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# Hedging strategies for currency risk

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## PREFACE

Producing a Master thesis is a demanding and prolonged process. During my work I have faced many challenges, and the biggest challenge for me has been to structure the paper and obtain relevant information. It has been a very interesting process where I have learned a lot.

I would like to thank my supervisor Domenico Dall'Olio for help, availability and guidance of my work. I would also like to thank Company A for taking time and opportunity to meet with me and to be interviewed.

Currency hedging is a complex topic and I am therefore humble discussing it. As the author I take all responsibility for any errors in the paper.

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## 1 INTRODUCTION

Financial derivatives are a powerful tool that is widely used in the business world today. However, people and companies have difficulties understanding the complexity of these technical instruments and finding ways to use them. “Derivatives are too complicated to explain and too important to ignore”, the CBS show “Sixty Minutes” once announced. For internationally operating companies, the exposure to foreign exchange risk is growing as export and volatility of foreign exchange rates is increasing. An important part of a company’s risk management policy is to manage this exposure: my aim is to understand how companies can hedge their currency risk and what kind of hedging strategies are available for them.

A derivative is a financial instrument whose value depends on the value of the underlying variable. The underlying variable varies from stocks, currencies, and commodities, to the weather. Derivatives such as forwards, futures, options and swaps are the most commonly employed and can be used for two very different purposes, namely speculation and hedging. Speculation refers to the purchase of financial derivatives in order to take positions in the expectation of profit, while hedging refers to the use of these instruments to protect against the risks associated with the everyday management of corporate cash flow. Hedging involves taking on a new risk that offsets the already existing risk.

The increasing subscription of financial contracts has led to an explosive growth in foreign exchange. The foreign exchange market is the most liquid market in the world and is experiencing a continuous trend of strong turnover growth. In 2013 the activity in the market reached USD 5.3 trillion per day.

One of the benefits of derivatives is better risk sharing across the economy. Nevertheless, trading derivatives involves high risk. Many derivatives are characterized by their high leverage, which means that the amount of money needed to open a position is much lower than the total value of the position. This means it is easy to take on large amounts of risks that can lead to large profits as well as large losses. An increasing issue in international markets is the counterparty risk associated with the counterparty not fulfilling contractual duty.

There are many different approaches to hedging and the best for one company might not be a single strategy. The hedging decision depends on many factors, such as costs of hedging and the relative risk attitude of the company.

I have decided to respond to this problem in a descriptive manner. I will also provide an in-depth study of a company with global activities in which I will suggest some hedging strategies. The paper is divided into three parts; a historical framework, a theoretical framework and a practical framework. In the first part I have decided to describe the development of international currency systems in order to enhance the understanding of today's currency system.

The second part examines previous research on hedging and motivations for hedging, followed by the discussion on the financial risk management process. It is important for companies to identify what kind of risks they are exposed to. I have therefore decided to study different risk categories and the factors of currency risk. I will also present and explain different hedging instruments and approaches, the decision making process behind currency hedging and different factors affecting this process. Further, I give a description of the design and actors of the foreign exchange market, followed by the study of the most common instruments and methods that can be used to minimize currency risk.

In the final part I provide a case study of a Swiss company that is exposed to currency risk. The company encounters problems in finding a hedging strategy due to its variable foreign exchange exposure. Based on a meeting with the company, a follow-up interview via email, and current information contained in the financial statements, I aimed to identify the current company approach and to come with suggestions for new hedging strategies.

## 2 HISTORICAL FRAMEWORK

We begin this paper by examining the development of the international currency system. This aims to give an important framework for businesses with international engagement and may help increase the understanding of today's currency system and to evaluate its strengths and weaknesses.

### 2.1 CURRENCY SYSTEMS

The international currency system gives important framework for companies with international activities. We will therefore in this chapter describe both the international currency system and currency system within EU.

#### 2.1.1 THE GOLD STANDARD

The introduction of the gold standard in the late 1800s came as a result of increasing trade in the free trade period. It was a formalized system for international trade balances and involved setting "rules" so that each country's currencies could be converted into gold. The U.S. dollar rate against gold was set to \$20.67 per ounce of gold<sup>1</sup>, and the exchange rates between currencies were fixed since the countries had agreed to trade gold on demand at its own fixed parity rate. In fact, Dam (1982) states that the system of fixed exchange rates was the most effective aspect of the gold standard. Further development of financial markets and central banks opened for governments to sell and buy foreign exchange in transactions with their own private sector. As a consequence, the public sector was permitted to play a larger role in controlling international payments. (Grubel, 1977).

However, the outbreak of World War I caused the end of the gold standard. During this period currencies fluctuated in terms of gold and in terms of each other. International speculators took advantage of weak currencies and sold them short, causing already weak currencies to fall further. Most industrial countries relied on purchasing foreign assets in order to build up their reserves, and as Grubel (1977) reports, foreign exchange reserves constituted 42 % of total reserves of 25 countries in the end of the 1920s. This was a contributing factor of the economic and reserves collapse in the 1930s - a collapse that led foreign exchange reserves to fall to 8 %

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<sup>1</sup> Eiteman et al.(2004)

by 1932. The sharp contraction in cross-border trade and investment was somewhat cancelled out by competitive devaluations<sup>2</sup> that permitted re-expansion of money stock to some degree. Nevertheless, the multilateral trade and investment that once had flourished had come to an end. (Grubel, 1977).

In 1934 a modified gold standard was implemented in the United States. Gold was only to be traded with foreign central banks, not in transactions with private citizens holding dollars. Even though many currencies lost their convertibility during and after World War II, the dollar remained the only currency convertible into gold, as well as the only major trading currency (Eiteman et al., 2004). The international monetary system was now practically “a solar system in which the US dollar was the sun”, cit. Dam (1982).

### 2.1.2 BRETTON WOODS

After the war, the allies met in Bretton Woods, New Hampshire, to form a new international currency system. Two institutions were founded; the International Monetary Fund (IMF) and the World Bank. The key institution, IMF, was mainly founded to help member countries in case of exchange rate problems.

The new system of the Bretton Woods Agreement was based on fixed parities since the dollar was the only currency convertible into gold. At this moment the US dollar had devaluated to a rate of \$35 per ounce of gold<sup>3</sup>. Other currencies were to keep a fixed value or parity with the dollar, and calculated the gold par value of its currency in order to make the desired dollar exchange rate. Acceptable fluctuation limits for these currencies were +/- 2.25 % around the fixed parities. Rates close to the limit would imply intervention from the IMF either by support purchasing or support sales of currencies. In the case of fundamental imbalance of a currency, it would be necessary to devalue, i.e. reduce the value of a currency with respect to other currencies, or revalue, i.e. increase the value a currency with respect to other currencies.

As national monetary and fiscal policies widely diverged, the gap between inflation rates increased and several unexpected external shocks emerged, the weaknesses of the Bretton

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<sup>2</sup> The devaluation of the U.S. dollar led to increased value of gold reserves.

<sup>3</sup> D'Arista, “The evolving international monetary system”, *Cambridge Journal of Economics*.

Woods system became clear in the 1960s. Robert Triffin, encouraging for a new post-Bretton system, said that “the alternative to the gold standard is not a dollar standard unilaterally run and managed by the United States alone, but a true international standard, calling for concerted decisions and management by all participating countries”. Triffin (1968).

Deficits of the United States balance of payments and the need to finance these required a considerable capital outflow of dollars. Since the dollar was the dominant currency, this would also meet foreigners’ growing demand for dollars. However, foreigners became less confident that the US could meet its commitment to convert dollars to gold. As a forced result, the dollar-convertibility with gold was suspended. Leading trading countries had floating exchange rate against the dollar (i.e. no fixed parity), resulting in a 10 %-devaluation of the dollar in 1971 and an appreciation of the major trading currencies. Increasing speculation proved that the fixed-rate system was not feasible. Currencies were allowed float freely according to market forces.

