing of inputs, differentiation of the product and other strategic measures are vital for hedging the firm's competitive risk. In consequence, both prior planning and continuous monitoring are essential for coping with this kind of foreign exchange risk. Therefore, the competitive exchange rate risk should be taken into consideration in the overall corporate strategy.

However, the concepts of real exchange rate and competitive exposure are seldom recognized in the foreign exchange management of firms, the reason probably being the treasury's inability to implement the necessary hedging independently. The top management of the company has to be committed to managing competitive exposure: both operational decisions and financial techniques are required in order to construct an effective hedge against competitive risk, and some near-term profits may have to be sacrificed in favor of long-term operational flexibility.

Despite the complexity of hedging competitive risk, it would be a serious error to ignore it. Most large European industries, such as the automobile industry, are mature; they will be the first to be hit by an economic downturn or an external shock like a currency crisis. And, there is very little margin for strategic error. (Srinivasulu 1981, 21)

1.3 Prior Research

Competitive exposure is a relatively new concept, and the foreign exchange risk literature often refers to it under the topic "economic" or "operating" exposure, both of which are, however, broader concepts than competitive exposure. (See e.g. Srinivasulu 1981&1983, Buckley 1992 and Shapiro 1994.)

Flood and Lessard (1986) grouped the cash flows of a company into two broad classes: (1) those fixed in nominal terms in a particular currency, such as accounts receivable and most debt, and (2) the firm's future operating cash flows. The first class is exposed to "transaction" risk: the home currency value of these flows moves one-for-one with the exchange rate. Flood and Lessard also divided the exposure of the firm's operating cash flows, the operating exposure, into two different components: a competitive effect and a conversion effect. According to them, the competitive effect is the sensitivity of the local currency cash flows to changes in the real exchange rate, which depends on the competitive structure of the markets in which the company sells its products and sources its inputs. The home currency value of these flows may move more or less than one-for-one with changes in the nominal exchange rate. The conversion effect is purely the exposure to nominal exchange rates when the local currency cash flows are converted into the home currency.

Studies with a macroeconomic perspective (Cornell 1980, Oxelheim and Wihlborg 1987&1991, for example) recognize the role of relative prices and the real exchange rate, but do not separate the different exposures.

The studies concerned with the valuation of the firm with exchange rate exposure include the studies of Choi (1986), and Karikari and Collins (1989). These studies take the viewpoint of the investor.

From the viewpoint of the management, Torniainen (1992) developed a model for measuring competitive exposure based on the work of Choi (1986), with some extensions and modifications: the use of several currencies and the use of real exchange rates instead of nominal ones. Torniainen also developed a new approach to strategic hedging of competitive exposure; his joint approach makes use of Shapiro's and Soenen's approaches. Consistent with Soenen's approach he includes in the model the statistical relationships between currencies, but he also takes into account the fundamental sources of competitive risk, which is consistent with Shapiro's approach.

In a recent empirical study concerning the exchange rate management practices in the 100 major Finnish firms (Hakkarainen, Kasanen and Puttonen, 1994) aspects concerning the economic exchange rate exposure were found to be taken into account in decision making in most of the answers. The reference currency of the main products or the degree of internationalization of competition was of no significance in less than 16 % of the respondents. The location of production was of no importance to 30 % and competitors currency positions to 40 % of the study respondents. The above aspects are either followed up or they affect decision making in the studied companies.

However, the only aspect of economic exposure that affected decision making in over 50 % of the answers was the reference currency of the main products. For example, competitors' currency positions affected decision making in less than 20 % of the respondent companies in the study in question. A point worth noting is that the firms' own assessment of exchange rate exposure was found to be positively related with the extent to which aspects concerning economic exposure were taken into account in decision making.

1.4 Objective, Limitations and Organization of the Study

This study provides further knowledge on the perception of competitive exposure and the ways in which this perception influences decision making in the Finnish multinational companies.

The objective of this study is to clarify the state and status of competitive risk and strategic hedging considerations in Finnish MNCs. As the method of reaching this objective, interviews were used. The aim of the interviews was to reveal the true understanding, with or without knowledge of a strict theoretical framework, of the competitive risk concept and the means by which this risk is measured and managed at the corporate level. A secondary objective was to attain a better understanding of the overall foreign exchange management strategy and structure of the studied companies.

The study aims to reveal the state and status of strategic hedging in Finnish MNCs. The development of a new model to quantify competitive exposure falls beyond the objectives of the study.

Interviews were chosen as method of study given the novelty of the competitive exposure approach, the firm- and business-specificity of the exposure, and the

subjective nature of the measurement and management process recommended by the literature.

The viewpoint is that of the management of the company, not that of the investor. The theory presented in the study aims to clarify the taxonomy of exchange rate exposures and introduces a survey of research concerning competitive exposure.

The study is organized as follows: Chapters 2,3 and 4 deal with the significance of real exchange rates and competitive exposure to a company. Chapter 2 and 3 explore the determinants of real exchange rates, i.e., nominal exchange rates and inflation, and Chapter 4 examines the measurement and management of the different exchange rate exposures and risks.

Chapter 5 studies the specific challenges of strategic hedging to the multinational company. In chapter 6 the realization of the study is discussed. Chapter 7 presents the empirical results. Chapter 8 draws the conclusions and summarizes the contribution of the study.

1.5 Definitions

The **real exchange rate** is derived from the theory of Purchasing Power Parity (PPP), which bears an important message: the change in the nominal exchange rate should just cancel out the change in the foreign price level relative to the domestic price level, and this offsetting movement has no effects on the relative competitive position of domestic firms nor their competitors. Therefore, deviations from PPP cause real exchange rate changes; and it is only the changes in the *real* exchange rate that will affect the relative competitive positions of domestic firms and their competitors. (Shapiro 1994, 152-153)

In technical terms, the real exchange rate RE at time t is:

$$RE^t_f = S^t_f / (P^i_{h,t}/P^i_{f,t})$$

where

- S^t_f is the nominal spot exchange rate at time *t*, expressed as units of home currency per one unit of foreign currency,
- $P^i_{h,t}$ is the home country price index , and
- $P^i_{f,t}$ is the foreign country price index (the base year of both indices is the same: 0).

As noted above, the determinants of real exchange rate are the nominal exchange rate and the relative inflation rate differential. Therefore, the real exchange rate is affected by the volatility of both of these terms. This will be discussed in detail in chapters 2 and 3.

Risk exists because our knowledge of the future is limited. **Foreign exchange rate risk** is defined here as in Glaum (1990, 66): *it is the probability of changes, for better or worse, in the home currency value of an asset, liability or cash flow stream caused by unexpected future exchange rate changes.*

Consequently a currency is not risky because of a future devaluation; if the magnitude and timing of the devaluation were certain, there would be no risk at all. A weak currency can be less risky than a strong currency. Risk or uncertainty is a question of randomness, i.e., unexpected exchange rate variations (Adler and Dumas 1984, 22). Anticipated exchange rate changes are compensated for in the markets, and it is only to the extent that exchange rates change by more or less than expected that there will be foreign exchange gains or losses (Levi 1990, 188).

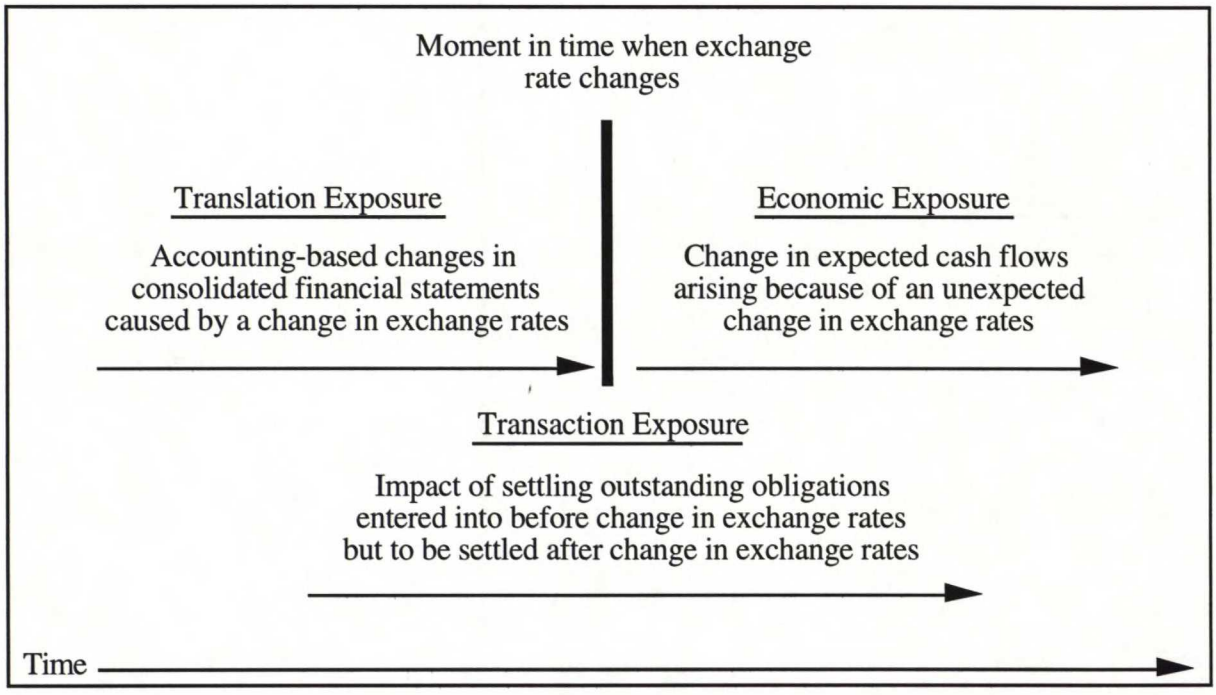
The exchange rate risk itself, which here is seen as a statistical concept, has to be distinguished from *the actual values a company has at risk at any one time:* its **foreign exchange rate exposure** (Glaum 1990, 66).

1.6 Taxonomy of Exchange Rate Exposures

The taxonomy used in this study is developed from the works of Eitemann and Stonehill (1986), Flood and Lessard (1986), Torniainen (1992) and Hekman (1989, in Antl ed.).

The exposures are divided to the three main categories: translation, transaction and economic employing the distinctions of Eitemann and Stonehill. The distinction between the exposures is well illustrated in Figure 1-1.

Figure 1-1 Conceptual comparison of difference between translation, transaction and economic foreign exchange exposure



Source: Eiteman and Stonehill, 1986, 155.

The distinction between translation and the other two exposure types is the most straightforward, because translation exposure relates to realized, reported operations. The distinction between transaction and economic exposure is more controversial, and a common view states that transaction exposure is a subset of economic exposure (see e.g. Madura 1989, 249). In this study, however, these exposures are treated separately.

Translation exposure is an accounting-based exposure, which refers to assets, liabilities, revenues, and expenses, originally measured in a foreign currency, being restated in terms of a home currency in order to be consolidated with home currency accounts (Eitemann and Stonehill, 1986, 154). If the item is translated at the historic exchange rate, the rate which prevailed when the item was acquired, it is considered unexposed. But when the item is translated at the current exchange rate, the rate that prevails on the date of consolidation, it is exposed. It is clear that translation exposure is largely determined by accounting conventions. (Srinivasulu, 1983, 37)

Transaction exposure relates to actual transactions in foreign currencies, whereas translation exposure deals with the valuation of operations abroad. A company's transaction exposure is measured currency by currency and equals the difference

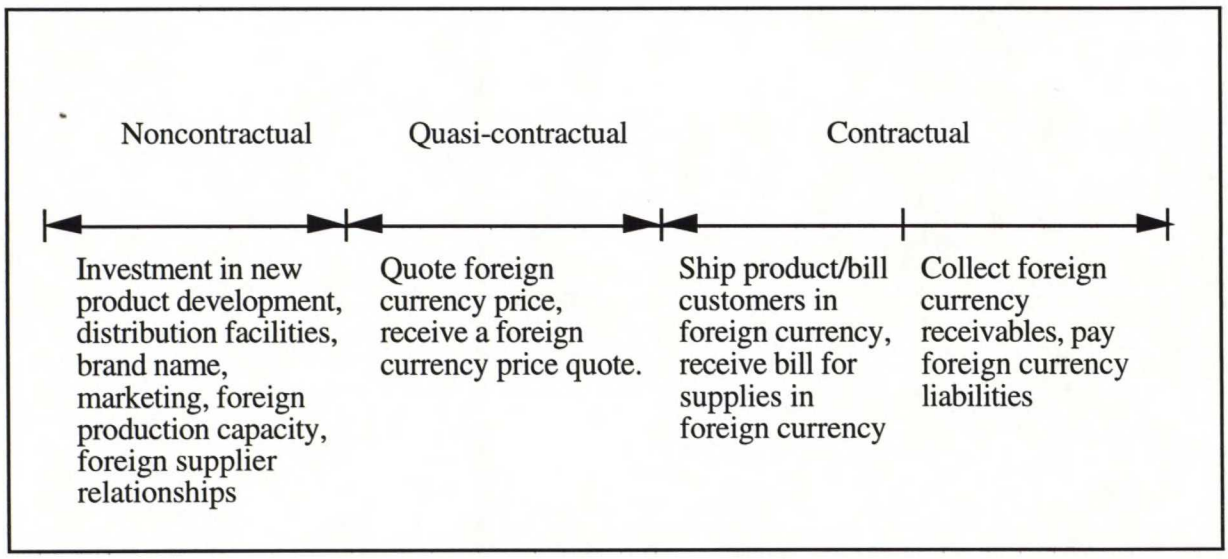
between contractually fixed future cash inflows and outflows in each currency (Shapiro, 1994, 197).

Transaction exposure refers to gains or losses that arise from the settlement of transactions whose terms are stated in a foreign currency. Transactions include (1) purchasing or selling on credit goods or services whose prices are stated in foreign currencies, (2) borrowing or lending funds denominated in foreign currencies, (3) being a party to an unperformed forward foreign exchange contract, and (4) otherwise acquiring assets or incurring liabilities denominated in foreign currencies. (Eiteman and Stonehill, 1986, 156)

Some of these unsettled transactions, including foreign-currency-denominated debt and accounts receivable, are already listed on the firm's balance sheet. But other obligations, such as contracts for future sales or purchases, are not. (Shapiro 1994, 197)

Figure 1-2 illustrates the time pattern of foreign exchange cash flow exposure. The source of the figure, Shapiro, argues that transaction exposure relates only to the contractually fixed foreign-currency denominated cash flows. Some writers, however, (see e.g., Pietikäinen 1994) consider also the quasi-contractual (firmly anticipated, budgeted) items exposed to transaction risk. The study adopts this point of view.

Figure 1-2 The time pattern of foreign exchange exposure



Source: Shapiro, 1994, 228.

Transaction exposure is concerned with foreign-currency denominated transactions practically fixed in amount and timing while **economic exposure** is a broader concept looking more into the future. Booth and Rotenberg (1990) define economic exposure as the extent to which unexpected exchange rate changes will alter a firm's market value by changing the present value of its expected future cash flows.

The above definition is value-based; economic exposure refers to all expected future cash flows - not only to the foreign-currency denominated cash flows. This definition also emphasizes the role of *un*expected exchange rate changes and thus recognizes the message of modern capital market theory: markets reflect current information, and only "news" cause changes of value.

Economic exposure is a broad concept, and several different types of exposure can be identified within it:

(1) Asset & Liability Stock exposure (referred to as Fixed Nominal Terms exposure by Torniainen 1994)

(2) Operating exposure, which is the combination of two exposures:
- competitive exposure
- conversion exposure

(Many writers, such as Srinivasulu, Glaum and Buckley, refer to operating exposure as economic exposure.)

(1) As discussed earlier, the changes in the nominal exchange rates change the home currency values of the stocks of foreign assets and liabilities of a company. These changes in asset and liability book values should have no effect on the market value of the firm as long as they do not affect the company's operative functioning and profits.

But when the profit generating operations are based, in some manner, on these book values, the result of a change in the book value is a change in the ability to generate profits, which will affect company market value. Consider the following example: A company has given a foreign real asset as a security for a loan denominated in the home currency, and when the foreign currency depreciates (in nominal terms) relative to the home currency, the value of the security drops below the necessary level and the company must increase the security; a purely "paper" loss pulled resources away from other operations.

So in this study, the term *"asset and liability (A&L) stock exposure"* is used to indicate the foreign asset and liability book value exposure to changes in the nominal

exchange rates. This exposure differs from translation exposure in time focus: translation exposure concentrates on the translation effects of historical values of foreign stocks and flows, whereas the A&L stock exposure focuses on the impact of the book value changes on future profits and firm value.

(2) *Operating exposure* to exchange rate risk is the responsiveness of operating profits (measured in the parent currency) to shifts in exchange rates, and it is affected by both nominal and real exchange rates. More specifically, operating exposure has two parts: a competitive effect caused by real exchange rate changes and a conversion effect caused by changes in nominal exchange rates.

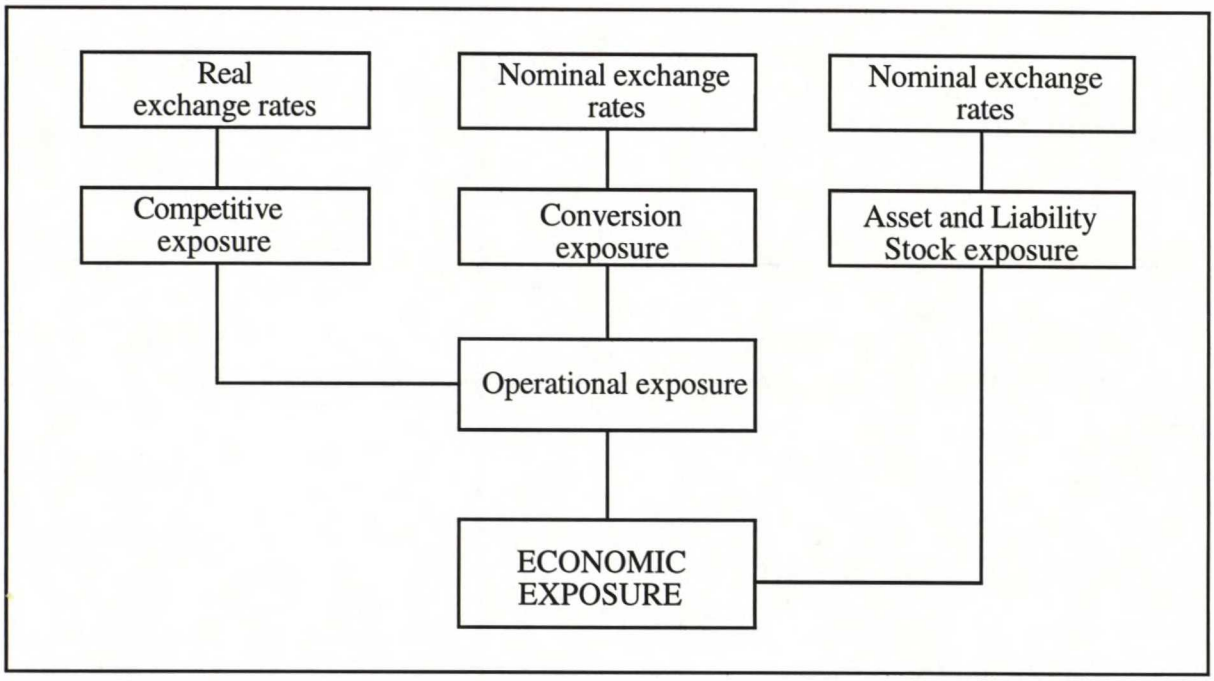
The *competitive exposure* is the sensitivity of the local currency cash flows to changes in the real exchange rates. A company faces this risk through changes in the relative costs and profit margins due to shifts in exchange rates, unless all competitors have the same geographical patterns of value added, which is seldom the case (Lessard in Vernon-Wortzel, 1991, 229; reprint from Porter (ed.) 1986). Thus, a firm operating in a domestic currency, in a domestic market can be just as exposed to competitive risk as a firm operating in several currencies.

The extent of the exposure to competitive risk of a particular company is dependent on the relative price shifts caused by changes in the real exchange rates, elasticities of demand in the different product/market combinations, as well as on the structure of the markets.

The term strategic hedging refers to the use of different operational and financial, strategic and tactical measures to manage competitive exposure. (See section 4.4.2 for more.)

Conversion exposure is the exposure to nominal exchange rates, if local currency cash flows need to be converted into a home currency. This exposure becomes transaction exposure later in time, when the operational cash flows are certain in timing and foreign currency amount. Figure 1-3 illustrates the structure of economic exposure.

Figure 1-3 Structure of economic exposure



Applied from Torniainen 1992, 11.

2 INTERNATIONAL PARITY CONDITIONS AND FORECASTING NOMINAL EXCHANGE RATES

In order to understand the competitive risk of a company, the elements of the real exchange rate must be examined, because it is the changes in the real exchange rate that affect the relative competitive positions of companies with different geographical patterns of value added.

As discussed earlier, the determinants of the real exchange rate are the nominal exchange rate and the relative inflation rate differential. This chapter examines theories of nominal exchange rate determination and forecasting. Chapter 3 examines the inflation element.

2.1 International Parity Conditions

The international parity conditions are theories of how exchange rates - spot, forward and future spot rates - respond to changes in inflation and interest rates, under freely floating exchange rate regime. They are manifestations of the "Law of One Price" (LOP), which states that in competitive markets the exchange-adjusted prices of identical tradable goods and financial assets must be equal worldwide, taking account of information and transaction costs (Copeland and Weston 1988, 791). International arbitrage prevents all but trivial deviations from equality.