### 2.1.3 THE CURRENCY SYSTEM WITHIN EU

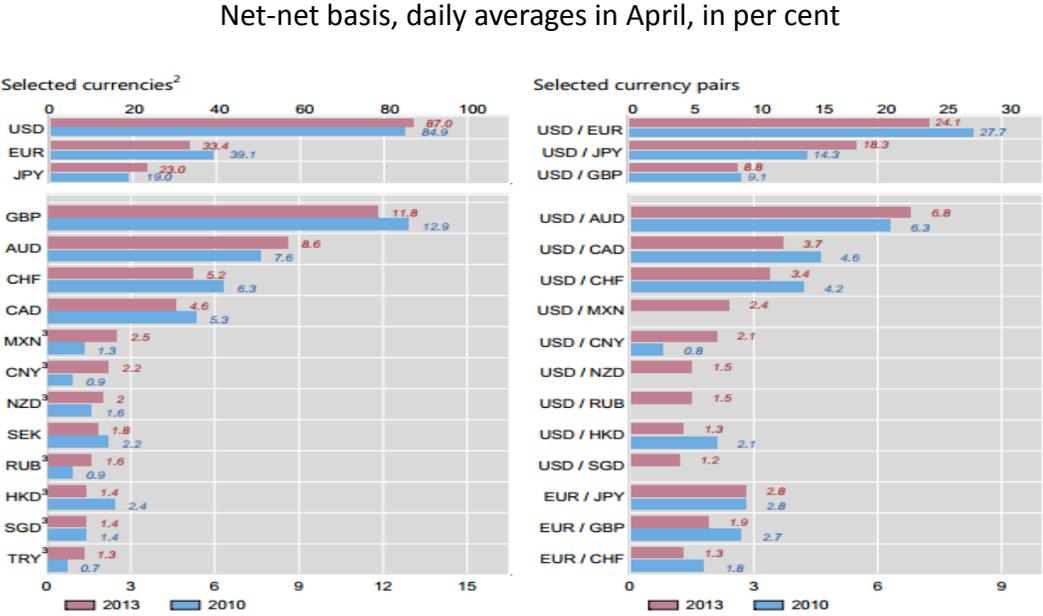
In order to resolve the existing monetary instability, European Monetary System (EMS) was created in December 1978. It involved the Exchange Rate Mechanism (ERM) that uses European Currency Unit (ECU) as a parity basis. ECU was made up of a curve of currencies calculated as a weighted average of the EU-member countries’ currencies, where the weights reflected the nations’ relative gross domestic product and foreign trade. The first step implied calculating the value of ECU against USD, and then against single countries’ currencies. Fluctuation limits against ECU were +/- 2.25 %, which, similar to the previous system, indicated that central banks intervened when currencies approached this limit. See Korsvold (2000).

In the ‘90s the ERM-mechanism experienced unrest based on the wish to maintain fixed parities between the participating currencies at a time when the countries’ economic development diverged. Attempts to devalue different currencies did not solve this underlying problem. A heavy speculation against the weakest ERM-currencies followed, and consequently, the fluctuation limits changed to +/- 15 %.

A year before, in February 1992, the Maastricht Treaty had established the framework and the schedule for the Economic and Monetary Union (EMU) - a monetary union to coordinate economic and fiscal policies. In 1998 the European Central Bank (ECB) was created, followed by the introduction of the common currency, Euro, on 1<sup>st</sup> of January 1999. As much as 17 out of 28 EU member countries today use the Euro as the official currency, and some 332 million people using it every day.<sup>4</sup> Some countries have chosen to stand outside the common currency, and some have decided to stabilize their currencies against the Euro according to the ERM II cooperation.<sup>5</sup>

According to the Triennial Central Bank Survey, the dollar remains the dominant vehicle currency worldwide, representing 87 % of all deals initiated in April 2013 (see Figure 1). Euro plays the role as the second most important currency in the world, although it has shrunk since the start of the debt crisis in 2010 and decreased by almost 6 % to 33 % of global market share<sup>6</sup>.

Figure 1: Foreign exchange market turnover by currency and currency pairs



Source: Triennial Central Bank Survey

<sup>4</sup> Europa.eu: “The euro”  
<sup>5</sup> Korsvold (2000).  
<sup>6</sup> Triennial Bank Survey 2013

Note that as two currencies are involved in each transaction, Figure 1 shows that the sum of shares in individual currencies will total 200 %. Some currencies are not listed and the share of them is 12.2 % for 2013 and 13.7 % for 2010.

Today's international monetary system is denoted as a relatively "floating regime" where major currencies are allowed to float freely against each other. Each country can choose from which of the IMF's classifications of exchange regimes that they wish to follow (for example floating exchange regime or fixed exchange regime). The contemporary monetary system is made up of national currencies, artificial currencies (Special Drawing Rights) and the euro. Every country's government can intervene in the currency exchange market whenever necessary, typically through their central banks.

Much of the criticism of today's monetary system is about the inequities and the unsustainability of the system. Skepticism in the role of the euro has its basis in the euro-area's debt crisis and the EU-countries large deficits. Some experts believe that the euro stands strong, whereas others claim that more countries will leave the euro and that a collapse in the euro-area will happen. Creating a reserve asset that is not based on national currency has been suggested, as well as an international monetary reform. Other proposals to the debate are the creation of a public international investment fund for emerging economies and the reform of the international payment system.<sup>7</sup>

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<sup>7</sup> For more information on the proposals see D'Arista, J. (2009), *Cambridge Journal of Economics*

### 3 THEORETICAL FRAMEWORK

In this part of the paper we will introduce some theories about corporate hedging and the process of financial risk management. Further we examine the foreign exchange market, the different internal and external instruments for hedging, as well as different risk exposures.

#### 3.1 CORPORATE HEDGING

It is likely to believe that we gain a better understanding of corporate hedging if we first examine what has previously been said about hedging and the motivations behind hedging strategies.

As Eiteman et al. (2004) defines hedging, it is “[...] the taking of a position, acquiring either a cash flow, an asset, or a contract (including a forward contract) that will rise (fall) in value and offset a fall (rise) in the value of an existing position. Hedging therefore protects the owner of the existing asset from loss. However, it also eliminates any gain from an increase in the value of the asset hedged against.” In other words, hedging means to apply strategies that involve taking new risks in order to offset existing risks.

Currency exposure is viewed as one of the major risk exposures to multinational companies because it has the power to greatly affect a firm’s future cash flows. Since nothing about the future is certain, companies can manage this risk by hedging and in this way reduce the variance in the value of the firm’s future expected cash flows.

#### **Classical theory**

Much has been said about the motivations behind hedging. Classical theorists such as Miller and Modigliani (1958, 1961) say that given perfect markets, absence of taxes, bankruptcy costs, agency problems and information asymmetry, the value of a company will be unaffected by how a company is financed. An investor (shareholder) of the company has the possibility to diversify and perform necessary hedging strategies on their own if they are unhappy about the company’s risks. Risk reducing measurements from the company will therefore not have any effect on its value, according to traditional theory. In other words, if financing methods and characteristics of risk do not matter, hedging them is not necessary.

Miller and Modigliani further claim that since the present value of a hedging contract at the time of entering the contract is equal to zero, it will not increase the value of the company. They conclude that a derivative contract only has an effect on the firm value if market imperfections exist. However, in real life market imperfections do exist. As we know, bankruptcy costs, agency costs, information asymmetry, and taxes are all costly to firms.

Smith and Stulz (1985), Bessembinder (1991), Nance et al. (1993) and Froot et al. (1993), among others, demonstrate why market imperfections are necessary to justify hedging activities, taking into account the existence of sufficiently large risk exposures and the cost related to the implementation of hedging strategies.

### **Bankruptcy costs**

A company may see bankruptcy costs as the main reason for hedging risks. This reflects the fact that investors and money lenders want to be paid for carrying the risk as long as there is a probability of bankruptcy. Smith and Stulz (1985) say that hedging reduces the volatility of income and therefore also reduces the probability of facing financial distress. The expected costs of financial distress (i.e. the minimum cash flow point that has to be generated to make financial payments in order to operate) will be reduced and further lead to better loan conditions and interest rates. Stable income gives companies better possibilities to take on more debt. In this way, the company can exploit the maximum advantage of the tax shield and increase the value of the company.

### **Financial distress**

Nance et al. (1993) reports that direct costs of financial distress is higher for smaller firms than it is for larger firms, i.e. it is not proportional. Therefore smaller firms should hedge more than larger firms. However, empirical research by Geczy et al. (1997) shows us that bigger firms are overrepresented among users of currency derivatives. It should be stressed that costs and economies of scale mostly concerns the use of financial hedging instruments, and that smaller firms can benefit from less complex methods of hedging. This is due to the fact that hedging currency exposure requires resources and competence as well as surveillance and monitoring of existing contracts that is costly.

## **Taxes**

Regarding taxes, Smith and Stultz (1985) proves that hedging activities can increase a company's value if the effective tax is progressive. Hedging risk will reduce the volatility of the income and hence lower the company's expected tax liabilities. Low income means low marginal tax whereas high income means high marginal tax. By hedging, the increase in expected tax in the case of low income will be more than outweighed by the reduction in expected tax in the case of high income. In other words, the more progressive the tax is, the higher is the gain from hedging. On the other hand, Graham and Rogers (2002) do not find empirical evidence for companies considering hedging with respect to tax convexity.