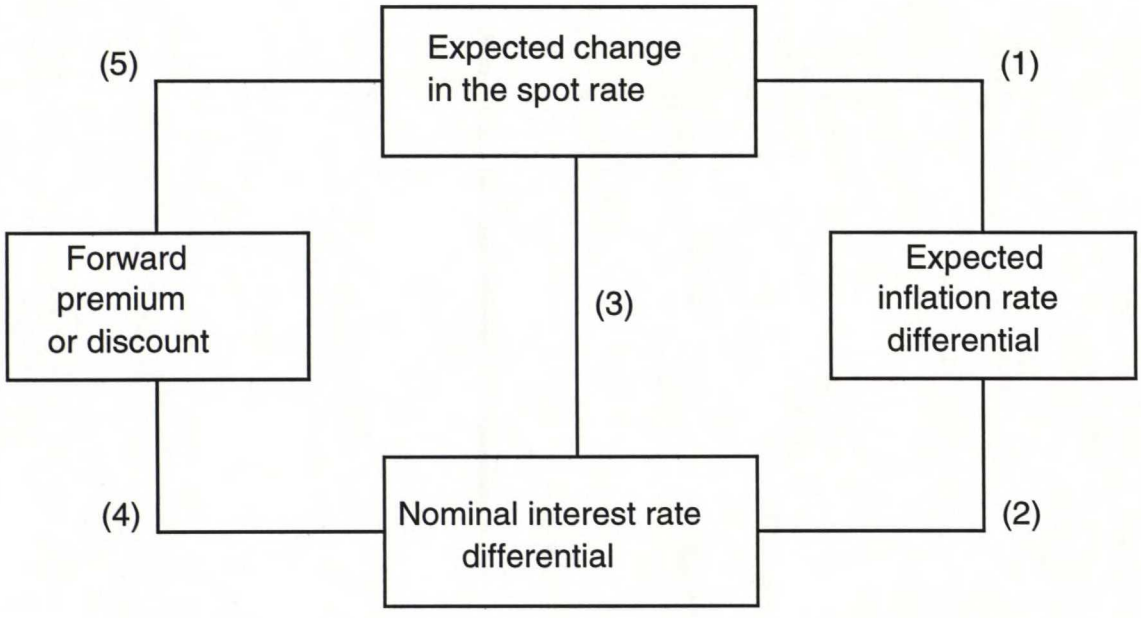
The parity conditions, also called fundamental equilibrium relationships are:

(1) the theory of Purchasing Power Parity (PPP)
(2) the Fisher effect (FE)
(3) the International Fisher effect (IFE)
(4) the theory of Interest Rate Parity (IRP)
(5) the forward rate as an unbiased predictor of the future spot rate (UFR).

It should be noted that the assumptions underlying these equilibrium relationships include (Copeland and Weston 1988, 790):

- perfect goods markets: numerous buyers and sellers, no transportation costs or time, no barriers to trade;
- perfect financial markets: numerous buyers and sellers, no taxes, no information or transactions costs, no controls; and
- there is a single consumption good common to all (there is no differences in tastes).

Figure 2-1 The five key theoretical relationships among spot rates, forward rates, inflation rates and interest rates.



Source: Eiteman and Stonehill 1986, 128

The theory of **purchasing power parity (PPP)** was first presented in a rigorous manner by the Swedish economist Gustav Cassel in 1921. He introduced the *absolute* version of the theory, which states that exchange-adjusted price levels should be identical worldwide. In other words, a unit of home currency should have the same purchasing power around the world. This theory is just an application of the law of one price to national price levels rather than to individual prices. However, absolute PPP ignores the effects of transportation costs, tariffs, quotas and other restrictions, as well as product differentiation. (Shapiro 1994, 151).

The absolute PPP expresses the relative price levels at one point of time, whereas the *relative* version of PPP expresses the relative change in price levels during some time period (i.e. inflation rates), and equals it with the change in the exchange rates.

In formal terms, relative PPP can be represented as follows:

$$S^t / S^0 = (1+i_h)^t / (1+i_f)^t \qquad \text{(equation 2:1)}$$

where

- S^0 is the equilibrium spot exchange rate (absolute PPP holds) at beginning of period,
- S^t is the equilibrium spot exchange rate at end of period,

Both exchange rates are expressed as units of home currency per one unit of foreign currency.

- i_h and i_f are the periodic price level increases (rates of inflation) for the home country and the foreign country, respectively. (Shapiro 1994, 151)

The one-period version of equation 2:1 results:

$$(S^1 - S^0) / S^0 = (i_h - i_f) / (1+i_f) \qquad \text{(equation 2:2)}$$

When the foreign inflation term is relatively small, the following approximation of PPP is often used:

$$(S^1 - S^0) / S^0 = i_h - i_f \qquad \text{(equation 2:3)}$$

In this form, PPP states that the relative exchange rate change during a period should equal the inflation differential for that same period. In effect, PPP says that currencies with high rates of inflation should depreciate relative to currencies with lower rates of inflation. (Shapiro 1994, 152)

Inflation is commonly measured by price indices, using which PPP takes the form:

$$S^t = S^0 * (P^i_{h,t} / P^i_{f,t}) \qquad \text{(equation 2:4)}$$

where

- $P^i_{h,t}$ is the home country price index, and
- $P^i_{f,t}$ is the foreign country price index,

To be consistent with the theory, the two price indices must have the same base period, the same bundle of traded goods and use the same weights (Tucker, Madura and Chiang, 1991, 103).

According to PPP, changes in the nominal (actual, observable) exchange rate are simply adjustments to the different inflation rates and should not cause any changes in the relative competitive positions of domestic firms or their foreign competitors. If the PPP holds (i.e. real exchange rate remains constant), currency gains or losses from nominal exchange rate changes will generally be offset over time by the effects of differences in relative rates of inflation, thereby reducing the net impact of nominal devaluations and revaluations. Deviations from PPP, however, will lead to real exchange gains and losses. (Shapiro 1994, 153)

In other words, if PPP held, the change in exchange rates would reflect exactly the change in inflation rates and nothing else. The "exchange risk" would be purely an inflation risk which could be avoided easily by contracting in real terms (indexing all contracts). Copeland and Weston (1988, 814) write: "If all contracts were written in real terms, all profits, all returns on investments of all kinds, would be independent of the geographical location of the investor or the investment, and the exchange rate would have no real role to play beyond the arithmetic of conversions."

However, no choice of index can perfectly hedge both parties to a contract against inflation risk, and further, the irrelevance of inflation risk requires that relative prices are constant and the law of one price (LOP) holds. In reality, the LOP may be invalidated by significant transportation costs, and in a world with nominal contracting, firms, both domestic and multinational, will generally be exposed to both price level and relative price risk. (Cornell 1980, 32-33)

Relative price risk refers to the possibility of exchange rate fluctuations due to changes in the relative prices of goods, occurring without price level changes. This is possible, when the assumption of one consumption good common to all is dropped, and countries (and individuals) are allowed to consume different baskets of goods. The relative price risk causes a "real" exchange rate risk because it cannot be hedged away by indexing contracts; it is a generic "business risk" in the sense that firms always face the risk that there may be changes in the relative prices of their product relative to its substitutes, of the product relative to the inputs, for example. (Copeland and Weston 1988, 814-817)

Two points are worth noting about the relative price risk: (1) it implies that PPP does not hold: exchange rates can fluctuate without changes in price levels; and (2) both domestic and multinational firms have to face it; thus it cannot usually be hedged away in the foreign exchange markets, but different operative business options have to be used also.

Indeed, the assumptions of PPP are unrealistic, and in reality empirical support for the PPP is weak (for a discussion of empirical studies, see e.g. Levi 1990, 129-133). A common conclusion is that exchange rates do adjust to relative inflation rates, but with a long lag.

In summary, deviations from PPP have been explained by:

- non-perfect goods markets (arbitrage is not instantaneous and costless, existence of trade restrictions).
- differently constructed price indices (different tastes).
- nontradable goods (e.g. most services; international arbitrage cannot equalize the price of these goods).
- different tax laws.
- differences in incomes or other endowments between countries.
- differences in productivities between countries.
- lags in market responses: the goods prices do not keep pace with exchange rate movements, especially downward rigidity of prices may not sufficiently capture the short-run variations of exchange rate behavior .
- risk premiums.

From the point of view of this study, the observation that PPP does not hold well, at least in the short or medium term, is central: the relative competitive positions of companies with different geographical patterns of value added are exposed to competitive risk.

The Fisher effect (FE) states that nominal interest rates in each country are equal to the required real rate of return to the investor plus the expected rate of inflation. Borrowers and lenders factor expected inflation into interest rates and international arbitrage equalizes the real interest rate, the rate at which current goods are being converted into future goods among countries.

Empirical evidence supports the hypothesis that most of the variation in nominal interest rates across countries can be attributed to differences in inflationary expectations. The proposition that expected real returns are equal between countries cannot be tested directly, but the highly integrated and fluid international capital markets is forcing pre-tax real interest rates to converge across all major nations. To the extent that real interest differentials do exist, they are due to either currency risk or some form of political risk. (Shapiro 1994, 157-160)

The **international Fisher effect** (IFE, also called Fisher Open) states that the expected return from investing at home should equal the expected return from investing abroad, expressed in the home currency:

$$(1+r_h)^t / (1+r_f)^t = S^*_t / S^0 \qquad \text{(equation 2:5)}$$

where S^*_t is the expected spot exchange rate in period t.

Essentially, IFE says that to compensate for the lower rates of return, currencies with low interest rates are expected to appreciate relative to currencies with high interest rates. Arbitrage between financial markets should ensure that the interest differential between any two countries is an *unbiased predictor* of the future change in the spot rate. This means that on average, the prediction error is close to zero. It is assumed however, that investors view foreign and domestic assets as perfect substitutes. If this condition is violated, and a risk premium is required to foreign assets in the form of higher expected real return, IFE will not hold. (Shapiro 1994, 161-162)

In fact, there is no stable, predictable relationship between changes in the nominal interest rate differential and exchange rates. The Fisher effect (equation 2:5) states that the nominal interest rate is a function of the real interest rate and inflation expectations. And, a change in the real interest differential and a change in the relative inflation expectations have opposite effects on exchange rates: a rise in the real interest rate in the home country, relative to others, would result in an appreciation of the home currency; whereas a rise in the inflationary expectations in the home country, relative to others, would cause a drop in the home currency value. (Shapiro 1994, 164)

The theory of **interest rate parity** (IRP) illustrates a general proposition of international finance: that in the absence of market imperfections the risk-adjusted expected real returns on financial assets will be the same in foreign markets as in domestic markets. Equilibrium among the current exchange rate, the forward exchange rate, and the domestic and foreign interest rates is achieved through covered interest arbitrage. (Copeland and Weston 1988, 796)

The IRP equilibrium condition is:

$$(r_h-r_f) / 1+r_f = (F^1 - S^0) / S^0 \qquad \text{(equation 2:6)}$$

where

• S^0 is the current spot rate, and F^1 is the forward exchange rate for a period, both expressed as units of home currency per one unit of foreign currency.

• r_h and r_f are the prevailing interest rates for the period in the home and foreign country, respectively. (Real rates of interest are assumed equal.)

The IRP says that to eliminate riskless profits, high interest rates on a currency are offset by forward discounts and that low interest rates are offset by forward premiums. IRP is usually applicable only to short-term securities with a maturity of one year or less, since forward quotes are not routinely available for periods longer than one year.

In reality, there are small deviations from the exact IRP condition without a possibility of riskless profits, because of the transaction costs, taxes and potential foreign exchange controls and restrictions; for covered interest arbitrage to occur, the expected profits must be at least equal to the transaction costs involved. However, periodic opportunities do exists for covered interest arbitrage. They are often available only to the market makers (banks) themselves, small and short-lived. And sometimes they are illusory, because of temporarily increased transaction costs or government interference. (Eiteman and Stonehill 1986, 105)

One of the cornerstones of modern financial theory is the theory of efficient markets. Some forecasters believe that for the major freely floating currencies, the foreign exchange market is reasonably efficient and forward rates are unbiased predictors of future spot exchange rates. This is, the forward discount (premium) is an unbiased predictor of the depreciation (appreciation) that will occur in the spot rate during the corresponding time period.

Formally, the **unbiased nature of the forward rate** (UFR) states:

$$F_1 = \hat{E}_1 \qquad \text{(equation 2:7)}$$

where F_1 is the forward rate for settlement at time 1, and $\hat{E}_1$ is the expected future exchange rate at time 1, both expressed as units of home currency per one unit of foreign currency.

The rationale of efficient markets assumes that all relevant information is quickly reflected in both the spot and forward exchange markets, transaction costs are low, and instruments denominated in different currencies are perfect substitutes for one another. If the market is efficient, it would not pay for a firm to spend resources on forecasting

future exchange rates, because current quotations in the forward market reflect all that is presently known about likely future rates. It is worth noting that the term "unbiased predictor" does not mean "accurate" in any specific situation, it simply means that over many situations, one cannot consistently forecast the inaccuracies. (Eiteman and Stonehill 1986, 137-138)

Nevertheless, empirical studies of the efficient foreign exchange market hypothesis have yielded conflicting results. Earlier studies support the UFR whereas more recent studies have argued that the forward rate is a biased estimator, probably because of a risk premium. This premium has however appeared to change signs - being positive at some times and negative at other times - and averaged near zero. (Eiteman and Stonehill 1986, Shapiro 1994)

2.2 Requirements for Successful Exchange Rate Forecasting Under a Floating Exchange Rate Regime

As may be concluded from the discussion in the preceding section, none of the five equilibrium relationships alone explains the behavior of exchange rates. The unrealistic assumptions needed to establish the conditions explain much of the deviation from the parities; this is not a perfect world, and especially in the foreign exchange markets there is a commonly faced force creating and maintaining market imperfections: government intervention.

Few exchange rates, if any, are freely floating. Most exchange rates are managed to some extent, when the government central banks are willing to absorb and counter the market pressures up to a point. This situation usually means that the central bank is willing to accept foreign exchange losses at the cost of stabilizing exchange rates. (Eiteman and Stonehill 1986, 138)

Shapiro (1994) adopts the requirements for successful currency forecasting, originally by Giddy and Dufey; currency forecasting can lead to consistent profits only if the forecaster meets at least one of the following four criteria: he or she

- has exclusive use of a superior forecasting model
- has consistent access to information before the other investors
- exploits small, temporary deviations from equilibrium
- can predict the nature (and timing) of government intervention in the foreign exchange market.

The first two conditions are self-correcting and are not likely to last long. The third situation applies primarily to foreign exchange traders (i.e., speculators) and explains why deviations from equilibrium are not likely to last long. The fourth condition is especially relevant in the case of managed exchange rates, when governments are willing to take losses to achieve target rates. This may offer profitable opportunities to speculators. Consistently profitable predictions are possible in the long run only if it is not necessary to outguess the market to win, and successful currency forecasting is most likely when governments are willing to spend money to achieve noneconomic objectives. (Shapiro 1994, 171)

Forecasting foreign exchange rates becomes increasingly difficult and less profitable as we move from fixed to managed or floating system. Government action becomes more unpredictable, and the forces for equilibrium become more influential. Developing forecasts superior to forward rates becomes very difficult when operating in efficient markets with floating exchange rates. (Holland 1993, 144)

With freely floating exchange rates the movement toward equilibrium in spot and forward exchange rates, interest rates and inflation rates, is uninterrupted. And, if the foreign exchange and money markets are efficient, all the variables of the five equilibrium relationships adjust very quickly to changes in any one of them. Thus, the forecasting success depends primarily on having prior information on the relevant variables. But obtaining such information is unlikely in the competitive foreign exchange and money markets, and the best way to succeed would probably be superior forecasting of the differential rates of inflation. This is why forecasters spend time, money and energy on analyzing factors that might cause inflation rates to change, such as growth in the money supply, the business cycle, productivity rates and capacity utilization. (Eiteman and Stonehill 1986, 139-140)

Nevertheless, short- and medium-term exchange rate forecasting is very unlikely to be consistently profitable in an (semistrong-form) efficient market, where current exchange rates reflect all publicly available information, and which is characterized by free entry and exit, and a nearly unlimited amount of resources that the market participants are willing to commit in pursuit of profit opportunities. (Shapiro 1994, 174-175)

However, despite the weak theoretical support for the rationale of forecasting exchange rates, currency forecasters continue selling their product. According to Madura (1989) the reason might be the additional advice on international cash management and other

corporate functions that the forecasting services may provide, the fact that treasurers prefer to buy the forecast rather than develop it themselves, or the company expectations for the forecasting service. If the company is only interested in a perfectly accurate forecast it will probably be disappointed in the forecasting service, but if the company wants an estimate on whether or not the exchange rate will be above or below some critical level, a currency value forecast might well pay itself.

3 INFLATION, PPP AND THE REAL EXCHANGE RATE

For longer time horizons, it is possible to use economic fundamentals to project the movements of exchange rates. The common denominator of the international parity conditions is the adjustment of the various rates to inflation. According to modern monetary theory, inflation is the logical outcome of an expansion of the money supply in excess of real output growth. The international analogue to inflation is home-currency depreciation relative to foreign currencies. Inflation involves a change in the exchange rate between the home currency and the domestic goods, whereas home-currency depreciation results in a change in the exchange rate between the home currency and foreign goods. (Shapiro 1994, 149-150)

A further link relating money supply growth, inflation, interest rates and exchange rates in the notion that money is neutral (i.e., it should have no effect on real variables); although a change in the quantity of money will affect prices and exchange rates, this change should not affect the rate at which domestic goods are exchanged for foreign goods, or the rate at which goods today are exchanged for goods in the future (Shapiro 1994, 150). These ideas were formalized in the theories of purchasing power parity (PPP) and Fisher effect, respectively.

In a world where PPP does not hold well, the nominal exchange rate changes seldom compensates for changes in the relative inflation differential, i.e. the real exchange rate fluctuates. This, as unanticipated swings in relative prices, cause turbulations in the relative competitive positions of firms with different geographical patterns of value added.

Because relative price effects are highly industry- and firm-specific, no national measure can fully capture the "real exchange risk" caused by relative price changes. Inflation, however, as usually defined, is the persistent rise in the *general* level of prices, and naturally measured on a national level. The real exchange rate, the nominal (equilibrium) exchange rate adjusted for the relative inflation differential, is therefore used as a measure of competitiveness effects related to national currency fluctuations.

3.1 Definition and Measurement of Inflation

Although a generally accepted definition of inflation does not exist, in this study it is secure to adopt a widely accepted pragmatic definition (by Laidler and Parkin) which states that "inflation is a process of continuously rising prices, or equivalently, of

continuously falling value of money". This definition enlightens the symptoms of inflation, but does not tell anything about the causes and effects of inflation (Frisch 1983, 9).Yet, several problems arise already: what is meant by *continuously rising prices*, and how to measure inflation.

A first comment concerns the rising prices; it should be noted that when speaking of inflation, it is the general price level, the weighted average of all prices, that rises. The increase of the price of a single commodity is not regarded as inflation, but rather as a change in relative prices in a particular market. While such increases may have implications for the allocation of resources and for changes in demand patterns they do not necessarily have a link with the inflationary process. Nevertheless, some individual goods, such as oil, have a greater weight in the calculation of the general price level or a straighter connection to the cost of producing other goods, so that a rise in the price of these goods may have significant inflationary effects. (McNabb and McKenna 1990, 2)

A second comment involves the *continuously* rising prices. In determining whether the price increases are continuous much depends on the chosen time horizon and frequency of measurements (McNabb and McKenna 1990, 3). No precise measure exists. Wilson (1982, 2) states that intuitively, when inflation (succession of increases in price indices) persists so long that the principal economic actors in the economy believe it will continue, that will define "continuous" or "persistent". This illustrates the fact that inflation is partly self-generating and self-reinforcing.

A third comment refers to the measurement of inflation, which is surprisingly complex. The development of the general price level can usually be measured by several kinds of price indices that do not produce the same result. A price index is basically a weighted average of the prices of a predetermined basket or collection of commodities. Its level is usually related to some base year or period, in which the value of the index is set at 100. (Wilson 1982, 3)

However, the construction or choice of an appropriate index is not straightforward. First, there are two different formulas for calculating an index: the Laspeyres and the Paasche formula. Second, as all commodities and their prices cannot be captured in an index, problems arise concerning which prices should be selected as indicators of the general price level, and how to assign the weights.

Without going into details, the two formula types differ in the use of weights assigned to the prices. The Laspeyres formula uses the weights (or "basket") of the base year,

whereas the Paasche formula uses the weights of the end period to calculate the change in the price level.

The Laspeyres index ignores the changes in the demand pattern, and thus fails to account for the substitution effect caused by changes in relative prices during the period examined. Consequently, it accords too much weight to goods that have become more expensive and too little weight to goods that have become relatively less expensive; therefore it over-estimates the rise in the general price level. Further, it does not take into account new goods that have appeared on the market after the base period. (Frisch 1983, 13-14)

As noted earlier, the Paasche index formula takes as reference the basket purchased at the end of the period, and so it takes into account the changes in the demand pattern, but in doing so it in fact overestimates the total expenditures in the base period and generally underestimates the rise in the general price level (Frisch 1983, 15).