## **Asymmetric information**

In the case of asymmetric information, i.e. when managers are better informed than shareholders about the risks that a firm faces, De Marzo and Duffie (1995) claims that hedging sometimes is based on private information that involves a cost if conveyed to shareholders. The private information puts the management in a better position to understand and identify a company's actual risk and the corporate hedging may thus be more beneficial for the shareholders. Stulz (1984) confirm that hedging is performed relatively more in periods of high perceived asymmetric information such as on days before major macroeconomic announcements.

## **Agency problems**

Agency problems refer to conflicts of interest between bondholders and shareholders that often lead to underinvestment. According to Bessembinder (1991) hedging reduces this conflict and therefore also underinvestment. Managers may act on behalf of their own interests, and the fact that they are likely to be undiversified resulting from their employment in the firm, can cause agency costs (Smith and Stultz, 1985; Stulz, 1990, Bartram, 2002). If managers with large ownerships in the firm are risk-averse, Smith and Stulz (1985) add that they are more likely to suggest hedging in order to avoid volatile expected profits.

Nance et al. (1993) stress the fact that firms may not reduce the conflict between shareholders and bondholders only by using hedging instruments, but also by issuing convertible bonds or preferred stocks. If hedging substitutes like these are present, then in general the need for hedging is reduced. A situation when dividend yields are low and liquidity ratios are high is also viewed as a “hedging substitute” because it eases the collection of sufficient liquidity. However, factors determining the use of derivatives may differ for the specific type of hedging (see, e.g., Tufano, 1996; Haushalter, 2000; Gezcy et al., 1997; Allayannis and Ofek, 2001; Judge, 2004; Bartram et al., 2004).

Gezcy et al. (1997) say that the use of foreign currency derivatives depends on a firm’s degree of foreign sales, foreign trade and size, but that they do not find any clear relation between foreign debt and the use of derivatives. Judge (2004) also concludes that, among U.K. non-financial firms, there is a strong explanatory power to firm size and the foreign currency transactions dummy.

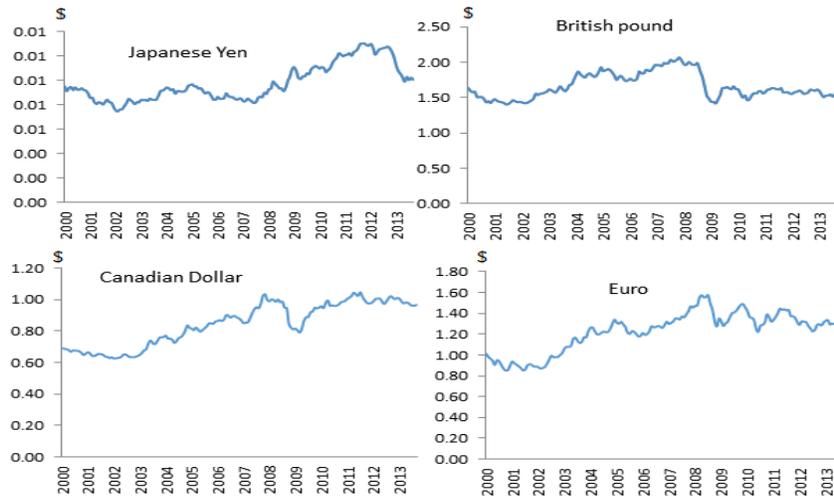
Froot and Stein (1998) suggest full hedging of exposures to any efficiently tradable risk, whereas Stulz (1996) claims that some firms have a comparative advantage in bearing certain risks, and that these firms should therefore engage in selective risk taking.

### 3.1.1 MOTIVATIONS TO HEDGE

The main aim of hedging is to minimize volatility of returns and to make companies’ results more stable and certain. Firms can more accurately predict future cash flows, improve planning capability and carry out good investment opportunities when the variability of cash flows is reduced. Further, correct hedging opens up for easier access to credit and higher appeal for investors, as well as increased competitiveness and protection from unpredictable events.

With globalization follows more exporting companies and increased trade across borders. International companies face larger exposure to currency risk due to increases in export and increases in volatility of exchange rates, as we can see in Figure 2. The high volatility of exchange rates has a great effect on the economy and our daily lives.

Figure 2: Exchange rates, 2000-2013



Source: Data from Federal Reserve Bank of St. Louis

The exchange rates in Figure 2 are quoted as dollar per unit of foreign currency. This means that a rise in these plots indicates a strengthening of the currency (weakening of the dollar). A fall of the dollar value makes foreign goods more expensive for Americans and American goods cheaper for foreigners. Export to the states may therefore decrease, and so the devaluation of the dollar is a major motivation to hedge.

### 3.1.2 MOTIVATIONS NOT TO HEDGE

Even though hedging leads to a reduction in the variability of the cash flows, it does not increase the expected cash flows. Instead, costs of hedging may potentially lower the cash flows such that the total impact on value will be a combination of reducing cash flows (less value) and a reducing the variance of the cash flows (increases value). Hedging often requires competence and specialized consultants that are expensive, and the hedging instruments itself is never completely free.

Internal strategies indirectly involve a cost through the implementation of new routines and procedures in the company system that can be expensive and demanding. The cost versus benefit of hedging strategies must therefore be considered before using or rejecting any hedging strategy. Even if the company has chosen a proper hedging method and exchange rates

move in the anticipated direction, but moves very little, the cost of hedging may in fact outweigh the gains.

To sum up, whether to hedge or not to hedge depends on many factors. Financial distress, risk attitude, laws that restrict hedging strategies, pressure of capital constraints (for example external regulatory capital requirements), stakeholders, and organizational structure all influence the hedging decision. Naik and Yadav (2003)<sup>8</sup> find that dealers hedge to a greater extent when the cost of hedging is lower, when the pressures of capital constraints are greater, and when economic uncertainty is greater.

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<sup>8</sup> The Journal of Finance

## 3.2 FINANCIAL RISK MANAGEMENT

### 3.2.1 UNDERSTANDING FINANCIAL RISK MANAGEMENT

Thanks to a better understanding of quantitative models and availability of computer power it has become possible to quantify risk to a large extent. Though, these risk instruments and mathematical models are of little use if the people dealing with them lack mature human judgment. Evaluating the risk management in the aftermath of the financial crisis shows that a major reason for the crisis was regulators that did not sufficiently understand the complexity of certain financial instruments.

Risk instruments can only be used given a proper understanding of risk management, the instruments, institutions, and agreements. Without this knowledge, it is hardly possible to create profit opportunities from volatile exchange rates and in worst case can lead to financial disasters (see section 3.1.). It is therefore natural to ask what is *risk*? Horcher (2005) explains risk and exposure as follows: “Risk provides the basis for opportunity. The terms risk and exposure have subtle differences in their meaning. Risk refers to the probability of loss, while exposure is the possibility of loss, although they are often used interchangeably. Risk arises as a result of exposure.” In practice, risk can neither be avoided nor eliminated completely. Actually, it might not always be desirable to eliminate risk, since we know that without taking some kind of risk a business cannot grow.

This, then, leads to the next question, what is *financial risk management*? Mainly, it involves dealing with the uncertainties resulting from financial markets.<sup>9</sup> The first step to implement the correct financial risk management strategy is to identify exposures and risks, and then to develop strategies in accordance with the company’s internal policies. The important thing is to decide which risks are acceptable to the company and which are not. Being proactive towards identifying financial risks may give a competitive advantage, whereas passively taking no action is the same as accepting all risks by default.

There is a variety and complexity of strategies and products to manage financial risks. Derivatives are the strategies that are mostly used for risk management. Derivative contracts,

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<sup>9</sup> Horcher (2005)

such as futures, forwards, options, and swaps, are valued depending on the underlying asset. They can be traded on everything from interest rates to exchanges rates, commodities, equity, credit, and even weather, and are traded among financial institutions and on organized exchanges.

However, analyzing the financial markets is not just easy. Risk usually do not occur in isolation, but may instead arise from interactions of several exposures. In fact, sometimes human behavior is the reason why it is nearly impossible to forecast these interactions. Then, if it is so difficult to analyze the financial markets, how does the *risk management process* work? In general, it includes the following steps<sup>10</sup>:

1. identify and prioritize the main financial risks;
2. determine the level of risk tolerance;
3. implement risk management strategy consistent with internal policy;
4. measure, report, monitor, and refine as needed.

Emphasize should be put on the importance of implementing and refining the strategies as the market changes. For instances, expectations about the market rates or changes to the business environment may be reasons to refine the strategies. Thus the process of financial risk managements is a dynamic and ongoing process. Reporting and feedback are also important components of risk management, both before and after strategies are taken in order to refine them.

The internal analysis of the risk management process involves examining the organization and its products, management, customers, suppliers, competitors, pricing, industry, trends, balance sheet structure, and position in the industry. Another part is to get a clear understanding of the stakeholder's perspective and tolerance for risk.

According to Horcher (2005) there are three broad alternatives for managing risk. The first is to do nothing and accept all risks; the second is to hedge only a portion of exposures, while the third is to hedge all exposures possible.

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<sup>10</sup> Horcher (2005)

Without going more deeply into each of these alternatives, we end by stating one of the leading finance historians, Niall Ferguson<sup>11</sup>: “The history of risk management is one long struggle between our vain desire to be financially secure and the hard reality that there really is no such thing as 'the future'..... There are only multiple, unforeseeable futures, which will never lose their capacity to take us by surprise”.

### 3.2.2 EXAMPLES OF DERIVATIVE AND MANAGERIAL DISASTERS

The practices of risk management have received much attention throughout the years as many firms have been ruined as a result of derivatives trading and the misuse of derivatives. A common characteristic of these disasters is that the people involved did not clearly understand the instruments or they acted in an immature way. Still, sometimes things go wrong even with smart investors. As Eiteman et al. (2004) states to the wise, “as is the case with so many issues in modern society, technology is not at fault, but, rather human error in its use”.

The financial crisis got out of control because authorities and regulators were not able to calculate the risks of new complex products and instead trusted the risk management methods of the banks themselves.<sup>12</sup> Accurate pricing of the risk associated with certain products was difficult and hence made the distribution of risk ineffective, according to D. H. McIlroy.<sup>13</sup>

Examples of companies that have suffered derivative and managerial disasters are provided by Eiteman et al. (2004). The list starts with the company Allied-Lyons (UK) that in 1991 lost £165 million related to speculation on currency options. Further, the German company Metallgesellschaft, suffered from an improper petroleum futures hedging strategy in 1993. The company ended up losing a huge amount which caused the collapse of the organization. The Long Term Capital Management of the organization was incapable of doing anything due to unexpected interest rate and currency movements. Despite the fact that the positions were hedged, the company ran into funding liquidity risk.

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<sup>11</sup> A. Lane (2008), “The Ascent of Money”.

<sup>12</sup> G. Soros, “Worst financial crisis in 60 years marks end of an era”, Financial Times, January 22, 2008.

<sup>13</sup> “Regulating risk: A measured response to the banking crisis”, Journal of Banking Regulation, Vol 9, 4, 284-292.

A couple of years later, Barings Brothers, the oldest investment bank in London, went bankrupt because of the risky deals of one trader. Responsible for the bank's trading operations, the now-legendary Nick Leeson, led the bank into losses of some £827 million on futures trading<sup>14</sup>. Because he was also in charge of the accurate accounting of the trades, the "rogue trader", misrepresented his situation and reported a profit instead of a loss to the management of the company.

One of many currency speculators who got it wrong was John Rusnak, a currency trader at the U.S. Baltimore branch of Allied Irish Bank. He failed to hedge currency futures contract positions against the potential fall of the Japanese Yen, which resulted in a loss of \$691 million. Taking a position for expected speculative profit, Rusnak tried to protect his speculation by purchasing currency option contracts that works like an insurance against the possibility that his expectations were wrong. The yen fell and Rusnak did not manage to cover. He did not report nor acknowledge his losses, and instead he falsified documents to make it look as if he had been covering the positions all the time.

There are many other cases of managerial and derivative failures that we can learn from. We believe the main message is that even though new and sophisticated techniques of dealing with risks are developed, mathematical innovations are only tools that must be used carefully<sup>15</sup>. The ability to know in which way and at what time these tools should be used is the start of being a wise investor. Intuitive skills are for sure highly respected, but must be backed up by numbers as much as possible.

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<sup>14</sup> J. Henley, "Show us the money", *The Guardian*, 19 September 2007.

<sup>15</sup> Financial Times Mastering Risk, Volume I.

### 3.3 INTERNATIONAL BUSINESS RISKS

In this section we will shortly describe some of the main risks for international businesses. It has to be noted that the way in which risks are categorized is not as important as the ability to understand, analyze and identify them. Engaging in international activities requires an awareness of what types of risks your business is exposed to. Despite that risk can be difficult to identify due to the uncertainty of the future, each company itself classify which risks to hold and which to transfer.

Rubinstein (1999), for instance, distinguishes between two types of risks, namely *core business risks* and *financial risks*. Core business risks arise from the operations of the firm of which the firm has expertise in. The second risk, the financial risk (includes foreign exchange, interest rates and equity price risks) are usually risks that firms do not have special expertise in dealing with, and therefore derivatives can be used to manage this type of risk.

#### 3.3.1 FINANCIAL RISK

Companies operating in the global market have to cope with a large number of transactions that involve financial risk. Business activities such as selling and purchasing goods, investment and loans are exposed to financial risks associated with volatility in interest rates, inflation rates, exchange rates, stock markets and commodity markets. Companies may experience defaults on loans, or increased costs, reduced revenues and lower profitability due to dramatic increases in financial prices.

According to Horcher (2005) there are three main sources of financial risk. The financial risks can arise from:

1. an organization's exposure to changes in market prices;
2. the actions of, and transactions with, other organizations;
3. from internal actions or failures of the organization.

#### 3.3.2 FOREIGN EXCHANGE RISK

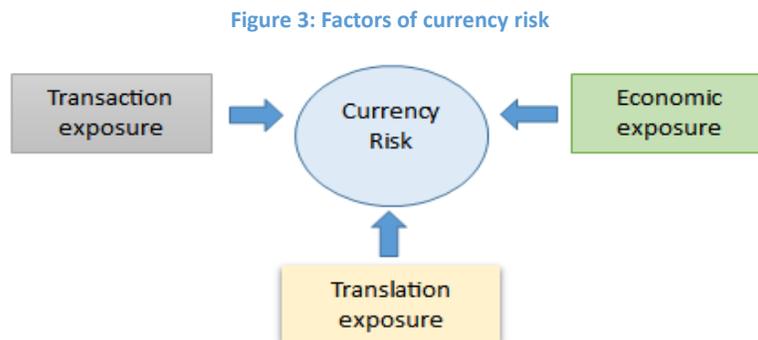
Foreign exchange risk, or currency risk, is a type of financial risk. It is the "consequence of an unexpected change in the exchange rate for the value of an investment or a loan measured in

basis currency or local currency". See Korsvold (2000). The basis currency is normally the domestic currency, but can be another currency for companies with a broad international shareholder structure.

Currency risk says something about the potential for profitability, net cash flow and market value. It is one of the main risks that an international company is exposed to and is feared because it can cause companies' profits to decrease if exchange rates move in wrong direction. On the other hand, it can increase profits if the exchange rates go in the right direction.

Hedging the foreign exchange risk is part of the management policy in most companies with activities abroad. Eiteman et al. (2004) explains when direct and indirect currency risk occurs. Direct currency risks affect the company's result of the present operational year, whereas the effects of indirect currency risk are shown on the result later. Direct currency risk occurs when companies export and import in foreign currency, obtain financial debts and assets in foreign currency and have foreign investments (or foreign subsidiaries that pay returns in foreign currency). Indirect currency risk occurs when companies work in domestic and international markets with domestic competitors who have costs that are exposed to foreign exchange rates, or with foreign competitors who have diverse capital cost structures. Indirect currency risk also occurs when companies' domestic prices are affected by currency fluctuations. See Eiteman et al. (2004).

As Figure 3, shows, currency risk arises through transaction exposure, economic exposure and translation exposure. We return to the factors of currency risk in Chapter 5.



### 3.3.3 COMMERCIAL RISK

Commercial risk is another type of financial risk because it affects a company's payments. The risk that counterparty will not fulfill contractual duty due to default, insolvency or bankruptcy, is a risk that many companies are exposed to. Nevertheless, there exist many managerial strategies to cope with this risk, for instances credit backup researching, export credit financing, insurance premiums and letters of credit. In the latter alternative a bank acquires the credit risk.

### 3.3.4 POLITICAL RISK

Another main risk to consider for multinational companies is political risk which can be classified on the following three levels<sup>16</sup>:

#### 1. Firm-specific (or micro risks)

Firm-specific risk has an effect at the project or corporate level. An example is governance risk, defined as "the ability to exercise effective control over a multinational company's operations within a country". A goal conflict between a multinational company and its host government can for instance impose constraints on the company's activities. Other examples of micro risks are business risk and foreign exchange risk. Firms that want to predict the micro risks should first analyze the macro risks of the respective country in which it wishes to operate in, and then relate it to the characteristics of the firm (Eiteman et al, 2004).