From the various, differently constructed price indices used to measure inflation, the consumer price indice is usually a Laspeyres Index whereas the Gross National Product (GNP) deflator most commonly is a Paasche Index. The GNP deflator measures the price development of all the goods and services that enter into value added in the GNP. For the transactions that do not take place in the market (principally government services), a fictitious price index must be used. This, and the fact that the GNP deflator is not very appropriate a measure of the value of money for the average household since it contains the prices of investment and export goods with which the household does not come into direct contact, are the main weaknesses related to its use. However, in this study, if not otherwise indicated, inflation is measured by the GNP deflator.

Regarding the causes of inflation, there is no consensus in modern economics. Two main schools of thought can be distinguished: the monetarists and the Keynesians. As it is an observed phenomenon that substantial inflation has always been accompanied by substantial increases in the quantity of money, the two schools differ mainly in the interpretation of the reasons for this. The monetarist view emphasizes the role of the excess growth of money supply, whereas the Keynesians relate inflation to factors such as changes in wage rates and productivity gains.

3.2 Inflation, PPP and the Real Exchange Rate

As discussed earlier, inflation has a central role in the theories of exchange rate determination. When forecasting exchange rates under any exchange rate regime, the inflationary expectations cannot be ignored. However, using inflation in predicting changes in exchange rates based on the assumption that the inflation rates are exogeneously determined; that is, inflation rates are not influenced by other economic variables.

Thus, in addition to the explanations listed in section 2.1, deviations from the theory of purchasing power parity (PPP) can be explained by the observation that both the changes in the exchange rates and the inflation differential are endogeneous. An unexpected change in the money supply probably causes both the exchange rate and the inflation rate to change. The former being an asset price it is likely to adjust faster than the prices of goods. In fact, in a study on this "causality" Frenkel has found that exchange rates cause prices, and that prices do not cause exchange rates. (Tucker, Madura and Chiang 1991, 109)

3.2.1 Real Exchange Rate Revisited

When a shock, monetary or real, alters exchange rates and price levels simultaneously but to different degrees, it is interesting to look at the nominal exchange rate adjusted by the relative price levels, i.e. the real exchange rate. A change in the real exchange rate is due to a change in the nominal exchange rate relative to a change in relative price levels between two countries. (Tucker, Madura and Chiang 1991, 110)

In general, a decline in the real value of a nation's currency makes its exports and import-competing goods more competitive. And conversely, an appreciating real value of the currency hurts the nation's exporters and those producers competing with imports. An increase in the real value of a currency acts as a tax on exports and a subsidy on imports. (Shapiro 1994, 230-232)

The real exchange rate is not observable in the international capital markets; it is rather a measure of competitiveness of nations trading in the world markets.

As defined in the introduction, the real exchange rate (RE) is formally:

$$RE^t_f = S^t_f / (P^i_{h,t}/P^i_{f,t}) \qquad \text{(equation 3:1)}$$

where

- S^t_f is the nominal spot exchange rate at time *t*, expressed as units of home currency (HC) per one unit of foreign currency (FC),
- $P^i_{h,t}$ is the home country price index , and
- $P^i_{f,t}$ is the foreign country price index (the base year of both indices is the same: 0).

To illustrate, let us say that the spot rate is now 5.05 HC per one FC, and the inflation between times 0 and now has been 10 % in the home country, and 5% in the foreign country. We will thus have a real exchange rate of:

RE = 5.05 / (110/105)
RE = 4.82

The home currency is thus stronger in real terms than in nominal terms, because of the higher inflation in the home country, which has not been fully reflected in the nominal exchange rate.

The real exchange rate is also commonly expressed in index form:

$$RE^i_t = S_t / PPP^{rel}_t \qquad \text{(equation 3:2)}$$

where

- S_t is the nominal spot exchange rate, and
- PPP^{rel}_t is an exchange rate that would satisfy the relative PPP condition.

Both expressed as units of home currency (HC) per one unit of foreign currency (FC), and for period t with base period 0.

So with the figures of the previous example, $S_t = 5.05$, but PPP^{rel}_t is a bit more complicated matter. It is assumed that at period 0 the exchange rate (HC/1FC) was at equilibrium, satisfying the absolute PPP condition, and let us say its value was 5.00. The relative PPP requires that the home currency would depreciate by:

(10%-5%) / (1+5%) = 4.76%

and therefore the PPP exchange rate at period t would be:

5.00 * 1, 0476 = 5.24

The real exchange rate index (RE^i_t) would then have the value:

5.05 / 5.24 = 0.96 , or as usually expressed, 96.

In the above examples, the nominal exchange rate depreciated as the home country experienced higher inflation than the foreign country, but the extent of the home currency depreciation did not fully offset the effect of the differing inflation rates. The real exchange rate thus appreciated, and the domestic goods became more expensive relative to the foreign goods.

An observation worth noting is that if the nominal exchange rate had stayed the same (at 5.00) instead of depreciating, the real exchange rate would have appreciated more than it did in the example. Hence, a fixed nominal exchange rate may lead to more, not less, exchange rate risk than a fluctuating exchange rate.

3.2.2 Real Exchange Rate for an Individual Company

From the micro point of view, an individual company has no control over the nominal exchange rate, but each company, in fact, has its own real exchange rate, depending on the commodity prices that the firm faces. Tucker, Madura and Chiang (1991) write the real exchange rate for the individual firm, in the logarithmic form, as:

$$\Delta e_{j,t} = \Delta s_t - (\Delta p_{j,t} - \Delta p^*_{j,t}) \qquad \text{(equation 3:3)}$$

where Δ denotes change, and

$e_{j,t}$, $p_{j,t}$ and $p^*_{j,t}$ are, respectively, the real exchange rate, and the domestic and foreign prices applied to a comparable commodity *j*. The component s_t is the nominal exchange rate, which is dependent on market forces, expectations and central bank policy, among other things; in contrast, the price components depend on the individual firm's pricing mechanism and market strategy.

Finance theory states that the value of the firm can be measured by its present value, the sum of after-tax cash flows capitalised at an appropriate discount rate. The cash flows are generated from the goods sold in the international markets, and determined by the multinational company's competitive position. The competitive position is in turn dependent on the real exchange rates faced by the firm. Consequently, changes in

either the price or the exchange rate component of equation 3:3 directly affects the value of a multinational company. As Tucker, Madura and Chiang (1991, 111) conclude: "a careful monitoring of the (expected) real exchange rate changes appears to be one of the most important strategies of a (multinational) firm, since its movements reflect a company's dynamic competitive position and its variations reflect information about the uncertainty of the cash flows for the firm."

3.2.3 Forecasting the Real Exchange Rate

Despite the fact that in modern industrialized countries inflation forecasts are usually made publicly available by many reliable sources (such as the central bank, research institutes etc.) forecasting the real exchange rate is not an easy task.

The biggest problems in forecasting the real exchange rate are obvious; its determinants are the nominal exchange rate and the relative difference in inflation rates between the two countries, which are both difficult to foresee. The accuracy of the real exchange rate forecast will then depend on the forecast accuracy of these factors. Moreover, it is difficult to avoid using inflation forecasts in nominal exchange rate forecasts.

It was concluded in chapter 2, from the section on forecasting with floating exchange rates, that in corporate use a currency value forecast is most likely to pay off when it is used to determine whether or not the exchange rate will be above or below some critical level. From the complexity of forecasting the real exchange rate it follows that the same conclusion can be made here also.

In fact, it is likely that a company has an advantage in forecasting cost and price inflation unique to its industry or relative price changes specific to itself. Inflation is a highly aggregative measure, and as discussed in section 3.1, it can be measured in numerous ways which do not usually capture the relative price behavior in any one specific industry. It is then unlikely that a company can gain advantage in forecasting changes in general price levels between the countries. But, given the company's intimate knowledge on its own industry and key competitors as well on the local conditions, if it is operating abroad, a company may have an advantage in assessing the impact of the firm-specific real exchange rate changes on the firm. (Holland 1993, 144-146)

However, as unanticipated changes in the real exchange rates can cause unanticipated changes in the company's cash flows and competitors' actions, forecasts on inflation and exchange rate changes should be central information for the management of currency exposures.

4 MEASURING AND MANAGING EXCHANGE RATE EXPOSURES

The taxonomy of exchange rate exposures used in this study was examined in the introduction. The different notions of exchange rate exposure, namely translation, transaction and economic exposure and their subnotions, have developed chronologically from the simplest to the more complex. Foreign exchange exposure considerations were mainly translational in nature until 1960-70's. After the collapse of the Bretton Woods system of fixed exchange rates among the main industrialized countries, in 1973, the attention shifted to the transaction exposure, and the development of financial instruments for managing this exposure began in a larger scale. During the 1980's a different aspect of foreign exchange considerations became widely known, at least among academics: the economic impact of (real) exchange rate changes on the competitive position and the market value of the firm.

The operating environment of firms has, during the same period, become increasingly international as monetary controls and restrictions, trade barriers and protectionism have given way to freer trade. National boundaries have lost in importance in international trade as well as in international finance, and the competition in many before relatively sheltered industries has become extremely hard.

In terms of foreign exchange exposures, companies must master the measurement of the many different types of exposures to risks, as well as the co-ordinated management of these. This chapter examines shortly the measurement and management of all the exposure types, the emphasis being on the concept of competitive exposure. But first, the cases for and against hedging these exposures are discussed.

4.1 Rationale of Hedging Foreign Exchange Rate Exposures

The most powerful cases against foreign exchange exposure hedging are usually based on models that assume an ideal world with perfect, or at least strongly efficient markets. The cases for foreign exchange hedging are therefore often based on market frictions or imperfections.

In particular, an important question is: if the foreign exchange risk does exist, who should hedge the exposures, the management or the shareholders of the company?

Next, based on the work of Dufey and Srinivasulu (1983) the most influential arguments against (managerial) hedging are tackled.

1. PPP implies that there is no exchange risk because the changes in exchange rates offset price level changes; the changes in the nominal exchange rates should have no relative competitiveness effects. This argument relates especially to the economic (competitive) exposure. But, as noted earlier, PPP does not hold well in the short to medium term, and even if the PPP holds in respect to a price index, a particular company may still be exposed to relative price risk. Thus, PPP offers no valid excuse for not managing foreign exchange risk.

2. The Capital Asset Pricing Model (CAPM) states that if exchange risk is unsystematic, it can be diversified away by the investors in the process of constructing their portfolios. What matters is systematic risk which can managed in the forward exchange markets, but if the forward contracts are priced according to CAPM, hedging offers no additional value to the company. However, since this result is conditioned to the assumptions that there are no market imperfections like transaction costs or default risks, it is easily broken. The corporate management's and shareholder's desire to avoid default (financial distress) risk justifies minimizing variations in company net cash flows through hedging.

3. The Modigliani-Miller (MM) theorem implies that whatever the company can do, investors can do; hence, there is no need for corporate management of exchange risk. However, in reality there exists several obstacles for low cost shareholder hedging. First, the size related entry barriers are market requirements for minimum trading amounts, security deposits and compensating balances, for example. In addition, there may be discriminatory laws about non-resident borrowing or taxation. Second, there are structural barriers related to the corporate internal hedging techniques; changes in inter company invoicing, and leads and lags in payments, for example, are exposure altering techniques which are available only to the company, not to the individual stockholders. Third, to calculate the exposure of the firm, investors would need detailed information not only on the operations, but also on the financial side. In the absence of this information, optimal exposure decisions cannot be made. As a result, the company is in a better position to obtain a low-cost hedge.

4. The concept of self-insurance suggests that foreign exchange losses and gains do not matter, since they average out over a longer period. This approach assumes risk neutrality on the part of the decision makers, and therefore ignores the interest of

reducing the additional variability introduced by unexpected exchange rate changes. Nevertheless, managers show this interest because they usually are not risk-neutral, but want to achieve "comfortable" or satisfactory levels of risk/return ratios. In addition, regulators, stockholders and creditors may well be interested in changes in the probability of bankruptcy. Not only can the stock price incur drops in case of big exchange losses, but the cost of credit may increase as the debt capacity is reduced, and in case of progressive taxes and other government regulation that is a function of the profit level, the bill to pay with variable income stream will most probably be higher than with a stable stream of earnings.

5. A firm's exchange-related gains and losses may be useful to hedge the consumption bundles of its shareholders. However, for a group of heterogeneous investors, an optimal hedge cannot be found by the firm, even if it could acquire the shareholders' consumption bundles and investment positions at low cost. Thus, firms should hedge exchange risk and shareholders the consumption bundle risk.

6. The final argument, the uncertainty of forward and spot rates, suggests that hedging is of dubious value since future forward rates are as uncertain as future spot rates. This argument applies only to hedging transactional exposure in the forward market. Hedging does have its appeal, however: using the forward market the company knows at the beginning of the period what it will be receiving at the end of the period, and the company will be able to use this information for corporate cash planning and working capital decisions, if the company's planning and action horizon is equal to the maturity of the forward contract.

Dufey and Srinivasulu (1983, 61) concluded that if one or more of the following market imperfection conditions exist, the case for foreign exchange risk management at the corporate level is made: incomplete securities market, positive transactions and information costs, the dead weight loss of financial distress and agency costs. The extent to which management can cope with exchange risk is a different issue altogether.

Levi and Sercu (1989) adopted a differing view in their working paper on erroneous and valid reasons for hedging foreign exchange rate exposure. They, for example, rejected differential information and transactions costs (economies of scale) as valid reasons for hedging, and stated that better internal profitability information (not distracted by the "noise" of foreign exchange gains and losses), agency cost considerations and avoidance of sub optimal investment decisions are "possibly valid" reasons for managerial foreign exchange hedging. The only valid reason, according to

them, was financial distress; the links between hedging and expected cash flows, and thus the present value of the firm, are attributable to financial distress. They considered four specific links: financial distress and (1) the product market (marketing of a company's product may be helped by a stable corporate income if buyers want assurance that the company will stay in business to service its products and supply parts); (2) the labor market (risk averse employees are likely to demand higher wages the more uncertain is their future employment, some are frightened away altogether by volatile corporate earnings); (3) the capital market (loan repayments can be triggered when earnings fall below a stated level); and (4) bankruptcy costs; it may be that suppliers of capital will demand higher returns to cover the expected bankruptcy costs.

Finally, it should also be kept in mind that, generally, hedging does not require forecasting, while speculation does.

4.2 Translation and Transaction Exposures

Translation exposure to exchange rate risk is an accounting exposure, that is, it arises from the need of restating accounting items, originally booked in a local currency, in terms of the home currency of the parent company. It is thus the exposure of a multinational company's (MNC) consolidated financial statements to exchange rate fluctuations. Every item on the income statement and on the balance sheet, other than those translated at historical exchange rates, is subject to changing exchange rates when periodically measured in another currency.

The determinants of a MNC's translation exposure are (1) the degree of foreign involvement by foreign subsidiaries, (2) the locations of foreign subsidiaries, and (3) the accounting methods used. First, the greater the percentage of an MNC's business conducted by its foreign subsidiaries, the larger will be the exposed percentage of a given financial statement item. Second, since the financial statement items of each subsidiary are typically measured in the local currency, the location affects the degree of exposure; a local currency value that closely follows the development of the (parent) home currency value represents less translation risk than a local currency that is unstable against the home currency. Third, as translation exposure is the difference between exposed assets and exposed liabilities, the accounting method used to determine which assets and liabilities are exposed greatly affects the degree of exposure measured. (Madura 1989, 258)

Translation gains and losses from the consolidation involve no cash flows, and therefore it has been suggested that it is irrelevant. However, stock analysts tend to value stable reported earnings, and in some cases, the performance evaluation of the managers of the MNC can be dependent on the reported consolidated earnings. If the financial management of a MNC believes that the security analysts, stockholders or bankers, for example, evaluate the company on the basis of its reported earnings or changes in accounting net worth, regardless of the underlying cash flows, it may undertake costly measures to hedge the translation exposure.

More specifically, firms have three available methods for managing their translation exposure: (1) funds adjustment, (2) entering into forward contracts, and (3) exposure netting. Shapiro (1994, 214) describes a basic hedging strategy based on these techniques: increase hard currency assets and decrease soft currency assets while decreasing hard-currency liabilities and increasing soft-currency liabilities. (A hard currency is expected to appreciate, and a soft currency is likely to depreciate.)

It is worth noting that when the company uses external market priced hedging tools, such as forward contracts, the firm can attain reduced costs only if the firm's anticipations differ from the market anticipations and are superior to those. In other words, the market expectations are already discounted into the cost of the hedging tools, such as forward contracts.

Foremost, it should be kept in mind that hedging translation exposure is based on the assumption that the financial markets cannot properly understand and interpret detailed financial statements and the accounting "gimmicks" behind corporate balance sheets and income statements. This assumption has little empirical support (in the US markets): when accounting numbers diverge significantly from cash flows, changes in security prices generally reflect changes in cash flows rather than reported earnings. In an efficient market, translation gains and losses will be placed in a proper perspective by investors, and therefore should not affect a MNC's stock price. Nevertheless, to help the market correctly interpret the translation outcomes, companies should clearly and openly disclose the translation method in use, as well as a note explaining the management's view on the economic consequences of exchange rate changes.

Finally, in the attempt of reducing its translation exposure, a company may be increasing its transaction exposure.

Transaction exposure to exchange rate risk was defined in the introduction as the exposure relating to actual transactions in foreign currencies. Since a transaction will

result in a future foreign currency cash inflow or outflow, any change in the exchange rate between the time the transaction is entered into and the time it is settled in cash will lead to a change in the home currency amount of the cash inflow or outflow. Protective measures to guard against transaction exposure involve entering into foreign currency transactions whose cash flows exactly offset the cash flows of the transaction exposure. (Shapiro 1994, 203)

A company's transaction exposure is measured currency by currency and equals the difference between contractually fixed future cash inflows and outflows in each currency. Some of these transactions to be settled in the future are listed on the balance sheet, but some are not. For example, contracts for future sales or purchases, and items that are firmly anticipated and thus budgeted, are usually also taken into account when determining the degree of exposure.

Effective management of transaction exposure requires detailed information of all foreign-currency-denominated future transactions (e.g., currency denominations, amounts, maturities). This information is used in the construction of periodical net exposure tables, which are the basis of the hedging decisions.

Buckley (1992, 180) lists four basic requirements of the transaction exposure information system: First, the information system should be forward looking. Secondly, the frequency of reporting needs to be adequate. Thirdly, the flow of information should be direct to the treasury rather than being routed via other departments, which creates delays. Finally, the need of information must be "sold" to management in subsidiary companies. More specifically, the reports should also distinguish between inter-company versus third-party flows, capital versus trading items, firm contractual flows versus probable flows, and details of covered and uncovered flows.

Thus, for a centralized approach to foreign exchange exposures to be successful, an efficient reporting system is extremely important. The construction of the subsidiary cash flow reports usually requires data on known as well as forecasted cash flows which depend on the subsidiary management's assessment of trends in the local business environment (resulting estimates of, e.g., future sales volumes and values). The quality of the hedging decisions is thus partly dependent on the forecasting ability of the local subsidiary management, and the speed (method) of communication between the subsidiaries and the treasury. (A centralized treasury of a large MNC usually necessitates heavy information technology equipment, but the investment

should be profitable because of the increased possibilities it offers for corporate cash-, asset- and foreign exchange exposure management.)

Transaction exposure reduction techniques internal to a (multinational) company include: (1) matching of currency in- and outflows at given points of time, (2) leading and lagging payments and receivables, (3) currency (price adjustment, or risk sharing) clauses in contracts, and (4) risk shifting by invoicing in desired currencies. A company may also use cross-hedging (based on currency correlations) or currency diversification to reduce the extent of exposure and (or) to avoid the use of costly financial instruments when a reasonable "natural" hedge exists.

The internal tools available are not likely to provide a perfect hedge and usually do not eliminate the transaction exposure altogether, but they do offer reduction in the exposures, and are often less expensive than external financial instruments (which may also not be available). A cost minimizing hedging strategy might include primarily the use of the internal methods of exposure reduction, and secondarily the use of financial instruments for eliminating the remaining exposure.

The financial instruments available for foreign exchange rate exposure management have become more and more sophisticated during recent years of currency turbulations, and the variety of different instruments available today is so large that the detailed description of all would be an enormous, if not impossible, task.

A company may use external techniques such as futures contracts, forward contracts, money market hedge and currency option hedge to eliminate its foreign exchange transaction exposure. However, these techniques provide primarily short-term hedges; if the company wishes to hedge long-term transaction exposure, it might use one of the following three techniques (if they are available): (1) long-term forward hedge, (2) currency swap, and (3) parallel loan. The use of these techniques requires, however, that the company can accurately estimate foreign currency payables and receivables that will occur several years from now. (Madura 1989)

The following table (4-1) illustrates the use of basic (internal and external) translation and transaction exposure hedging techniques in case of a local currency depreciation, and the costs of these techniques. (The actions are reversed in case of appreciation.)

Table 4-1 Basic translation and transaction exposure hedging techniques

Responses to expected local currency depreciation relative to foreign currencies	*Costs related to the responses*
• Sell local currency (LC) forward	• Transaction costs: difference between forward and spot rates
• Reduce levels of local-currency cash and marketable securities	• Operational problems: opportunity cost (loss of higher interest rates on LC securities)
• Tighten credit (reduce LC receivables)	• Lost sales and profits
• Delay collection of hard-currency receivables	• Cost of financing additional receivables
• Increase imports of hard-currency goods	• Financing and holding costs
• Borrow locally	• Higher interest rates
• Delay payment of accounts payable	• Harm to credit reputation
• Speed up dividend and fee remittances to parent and other subsidiaries	• Borrowing cost if funds not available or loss of higher interest rates if LC securities must be sold
• Speed up payment of inter subsidiary accounts payable	• Opportunity cost of money
• Delay collection of inter subsidiary accounts receivable	• Opportunity cost of money
• Invoice exports in foreign currency and imports in local currency	• Lost export sales or lower price; and premium price for imports

Source: Shapiro 1994, 219

At this point, it should be noted that eliminating transaction exposure does not eliminate all foreign exchange risk. The firm is still subject to exchange risk on its future revenues and costs - it is exposed to economic exchange risk.