#### 2. Country-specific (or macro risks)

Country-specific risk is created on the country level but affects at project and corporate level. Analyses could be conducted on historical stability of the respective country as well as on indications of economic stability. The main risks of this type are transfer risk, for instance block funds that limit transfers of funds into and out of host countries without restrictions<sup>17</sup>, and cultural / institutional risk, for instance shared ownership requirements by the host governments. The latter risk also involves differences in human resources, norms and religion, corruption, protection of intellectual property rights, and protectionism.

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<sup>16</sup> Eiteman et. al (2004)

<sup>17</sup> A company with lack of foreign exchange faces troubles in finding additional funds through borrowing.

### 3. Global specific risk

Global specific risk is a risk on the global level that is often unexpected and more difficult to predict. Examples are terrorism and war, environmental concerns, anti-globalization, and poverty. The World Trade Center terror attacks on September 11, 2001, the Tsunami on December 2004 and Hurricane Katrina on August 2005 were unexpected events not easy to foresee. An illustrative example of a company that sees itself as a target for the anti-globalization movement is Starbucks<sup>18</sup>, another American cultural imperialist in countries everywhere.

#### 3.3.5 PRODUCT RISK

Product risk is related to the product nature and the conditions stated in the sales contract such as who is responsible for the operational quality, performance, service and maintenance of the products. Is it the exporter or the importer? What are the direct payments conditions correlating to the products? When does the exporter get paid? What happens when payments are delayed? These questions are important to answer to state insurance, and normally responsibility clauses in the contracts solve these uncertainties.

#### 3.3.6 OTHER RISK CATEGORIES

There are several other classifications of business risks. The Economist Intelligence Unit, for instance, divides risks into four broad categories:

1. "Hazard risk", related to natural hazards, accidents, fire, etc. that can be insured.
2. "Financial risk", related to changes in interest rates, inflation rates, exchange rates, stock markets and commodity markets.
3. "Operational risk", associated with systems, processes and people and deals with issues such as succession planning, human resources, information technology, control systems and compliance with regulations.
4. "Strategic risk", related to the inability to adjust to changes in the environment such as changes in customer priorities, competitive conditions and geopolitical developments.

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<sup>18</sup> Case taken from "Planet Starbucks (A)" by Professors Michael H. Moffett and Kannan Ramaswamy (2003), Thunderbird Case Series

### 3.4 FACTORS OF CURRENCY RISK

How does a company or an individual know if they are exposed to currency risk? The answer is very simple; all companies and individuals are exposed to currency risk as long as we live in an open community. Instead, we should ask ourselves which degree of exposure we face. As we have already shortly mentioned, foreign exchange risk arises from three types of exposures, namely transaction exposure, translation exposure and economic exposure. If the company is exposed to at least one of these, it means that it is exposed to foreign exchange risk.

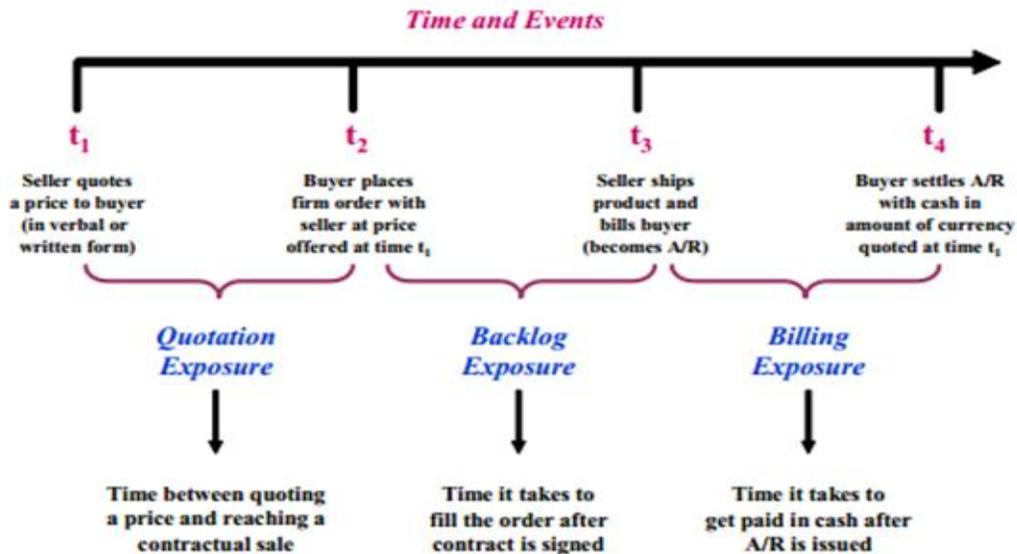
#### 3.4.1 TRANSACTION EXPOSURE

In order to measure the degree of transaction exposure we need to consider the value of all outstanding financial commitments that have been incurred before a certain movement in the exchange rate but with the intention to be settled after the movement in the exchange rate. Due to existing contractual obligations it impacts an organization's profitability through the income statement, and the result of the impact is changes in the cash flows. Any gain or loss from transaction exposure may increase or reduce taxable income in the year in which they involve cash flows, i.e. are realized (Eiteman et al., 2004).

Transaction risk arises from ordinary business transactions. The most common example of transaction exposure is when companies have payables to suppliers and receivables from customers in a foreign currency. It also arises through borrowing and lending funds where repayments have to be made in foreign currency. If a company is a party to an unperformed foreign exchange forward contract, or if it has acquired assets or liabilities denominated in other currencies than the domestic currency, then the company also faces transaction exposure.

Figure 4 shows the life span of a transaction exposure. As soon as the seller has quoted a price to the buyer, either in verbal or written form, transaction exposure is created and lasts until the seller gets paid.

Figure 4: Life span of transaction exposure



Source: Eiteman et al. (2004)

How can a company best manage transaction exposure? There are many alternatives such as hedging with forwards-, futures-, options- and money market. Also operating and financial hedging techniques that off-set debt obligations can reduce the transaction risk, such as a loan or a derivative contract like interest rate swaps (Eiteman et al., 2004)

### 3.4.2 ECONOMIC EXPOSURE/ OPERATING EXPOSURE

While transaction exposure involves real cash flows, economic exposure, also called operating exposure, changes the present value of a firm. The economic value is equivalent to the discounted value of future cash flows. Economic exposure is concerned with what is *expected* to happen if an unexpected change in the currency should occur. (Korsvold, 2000). We can expect that a firm's future sales volume, prices and costs will be affected by changes in exchange rates. It will not only alter the domestic currency value but it will also alter the quantity of foreign currency cash flows, reflecting altered global competitiveness.

For a listed company, we can measure the economic exposure degree for a foreign investment (an asset) directly if it is traded in a domestic market. The degree of economic currency exposure equals the change in the investment's expected value in domestic currency, given an unexpected change in the exchange rate. However, most of the commercial foreign investments are not traded on the market. In the case of export orders we usually have to estimate an investment's exposure degree directly by considering the cash flows of the investment.<sup>19</sup>

Contractual transactions such as export contracts have an exposure degree of 100 %. This means that the transaction's value changes as much as the percentage unexpected change in the currency rate. For example a 10 % increase in the exchange rate implies a 10 % increase in the value of the export contract in domestic currency. Also financial risk-free investments and fixed-interest rate loan in foreign currency involve cash flows that are 100 % exposed. However, the exposure of financial investments is equal to zero as long as uncovered interest rate parity holds<sup>20</sup>. Therefore, it is important to consider potential deviations from uncovered interest rate parity when measuring foreign financial investments' exposure (Korsvold, 2000).

Dealing with economic exposure also involves forecasting and estimating future exposures of all competitors worldwide. The degree of the firm's competitiveness in various markets and its competitors' major operating exposures decides any change in the future cash flows.

A firm can manage operating exposure by diversifying operations and diversifying financing. It can for example diversify sales, location of production facilities, and raw material to reduce the risk of operations. Another way is to raise funds in more than one capital market and in more than one currency, so that some of the financial risk disappears.

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<sup>19</sup> A foreign investment's economic value equals the present value of the future expected cash flows that the investment generates.

<sup>20</sup> What you lose on the low foreign nominal interest rate, you win on the gains from the exchange rate, and vice versa. The return of foreign investment will be identical to equivalent domestic investments. (Korsvold, 2000)

### 3.4.3 TRANSLATION EXPOSURE

Translation exposure, also called accounting exposure, uses real or realized rate changes and measures what has *happened*. Accounting values often differ from economic value because accounting exposure does not show the economic consequences of exchange rate fluctuations for a company.

Accounting exposure describes the changes in a company's accounting value and affects an organization by affecting the value of foreign currency balance sheet items. Horcher (2005). The exposure occurs because assets and liabilities in foreign currency are included in the balance sheet. When a company has foreign subsidiaries, their respective financial statements need to be translated into the parent's reporting currency in order to make consolidated financial statements. This process can lead to a decrease or increase in the mother company's net worth and reported net income when exchange rates change.

One method to manage translation exposure is called the "balance sheet hedge". This method requires an equal amount of foreign currency assets and liabilities exposures on a company's consolidated balance sheet. However, the technique can be costly since it depends on relative borrowing costs, and also in terms of interest expense and operating efficiency.

The problem regarding accounting exposure is whether to use historical rates (the rate at the time the single asset was acquired), spot rates (the rate at the moment the exposure is calculated), or a combination of these. There are different methods to manage this risk and to decide whether to use historical or current rates. Short-term / Not short-term methods are valuing short-term assets and liabilities by using current rate, while long-term assets and liabilities are valued using historical rates. Financial / Non-financial methods are valuing all financial assets and liabilities with current rate and other assets with historical rates. Finally, the current rate method uses the current rate for all posts in the balance sheet and the financial statement. The temporal method is similar to the financial / non- financial methods.<sup>21</sup>

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<sup>21</sup> Korsvold (2000).

#### 3.4.4 SUMMARY

If we compare gains and losses from translation exposure with gains and losses from operating exposure it is obvious that they can present different views of the same situation. Sometimes they may even lead to opposite conclusions, for instance whether to do business in a country or not. A company should avoid trying to offset both translation and transaction exposure at the same time, because reducing one of them normally leads to a change in the amount of the other. One way to see it is that it can be more beneficial to first focus on reducing economic exposure instead of first focusing on reducing translation exposure, since economic exposure concerns the long-run strength of the company.

On the other hand, taxes may affect the decision between transaction and translation risk. The reason is that translation exposure is not deductible or taxable since losses or gains are only changes in owner's equity, while losses from transaction exposure are realized losses and hence deductible from taxable income. Some companies therefore views transaction exposure as more important than translation, and choose to reduce transaction exposure first, if forced to make a decision. We must here stress the importance that managers decide which exposure is the greatest or of greatest significance before they choose the one to manage first.

## 3.5 MARKET INFRASTRUCTURE

Following is a description of essential features of financial markets such as exchanges and over-the-counter markets. Further we examine the foreign exchange market, the financial market where exchange rates are determined. Primary markets refer to markets where new issues of a security are sold to initial buyers by the corporation or government agency borrowing the funds, while secondary markets refers to financial markets in which securities that have been previously issued can be resold. Mishkin (2013).

### 3.5.1 EXCHANGES AND OVER-THE-COUNTER MARKETS

Secondary markets are organized as exchanges and over-the-counter market. Exchanges such as The New York Stock Exchange and Chicago Board of Trade are the locations where buyers and sellers (or their broker) of securities meet to trade. For speculators and individuals who usually do not have access to the over the counter market, exchange-traded contracts are appealing.

According to EMIR (the European Market Infrastructure Regulation)<sup>22</sup>, OTC derivatives can be defined as all derivatives contracts which are not executed on a regulated market. This means that all derivatives contracts are OTC derivative contracts if they are executed on a market that is not regulated. In over-the-counter markets dealers buy and sell derivative contracts that are privately negotiated between two counterparts (for example a bank and a manufacturer). The market offers possibilities to trade a variety of product types and OTC derivatives that differ with respect to characteristics, standardization levels, and in ways that they are used.

The market infrastructure in the OTC market consists of central counterparties (CCP) and trade repositories. A CCP is “an entity that interposes itself between the two counterparties to a transaction, becoming the buyer to every seller and the seller to every buyer”. Its goal is to handle the counterparty risk, i.e. the risk that one of the parties is not able to pay. Currently, there is no CCP clearing FX OTC derivatives and no trade repository to which the contracts are reported, but it will soon come.<sup>23</sup>

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<sup>22</sup> Europa.eu (2013), “Regulation on Over-the-Counter Derivatives and Market infrastructures – Frequently Asked Questions”, [http://europa.eu/rapid/press-release\\_MEMO-12-232\\_en.htm](http://europa.eu/rapid/press-release_MEMO-12-232_en.htm)

<sup>23</sup> Europa.eu (2013)

Counterparty risk has been one of the determining factors of choosing exchange-traded rather than over-the-counter derivatives. Most exchanges are the counterparties to all transactions and may require a small fee from all traders in order to protect all parties (uses the fee to pay insurance funds that protect all parties). Eiteman et al. (2004) claim that OTC products, however, make the firm directly exposed to credit because the contract is usually between the buying firm and the selling financial institution.

Since OTC derivatives contracts are not executed on regulated markets they are not subject to reporting rules. Information about the prices, time period of trading, the underlying assets and amounts of trading is not available for the public. Hence it provides little reliable information about the contracts and gives market participants an unclear view of the market. In order to increase transparency and reduce counterparty credit risk in the OTC market, the European Commission has recently proposed new rules saying that all OTC derivatives contracts should be cleared through a CCP and reported to trade repositories. The agreement suggests that “all standard OTC derivative contracts should be traded on exchanges or electronic trading platforms [...]”.<sup>24</sup>

The Triennial Central Bank Survey<sup>25</sup>, a source providing information of the market activity and exposures in the global financial system, reports that the largest majority of trading foreign exchange products is conducted over the counter, and that the OTC turnover to a large degree exceeds the trading volume of standardized FX products on organized exchanges.

### 3.6 THE FOREIGN EXCHANGE MARKET

The foreign exchange market is also called the FX, forex or the currency market. It is organized as an over-the-counter market and is the place where actors trade currencies and bank deposits denominated in certain currencies. FX trading occurs around the world with trading opportunities 24 hours a day<sup>26</sup> and markets moving constantly.

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<sup>24</sup> Europa.eu (2013)

<sup>25</sup> Triennial Central Bank Survey, “Foreign exchange turnover in April 2013: preliminary global results”, *Bank for International Settlements*, September 2013.

<sup>26</sup> Cmcmarkets.co.uk

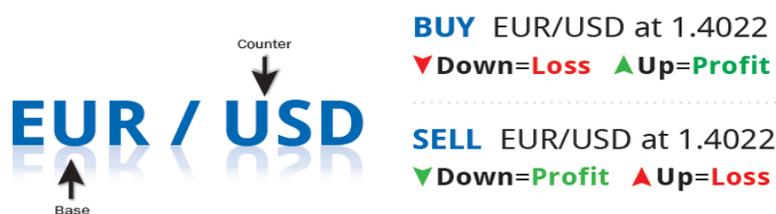
The FX market is considered to be the largest financial market in the world. According to the Triennial Survey activity in the market increased from \$4 trillion per day in 2010 to \$5.3 trillion in 2013. This growth in global FX turnover is a constant trend of strong turnover growth. It outpaced the 19 % rise from 2007 to 2010, but is defeated by the record growth of 72 % increase between 2004 and 2007<sup>27</sup>.

Many hundred dealers (mostly banks) sell and buy deposits denominated in foreign currencies (i.e. buys a foreign currency) on the foreign exchange market. FX trading refers to the simultaneous buying of one currency and selling of another. Traders on one side believe that the value of a currency will rise in the future (they are “bullish”) whereas traders on the other side believe that the value of a currency will fall in the future (they are “bearish”).

Currencies are quoted in pairs, comparing one currency to another, for example EUR/USD. The first currency is referred to as the base and the second as the quote. It says how much one unit of the base currency is worth in the quote currency. Figure 5 shows that one euro is exchanged for 1.4022 U.S. dollar.

Suppose that you are bearish of euro. Then you could sell EUR/USD, i.e. you sell euros and buy dollars. If you are more bullish on CHF than USD, you can sell the EUR/CHF instead. We can say that down is good if you sell a pair and up is good if you buy a pair. If you sell EUR/USD and the exchange rate falls, then euro is getting weaker and you get a profit.

Figure 5: Quotation of currency pairs



Source: fxcm- guide to forex trading

<sup>27</sup> Triennial Central Bank Survey 2013

The fact that many participants are trading at all times makes the forex market the most liquid market of all financial markets. It is easy to get in and out of trades at any time, even in large sizes. Because of this deep liquidity you can trade with considerable leverage (up to 200:1) and take advantage of very small movements in the market. However, leverage can significantly increase your losses as well as your gains.

### 3.6.1 THE DESIGN OF THE FOREIGN EXCHANGE MARKET

According to Levinson (2005) the foreign exchange market can be divided into four markets; the spot market, the futures market, the options market and the derivatives market.

#### **1. The spot market**

A spot-market transaction involves an immediate delivery of a currency. A tourist's purchase of foreign currency or a company converting receipts from an export sale into its domestic currency is a typical example of spot transaction. Dealers are in constant contact through telephone and electronic broking services because these services are important for the arrangement of large spot transactions among financial institutions, currency dealers and large firms. Face-to-face transactions, on the other hand, typically involve small spot transactions.