4.3 Economic Exposure

Economic exposure to exchange rate risk is a broad concept by definition; it is the sensitivity of company value, measured by the current value of future cash flows, to unexpected changes in exchange rates.

The concept of economic exposure has developed later in time than the previously discussed translation and transaction exposure concepts, which explains some of its distinct characteristics: First, economic exposure does not exclude the other exposure types; translation and transaction exposure may both be relevant within economic exposure, but only to the extent that they alter the *future* cash flows of the firm, or the firm's capacity to generate and maintain these cash flows. Second, the economic

exposure concept recognizes the impact that currency fluctuations may have on purely domestic firms; the cash flows affected by changes in the competitive position need not be foreign currency denominated.

The above mentioned characteristics help to distinguish different exposure types within the broad and forward looking concept of economic exposure (see definitions in the introduction). The exposure related to translation exposure is the "Asset and Liability (A&L) Stock exposure", the exposure related to transaction exposure is the "Conversion exposure", and the exposure related to the second distinct characteristic of economic exposure is the "Competitive exposure", the focus of interest in this study.

4.3.1 Asset and Liability (A&L) Stock Exposure

A&L stock exposure is the exposure of foreign asset and liability book values, changes in which (caused by exchange rate fluctuations) may affect the cash flow generating capacity of a company. This exposure is a function of nominal exchange rates.

A&L stock exposure is not a pure translation exposure because it focuses on the future and not on historical accounting figures, and it is restricted to the extent that changing asset or liability book values directly affect a company's functioning.

For example, the debt capacity of a firm may be altered by fluctuating exchange rates if it has foreign-currency denominated loans outstanding; the amount outstanding, expressed in the home currency, fluctuates one-to-one with the nominal exchange rate. Even if the company eliminated the transaction risk, it would still have to face the risk of getting less additional credit than it desires or getting the additional credit at less favorable terms because of the appreciation of the foreign currency, and a following deterioration in the company's debt capacity ratios.

The A&L stock exposure is not easily measured since in addition to foreign-currency denominated assets (e.g., given as securities), it encompasses the foreign liabilities' book value changes that might alter the company's financial flows. Clearly, though, a firm with no foreign-currency denominated assets or liabilities is not exposed to this type of foreign exchange rate exposure.

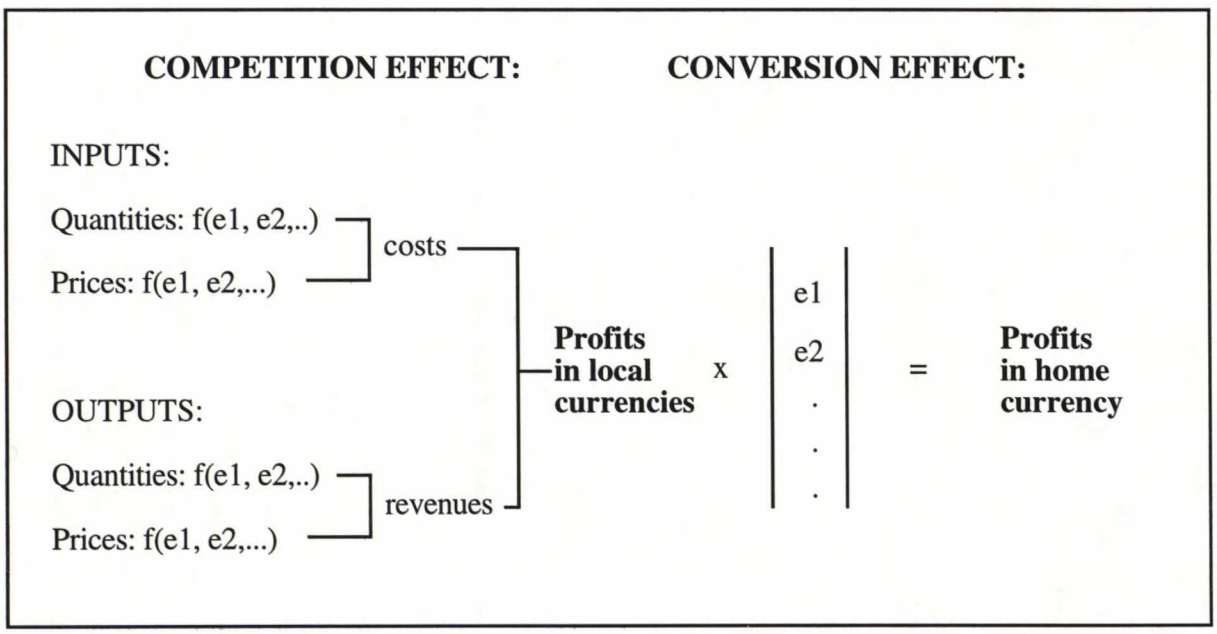
A&L stock exposure can thus be managed primarily by co-ordination of foreign assets and liabilities. Matching the cash flow effects of foreign-currency movements on these foreign asset and liability book values seems the generally advisable strategy.

4.3.2 Operating Exposure

The exposure of a company's future operating cash flows to unexpected changes in exchange rates is called the "Operating exposure" of the firm. This exposure works through two different effects: a conversion effect and a competitive effect (Flood and Lessard 1986, 26). The competitive effect refers to all cash flows affected by the competitive situation which may alter due to unexpected changes in real exchange rates. The conversion effect occurs if cash flows are subject to a conversion to another currency.

The conversion effect is simply a reminder of the cash flow effect of transaction exposure, which will arise later in time when the foreign currency cash flows are (more) certain in timing and amount (to be converted). The conversion effect is thus a function of nominal exchange rates. The following figure illustrates the components of operating exposure.

Figure 4-1 Operating exposure



Source: Glaum, 1990, 68.

Since the focus of interest in this study is competitive exposure, it will be discussed in detail in a separate section next.

4.4 Competitive Exposure

As defined in the introduction, competitive exposure is the sensitivity of local currency cash flows to changes in real exchange rates, which result in shifts in competitive positions of companies with different geographical patterns of value added. Competitive risk arises because of shifts in relative prices due to significant and persistent shifts in real exchange rates, which imply deviations from parity conditions (PPP).

The firm's competitive exposure is derived from the competitiveness of its line businesses as impacted by future unexpected real exchange rate movements, and competitive risk may, in fact, hinder the firm's ability to maintain and achieve its strategic business plan (Moffett and Karlsen 1994, 161-162). Competitive exposure is thus specific to a particular business. A company is likely to have a variety of competitive (and operating) exposures among its subsidiaries doing business in any given country, and the competitive exposures of these businesses must be evaluated separately. (Lessard and Lightstone in Antl (ed.) 1989, 35)

Indeed, competitive exposure is profoundly and fundamentally different in concept from transaction exposure. Flood and Lessard (1986, 35) listed four differences between operating exposure and contractual (transaction) exposure; since these are characteristics of competitive exposure, they can be applied here:

1. It is not the currency of invoice that determines the competitive exposure of the firm, but the market structure in which the firm operates.
2. Competitive exposure may bear little relationship to the location of the firm's physical assets.
3. Competitive exposure is a response to changing real exchange rates as opposed to the nominal exchange rates that drive contractual exposure.
4. Understanding the firm's accounting statements is not sufficient to assess its competitive exposure; a competitive analysis must be done.

Measuring competitive exposure must therefore take into account the nature of the company and its competition. Managing competitive exposure should be aimed to reduce the volatility of the company's profits over the long term.

4.4.1 Identifying and Measuring Competitive Exposure

As was illustrated in figure 4-1, the competitive effect of real exchange rate movements alter the local currency cash inflows and (or) outflows, and thus the operating profit, by affecting the competitive situation: the costs of a firm may rise relative to its competitors, which forces the firm to accept lower margins or to lose market share by increasing the (relative) selling price of its products. Both a margin and a quantity effect determine the overall effect on local currency costs and revenues.

Thus, companies must distinguish between strategic (i.e., competitive) currency exposures affecting the company's ability to sell profitably in each market, and the after-sale impact of currency movements on converted and translated revenues and costs (George and Schroth 1991, 114).

In some cases, competitive exposure is the major cause of variability in operating profit from year to year (Lessard and Lightstone in Antl (ed.) 1989, 29). But some firms and industries are certainly more exposed than others. In fact, the general determinants of the degree of exposure of a particular company include:

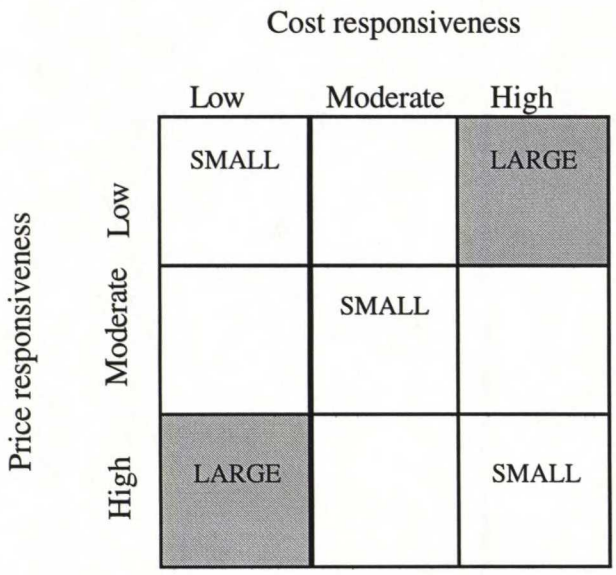
- *structure of the markets* in which the company and its competitors source inputs and sell products: the market share of the firm (monopoly / oligopoly / perfect or monopolist competition); global or national markets
- *geographical pattern of value added of the major competitors*: if all (the firm and its competitors) have the same cost and revenue base, changes in real exchanges would not cause changes in the relative competitive positions
- *relative profitability and margins of the competitors*
- *current business goal*: building market share or enhancing profitability
- *market sector*: e.g., export oriented or import-competing
- *pricing flexibility* of the firm, which is affected by the elasticities of demand in the different product/market combinations faced by the firm
- *product* of the firm: degree of differentiation, absolute margins and added value, life cycle, maturity and rate of innovation
- *sensitivities of input costs* to real exchange rate changes
- *time period of the supply, inventory and receivables pipeline*
- *production and marketing flexibility* of the firm: if a firm can quickly alter its production and (or) marketing choices in response to changed competitive situations, the less it is likely to be exposed to persistent changes in real exchange rates.

The above list is collected from the writings of numerous scholars, and many of the points are interrelated, explaining the same issue only from a slightly different point of view. The list could be summarized by stating that the competitive exposure of the firm is determined by the structure of the firm, and of the markets in which it sells its products and purchases its inputs.

The literature on competitive (economic, operating) exposure does not offer any straightforward, globally accepted answer to the competitive exposure measurement problem. The work of Lessard, in co-operation with several authors (e.g., Flood and Lightstone), seems to be the most extensive, and is the basis of the following discussion.

Lessard and Lightstone (in Antl (ed.) 1989) introduced a matrix, which can be used as a first tool in the determination of the severity of the competitive exposure problem for a company. The matrix illustrates the effect of various combinations of cost responsiveness and price responsiveness to real exchange rate changes on the magnitude of the resulting *operating* exposure.

Figure 4-2 Operating exposure matrix



Source: Lessard and Lightstone in Antl (ed.) 1989, 34

According to the matrix, companies with a serious mismatch of input cost and selling price responsiveness to real exchange rate changes have the greatest extent of operating (competitive) exposure. A company with high cost (or price) responsiveness to real exchange rate changes probably operates in a business where the input (or output) markets are highly integrated and the prices are determined by consumer

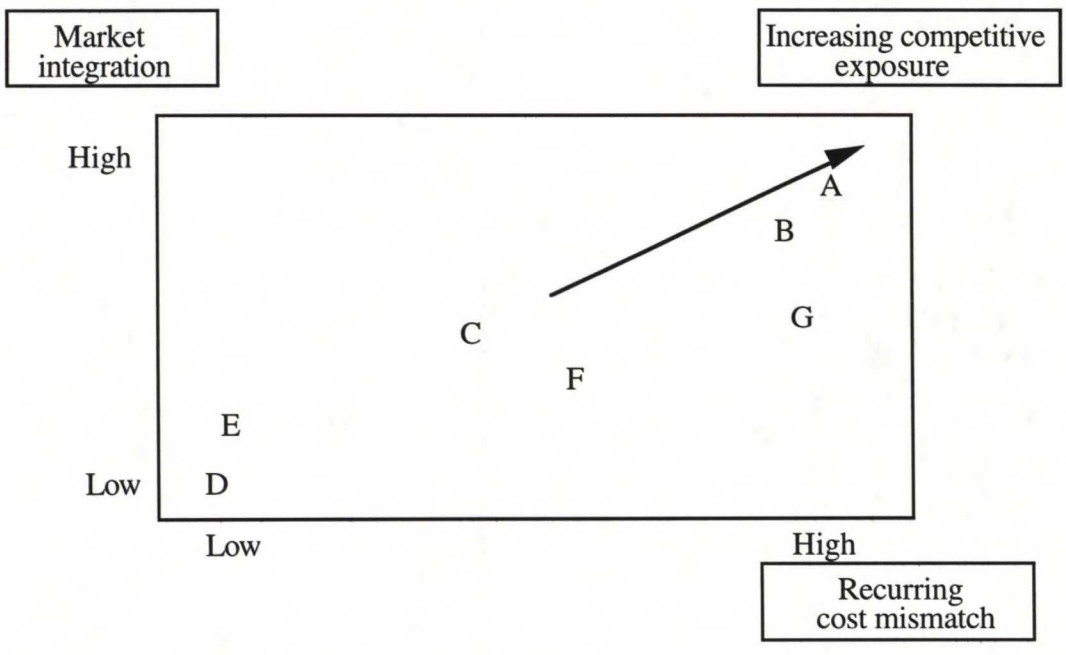
demand rather that producer cost. This analysis does not, however, include the quantity effects.

Another matrix by Lessard and Lightstone (1989) exhibits the determinants of *competitive* exposure as the degree of cross-border market integration (the extent of global competition) and differences in cost structure between competitors (currency mismatch in costs and the relative importance of variable versus fixed costs).

The matrix below shows that the degree of competitive exposure of a company (business) increases the higher the costs mismatch between competitors, and the higher the market integration (and extent of global competition) in the markets for the products. Company A operates in markets which are almost completely integrated and the variable cost component of manufacturing is substantial. For company D there is little cross-border integration of markets and most variable costs are incurred in the country and currency of sales, and the portion of fixed costs is larger than for the company A.

Companies D and E have low levels of competitive exposure, but if they operate in many countries, they will have substantial operating exposure because of the conversion effect.

Figure 4-3 Determinants of competitive exposure



Source: Lessard and Lightstone in Antl (ed.) 1989, 36

In fact, companies whose product has a large services content are likely to have a small competitive exposure as the services are usually bought locally, and the costs mismatch between competitors is likely to be insignificant. Also, companies which operate in strictly regulated national markets are more protected from foreign competition because the regulation serves as a barrier to transhipment.

The appropriate manner to conduct a competitive exposure analysis is a "bottom-up" estimate, which would result estimates of quantity and margin effects in case of different highly probable real exchange rate scenarios, and thus estimates of the local currency cash flows. A bottom-up measurement of competitive exposure requires an understanding of (1) the structure of the markets in which the company and its competitors source inputs and sell their products, and (2) the degree of flexibility of the company and its competitors in changing markets, product mix, sourcing and technology. This information is obtained from the operating (marketing, production and logistics) management by means of structured dialogue. This represents a closer involvement of the treasury group with operations, and an enlarged treasury responsibility; operating managers do not usually have the analytical framework to use the information, and thus the treasury will have the responsibility of co-ordinating the measurement process.

The exposure audit with operating management will typically include the following types of questions (Lessard and Lightstone in Antl (ed.) 1989, 37):

- Who are actual and potential major competitors in various markets?
- Who are low cost producers?
- Who are price leaders?
- What has happened in the past to profit margins when real exchange rates have become overvalued and undervalued?
- What is the flexibility of the company to shift production to countries with undervalued currencies?

Lessard (in Vernon-Wortzel 1991, p.238; reprint from Porter (ed.) 1986) states that real currency fluctuations alter the attractiveness of the company's strategic options, and recommends a three-stage procedure for the assessment of the strategic options of the firm:

1. assess future expected cash flows conditional on PPP, concentrating on micro competitive factors such as the firm's likely experience gains relative to anticipated wage increases
2. assess how these (conditional expected) cash flows would differ under alternative exchange rate scenarios, and
3. estimate cash flows across scenarios given their relative likelihood.

The bottom-up process of measuring competitive exposure is likely to be time-consuming and costly, which is why quicker top-down estimates have been developed to measure *operating* exposure.

The top-down estimate is derived from an analytical comparison of the historical profitability of the company with the changes in profitability expected on the basis of changes in real exchange rates, assuming that the competitive position of the company is constant during the period of the comparison and that the company has not undergone major structural changes at the level of aggregation under review. The regression analysis can identify both the principal exchange rates to which the company is exposed and the fraction of revenues exposed. (Lessard and Lightstone in Antl (ed.) 1989, 38)

Since the top-down analysis provides estimates of the part of variability of profits that result from exposure to real exchange rate effects, it can serve as a tool of revealing the approximate severity of the competitive exposure problem. The type of analysis is often referred to as VAR (Value-At-Risk) -analysis in modern financial literature.

Independent of the analytical framework used, the biggest difficulties in measuring a firm's competitive exposure are related to assessing the period of time the real exchange rate shift is going to persist, the elasticities of demand in the product/market segments of the firm, and the competitors responses to different real exchange rate changes and measures undertaken by the firm.

In conclusion, only few issues are universally true regarding the competitive exposure measurement problem of any company: Competitive exposure is a business-specific exposure to changes in the real exchange rates, and thus the measurement requires a long-term, forward looking perspective. Substantial effort is needed to gather and analyse the sensibilities of cash flows; the information is not a by-product of any traditional accounting reporting system - a cross-functional process must be established for the purpose. The analysis tool should treat scenarios for different,

probable states of nature (levels of real exchange rates) and market responses. For this purpose, computerized models can be constructed; as this is costly, top-down regression analysis could be used first to determine the approximate severity of the problem, if the company structure and market environment have been, and are likely to stay stable in the period of examination.

When the exposure to different real exchange rate (and relative price) movements is measured, the company should examine what actions would reduce the level of exposure in the different scenarios. In other words, the firm should answer the question "what could be done to reduce the sensibility of cash flows and operating profit?" so that the shifts in real exchange rates would not cause major (unfavorable) changes in the competitive position of the firm.

The different measures that can be used for this hedging purpose are discussed in the following section.

4.4.2 Strategic and Tactical Measures for Hedging Competitive Exposure

Despite the globalization of a growing number of industries that has been the trend from the 1970's, the companies which manage actively their competitive exposure are still few in number. The common explanation in the literature is that treasurers feel that competitive risks cannot be managed because the exposures are not easily quantified and routinely reported, and because hedging the exposures implies large and long-term hedges, engaging in which falls beyond the jurisdiction of the treasury function. Moreover, George and Schroth (1991, 112-113) introduced the term "CEO exposure" to point out that CEOs, concerned with short-term reported earnings, focus on translation of foreign currency income, instead of focusing on the longer term effect of exchange rate movements on the company's ability to improve sales and margins in a competitive environment. The authors stated that the absence of an accounting result that isolates the strategic impact of currency movements on earnings is probably the single most important reason for US corporations failing to use foreign exchange as a competitive tool.

In fact, George and Schroth found that it has been acceptable for senior management to blame poor results on exchange rates without answering the question "Why didn't you do something about it?" The reason was the managers' defence of the status quo based on the difficulty of quantifying strategic (competitive) foreign exchange

exposure. But, the authors stress that despite the impossibility of measuring all the variables affecting a company's competitive exposure with absolute precision, the exposure can be measured to a large extent and it must be viewed as a major element in a company's competitive position. For successful management of competitive risk, it must be considered in the strategic decision-making at the same time as all other factors, not after the fact. (George and Schroth 1991, 115)

Indeed, George and Schroth (1991) put the case for competitive exposure management briefly: "*In order to be a global winner, it will be necessary to use all the weapons available.* In a global marketplace in which currency movements may affect the various players differently, a strategy that recognizes the effects of exchange rates on competitive position is a key offensive tool. Such a strategy helps to ensure cost and price competitiveness in each market, and protects and improves margins and market share. Corporations that fail to use this tool in a timely and effective fashion run substantial risk of loss of competitive position."

The key issue in hedging competitive exposure is to make the senior management, business as well as financial, understand that competitive exposure of a company is the result of strategic and tactical (operating) decisions, and consequently, the best way to hedge competitive exposure is to factor it into operating decision-making. Hedging competitive exposure requires top management mandate.

The tools used in competitive exposure management are strategic or tactical, and involve either the R&D, marketing and sales, production and logistics, or finance function of the firm. The table 4-2 illustrates the different responses by these dimensions.

The strategic options for managing competitive exposure of a company, such as the plant (re)location decision, require anticipation of the future operating environment, and are costly as well as difficult to reverse. The strategic options are thus proactive decisions which are targeted to build in the responsiveness and flexibility to tackle problems caused by unanticipated real exchange changes. The tactical options require usually less anticipation as they can be employed within a shorter time frame than the strategic options. Also, the tactical responses are easier to reverse and are likely to be less costly than the strategic options. Thus, the tactical options are reactive decisions to exploit the strategic flexibility in response to recent changes in the real exchange rates. (Holland 1993, 138)

Holland (1993, 157) names three distinguishing factors of strategic versus tactical decisions: degree of reversibility, overall shareholder value significance for the firm, and longevity of the effects of the decision. It should be noted, however, that the same decision types may be considered strategic in one firm and tactical in another. This is why the term strategic hedging refers to both strategic and tactical decision categories.

Table 4-2 Competitive exposure management tools

DOMAIN	TIME FRAME	
	STRATEGIC	*TACTICAL*
R&D	New product development Product cycle	Product(ion) modifications
MARKETING AND SALES	Product mix Market selection Market positioning	Pricing policy Promotional policy
PRODUCTION AND LOGISTICS	Plant (re)location Production method Production planning	Sourcing adjustments Productivity and capacity adjustments
CAPITAL AND FINANCE	Currency denomination of core financial structure	Cash and asset management Use of financial instruments

The operational hedging alternatives in table 4-2 will be discussed next. The operational tools for hedging competitive risk include strategic and tactical measures concerning R&D, marketing and sales, as well as production and logistics.

Strategic research and development (R&D) decisions include above all the location decision; when the currency of denomination of R&D is different for the competition, real exchange rate movements have a built-in structural impact on comparative costs (George and Schroth 1991, 110). Also, a company may decide to alter its product strategy in response to competitive risk. In co-ordination with the marketing strategy, a firm may invest in R&D for faster new product development, product innovation or decide to reorient the product line in order to reduce the price sensitivity of demand. Further, probably the greatest "boost" to competitiveness comes from compressing the time it takes to bring new and improved products to the market. The advantage of shorter product cycles is dramatic: not only can the company charge a premium price

for its exclusive products, but it can also incorporate more up-to-date technology in its goods and respond faster to emerging market niches and changes in taste (Shapiro 1994, 265). Differentiated innovative quality products are a powerful way to reduce the impact of real exchange rate changes on the competitive position of the firm.

Tactical (reactive, after-the-fact) R&D alternatives are closely related to marketing and production tactics: if a firm decides to slightly modify the product or the input mix of the production, for example, the R&D department is involved in the process.

Strategic marketing alternatives include the product mix, market selection and positioning and company image strategy. A company with a low-quality bulk product and a highly price-sensitive customer base is certainly more likely to be hit by unexpected shifts in competitive situation due to real exchange rate swings. To reduce its competitive risk, a company might decide to differentiate its product, improve the quality and thus service a different market segment. This is likely to take several years and heavy investment in image campaigns. The market selection decision is especially relevant when the company is heavily dependent on only few export markets, and competes on these markets with companies from different countries than its own. Real exchange rate changes are very likely to cause major turbulations in the competitive position of the firm and the cash inflows of the company, whereas cash outflows are likely to stay somewhat stable. Diversification of export markets and changing the market focus takes serious efforts and time to succeed, but is effective in the battle against competitive exposure.

Tactical marketing alternatives include price and service adjustment, and promotional policy. In order to keep the market share after an adverse real exchange rate development, the firm may be forced to accept substantially lower margins. If the firm is more interested in maintaining the margin, it will increase the price. The wisest policy is determined by the elasticity of demand and economies of scale. The greater the price elasticity of demand - the change in demand for a given change in price - the greater the incentive to hold down the price and maintain the sales and revenues. Similarly, if the real exchange rate movement is favorable and significant economies of scale exist, it will generally be worthwhile to hold down price and expand demand, and thereby lower unit production costs. The reverse is true if economies of scale are non-existent or if the price elasticity of demand is low. (Shapiro 1994, 257)

A very effective *strategic production tool* in hedging competitive exposure is the plant (re)location decision. This decision locks in, to a great extent, the currency denomination and the inflation of the fixed production costs, and affects directly the

geographical pattern of value added of the company relative to its competitors. The other strategic production tools are the method of production, and production planning, which includes production amount and capacity planning among plants, and the sourcing decisions such as long-term supplier contracts. In fact, in response to an expected persistent real exchange rate change, a company may decide to incur substantial losses of scale economies, and diversify the production to several smaller production units located in different countries, or direct the production amounts so that the production in a country whose currency has become expensive in real terms is cut down, while the production in countries that have become cheaper in real exchange rate terms, is increased. This however requires that excess capacity exists.

The flexibility of the manufacturing system is also a salient strategic aspect of the production policy in the world of long-term deviations from PPP-levels of exchange rates. The investments in production flexibility are likely to yield high returns; flexible manufacturing systems permit faster production response to changing market situation, and foreign facilities that may be uneconomical at the moment, can pay off by enabling companies to shift production in response to changing real exchange rates of other relative cost shocks (Shapiro 1994, 265). Lessard (in Vernon-Wortzel, p.237; reprint from Porter (ed.) 1986) states that in some cases, the firm will be able to enhance its average profitability over time by building a degree of flexibility that allows it to shift sourcing and value-added activities as exchange rates move.

Tactical production tools include adjustments in sourcing, productivity and capacity employment. Outsourcing is a sourcing adjustment that means purchasing intermediate components from independent suppliers rather that manufacturing them within the firm. This gives flexibility to shift purchases of intermediate components toward suppliers that are most competitive at a given point of time. The sourcing adjustments may also include supplier or input mix changes. Increasing productivity can be a preferable alternative for a firm that relies heavily on co-ordination with and closeness to suppliers.

The use of *financial tools* in hedging competitive exposure is a controversial issue, because the financial instruments usually available for foreign exchange hedging are linked to nominal exchange rates only, and the competitive exposure is a responsiveness to changes in real exchange rates. The use of traditional financial instruments thus have limited effect on competitive exposure, but they do have advantages also. The costs related to the operational tools for hedging competitive exposure are often significant, they often require long-term investments as well as organizational restructuring. In contrast, the costs of using financial instruments are

often limited to the transaction costs, and the positions can be quickly changed in response to changes in the market situation. The ideal financial instrument would, however, be linked to the real exchange rate. This would enable the firm to closely offset the variability in the operating profits caused by changes in the real exchange rate with the financial position.

Nevertheless, the appropriate design of core financial structure and co-ordination of its currency denomination is an essential part of securing corporate value. Holland (1993, 138) states that financial hedging methods can be helpful for buying time for the real operational responses to take effect, for dealing with those parts of the currency risk problem that cannot be tackled using strategic decisions, or for dealing with those problems that prove too costly in terms of strategic or operational value penalty losses (shareholder value penalty associated with management ignoring the currency risk problem).

However, it should be noted that the unique nature of a firm's competitive exposure, and the best ways to manage it, depends to a large extent, on the nature of competition in its business(es). For example, firms in highly competitive industries may have to focus on price adjustments caused by advantageous real changes experienced by their competitors. In contrast, firms operating in industries dominated by few large companies may have to deal with competitive variables, such as R&D expenditure in product development and differentiation, in responding to competitive risk. Further, firms in businesses with long product development times may find that real decisions can have long lead times and this can mean little flexibility in adapting these decisions in order to deal with competitive risk. (Holland 1993, 171)

To conclude, the most effective tools for hedging the competitive position of a company from unexpected real exchange rate changes - a company's competitive foreign exchange risk - are strategic operating decisions common to most (manufacturing) businesses. The novelty of the competitive exposure framework is not the hedging technique. In fact, the literature with a competitive risk approach comes very close to the general literature of competitiveness of the firm; for example, many of the influential articles on the subject have been published in books dealing with global competition - not only with finance and international economics. The novelty in the competitive risk and strategic hedging approach is the idea that a business's competitive situation (ability to sell its product profitably at a given market) may be greatly affected by shifts in real exchange rates - and something can be done ahead of time to reduce the impacts.

5 STRATEGIC HEDGING AND THE MULTINATIONAL COMPANY

Competitive risk exists for a company if real exchange rates are volatile, the changes are unpredictable, and the profitability of the company is affected by these unexpected changes. Risk is a combination of uncertainty and value at risk.

The objective of hedging competitive exposure is to reduce the volatility of the company's profits over the long term. The concept of strategic hedging encompasses the strategic and tactical measures used by a company to reduce its competitive exposure, in order to preserve and possibly enhance shareholder value in the long term. Strategic hedging decisions alter exposures (and) or reduce sensitivities to competitive risk.

All companies operating in an international marketplace are subject to some degree of competitive risk, but from a quick review of the literature on competitive risk, competitiveness of firms and strategic management, it can be concluded that manufacturing firms operating globally with few strong (foreign) competitors are very likely to have large exposures. In particular, multinational companies (MNCs) often operate in world-wide oligopolist markets which are characterized by significant barriers to entry and by a high degree of interdependence among the existing few firms. The firms are forced to take into account the actions and possible reactions of the rivals in making their own output, pricing and other business decisions. In fact, the oligopolist market situation is a special case of the market imperfection theory of international investment and diversification. (Weekly and Aggarwal 1987, 181-183)

The driving force of global competition is, according to Hamel and Prahalad (1985, 140), a sequence of competitive action and reaction in search of world brand dominance: First, an aggressive competitor adopts the strategy of cross-subsidization, i.e., uses cash flows generated in one part of the world to fight a competitive battle in another. Second, the defensive competitor retaliates in the markets where the aggressor is the most vulnerable. International cash flows, rather than international product flows, scale economies or homogeneous markets finally determine whether competition is global or national. Companies should distinguish between cost effectiveness and competitive effectiveness.

Thus, MNCs are likely to be in a situation where the changes in the competitive position in any market significantly affect the position in other markets. Since strategic hedging of competitive exposure aims at securing the company's overall long-term

competitiveness against the effects of volatile real exchange rates, monitoring the exposure, as well as planning and implementing a proactive strategic hedging policy should be of great importance to the multinational companies.

The global competition among MNCs is likely to demand a new strategic thought in a successful company: new organization of responsibilities, new concepts and analysis (Hamel and Prahalad 1985). Both cross-functional and cross-business-unit teamwork are trends of organizational responses to the changing game. The next section of this chapter examines the overall foreign exchange strategy, also in relation to the corporate strategy, and the second section discusses the most important organizational challenges of strategic hedging.

5.1 Foreign Exchange Management Strategy Process

5.1.1 The Ideal Foreign Exchange Management Strategy

Generally, a diversified company has two levels of strategy: business unit (competitive) strategy and corporate (company wide) strategy. Competitive strategy concerns creating competitive advantage in each of the businesses in which a company competes. Competition occurs at the business unit level. Corporate strategy, the overall plan for a diversified company, concerns two different questions: what businesses the corporation should be in, and how the corporate office should manage the array of business units. A successful corporate strategy must grow out of and reinforce the competitive strategy; it is what makes the corporate whole add up more than the sum of its business unit parts. (Porter 1987, 43-46)

Strategic hedging is an issue of both levels of strategy: competitive exposure management should be viewed as a major element in a firm's competitive position, and companies should make sure that their currency management program best supports the corporate goals and is consistent with the different competitive strategies.

Lessard (in Vernon-Wortzel 1991, 234) proposes three kinds of corporate alternatives for managing *operating* exposure:

1. configure individual businesses to have the *flexibility* to increase production and sourcing in countries that become low cost due to swings in exchange rates,

2. configure *individual businesses to reduce operating exposure* by matching costs and revenues, and
3. select *a portfolio of businesses* with offsetting operating exposures.

The first option, increasing flexibility, can actually add to a firm's expected operating profits as well as reduce their variability. The other two can at best reduce variability with no diminishing of expected operating profits and will, in fact, often result in some reduction in the expected operating profits. The reason for this, in the case of configuring individual businesses to match the currency habitats (the currency in which the operating result of a business is most stable) or revenues and costs, is that such matching typically will require some departures from the optimum configuration in terms of scale and locational advantages. In the case of selecting a portfolio of businesses with offsetting exposures this is likely, because of the increased administrative costs and reduced efficiency associated with managing diverse businesses without other synergistic linkages, as well as with the need to review the operating results of the businesses after correction for the effects of operating exposure. (Lessard in Vernon-Wortzel (ed.) 1991, and Lessard and Lightstone in Antl (ed.) 1989)

The portfolio motive of diversification has also been heavily criticized in the modern literature of corporate strategy; Porter (1987) takes the criticism to extreme: he states that portfolio management is no way to conduct corporate strategy, and diversification of risk should only be a by-product of corporate strategy, not a prime motivator.

The overall foreign exchange strategy should fit the corporate strategy formulation, organizational structure, management style and administrative processes. Therefore, a company should not structure or change its strategic decisions solely on the basis of foreign exchange risk management considerations. According to Holland (1993, 147) the goals of foreign exchange risk management relative to strategy include the following: (1) to take currency volatility into account at an early stage in strategic decision making, (2) to identify existing strategic flexibility relative to potential new changes in the real exchange rates, and (3) to create new levels of strategic flexibility relative to such changes.

Two overall foreign exchange exposure management strategies that can be identified depending on the circumstances in the firm's economic environment: (1) a passive strategy, and (2) an active opportunistic strategy, either with real response a priority and financial decisions in support, or with the treasury as a speculator (Holland 1993, 123).

A passive strategy is suitable only in integrated and efficient foreign exchange and world capital markets, when all the parity relationships hold. This strategy assumes that after matching of asset and liability cash flows as far as is possible, a policy of doing nothing is acceptable to shareholders, as any gains and losses on unhedged positions are expected to cancel out each other over a long period. (Holland 1993, 125)

An active foreign exchange management strategy is appropriate in more turbulent and imperfect market conditions, or when the markets are efficient, but there are circumstances unique to the firm that make active management advantageous or otherwise necessary. For example, Holland (1993, 125) argues that if the firm has access to superior forecasts, has very large default risks, or if the parities hold well on average and poorly for the individual firm, active management of currency risks is suitable. It will have even more importance when there are major imperfections in the markets: long term PPP deviations creating real exchange rate changes between economies, segmented capital markets or other major imperfections in world capital and foreign exchange markets.

However, the active management strategy needed in circumstances of the international parities, especially PPP, failing to hold for a firm, differs from the response suitable for segmented or otherwise imperfect financial markets. Under deviations from PPP, the foreign exchange management should focus on responses via real decisions with financial decisions playing a supporting role, while in the case of major imperfections in financial markets the whole range of financial tactics to exploit deviations in financial markets should be used. Treasury then begins to act as a bank, exploiting mispricing in financial markets. The danger here is that treasury will pursue profits in this role as a speculator and arbitrageur to the detriment of its other roles in the firm. In fact, the treasury may see financial responses as the only means to deal with currency risk. (Holland 1993, 123-127)

In practice, the choice of the appropriate foreign exchange management strategy is largely determined by the managers' attitude towards risk; those adopting a passive strategy are likely to be risk-neutral, while risk-averse managers may take the view that hedging is of value to them in reducing the variability of cash and income flows, even though the same level of cash flow is expected to occur under hedge- and no-hedge strategies. This would allow them to concentrate their attention on real decisions; and if managers can, through their production, marketing and other strategic and tactical decisions, reduce the systematic risk for the same expected cash flows, or increase the

expected cash flows for the same systematic risk, then these actions would clearly be of value to shareholders (Holland 1993, 125).

It is therefore presumed that the major foreign exchange risk problems are best dealt with by using combinations of real and financial responses set within an active opportunistic foreign exchange risk management strategy. Strategic decisions take priority, with (tactical) operational decisions providing an important support capability when responding to currency risk. Any remaining lack of currency flexibility in the real business of the firm can be compensated for by imaginative manipulation of the internal financial system, the currency mix for financing and various risk management products supplied by financial markets. The treasury acts as a specialist corporate function providing market information, forecasts, hedging services and financial advice to those managers taking strategic and operational decisions. It has an important information provision and liaison role in adapting the strategic and (tactical) operational decisions to foreign exchange risks. (Holland 1993, 127 & 163)

5.1.2 Developing a Foreign Exchange Management Strategy

A thorough discussion of foreign exchange rate risk management strategies, policies and process, from the point of view of multinational corporations, is found in Holland (1993). Holland states that while it is clear that MNCs should manage their foreign exchange rate risk, given the imperfections discussed in section 4.1 of this study, it is often less than clear what foreign exchange management goal the firm should pursue. He argues that, generally, the corporate pursuit of the goal should be in the best interest of shareholders and creditors; it should minimize the costs of financial distress arising from currency risk. And, as a practical goal, the managers should aim to minimize the impact of unexpected real exchange rate variations on the cash flows and earnings of the firm as measured in some relevant currency (conventionally interpreted as home currency returns). (Holland 1993, 121-122)

George and Schroth (1991) introduced a five stage process for developing a foreign exchange strategy that recognizes competitive exposure. It is presented in the following table, in a slightly modified form.

Table 5-1 The foreign exchange strategy development process

1. GOALS: Define corporate foreign exchange management objectives and policy

The first step in developing the foreign exchange strategy is to establish a consensus within the organization of what needs to be done and who is responsible for each part. How will exposure be defined and what methods can be used to deal with it?

- Establish consensus of the goals
- Define exposure (the chosen definition should recognize all the important ways in which changes in foreign exchange rates, including real ones, have an impact on the corporation)

2. INPUT: Collect the data on competitive, operating and economic exposures

- Determine cash flows
- Research competitor's position
- Develop operating alternatives

3. ANALYSIS: Identify the competitive exposure for each product/market combination

Once the company collects and analyzes the data, it can construct solutions, both financial and operating, to maintain and possibly enhance its competitive position.

- Develop business framework
- Measure exposures
- Run simulations

4. ACTION: Link foreign exchange to business planning, develop a proactive approach

- Implement operating procedures
- Increase operating flexibility
- Make necessary capital expenditures and acquisitions
- Execute financial contracts
- Evaluate divisions and individuals on their performance

5. RESULTS: The only unplanned results of currency movements will be favorable ones

- Greater pricing flexibility
- Improved margins
- Increased market share
- More competitive strength
- Enhanced shareholder value.

Indeed, firms face a complex decision problem with respect to foreign exchange rate risk, and the significance of this problem will change with economic circumstances and corporate specific factors. More specifically, the central elements of the foreign exchange management problem are (Holland 1993, 128):

- defining currency risk: real vs. nominal exchange rates and deviations from PPP
- defining exposure and collecting information on the exposure
- understanding the dynamic nature of the foreign exchange management problem:
  - the time structure of the exposure
  - simultaneous management of all exposure types, and
  - recent and potential changes in real exchange rates
- forecasting inflation rates and nominal exchange rates.

In summary, the goal of the foreign exchange risk management policy should be to reduce the impact of unanticipated (real) exchange rate changes on the company's expected home currency cash flows. In practice the firm must simultaneously employ a set of real and financial responses to currency risk in the same period. The firm makes alterations to strategy and operational policy as a priority response, and then uses internal and external financial techniques to deal with the remaining elements of its foreign exchange risk management problem. The company is, however, constrained in taking these decisions by a unique, firm-specific set of corporate and environmentally determined constraints which restrict the choice of methods and limit the periods of feasibility and usefulness of real and financial methods. The overall value impact of all major foreign exchange exposure management methods is the ultimate guiding criterion for choice. Each method will have a different impact on corporate value, but it is the overall impact of all methods chosen that must be used to assess the effectiveness of the mix of foreign exchange exposure management methods. (Holland 1993, 164-166)

5.2 Organizational Challenges of Strategic Hedging

When factored into corporate and competitive strategies, strategic hedging decisions are matters of corporate strategic management, marketing management, production management, as well as of human resources management and organizational planning. Financial management plays only a supportive role. In other words, the measurement and management problem of competitive foreign exchange exposures cannot be solved by the treasury or the finance function alone. The management strategy process discussed above requires cross-functional teamwork in the data collection, analysis, action plan development, and finally, performance evaluation. But foremost, the top

management has to understand the matter, and has to be truly committed to developing a policy and a process to deal with competitive risk.

In order to manage competitive exposure in a co-ordinated manner, top corporate management must decide on an organizational structure to plan and monitor the exposure and the responses to it. The literature recommends no structure to fit all companies, but suggests cross-functional, even cross-business-unit committees, working groups and task forces to be established on different levels of the organization in order to tackle the unique competitive exposure problem of the company. It is worth noting that in some cases, the global approach to competitive risk of a global company may threaten the integrity of the strategic business unit (SBU) organization. Since this is probably not easily understood by the business-unit management, the corporate top management understanding, commitment and involvement in the process is imperative.

The operational flexibility needed to cope with volatile real exchange rates is also likely to be bought at the expense of some degree of operating (cost) efficiency. Therefore, in order to get the operational managers to make the "correct" decisions, they must have the relevant information on the economic environment, competition and company overall exposure, and their performance evaluation must be tailored in such a manner that they are not punished for sacrificing some near-term profits in favor of longer-term flexibility.

Hekman (1991) discusses the human resource management and organizational structure in relation with foreign exchange rates, and mentions some important questions about the effect of exchange rates on both corporate organizational structure and performance: What effects do foreign exchange rates have on the relationships between operating divisions? How do changes in foreign exchange rates affect group and individual performance? Are the measured effects on performance "real" or artificial? Should individuals and groups be held responsible for the effects of changes in exchange rates or should they be relieved of that responsibility?