The Triennial Survey reports that trading in the spot market grew by 38% to \$2 trillion per day in April 2013. This contributed to a 40 % rise in global FX market activity between 2010 and 2013.

#### **2. The futures market**

The participants in the futures market can buy or sell a futures contract that allows him or her to lock in the exchange rate at certain future dates. For example, a Swiss company expecting to receive 10 million dollars can purchase American dollar futures on the Chicago Mercantile Exchange, so to guarantee that the received dollars can be converted into Swiss francs at an agreed rate. In this way the company will be protected from the risk that the dollar might lose value against the Swiss franc before the payment is settled.

### **3. The options market**

Currency options were for the first time traded on exchanges in 1982, but a relatively small amount of currency trading is happening in option markets. An option gives the owner the right, but not the obligation, to buy or sell foreign currency at a specified price at certain future dates. The majority of options that are traded on the foreign exchange market are conducted over the counter, with only a marginal share conducted on exchanges. (Find more information about options in Chapter 7.3).

In 2010 options were traded for 207 billion USD, only 5 % of total currency turnover, whereas the trading volumes of FX options increased the most in April 2013, by more than 60 %. However, options only account for a small share of the total trading volume of foreign currencies.<sup>28</sup> (See Figure 6).

### **4. The derivatives market**

Today most FX trading takes place in the derivatives market. Technically “derivatives” describes a large number of instruments, including options and futures, but the derivatives market generally refers to instruments that are not traded on organized exchanges. Among these instruments are forward contracts and foreign-exchange swaps, which we will discuss deeply in Chapter 7.

A forward contract is largely the same as a future contract, except that a forward contract is included directly between the two parties involved (often between customer and bank). This implies a larger degree of tailor-made contract and the possibility to adjust quantity and maturity according to the customer’s need. Trading activity increased strongly in the forward parts of the FX OTC derivatives market accounting for a 43 % growth in trading volume, from \$475 billion in 2010 to \$680 billion in 2013<sup>29</sup>.

Foreign-exchange swaps involve an exchange of a given amount of one currency against another currency, and a return swap at a later time for an agreed exchange rate. The Triennial

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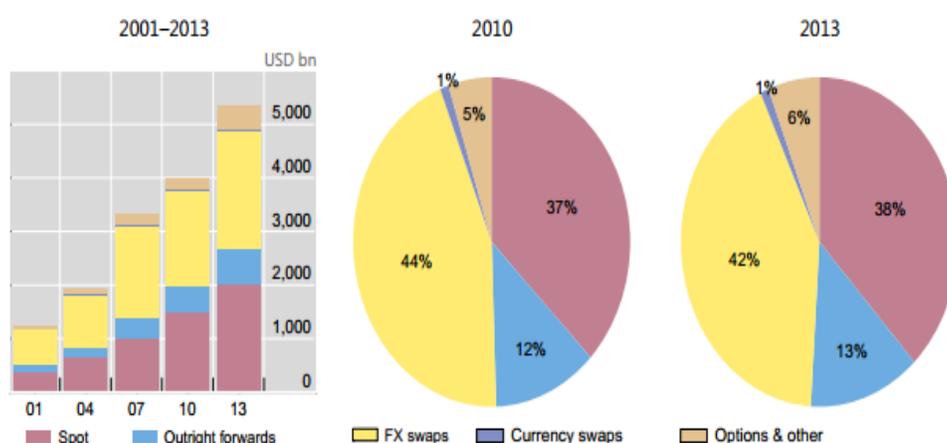
<sup>28</sup> BIS Triennial Bankin Survey

<sup>29</sup> BIS Triennial Banking Survey

Survey can report that FX swaps continued to be the most actively traded FX instrument in 2013.<sup>30</sup> It grew with a rate of 27 % but did not keep up with the growth of the overall market. A daily volume of \$2.2 trillion constitutes 42 % of all related transactions on FX. Trading volume of currency swaps grew with almost the same rate, but with a turnover of \$54 billion per day and a smaller share of the overall market.

**Figure 6: Foreign exchange market turnover by instrument**

Net-net basis, daily averages in April



**Table 1: Global foreign exchange market turnover**

Net-net basis, daily averages in April 2013, in billions of dollars

Instrument	1998	2001	2004	2007	2010	2013
Foreign exchange instruments	1,527	1,239	1,934	3,324	3,971	5,345
Spot transactions	568	386	631	1,005	1,488	2,046
Outright forwards	128	130	209	362	475	680
Foreign exchange swaps	734	656	954	1,714	1,759	2,228
Currency swaps	10	7	21	31	43	54
Options and other products <sup>2</sup>	87	60	119	212	207	337
<i>Memo:</i>						
Turnover at April 2013 exchange rates <sup>3</sup>	1,718	1,500	2,036	3,376	3,969	5,345
Exchange-traded derivatives <sup>4</sup>	11	12	26	80	155	160

<sup>30</sup> FX swaps are heavily used by banks to raise liquidity across money markets denominated in different currencies

### 3.6.2 ACTORS IN THE FOREIGN EXCHANGE MARKET

Only a small part of the world's total volume of currency trading takes place on exchanges between dealers. The biggest part of the turnover takes part outside exchanges using telecommunications. Dealers are seen as specialists who link buyers and sellers by purchasing or selling currency for customers. They are mostly banks that are actively involved in large volumes of foreign exchange trading and usually handle the most traded currencies. Market makers, on the other hand, purchase and sell for their own account.

The actors in the currency markets can be categorized according to its function or the type of transaction they manage. Levison (2005) divides the actors in following four major groups; exporters and importers, investors, speculators, and authorities.

#### **1. Exporters and importers**

Exporters and importers is a group of actors that have receivables or payables in foreign currency and use currency dealers to handle their currency transactions. Firms that export their goods to different countries may receive payments from customers in foreign currencies, while the cost of suppliers and workers sometimes must be made in local currency. The exporting firms therefore depend on converting the foreign currency earnings into domestic currency. The opposite applies to importers, who typically have to pay in foreign currency. Even if the historical purpose of currency trading was to support international trade, this has eventually changed in modern times.

#### **2. Investors**

Thanks to globalization and an increase in capital movement, investors today have an ocean of international investment opportunities. They can easily invest abroad (in facilities, properties or companies) and exchange currencies without major transaction costs. Financial investors and borrowers in foreign currency also use currency dealers to conduct their currency transactions. An investor needs foreign currency to make a purchase, and then to convert the earnings from the foreign investment into its home currency. There are notable gains in holding an international investment portfolio due to international diversification effects. This has been

supported by an increasing popularity to purchase bonds, shares or other securities denominated in foreign currency. If a company is exposed to many currencies, the diversification effect reduces risk without necessarily reduce expected value.<sup>31</sup>

### **3. Speculators**

“Speculation is an attempt to profit by trading on expectations about prices in the future”. (Eiteman et al.,2004). Speculators typically buy a currency they believe will rise in value, or sell a currency that has to be delivered at a future date without yet owning the asset, expecting that the price of the asset will fall before they have to buy the asset in the market and deliver it to the buyer.

Earlier the speculators took the role as arbitrators. An arbitrator purchases and sells a good in order to exploit the inconsistencies between prices in two markets. If there are no limits to short selling, an investor with access to both markets can buy the good in the market where it is cheaper and sell it in the market where it is expensive (Hull, 1997). For example, if the price of a stock in New York is \$172 and the price of the same stock in London is £100, an exchange rate of \$1.7500 per pound will give the opportunity for an arbitrator to buy, say, 100 shares in New York and sell them in London, receiving a risk-free profit of  $100 \times (\$1.75 \times 100 - \$172)$ , assuming no transaction costs. However, this arbitration opportunity cannot last long because profit hungry arbitrageurs will cause the dollar price to rise and make the two prices equivalent at the current exchange rate.

With today’s technology, arbitration is more difficult. In practice, only dealers with direct telecommunication to other currency markets can make arbitrage because such business quickly changes the exchange rates such that profitability no longer is possible. Modern telecommunication has made national currency markets more integrated, and so the exchange rates between two currencies do not differ from each other from country to country.

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<sup>31</sup> Korsvold (2000)

Although the biggest speculators are leading banks and investment banks, speculation today is less prevalent. However, the emergence of hedge funds and other investment funds through the 2000s have increased the speculators' share of the total currency trading. Indeed, a company that does not hedge an exposed currency position completely, is in reality speculating on a future rate change (Korsvold, 2000).

#### **4. Authorities**

The last group of actors is the authorities in the foreign countries, usually represented by their respective central banks. The authorities have the power to intervene in order to support the local currency, depending on how governments have decided to deal with foreign exchange activities. They can do so either by support purchasing or support selling their own currencies and their only purpose is to affect the exchange rates.