Quoting the words of Hekman (1991, 8): "These concerns are effectively summarized within the human resources management's (HRM) objective - to minimize instances where performance is under-budget. HRM achieves this objective through design and management of both the budget itself and the system that measures and rewards performance. Performance is also affected through design of the organizational groups and relationships which comprise the company. The challenge, from an HRM

perspective, is to distinguish exchange rate effects which are manageable from those which are not"

The foreign exchange experts and managers are thus useful as internal consultants to the functional managers, and can support the functional (marketing, production, etc.) managers in their attempt to adjust both the substance and the process of their decision making to recognize and account for exchange rates, prices, and costs in the global environment. Hekman (1991, 9) defines two fundamental tasks that the foreign exchange managers can help functional managers to learn: the distinction between nominal and real exchange rates, and between short run and long run swings in the market.

The study of the "currency components" of corporate decisions is likely lead to a real understanding of the nature of the markets in which the firm operates, which, in turn, is basic to any organizational decision regarding the centralization and decentralization of activities. Also in a more strategic sense, internal foreign exchange consulting has some important indirect effects: as the consulting relationships develop and line managers become more comfortable with currency considerations, they develop a significant understanding of the relationships between corporate objectives and exchange rates. In addition, as these managers come to understand the linkages between local and global competition, markets and prices, and exchange rates, they gain new insights into the basic nature of the corporation's competitive advantage. (Hekman 1991, 9)

6 CONDUCTING THE STUDY

6.1 Objective and Method of Study

The aim of the study was to clarify the state and status of competitive exposure management in Finnish multinational companies. The attitude towards competitive exposure was under study. The objective was to reveal the true understanding of the concept of competitive exposure, and the means by which this exposure is managed in a co-ordinated manner in the studied companies. Secondarily, the study aimed to clarify the status of competitive exposure relative to the other foreign exchange exposure types in the overall foreign exchange management strategy. In addition, it was expected that the study would bring up new ideas on the processes needed to monitor and manage the competitive exposure of a company.

The extent of the companies' competitive exposure was not directly studied due to the strategic nature of the exposure and the resulting difficulty of getting any specific information on the subject. Also, if a more thorough study had been conducted within one company, there would have been two problems above all: first, the requirement of confidentiality, and second, the firm-specific nature of the results (in other words, the expected small generalizability of the results).

Interviews were chosen as the method of study; the relative novelty of the competitive exposure approach and the results of the earlier studies realized abroad, as well as in Finland (the study by Hakkarainen, Puttonen and Kasanen), suggested that only with personal interviews the true understanding of the competitive risk concept and of the strategic hedging measures could be revealed. More specifically, personal interviews were chosen as study method because: (1) there are many different taxonomies of foreign exchange exposures, and in order to minimize the risk of misunderstandings, it was judged best for the interviewer to be present when the questions were being answered; (2) the relative difficulty of the competitive exposure concept required a questionnaire that allowed further explanations both to many of the questions asked, as well as to many answers given, otherwise valuable information might have been lost; (3) the questionnaire was extensive, and the likelihood of the interviewees to take the time and effort to read, answer and return it expeditiously was small.

Nevertheless, the interview method has some disadvantages, which deserve some attention:

- the answers are highly dependent on the interviewee: e.g., his or her attitude towards the interview, position in the firm and willingness to give objective information affect the quality of the answers, and thus,
- the quality of the answers may vary greatly between the different interviews, and the comparability of the answers may suffer. (It can also be affected by the situation, the interviewer, etc.)

The fact that the interviewees had not been given the questions in advance had both positive and negative implications: on the other hand, the quality of the answers could have been better in some cases, if the interviewees had had more time to think about their answers, but on the other hand, the objectivity and truth value of the answers could have had suffered.

In this study, the interviewees in all studied companies were, in most cases, senior members of corporate financial management, the positions ranging from Dealer to Chief Financial Officer (CFO). (A detailed list of the persons interviewed is found in the references.) Corporate level was chosen primarily for the pragmatic reason of sample size: if the study had been conducted, in the depth in which it was actually realized, at the business unit level, in every business unit, in every firm, it would have been such a task that the sample of firms would have had to be smaller. Financial management was interviewed because of the assumptions that the theoretical knowledge of foreign exchange exposure management issues is greatest within this function, and that the treasury and financial risk management function is centralized and has a co-ordinating and consulting role in all foreign exchange related issues throughout the company.

Finnish MNCs were chosen as the sample firms for the following reasons:

- corporate and division levels are separated (the viewpoint of the corporate level applied in the study)
- MNCs are most likely to operate in global markets (the risk structure of major competitors significantly different)
- strategic hedging is a relevant competitive tool and the operational elasticity to change is large, relative to purely domestic companies.

The eleven companies interviewed were chosen among the largest companies in Finland with a large proportion of turnover realized abroad. No explicit criteria concerning turnover or scope of foreign operations were applied in the selection. The information sources were the Helsinki Stock Exchange listed company Yearbook, Talouselämä magazine study of 500 biggest Finnish companies, and a listing of the

biggest Finnish companies (by net sales in 1995) in the journal Helsingin Sanomat of 2 April 1996 (page: D1). All the sample companies were included among the 25 biggest Finnish companies in this listing. The interviews were made during March and April 1996.

Table 6-1 The studied companies (in order of net sales in 1995):

COMPANY	Core business areas	Net sales in 1995, FIM mio
UPM-Kymmene	forest industry & engineering	54738
NESTE	oil, energy & chemicals	43335
NOKIA	telecommunication	36810
ENSO	forest industry	28026
OUTOKUMPU	metals & technology	16952
METSÄ-SERLA*	forest industry	13123
KEMIRA	chemicals	12352
AHLSTROM	paper & engineering	12108
METRA	engineering, bathroom ceramics, steel, etc.	10617
KONE	elevators & escalators	9523
HUHTAMAKI	confectionery & food packaging	7836

Source: Annual reports 1995 (except UPM Kymmene: a press release)
* Metsä-Serla is the only studied company that is a part of a larger group (Metsäliitto, Net Sales FIM 17 665 mio in 1995).

This table can also be found as appendix no. 2, with the extension of a rough analysis of the mismatch of the studied companies' income and cost currency structure. In that table, the percentages of the companies' net sales realized outside Finland and of the personnel

outside Finland are listed. It is worth noting that in only one company the percentage of personnel abroad is superior to the percentage of the company's sales realized outside Finland. In all the other companies the situation is reversed, and thus the companies' incomes (sales) seem to be far more dependent on international economy than the costs, which (measured here by the percentage of personnel outside Finland) seem to be highly dependent on the Finnish economic cycles. (The average difference between these percentages was approximately 36 percentage points, all firms included.)

6.2 On the Choice of the Study Questions

The study questions are based on the scholars' suggestions discussed in chapters 4 and 5. The core questions (1 to 5) approach the issue directly, while the supporting questions (6 to 14) were aimed to clarify the answers to the core questions, to study the firms' attitude towards different determinants of competitive exposure (e.g., real exchange rates, competition and market structure) and its management. Also, from the whole of the study, a clear picture of the overall foreign exchange structure and processes of the studied companies was expected to be formed. The study questionnaire is found as the appendix no.1.

Questions 1 and 13 study the perception of competitive exposure in the studied companies. Question 1 was presented in the beginning of the study, while question 13 was presented in the end of the study. The reason was simply that while the issue was at first directly tackled, the interviewees were given time to form their arguments backing their perception of the importance of competitive exposure to their company. This was hoped to improve the quality of answers.

The questions that form the very core of the study, i.e. questions 4 and 5, study the attitude towards measuring and managing competitive exposure, the measurement and management process in companies that have made that decision, as well as the reasons for not hedging in companies that have made the decision not to hedge.

7 RESULTS OF THE STUDY

This chapter is organized as follows: First, some generic impressions of the study results are presented in section 7.1. Secondly, the study results (answers to the questions) are introduced in section 7.2. Thirdly, the study results are analysed more in detail, especially relative to the theory's suggestions (presented in chapters 4 and 5), in section 7.3.

The reason of treating the analysis separately is the fact that it is useful also to the reader to learn the answers to all of the questions before drawing any conclusions; the answers to some questions may be of little interest by themselves, and only by linking the answers to the answers to another question something revealing is found.

7.1 General Impressions

The strongest general impression of the answers was that the interviewees regarded competitive exposure as an extremely difficult concept to define, measure and manage.

The difficulties of *defining* the competitive exposure concept were related to the many different ways of understanding the concepts of economic and competitive exposure. The lack of one, universally accepted taxonomy of foreign exchange exposures is a problem especially when talking about economic exposure. The answers revealed the same diversity as in literature in the use of the concept economic exposure: most interviewees understood it simply as a transaction exposure extended from 12 months ahead to longer into the future, some regarded economic and competitive exposure as the same thing and some called competitive exposure "structural exposure", "strategic exposure" or "business exposure". The role of the real exchange rate was generally not recognized.

In many cases, the problems of *measuring* competitive exposure were related to: (1) the business-specificity of the predictability of future developments in the market situation and thus of the future cash flows, and (2) the difficulty of getting the necessary information on competitors. Comments against a co-ordinated competitive exposure measuring process also included the corporate treasury's lack of interest in "confusing the field" with more complicated risk management procedures, and questioning the rationale of a co-ordinated measuring process (because the competitive considerations are claimed to be already factored into every-day business). Also, the participation of the finance function in the process was criticized, and the difficulty of measuring absolute and relative competitiveness in general was stressed.

Nevertheless, a company that made efforts to measure and manage its competitive exposure pointed out that even if a company does not plan to start a competitive exposure management program, it is in the interest of every company to assess the approximate exposure by a top-down regression analysis (Value-at-Risk, VAR -approach).

The difficulty related to the *management* of competitive exposure was regarded as not so much a question of how to manage it, but rather a question of who will take the responsibility of the decision. Especially in cases of financial hedges no-one wanted to take the responsibility for the decision because of the size and length of the hedge positions. The question of whether or not a financial hedge, which is tied to the development of the nominal exchange rate, is appropriate for hedging competitive exposure, which is a function of the real exchange rate, was given very little importance. It was seen as "noise", at least in the case of financial hedges concerning OECD currencies.

The strategic business decisions were generally made without the involvement of the finance function in the process, and many interviewees stressed the "more strategic" reasons behind these business decisions. Foreign exchange considerations are, in some cases, considered in the decision making process, but are seen as too volatile to determine the decision.

Next, the answers to the study questions are discussed question by question.

7.2 Results of the Study

7.2.1 The Core Questions

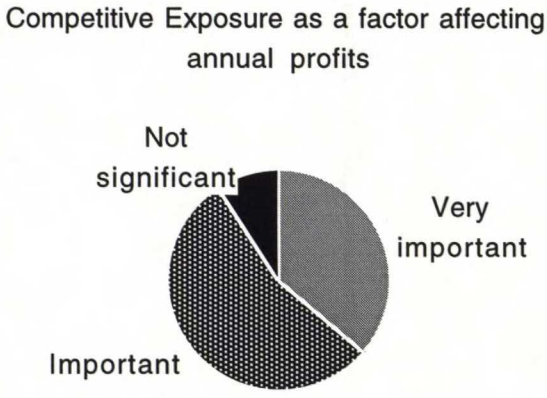
Before answering the questions, the interviewees were asked to read a short introduction to the issue of competitive exposure before answering the study questions. The introduction briefly explained the difference of nominal and real exchange rates, the link between real exchange rate and competitive exposure, and the taxonomy of exchange rate exposures used in the study. The introduction can be found in the appendices (appendix no. 1: the study questionnaire).

(Q.1) The importance of competitive exposure

When asked whether (unhedged) competitive exposure is a very important, important or not a significant factor affecting the annual profitability of the company, four out of eleven

(36%) companies answered that it is a very important factor while the majority, six companies (55%), considered it an important factor, and only one company considered competitive exposure not a significant factor affecting the annual profitability.

Figure 7-1



(Q.2) The foreign exchange management objective

All of the studied companies had a written foreign exchange management policy. In addition to the corporate policy, the strategic business units (SBUs), also called sub-groups, usually had their own foreign exchange management policies.

The corporate foreign exchange management objective generally focused on identifying and minimizing transaction and translation exposures. The attitude towards risk seemed to be risk-averse, but in most cases, allowing for certain conditions, more speculative position-taking was allowed.

Competitive exposure management was not directly mentioned in the policy of any of the studied companies. One company, in fact, stated that competitive exposure is far from being included in any written policies (which have to be approved by the top level of management), even though it has been discussed informally.

(Q.3) The definition of foreign exchange exposure

Only one of the studied eleven companies had not defined foreign exchange exposures in the foreign exchange management policy or in a separate financial management operating plan. All of the other ten companies defined transaction and translation exposures, while only four companies had mentioned economic exposure in the policy (or plan). The term competitive exposure was not used in the policies.

The reasons for leaving economic exposure unmentioned in the foreign exchange management policy were various: some companies had not even considered it while making the policy, one treasury manager had suggested it to be considered but had not succeeded to convince higher levels of management, and one company which hedged its competitive exposure left it undefined in the financial policy, because the company considered it a matter of strategic management, not of financial management.

Moreover, one company had a visibly different taxonomy of foreign exchange exposures. It divided foreign exchange exposures into four main categories: translation, transaction, economic and strategic exposure. The difference between transaction, economic and strategic exposures was the time frame: while transaction exposure was considered to concern the cash flows up to 6 months ahead, economic exposure concerned expected cash flows from 6 to 18 or 24 months ahead, depending on the business in consideration, and strategic exposure concerned the anticipated cash flows from 18 or 24 months ahead and further. In addition, it treated "tender-time exposure" as a separate category of exposures. The company had defined economic exposure in the foreign exchange management policy, but had left strategic exposure out of the policy.

It is worth noting that of the four companies mentioning economic exposure in the foreign exchange management policy, two did not engage strategic hedging policies, and two did. The attention given to the matter in practice does not seem to be revealed by the choice of words in financial policies.

(Q.4) Corporate decision of measuring and managing competitive (economic) exposure

The majority, 6 companies (55%), had not made any specific decision about whether to measure and manage competitive (economic) exposure, or not. Five companies (45%) had made a decision: three companies (27%) had decided to measure and manage the exposure in some way, while two (18%) had decided not to.

Those three companies which had decided to measure and manage their competitive (economic) exposure had very different approaches to the matter, and represented three very different fields of business. Two of the companies had specifically decided to measure and manage their competitive exposure while one stressed that the decision concerned economic exposure, a cash flow exposure from 6 to 24 months ahead of time. Thus, the decision did not concern a longer exposure, called "strategic exposure" by the company.

The competitive exposure measurement and management processes and policies of these three companies are studied in more detail in section 5 a.

The two companies which had decided not to measure or manage their competitive exposure considered financial hedges best for exposure management purposes, but stressed the difficulty of making the decisions to build hedges for the amounts and time periods necessary. In fact, one of these two companies had adopted a financial hedge policy in the past, but as soon as the positions began to show large losses, the policy was abandoned. The initial reason behind the contracts, hedging - not speculating, was forgotten; the losses from the financial hedge contracts were not weighed against the gains realized in the operative businesses.

Further discussion about the reasons behind the decisions not to measure and manage competitive exposure is found in section 5 b.

(Q.5 a) How the companies measure and / or manage competitive (economic) exposure

Next, the answers of the three companies which answered yes to the competitive exposure measurement and management question are discussed company by company.

1. One of the three companies defined competitive exposure as the risk of exchange rate changes *worsening* the company's competitive position, and saw the continuous measuring of competitive exposure very difficult, and more importantly, unnecessary. The measurement was conducted in the company once a year, within the strategic planning process. The company stated that a way to measure competitive exposure would be a simple comparison of the sales value realized in a market vs. the turnover generated locally, and thus an efficient hedge is the shifting of production to the main markets, in order to match the currencies of sales and costs. But, this approach gives little attention to the competition, and is not necessarily an effective hedge against competitive exposure.

However, the company did a more thorough analysis to determine its competitive exposure and the hedging measures to be taken. It conducted once a year a bottom-up process of strategic planning, with a strategic time horizon from 5 to 10 years. Within the process, business units are asked to form their own strategies, with different scenarios, and the corporate planning unit then co-ordinates the different strategies for different scenarios at the corporate level. The strategic hedging measures then decided upon were, above all, strategic production decisions, such as the location of production. A saying within the firm reflects this culture well: "it would be best to have a production facility on wheels, in order to cope with exchange rate volatility". The company did therefore not perform specific analyses to assess the success of its strategic hedging measures, but did a very generic assessment of the stabilizing effects of the strategic hedging measures on company performance, and concluded that the objectives of the measures had been reached.

The company stated that the greatest difficulty in competitive exposure measurement and management is getting the required thorough understanding of the company's businesses and the factors affecting their competitive position.

2. The company that stated that it measures and manages its economic exposure, but has no co-ordinated policy for measuring and managing its (so called) strategic exposure, stated that it measures its economic exposure (cash flows in the time frame of 6 to 18 or 24 months ahead, depending on the nature of the business) by routine financial planning and estimating the future income statement, especially the financial income and expenses on it.

The company's method of hedging its economic exposure included both financial and operational measures. The company stated that it is well aware of the tactical and strategic tools of hedging competitive exposure, and uses, for example, sourcing adjustments and shifts of market focus as methods of coping with economic exposure. However, also financial contracts are used as a tool of hedging this exposure of 6 to 18 or 24 months ahead in time.

The so called strategic exposure was seen by the company as an integral part of the overall strategic planning, but as there was no co-ordinated process of overall strategic risk analysis, there was no co-ordinated strategic hedging policy, either. The strategic business unit management was responsible for planning, guiding their own business, as well of managing all risk types. Centralized information about strategic decisions taken by the SBUs (with a foreign exchange hedging motive) was not available.

According to the company, the greatest difficulties related to the "strategic exposure" measurement and management were: (1) the amount and nature of information required in order to construct an effective hedge, especially the information about the competitors was considered difficult to get; (2) the dynamic, fastly changing business environment; and (3) lack of suitable hedging instruments: the hedging measures should be real business decisions, but as these take a long time to take effect and are hard to reverse, other matters determine these decisions.

However, the interviewee stated that even if no measures were planned to be taken in order to manage a company's competitive exposure, the knowledge of the approximate exposure is always useful. This can be achieved by performing top-down regression analyses, as discussed in section 4.4.1.

3. The third company adopted a selective competitive exposure measuring process: it traces the currency pairs through which the greatest risks arise, and does a more thorough analysis about the competition in some product categories. The approach may be market, project or currency basket -based. The market based approach is simply an analysis of the origin of competition in the market, and of the effects of different foreign exchange rate movements on the competitive situation. The measurement of the competitive exposure of a single project is realized by calculating, based on past volatilities, probabilities of exchange rates changing to such levels that profit margins are lost. In this approach the foreign currency cash flows are given, because the price elasticity of demand is considered small.

In the case of a currency-basket approach, the currency basket of the company's own production costs is examined and its volatility against the currencies of the main markets is compared with the volatilities of the competitors' corresponding currency baskets. In this type of analysis, the individual risks even out, and the "true" risk is revealed. According to the company, the risk could be reduced by the relocation of production if the product is homogeneous (little differentiation). When the product is differentiated enough and the elasticity of demand is small, there is less need for dramatic operational changes in order to cope with competitive exposure.

Nevertheless, the company uses both operational and financial hedging techniques in competitive exposure management. Competitive exposure is normally taken into consideration in plant (re)location decision making processes, and some experimental financial hedging positions have been taken.

When asked to comment on the suitability of hedging competitive exposure with financial instruments and strategies, the interviewee stated that in the scale of the financial hedges needed to cover the company's competitive exposure the difference between the development of nominal and real exchange rates is only "noise", at least in the cases concerning the OECD countries. To back up this assumption, the treasury has made some calculations of the differences in volatilities of nominal and real exchange rates, and concluded that no significant differences exist. However, in the case of more "exotic" countries, whose inflation significantly differs from the OECD levels, the greater difference between real and nominal exchange rate receives more attention in the hedging strategies. The time horizon of the financial hedges can be up to 3 years.

The greatest difficulties related to the measurement and management of competitive risk are, according to the company: (1) getting the needed information about competition, and (2) the decision making concerning the financial hedging strategies, due to the extremely large amounts and long time periods of the contracts needed for an effective hedge, and thus the unwillingness of management to accept responsibility of engaging the company in such contracts.

(Q.5 b) *Reasons for not measuring and managing competitive exposure*

The two companies which had decided not to measure and manage their competitive exposure were asked the most important reason behind the decision: three predetermined alternatives were given, and additionally, the companies were free to name other reasons also.

The alternatives given were:

a) difficulties of measurement
b) the stock markets' and other stakeholders' focus on accounting results and ratios,
c) the unwillingness of the top management of the company to allocate resources to the measurement and management of competitive exposure (lack of will or understanding of the matter ?).

One company named the first reason, difficulties of measurement, as the primary reason of not measuring and managing the competitive exposure of the company. The company also stressed the unwillingness of the management to take the responsibility of the hedging decisions as a very important reason of not hedging competitive risk.

The other company which had decided not to measure and manage its competitive exposure named the second alternative, the stock markets' and other stakeholders' focus on accounting results and ratios, as the primary reason behind the decision. However, the company had abandoned its competitive exposure hedging policy because of large losses on a financial position constructed to act as a hedge. But as the financial position turned to show significant "losses", the hedge was called off. The history behind the company's decision reveals that the same reason as above, difficulty of taking responsibility of *financial* hedges to cover a company's competitive exposure, is perceived as an important difficulty in the measurement and management of competitive exposure.

7.2.2 The Supporting Questions

This second section of the study was aimed to reveal the "big picture" of the studied companies' foreign exchange management structure, processes and interaction with other activities, including operative businesses. Since the taxonomy of foreign exchange exposures is far from universal, and the danger of misunderstandings is significant especially in the cases of economic and competitive exposure, these additional questions were judged necessary in order to reveal the companies' true understanding of the matter, and the role of that understanding in practise, even if the foreign exchange nomenclature had been different.

(Q.6) Organizational structure of the corporate finance function: is the treasury and the foreign exchange expertise centralized ?

All of the eleven studied companies had centralized the corporate treasury function to one or more treasury centers. Most centralized treasuries acted as corporate internal banks, with internal financial result targets, but only one company stressed the role of speculative trading; the majority of companies described their treasury function as a "quasi profit center", i.e., a support function that does not aim to maximize profits, but has a positive result target. Thus, selective hedging was favorized by most companies. In addition, the subsidiary companies were obliged to do all their foreign exchange related transactions through the corporate treasury in most companies. In only three companies the corporate policy did not include this obligation. However, the corporate recommendation also in these companies was that the subsidiaries should ask a price also from the corporate treasury, when wishing to do a foreign exchange transaction, and that they should accept the treasury's offer when the price is equal to the price offered by an outside financial institution.

The responsibility in foreign exchange exposure management decisions was typically divided between the subsidiary companies and the corporate treasury so that the treasury was responsible for giving information and advice, but the subsidiaries, into which foreign exchange exposures were "centralized" (mostly production facilities), were held fully responsible of their financial results and of the risk management decisions affecting them. In only one company, the mid-level, business unit or some sub-group level, was actually responsible for making the hedging decisions while the subsidiaries were still held responsible for the consequences.

The answers show that the studied companies have centralized the financial expertise into few corporate treasury centers, finance companies, etc. The expertise on foreign exchange markets is centralized into the treasuries that are held responsible for gathering, processing and passing information as well as giving advice to the subsidiary companies, and actually doing the internal and external foreign exchange transactions. A generic impression of the answers was that the foreign exchange experts' time is consumed by daily, weekly and monthly routines, and that very little time is left over for longer term considerations or even for understanding the motives behind the transactions requested by the operative companies.

Few interviewees pointed out another person in another function, or higher in the organization that participates in some longer term, more strategic discussions about the effects of exchange rate movements on the competitive situation and, finally, cash flows generated by the operative business, but the nature of these considerations seemed to be very general, without structured calculations to back them up.

(Q.7) The principal reporting and discussion channels in matters concerning foreign exchange exposure management

This question was divided into two parts:

a) routine reports

b) working groups, courses, lectures, seminars etc. and other (informal) means of communication.

The answers to question (a), routine reports, revealed that the clear majority of the companies had some kind of a routine foreign exchange position (cash flow / exposure / etc.) report. Only two companies had no formal report, but also they were planning to implement a more sophisticated financial reporting system in the near future.

The most frequent reporting interval was two weeks while the longest was four months. The time frame of the reports varied from 0-6 months to 0-18 months, this varied also within a company, between businesses of different nature. The most common time frame of the reports was 12 months; the cash flows up to three months ahead are usually contractual, and thus known for certain, while the cash flows after 3 months are estimated (in some cases budgeted figures), and according to most companies, the focus in hedging estimated cash flows is in months 3 to 6 because after that the figures are too unreliable.

In summary, the reliability of the foreign currency cash flow report was put in question by several interviewees: either they thought that it was not filled with careful thought by the daughter companies, or they questioned the rationale of predicting the future in a volatile business environment.

Since other forms and forums of communicating are more important in the case of competitive exposure, the companies were asked to describe all other, significant channels of communication in matters concerning foreign exchange exposure (question 7b). The results could be summarized in relation to the companies answers to the question 4 (decision about measuring and managing competitive exposure):

A) Companies that measure and manage their competitive (economic) exposure:
All of these three companies have working groups, an active advising service, education courses and seminars as well as more informal meetings and discussions with operative business management and financial managers of the daughter companies. These companies also have frequent telephone discussions about each daughter company's individual situation. In conclusion, the advisory and consulting role of the treasury is significant in these companies.

B) Companies that have decided not to measure and manage their competitive exposure:
These two companies have less forums of discussion in matters concerning foreign exchange management. The other stresses the importance of telephone discussions while the other relies more on the currency exposure report. The common feature to these two companies is that the consulting, advisory role of the treasury is not very active.

C) Companies with no decision about measuring and managing competitive exposure:
This group includes the two companies that had no routine currency exposure reporting system. One of these two companies also states that the telephone conversations with the daughter companies concern only routine hedging transactions. The treasury management does lead one foreign exchange exposure management workshop per year, but the

interviewee stated that the need for education is more acute in the top management than lower in the organization. The other company without a currency exposure reporting system is relatively passive in other forms of communication also; the telephone discussions cover only the routine transactions, and the courses, seminars and workshops are arranged only when requested.

However, some signs of change were found: in two companies which had poor foreign exchange reporting systems there were ambitious IT- projects going on. These new systems integrate, in the best case, the whole process of the firm into one huge database, where the operational and financial information can be found, if someone wishes to perform an operational foreign exchange exposure analysis, for example. The problem is how to get the relevant information into the system and who wants the analysis to be done.

Only one of the remaining four companies specifies consulting, training and advising the daughter companies and other levels of the organization in foreign exchange exposure management as one of the corporate treasury's main tasks.

(Q.8) Do finance (foreign exchange management) experts have a role in operational and strategic decision making processes concerning international operations ?

This question was structured as follows:

Frequency : / Level :	1. Corporate	2. Business (unit)	3. Subsidiary
Always	(1)	(-)	(-)
Often (when?)	(-)	(1)	(1)
Sometimes (")	(7)	(6)	(6)
Never	(3)	(4)	(4)
	11	11	11

The answers to this question are summarized by the numbers (in brackets) which tell the numbers of answers falling into the different categories. The matrix clearly shows that in the studied eleven companies, experts of foreign exchange risk management are rarely consulted in an operational or strategic decision-making process concerning some kind of international operation. In the majority of companies the financial experts are consulted only sometimes, usually in case of operations concerning some more "exotic" (non-OECD) country. The number of companies answering "Never" was also considerable.

These results were found to hold at all three levels of organization in question: the corporate, business (unit) and daughter company level.

Further, there was one exception from the common line of answers: one company stated that a foreign exchange expert is always consulted when deciding on international operations at corporate level. The interviewee stressed that it is the financial director and CEO that participate in these kind of decision making processes, and that these people certainly can be called foreign exchange risk management experts, even if they were not asked to conduct careful analyses from the exchange rate risk point of view, but rather consulted on the optimal financing method. This comment, however, suggests that the financial expertise is brought into the process after, rather that before, a decision to engage in a new international operation.

(Q.9) The use of foreign exchange rate forecasts

All of the studied companies receive, monthly or more often, several currency rate forecasts made by banks, security brokers, e.g. Therefore the companies' own foreign exchange rate forecasting activity was small. Most companies read all of the forecasts received, follow the situation also through other sources of information, and form an opinion of their own. This synthesis is passed to daughter companies in eight of the studied companies, and three companies do not pass currency rate forecasts to their daughter companies on a regular basis (only if asked). An interesting point is that these three companies include two of the companies that measure and manage their competitive exposure. The other of these two companies stated that "when the objective is to hedge, the need for forecasts is small".

The main focus in the forecasts discussed above is in the short term, from 3 to 6 months, even if the forecasts often cover also the 6 to 12 months period. Forecasting of exchange rates was generally seen as extremely difficult, and the reliability of the forecasts received was openly questioned, especially concerning the time frame after 6 months ahead.

In one company which measures and manages its economic exposure the most relevant real exchange rates were routinely followed by the chief economist. In addition, another company in this category has followed the real exchange rates during some strategic hedging trials. Some of the remaining nine companies stated that they followed the deviations from the PPP-exchange rates, concerning the most relevant currency pairs, and that this information was used to forecast the nominal exchange rate development. One company stated that in some, more "exotic" cases, the real exchange rate is considered, but

it has very little importance, because the price risks unique to the industry were far more important factors to the operations assessment. This firm was the only one to state that competitive exposure is not a significant factor to the profitability of the company, as answer to question 1.

(Q.10) Competitor analyses

Consistent with theories of competitive strategy (see e.g. Michael E. Porter 1987), which state that competition occurs at business unit level, the majority of the studied companies had decentralized the main responsibility of competitor analyses. However, four companies had centralized this responsibility.

Despite the vast diversity in the interviewees' knowledge upon this activity in their company, and thus in the quality of answers to this question, some points are worth noting: Most of the companies described the nature of the analyses as a kind of strategic analysis of the competitors strategic intents, and of the company's and strengths and weaknesses in relation to the competition in each business sector the company is involved in. The focus is on the future developments in the markets and in the competition, the analysis of financial results is secondary.

All three companies that measure and manage their competitive exposure had decentralized the main responsibility of competitor analysis. Two of these companies stated that in competitor analysis, the breakdown of the currency structure of competitors' costs and revenues is judged necessary, and conducted regularly. The other further stated that a competitor analysis is also conducted concerning the financial services: e.g., in cases of project finance, the banks' offers to the company and the competitors' are followed.

(Q.11) The nature of competition in the companies' core businesses: global or nationally segmented ?

This question was commonly misunderstood; many interviewees interpreted it as a question of market presence. A further explanation was therefore given, and some points are worth noting about the answers:

- Four companies stated that the competition in their core business is nationally segmented (daughter companies in different countries operate independently of the market situation in other countries).

- Four companies stated that some of the core businesses operate in global competition, and in other core businesses the competition is nationally segmented.
- Three companies stated that the competition in their core businesses is global in nature (cross-subzidation common, business is a world-wide "game", etc.).

None of the companies that measure and manage their competitive (economic) exposure were included in the first group (nationally segmented competition).

(Q.12) Long term cash flow forecasts and other longer range (> 1 year) planning

From the very diverse answers to this question, the following observations were made:

- Two of the studied eleven companies did not forecast cash flows beyond the time frame of one year.
- All companies found forecasting beyond six months ahead difficult.
- The time frame of the longer range planning varied between 2 and 5 years.
- All of the companies which measure and manage their competitive (economic) exposure were engaged in some kind of a long term cash flow forecasting activity, but only one of these companies did more profound scenario analyses with different states of nature (exchange rates, inflations, etc.). One of these companies stressed the unpredictable nature of the fastly changing business as a reason of not doing such analyses.
- Altogether three companies stated that they do profound sensitivity analyses with different variables, including macroeconomic factors like exchange rates, and inflation. One of these companies, however, stated that the business-specific price risks are far more important than the general price level changes. This company stated that competitive risk is of little importance to it, as answer to question 1.

(Q.13) The most important firm-specific reason behind the answer to question 1. (the importance of competitive risk to the company).

The answers to the question of the most important firm (or business)-specific reason behind the importance of the company's competitive exposure were quite unanimous: almost all stressed the fact that their company is dependent on international sales but has a relatively large proportion of production in Finland, which means that there is a mismatch between the currencies and price level trends of sales and costs (fixed and operating). Also, most companies noted that the hard local and foreign competition in the main

markets is a significant factor contributing to the importance of competitive exchange exposure of the company.

More specifically, three factors were mentioned as increasing the importance of competitive exposure to the profitability of the company:

1. *the product* : if the product is of bulk or business-to-business -nature, the price is likely to be the most important selling argument of the product, and thus the swings in the (real) exchange rates are likely to cause large swings in the competitive situation and finally in the operating profits of the company.
2. *the markets of the product* : if the markets are truly global, the price of the product is likely to be globally set, and the company may have no say in the world price of the product, which may also be tied to a foreign currency.
3. *the size and growth of the company* : A small company is a price-taker, while a large company is likely to have more freedom in price setting, and can thus change its pricing more easily in response to unfavorable exchange rate changes. The growth of the company, in its turn, is likely to increase the relevance of new market selection, mergers and acquisitions, and other foreign operations that affect the company's competitive exposure.

Among the factors diminishing the importance of competitive exposure the following were mentioned:

- *the cyclical nature of the business* : the business cycles, and thus the product price risks overshadow other risks, including exchange rate risks.
- *the business's dependence on mainly one foreign currency* : sales prices and material costs are both tied to the same currency.
- *a differentiated product* : the demand of a high tech product or a strong consumer product brand, for example, is less vulnerable to price increases due to (real) exchange rate changes than the demand of a bulk product.
- *operating locally* : currencies and price level trends of costs and sales match.
- *a vast product selection* : the products' demand do not follow the same cycles.
- *business-specific price risks* : they may have far more significant effects on the profitability of the business than exchange rate changes or the general inflation in the main markets.

7.2.3 Case: International Diversification or Reorganization of Operations

Every studied company was asked to tell about a case of international diversification or reorganization of operations. This kind of an operation is very likely to alter the company's geographical pattern of value added (more than the sensitivity of the existing cash flows to competitive risk, which is another means of competitive risk management).

However, significant difficulties were encountered in getting sufficiently thorough answers to this question: the interviewees had not been involved in the decision-making processes, and could not answer with certainty, or they knew so little about the business operations that they could not name a suitable case.

Therefore, only seven companies tried to answer the question and four companies left the question unanswered. Interestingly, two of the three companies to measure and manage their competitive exposure were among the four companies that left this question unanswered. The seven companies which presented some kind of a case included the remaining one company that measures and manages its competitive exposure, as well as the two companies that had decided not to measure or manage the exposure.

The seven cases studied were very similar: all interviewees chose a case concerning a growth-investment in foreign production. Five of the seven cases were company acquisitions, while one concerned the establishment of a manufacturing operation, and one case concerned an investment in raw-material resources.

The main difficulty of interpreting the answers is related to two facts: (1) the interviewees, if included at all in the decision-making process, had a very restricted role in the process; and (2) all the processes are unique: it is impossible to find two exactly similar decision-making processes concerning investments of this scale even within one single firm. Thus, the first difficulty affects the reliability of the answers given, and the second affects the generalizability of the results of the case.

Nevertheless, some points are worth noting in the cases:

A) Objective / Motive of the operation

- *Growth* : as mentioned above, most of the studied cases concerned a growth-investment in a foreign production operation. The most common motive of the operation was growth.
- *Expansion of production outside Finland* : in three cases out of the seven, the studied companies stated the strategic desire to expand the production outside Finland, in the main market areas, as an important motive to the operation. The companies stated that they are too dependent on the Finnish economy especially on the cost side and want to balance the cycles of revenues and costs.
- *Closer to customers* : three companies named the improvement of customer service as a motive for the operation.
- *Corporate image* : two companies claimed that corporate image was a motivating factor of the foreign investment.
- *Market share* : one company stated that it searched better market shares in the market.
- *Securing the supply of a raw material* : one company named increasing self-sufficiency in the raw material supply as the primary reason for the operation.

Some interviewees stressed that the objectives of and motives behind the operation are strategic, and the factors affecting the business environment are too rapidly changing and too vague to determine a decision of this scale.

B) Background

In most cases, the decision to invest abroad was a sum of a rarely presented opportunity, strategic willingness to invest, and a "right" price, according to the interviewees. However, some more specific points were mentioned as influencing in the background of the decision-making process:

- *A chance to costs and tax reduction* : the operation helps to cut costs from the present level, e.g., the following were mentioned: transport charges, customs charges, salaries, and taxes.
- *Chosen fields of growth* : a rare opportunity must be seized in the strategic field of growth.
- *Recent changes in competition* : the competitive situation has changed because of mergers between competitors, or other significant changes in the market situation.

- *Protectionism* : a company wants a more local image in order to avoid protectionist actions in an important market.
- *Subsidies* : the timing of the investment can be influenced by a government promising investment subsidies during a determined period of time.

Exchange rates were not mentioned as a factor affecting the timing of the operation, contrary to the suggestions made by some researchers.

C) Analyses supporting the decision

The analyses made to support the decision making seemed to be very traditional, i.e., a market study and an investment analysis. Quite interestingly, the need for a new market study was often small, as the firm had operated in the same market for years, and was therefore familiar with the competition and with the customers' tastes.

The investment calculations weigh the expected prospects of the product against the costs of the operation. The methods used in the calculation were not asked. Only two companies stated that they took competitive exposure into consideration in the investment calculations concerning the chosen case. One of these companies measures and manages its competitive exposure, while the other had not made any decision in this respect.

D) Results of the operation

- *Growth* : in cases motivated by growth, the objective was clearly reached.
- *More sales and a bigger market share* : three companies mentioned increased sales and market share as results of the operation.
- *Softer business cycle effects on the company* : three companies stated that increasing production outside Finland has made the effects of the Finnish economic cycles on the company's financial results less dramatic.
- *Getting closer to the competitors' structure* : when specifically asked, three companies stated that after the operation the company's costs and revenues currency structure is more similar to that of the major competitors' than before the operation.
- *Increased profits* : (only) two companies spontaneously named increased profits as a result of the operation.

- *More new customers* : two companies spontaneously stated that the operation brought more new customers to the company, than could have been reached without the operation.

Generally, the companies seemed to be satisfied, at this stage, with the results of the international operations chosen as cases in this study. What is suprising, however, is that increased profitability was mentioned as a result of the operation in only two cases.

7.3 Analysis

To summarize, the study results can be put in short: even if the competitive exposure was considered an important factor affecting the annual profits of the companies, it received very little attention. Generally, even if the idea of competitive exposure was familiar to the business and to everyone making the most important operating decisions, there was very little attempt to measure and manage it in a co-ordinated manner. Also, the finance function was typically very isolated from the operative decision making and its role in foreign exchange management was practically limited to hedging the resulting transaction exposure with a time frame of 6 months ahead.

In order to get a more thorough understanding of the results of the study, the answers are next analyzed more in detail.

7.3.1 The Perception of Competitive Exposure

Questions 1, 11 and 13 were directly aimed to reveal the companies' perception of competitive exposure.

The questions (1) and (13) were clearly interrelated. The answers to question (1) showed that competitive exposure is considered a very important or an important factor affecting the annual profitability of the company by ten companies out of the eleven studied. The firm-specific reasons behind the answer were asked in question (13). Most of the interviewees stressed the mismatch of the firm's currencies of sales and costs, and the fact that the competition in the company's main markets is hard (and foreign as well as local) as the most evident reasons of considering competitive exposure at least an important factor in the annual variability of profits.

These arguments are related to the two general determinants of competitive exposure: the structure of the company itself, and of the markets in which it sells its products and purchases its inputs. However, the degree of market integration and the sensitivities of the revenue and costs cash flows to changes in the real exchange rates was not directly recognized in these general arguments in favor of the importance of competitive exposure.

When comparing the list of the other mentioned reasons behind the answer to question (1) to the list collected from the writings of scholars in section 4.4.1, the following observations were made:

- all of the mentioned reasons (product, markets of the product, and size and growth of the company) were found, in some form, on the scholars' list.
- the product was perceived as a determinant of competitive exposure concerning the degree of differentiation, margins and added value, but the roles of life cycle, maturity and rate of innovation were less recognized.
- the comments on the role of the markets of the product encompass several points on the scholars' list: the structure of (product) markets, market sector, and the pricing flexibility of the firm.
- the comments on the size and growth of the company are less evidently present on the scholars' list: the size of the firm affects the pricing flexibility of the firm, and is a key success factor in certain fields of business, and growth of firms is related to the current business goal (building market share).

Thus, when thoroughly studied, the results of the study seem to be in line with the theory concerning the determinants of competitive exposure. Nevertheless, it is worth noting that in the study results, the costs side (sensitivities of input costs to real exchange rate changes) received little attention. Also, the competitors' relative profitability and margins, as well as the marketing and production flexibility of the firm were not mentioned in the answers. This suggests that the studied companies regard competitive exposure isolated from the competitive strength and strategic flexibility of competitors.

In question (11) the nature of competition in the companies' core businesses was asked. The question was, as mentioned above, commonly understood as a question of market presence, rather than a question of market integration. This might have twisted the results. However, since the majority of firms stated that competition in at least some of the core businesses is global, and the companies that engage in strategic hedging measures are included in this group, and further, as the company that considers competitive exposure as not significant is included in the group of nationally segmented competition, it can be concluded that the perception of the importance of competitive exposure is related to the nature of competition in the companies' core businesses, consistently to the theory's

suggestions. Global competition in the core businesses usually means a more significant competitive exposure than under nationally segmented competition.

This conclusion is reinforced by the study of the companies which considered competitive exposure very important to them: only one of these four companies considered the competition in the core businesses nationally segmented.

7.3.2 The Role of the Perception of Competitive Exposure

Questions 2, 3, 4, 5, 7, 8, 9, 10, 12 and 14 were targeted to clarify the status of competitive exposure considerations relative to the other exposure types, as well as to reveal the state of the competitive exposure measurement and management processes in the studied companies.

Questions 2 and 3 were aimed to clarify the attitude towards competitive exposure relative to the other foreign exchange exposure types. The answers to question 2 clearly showed that the foreign exchange management goal seems to be clearly defined in every studied company, but the management of competitive exposure is not mentioned in the foreign exchange management policies. If interpreted strictly, according to George and Schroth (see section 5.1), the answers to question 3 suggest that translation and transaction exposures encompass all the important ways in which changes in foreign exchange rates affect the majority of the studied companies. This is because the definition of exchange exposure should recognize all these ways, and the majority of firms defined foreign exchange exposure as transaction and translation exposure. However, all except one of the studied companies perceived competitive exposure as at least an important factor affecting the annual variability of the company's operating profits. This suggests that the definition of foreign exchange exposure fails to serve its purpose in most of the studied companies.

Four companies had mentioned economic exposure (one used the term competitive exposure) in their definition of relevant exposures to foreign exchange risk. However, since two of these companies did not measure or manage their competitive exposure, the significance of the foreign exchange management policy in revealing the attention given to the matter can be questioned.

Questions 4 and 5 were targeted to reveal the actual state of measurement and management of competitive exposure. The result of question 4 was not self-evident, because those who answered that they measure and manage their competitive risk had very different

approaches to the issue. Nevertheless, these three companies formed the group of companies who had decided to measure and manage their competitive exposure.

Interestingly, these companies considered competitive exposure (only) an important factor affecting the annual variability of profits, *when hedged.*

The ways in which the companies that do measure and manage their competitive exposure (economic exposure in one case) deserve further commenting:

- There were little evidence of carefully constructed bottom-up processes of gathering the required information. Rather, the data was collected as a by-product of another planning process, or there was no co-ordinated process for this purpose, and the information was collected only concerning some specific cases.
- The competitive exposure management strategies can be classified into two categories (see Lessard in section 5.1): two companies seemed to consider building operational flexibility as the most efficient strategy of coping with competitive exposure, and the remaining one company seemed to regard the configuration of different businesses to reduce the exposure as the most efficient strategy. The heavily criticized portfolio-strategy of managing competitive exposure was not used.
- Two of the companies seemed to lack co-ordination in their measurement and management processes: the measures taken in hedging purposes were mainly related to separate cases, and there was no uniform measuring process for the whole corporation, either.
- The answers to the question of the biggest difficulties in the measurement and management of competitive exposure showed that getting the needed information, especially information on the competitors, and the thorough understanding of the company's business and of the factors affecting its competitive position are considered among the biggest difficulties. Further, the fast pace of change in the business environment, the lack of suitable financial hedging instruments, and the difficulty of taking the responsibility of the financial hedging decisions were mentioned.
- The use of financial instruments in hedging competitive exposure was approved by one of these companies. It considered the difference in the real and nominal exchange rates as "noise" in the scale of time and amount of the hedges.

The two companies, which had decided not to manage their competitive exposure, indeed stated that an important reason behind the decision was the difficulty of taking the responsibility of the financial hedges, which, in order to be effective in case of competitive exposure, have to cover a long period of time and extremely large amounts of currencies.

The reason behind not hedging was thus, in this study, more a question of responsibility than jurisdiction, suggested by the North-American experience (discussed in section 4.4.2). This suggests that these companies over-weigh the importance of financial responses in coping with competitive exposure.

A comment by an interviewee representing a company that does manage its competitive exposure (at least to some extent) offered some explanation: the interviewee stated that in hedging competitive exposure with operational (production) decisions, the company typically increases some other type of exposure, e.g. to political risk, and therefore it is safest and easiest to use financial hedges.

A surprising result was the fact that the majority of companies had not even made a specific decision whether to measure and manage their competitive exposure. This result suggests that a co-ordinated strategic hedging program is far from being implemented in most Finnish companies, as the majority of the studied MNCs, which would have the resources (expertise, IT-systems) to implement such programs, have not even considered the possibility.

Questions 7 and 8 were aimed to clarify the interaction between the corporate finance function and other activities of the firm. The results of question 7 revealed that in the companies that measure and manage their competitive exposure the treasury has indeed an "enlarged role" as recommended in chapter 5; the advisory and consulting role is significant. The other studied companies, however, rely heavily on a currency exposure report and telephone discussions in their foreign exchange management. This is quite surprising, because the quality of the report was questioned by several interviewees, and two companies had even abandoned it altogether as being too unreliable. Only one of the remaining eight companies had a very active treasury service. One company also stated that the need for education in these matters is more acute in the top level of management, rather that in the subsidiaries. This might be a symptom of the so-called CEO-exposure (see George and Schroth in section 4.4.2); since there is no accounting result isolating competitive exposure, the management feels no need to manage it.

In conclusion of question 7, the liaison role of the treasury recommended by scholars seems to be in use in companies that measure and manage their competitive exposure, but not in companies that have decided not to, nor in companies that have not made any decision about the management of competitive exposure.

The answers to question 8 revealed the almost non-existent role of financial experts in the decision-making processes concerning international operations at any level.

Questions 9 and 10 studied two important issues in competitive exposure management: the use of real exchange rate forecasts and the competitor analysis activity. The results revealed that the role of real exchange rates in is very rarely recognized, and even more rarely followed up: in only one company the chief economist followed up the most relevant real exchange rates for the company. In contrast, competitor analyses were prepared by all companies, but the interviewees' very limited knowledge of the activity made the interpretation of the answers very difficult. This lack of knowledge itself might tell about the lack of adequate cross-functional communication.

The results of question 12, long term cash flow forecasts and other longer range (> 1 year) planning, were thinner than expected. Here also, the lack of knowledge was a problem. The bottom line, however, became clear: only three companies perform thorough scenario analyses on the estimated future cash flows. Two of these companies manage their competitive exposure, and one has not even made a decision in this respect: it considers competitive exposure not significant to it.

The answers to question 14, the case of an international operation, showed a different picture: even if the role of the interviewees had been minimal in the decision-making processes, one fact was evident: in some of the processes, the motivation and objective of the operation clearly suggested that competitive exposure had been considered in the process, even in companies that did not have a co-ordinated strategic hedging programme. For example, three companies were motivated by the "strategic need" of expanding production outside Finland. This strategic need was felt through the competition in the main markets, and through the slow worsening of the company's competitive strength in these markets. Thus, these operations were, at least partly, responses to competitive exposure.

Indeed, from the comments of several interviewees, claiming that the competitive exposure approach is in fact already built in the operational business thought, one can suspect that in the biggest Finnish exporters the direction of the need of education could be reverse to the international: the thorough understanding of the relationships between real exchange rates and the company's competitive situation may exists in the businesses, and the need for education may be at the corporate level, including the finance function.

7.3.3 The Overall Foreign Exchange Management Strategy

The secondary objective of this study, to get a clear picture of the overall foreign exchange management strategy and structure, was covered by question 6, as well as by some already discussed ones, such as questions 2, 3 and 9.

All of the studied companies had centralized finance functions. The attitude toward risk was risk-averse, but most companies favorized selective hedging policies. The typical foreign exchange management strategy can be described as active, none of the studied companies adopted a passive foreign exchange management strategy.

Concerning the combinations of real and financial responses used to deal with foreign exchange risks, it was noted that in most cases, financial responses clearly dominated. According to Holland (see section 5.1) financial responses should play only a supporting role under deviations from PPP, while in the case of major imperfections in financial markets the whole range of financial responses should be used. He warns companies of the danger that treasuries start acting as speculators in detriment of its other roles. This might have happened in Finnish MNCs, except in one of the companies that manage competitive exposure: in that company no-one is thanked for gains from foreign exchange trading.

In general, the foreign exchange management seems to be very isolated from the operative businesses; the finance functions, especially treasuries seem to belong to the financial markets more that to the firm in which they operate. However, the impact of the EMU, i.e., less resources will be needed in hedging transaction exposure, might well change the situation so that the treasury could have the time to consider building a co-ordinated measurement and management process for the remaining competitive exposures of the company.

8 SUMMARY AND CONCLUSIONS

The real exchange rate is the nominal exchange rate adjusted for changes in the relative purchasing power of each currency since some base period. Since the determinants of real exchange rate are the nominal exchange rate and the relative inflation differential between the two countries, real exchange rate is extremely difficult to forecast. But, hedging does not require forecasting while speculating does.

Each company has its own real exchange rate, the price component of which depends on the individual firm's pricing mechanism and market strategy, and which should be more easily forecasted than changes in the general price level.

Competitive exposure is the sensitivity of local currency cash flows to changes in real exchange rates, which result in shifts in competitive positions of companies with different geographical patterns of value added. Competitive foreign exchange risk exists for a company if real exchange rates are volatile, the changes are unpredictable, and the operating profit of the company is affected by these unexpected changes. Risk is a combination of uncertainty and value at risk.

The degree of competitive exposure of a company is a function of the structure of the company itself, and of the markets in which it sells its products and purchases its inputs. Manufacturing companies, competing globally with few strong (foreign) competitors are very likely to have large competitive exposures.

Competitive exposure to exchange rate risk can be hedged by using combinations of real operational and financial responses. The measures involve either the R&D, marketing and sales, production and logistics, or finance function of the firm. The measures can be either strategic or tactical. The term strategic hedging refers to both of these categories.

The strategic hedging decisions are normally targeted to alter known levels of exposure or potentially new levels of exposure to currency risk, as well as to alter the sensitivity of exposures to exchange rates.

This study was targeted to clarify the state and status of competitive exposure and strategic hedging considerations in Finnish multinational companies. Eleven of the biggest and most international Finnish MNCs were chosen as the sample companies. The study method was personal interviews.

The result of the study concerning the understanding of the concept of competitive exposure was two-sided: on the other side, the idea of competitive exposure seemed to be clear to the majority of interviewees, but on the other side, fewer of them recognized the distinction between nominal and real exchange rates. Thus, the concept of "competitive exposure", as they understood it, was closer to that of operating exposure than to the definition of competitive exposure used in this study. Also, the term economic exposure was treated as a synonym to competitive risk by several interviewees.

The companies regarded competitive exposure as an extremely difficult concept to define, measure and manage.

The status of competitive exposure, and strategic hedging, relative to the other foreign exchange exposure types, was low, even though the vast majority of the interviewees perceived competitive exposure as being a very important or important factor affecting the profitability of their company. None of the companies had mentioned the management of competitive exposure in their written foreign exchange management objectives, and only four of the eleven sample companies had mentioned economic exposure in the definitions of foreign exchange rate exposures.

From the answers to the question of the reason behind the perceived importance of competitive exposure, it was concluded that the studied companies do not consider enough the roles of the competitive strength and strategic flexibility of competitors in their competitive exposure. However, the extent of the perceived importance was related to the nature of competition in the companies' core businesses, so that the companies with businesses in global competition typically considered competitive exposure more important than those companies with businesses competing in nationally segmented markets.

With regard to the state of competitive exposure considerations in the studied companies, only five companies had made a decision concerning the measurement and management of competitive exposure, and two of those companies had decided not to. Of the three companies that formed the group of companies that measure and manage their competitive exposures, only one was truly consistent (with the theory) in its approach; it recognized the role of real exchange rates, it had a structured measuring process with a sufficiently long time period under review, and it employed a set of both real operational and financial, strategic and tactical, measures to cope with the problem of competitive exposure. The two other companies which had made a decision to measure and manage their competitive (economic, in one case) exposure had inconsistencies in their approach; both claimed that competitive exposure is considered in strategic decision making, such as plant location

decisions, but the measurement of the exposure concerned only some separate cases, and there was no co-ordinated management plan for the exposure.

Nevertheless, hedging seems to reduce the level of exposure; the companies that manage their competitive exposure stated that if hedged, competitive exposure is an important, instead of very important, factor affecting the annual profits of the company.

The greatest difficulties encountered by these three companies in the measurement and management processes, and reasons for not hedging of the two companies that had decided not to measure or manage competitive exposure, both included the fact that when competitive exposure is hedged mainly with financial contracts, the time periods and amounts involved are so great that nobody is willing to accept the responsibility for the decisions. This may be due to the poor measurement of the exposure that fails to report the gains from the operative businesses when the financial contracts show losses. This result further questions the rationale of limiting the management responses of competitive exposure to financial measures, especially when there is no co-ordinated measurement of the exposure.

The foreign exchange management strategies of those companies with no competitive exposure management processes also seemed to over-weigh the use of tactical financial management tools in their foreign exchange risk management. In summary, in the studied companies' general perceptions of the appropriate manners to manage competitive exposure, a clear concentration on strategic production decisions and tactical financial techniques was found.

Yet, the majority of firms had not even made a specific decision about the measurement and management of competitive exposure, and even though the businesses would have understood the relationships between the real exchange rate and their competitiveness, the lack of a suitable structured framework as well as of data collection and analysis processes, resulted in a lack of communication and co-ordination of the separate decisions affecting the exposure.

In fact, this result suggests that a co-ordinated strategic hedging program is far from being implemented in most Finnish companies, since the majority of the studied Finnish MNCs, which would have the resources, namely expertise and the information technology to implement such programs, have not even considered the possibility.

The study brought up some ideas of what could be done to improve the situation in the studied sample companies: (1) the role of the treasury could be enlarged to a true support,

advisory, and liaison role in all matters concerning foreign exchange exposure measurement and management (the forming of the EMU could help in this respect by freeing some time and resources of the treasury to the management of the remaining competitive exposure), (2) a VAR (Value-At-Risk) regression analysis could be used to get an approximation of the operating foreign exchange risk, and (3) the treasury could help the businesses in formulating the known relationships between real exchange rates (unique to the company) and the operative cash flows, as well as in constructing computerized models for measuring the exposure in different, probable, states of nature. This would help to construct a proactive approach to competitive ("structural"/"business"/ "strategic") exposure management.

But, reaching this goal requires the true and consistent commitment of the very top level of management of the firm.

The results of this study would most probably have been different if the sample of companies had been significantly larger, or if the sample companies had been chosen among small or medium sized companies. But, as the now studied companies were chosen among the biggest and most international Finnish companies, which can be expected to have the most sophisticated foreign exchange management systems, the result of the study implies that competitive exposure is not generally known nor managed in Finnish companies.

However, as the globalization of markets and competition is continuously spreading to new industries, the need for a strategic thought that recognizes the role of real exchange rates and competitive exposure will certainly become more visible in many fields of industry.

Since strategic hedging programs are worth implementing especially, if competitors do not hedge their competitive exposures, the result also suggests that companies that are among the first to start managing their competitive exposure in their industry can, in result, reach significant competitive advantages.

In the current Finnish economic situation, companies troubled with the idea of relocating production outside Finland, and therefore worsening the unemployment problem, should adopt a wider view of strategic hedging. The strategic production decisions are not the only means of managing competitive exposure; many other operational alternatives for reducing the exposure and the sensibility of the cash flows to changes in real exchange rates are likely to be available for any company.

Further research could be rewarding in the study on the extent of competitive exposure of one (Finnish) firm more in detail, as well as in the study on the process of constructing a co-ordinated strategic hedging program in a (Finnish) company. Further, at a more theoretical level, the use of game theoretical approaches and chaos theory seem to be appropriate in the study of the problem of competitive exposure measurement and management. The applications of neural networks to the problem could also offer an interesting field of further study.

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Roy Dahlstedt
Ass. professor (econ.) — HSEAB: Intermediary International Economics, fall 1994

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AHLSTROM 2 April 1996	Mr. Orvo Siimestö	Corporate Vice President, CFO
ENSO 20 March 1996	Mr. Urmas Rania	Treasury Manager, Risk Management
HUHTAMAKI 12 April 1996	Mr. Tomas Back	Manager, Corporate Finance
KEMIRA 15 April 1996	Mr. Tage Johansson	Treasury Manager
KONE 4 April 1996	Ms. Pirjo Krikorian	Assistant Corporate Treasurer
UPM-KYMMENE 26 March 1996	Mr. Juha Forsius	Treasury Manager
METRA 16 April 1996	Mr. Christoph Vitzthum	Dealer
METSÄ-SERLA 29 March 1996	Mr. Jukka Niemi	Foreign Exchange Manager
NESTE 19 March 1996	Mr. Eero Sihvonen	Corporate Vice President, Head of Corporate Treasury
NOKIA 12 April 1996	Mr. Timo Ihamuotila	Manager / Helsinki Treasury Center
OUTOKUMPU 19 April 1996	Mr. Juha Hakala	Finance Manager

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Appendix 1.

THE STUDY QUESTIONNAIRE

Introduction

According to the Purchasing Power Parity, the relative difference in inflation rates is compensated by the change in the nominal exchange rate between two countries, when the real exchange rate remains unchanged, and no changes in the relative purchasing power and competitivity of companies in the two countries are induced by exchange rate changes.

However, in reality, there can be large and persistent deviations from the PPP- level of nominal exchange rates, and the real exchange rate fluctuates when the change in the nominal exchange rate over- or undercompensates the relative inflation difference. This affects the the competitive situation of companies having competitiors, on which the real exchange rate change has had different effects. Thus, even cash flows realized domestically, in the domestic currency, can be touched by this effect, i.e., be subject to competitive exposure.

This exposure to competitive risk, function of real exchange rates, is the focus of this study. By these interviews, I intend to find out if the biggest Finnish multinational companies have indentified this kind of a foreign exchange exposure, what their attitude is towards measuring and managing it, as well as how they measure and manage it.

To clarify, the more widely known economic exposure is a broader concept of competitive exposure: it is most commonly understood as the extent to which unexpected exchange rate changes will alter a company's market value by changing the present value of its expected future cash flows. The "classic" taxonomy of exchange rate exposures distinguishes between translation, transaction and economic foreign exchange rate exposures.

The concept of competitive exposure is still relatively new, even if the issue itself is old: the competitivity of firms and managing the exposures to forces that could adversely affect the competitive position of a company.

QUESTIONS:

1. *Would you describe the importance of competitive exposure as a*

a) very important

b) important

c) not significant

factor affecting your company's annual profits ?

2. *How would you describe your company's foreign exchange risk management objective?*

(is it defined in written? where?)

3. *What is the definition of foreign exchange exposure for your company ?*

(is it defined in written? where?)

4. *Has your company made a specific decision concerning measuring and / or managing competitive exposure?*

NO

YES : what was the decision ?

if yes : answer the following question 5 a) or 5 b) depending on the answer.

5. a) *How does your company measure and / or manage competitive exposure?*

- on what level is the main responsibility?
- what kind of analyses are used?
- what is the time frame?
- what has been done in order to minimize the exposure?
- how are the hedging activities coordinated?
- has the follow-up revealed any specific results of the hedging policy?
- what is the greatest difficulty in this process of strategic hedging?

5. b) *What were the reasons behind the decision not to measure and manage competitive exposure ?*

1) difficulties of measurement
2) the focus on accounting results and ratios by the stock market and other stakeholders of the company
3) the unwillingness of the company's top management to allocate resources to the measurement and management of competitive exposure (lack of will or understanding ?)
4) other.

6. *The organizational structure of the corporate finance function :*
is the treasury and the foreign exchange management expertise centralized ?
(is the treasury a profit or cost center?
is it a pure support function or can it speculate?
what is the division of responsibilities in forex matters?)

7. *What are the principal reporting and communication channels in matters concerning foreign exchange exposure management?*

a) routine reports
b) working groups, courses, lectures, seminars, etc., and other (informal) means of communication.

8. *Do finance (foreign exchange rate risk management) experts have a role in operational and strategic decision making processes concerning international operations ?*

Frequency : \ *Level* : 1. Corporate 2. Business (Unit) 3. Subsidiary

Always
Often (when?)
Sometimes (")
Never

9. *Does the company use foreign exchange rate forecasts ?*
(why? what is the primary use?
are the forecasts produced in-house or are they from outside the company?
what is the time frame of forecasting exchange rates?
are real exchange rates forecasted? by whom?)

10. *Does the company perform any kind of competitor analyses?*
(what is the objective?
what type of analyses are made?
who is responsible for gathering the information, who prepares the analyses?)

11. *The nature of competition in the company's core businessess :*
Is it gobal or nationally segmented ?

12. *What kind of long term cash flow forecasts and other longer range (> 1 year) planning does the company make ?*

13. *What is the most important firm-specific reason behind the answer to question 1. (the importance of competitive risk to the company) ?*

14. *Case : International diversification or reorganization of operations*

- what kind of an operation in case?
- what was the objective of the operation?
- what was the background of the decision?
- what kind of analyses were made to support the decision making?
- were there any alternatives (other than not to change the situation)?
- what factors determined the decision ?
- what have been the results of the operation?
- ex post, does it seem now that the objective has been reached?

Appendix 2.

COMPANY	Core business areas	Net sales in 1995, FIM mio	% of net sales outside FIN	% personnel outside FIN	Other information/ indicators
UPM-Kymmene	forest industry & engineering	54738	87%	36%	Combined figures of Repola & Kymmene, merger effective from 1.5.1996
NESTE	oil, energy & chemicals	43335	67%	34%	
NOKIA	telecomm.	36810	91%	44%	
ENSO	forest industry	28026	83%	15%	Combined figures of Enso-Gutzeit & Veitsiluoto, merger effective 1.5.1996
OUTOKUMPU	metals & technology	16952	89%	47%	
METSÄ-SERLA*	forest industry	13123	78%	32%	
KEMIRA	chemicals	12352	78%	44%	
AHLSTROM	paper & engineering	12108	82%	62%	
METRA	engineering, bathroom ceramics, steel, etc.	10617	94%		45% of production outside Finland
KONE	elevators & escalators	9523	89%	92%	
HUHTAMAKI	confectionery & food packaging	7836	85%	73%	

Source: Mainly annual reports, the percentages were given in the report (press release/bulletin) or calculated/estimated in other ways

* Metsä-Serla is the only studied company that is a part of a larger group (Metsäliitto, Net Sales FIM 17 665 mio in 1995).