As an illustrative example of the government's role is Switzerland's central bank (SNB) that set a cap, i.e. a minimum exchange rate, on the Swiss franc in September 2011.<sup>32</sup> The value of the Swiss franc was reaching high levels as international investors were looking for a safe place to invest. The high demand for francs led to a strong appreciation of the currency, resulting in lower competitiveness of Swiss exporters. In the end the central bank had to put a ceiling price on the Swiss franc against the euro, a ceiling that is kept at 1.20 per euro. With this the SNB sent out a powerful message to the market: the Swiss franc is not a safe place.

The Swiss central bank's policy is to defend the ceiling with unlimited currency interventions, selling its own currency each time the Swiss franc crosses the ceiling price. The bank claims that keeping the ceiling on the franc remains essential to protect the economy even as dangers to the economy from Europe's debt crisis recede.<sup>33</sup>

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<sup>32</sup> C. Bosley, "SNB Says Franc Ceiling 'Essential' to Protect Economy", *Bloomberg*, 19 September 2013

<sup>33</sup> C. Bosley, "SNB Says Franc Ceiling 'Essential' to Protect Economy", *Bloomberg*, 19 September 2013

## 3.7 EXTERNAL HEDGING INSTRUMENTS

In the same way as there are different factors of currency risk, there are different instruments and strategies to manage them. External methods are the use of financial derivatives whose value is derived from the underlying asset. These instruments are used for hedging purposes and protect against outcomes that can disrupt a firm's cash flow. We will in this chapter focus on the instruments currency forwards, currency futures, currency options, currency swaps and contracts for difference (CFDs).

### 3.7.1 CURRENCY FORWARDS

Forward contracts are frequently used by corporations that deal with foreign exchange. As mentioned before, they are not traded on organized exchanges, but traded directly between the two parties involved (often customer and bank), practically for whatever amount. Hull (1997) defines a forward as "an agreement to sell or buy an asset at a certain future time for a certain price". In other words, a currency forward is an obligation to sell or buy a currency at maturity.

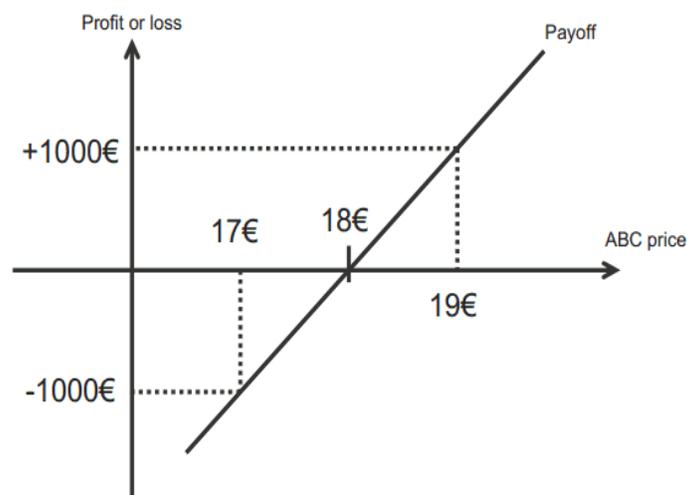
There is no cash transaction at the time of entering a contract because the forward price and delivery price are equal. The delivery price is chosen such that the value of the forward contract is zero, independently of whether you hold a short or long position in the contract. The party that takes a long position buys the currency on a certain specified future date for a certain exchange rate, while the party that takes a short position sells the currency for the specified exchange rate.

With time only the forward price is liable to change and may vary with the maturity considered. The forward price can therefore be different for a three months contract and a six months contract. A forward contract is settled at maturity, and the value of a contract is given by the current spot rate. After the contract is entered into, it can have a negative or positive value. If the foreign exchange rate increases, it will give a positive value of holding a long position and a negative value of holding a short position.

The payoff of holding a long position on one unit of currency is given by the difference between the spot rate and the forward rate at maturity of the contract, whereas the payoff of holding a short position is given by the difference between the forward rate and the spot rate at maturity.

Figure 7 plots the profits and losses of holding a position on an ABC stock. Let us assume that you are buying 10,000 shares. Profits and losses are straight proportional to the movement of the price.

**Figure 7: Profit and loss from forward contracts**



An advantage of forward contracts is that they are more tailor-made to the customer's need. They offer the possibility to adjust the quantity of currency and the maturity and because of this, many firms prefer to use forwards to futures when reducing their currency exposure.

### 3.7.2 FOREIGN CURRENCY FUTURES

A currency futures contract is an agreement between two parties to buy or sell currency at some date in the future, for a specific price. Futures are given of a maturity at which they are closed, regulated and retired from negotiation. In most cases there is only a cash settlement, but in the case of physical goods there may be a physical delivery of the underlying where the writer has the obligation to sell the good to the buyer (Hull, 1997).

Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME) trade futures contracts with a wide range of commodities (sugar, wool, copper, aluminum, gold etc.) and financial assets (stock indices, currencies, Treasury bills, and Treasury bonds) as the underlying assets. Futures are normally traded on an exchange that specifies standardized features of the contract. (See Appendix 1 for specifics of futures). The role of the exchanges is to organize trade in a way that minimizes contract defaults. Specification of the agreement between two parties must be done with respect to the asset, contract size, delivery arrangements, price quotes, daily price movement limits and position limits. See Hull (1997).

Prices of futures are determined in the same way as other prices. If there are more investors who want to go long (buy the asset) than to go short (sell the asset), the price goes up. In the reverse case the price goes down. The price needs to account for the gap between the interest rates of the two countries involved, so that the future price is equal to the following<sup>34</sup>:

$$\text{Fut} = S \cdot \exp[(R_i - R_f) \cdot t]$$

where  $i$  = internal interest rate,  $f$  = foreign interest rate,  $\exp$  = exponential function,  $S$  = spot price, and  $t$  = residual life on an annual basis (days to maturity divided by 365).

Suppose that the spot exchange rate between dollar and euro is 1.3034, the interest rate in the US market is 0.15 % and the interest rate in the Italian market is 0.5 %. If there are 30 days left to maturity, the futures price is:

$$\text{Fut} = 1.3034 \cdot \exp\left[(0.5 \% - 0.15 \%) \cdot \frac{30}{365}\right] = 1.303775.$$

The buyer of futures must pay an initial margin at the time of entering the contract. The high intrinsic leverage characterizing futures makes them attractive for speculators, and basically means that the capital needed to open a position is much lower than the value of the position. Initial margin is a measure of statistical risk of a position from the moment it is opened till the next day, and is called the leverage insolvency risk. This risk must be managed every day of the contract life by the “marking to market” procedure.

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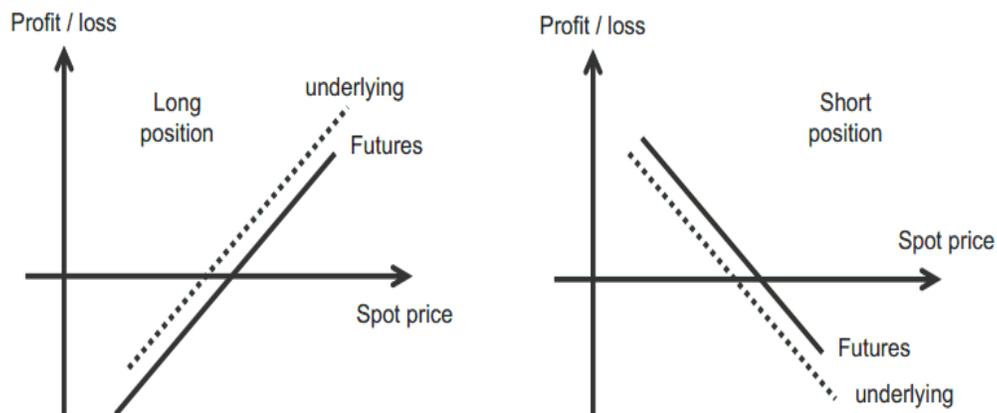
<sup>34</sup> Hull (1997)

Variation margins are the daily crediting and debiting of gains and losses due to fluctuations in exchange rates. This is done by the “marking to market” procedure. As the market closes every day nominal profits are immediately credited and losses paid. The exchange makes all debiting and crediting and guarantees settlement at a so called clearing central. A clearing house then asks banks to calculate net positions of their clients and collect losses. The intermediaries pick up money from the accounts of investors with losing positions and send it to the clearing house, which then sends it to banks whose clients have profiting positions. Finally, the bank credits the money on the accounts of those with gaining positions. Clearing houses act as counter-party in all trades, ensuring that the other party gets paid. There is therefore no credit risk linked to a futures contract, except from a risk that the clearing central goes bankrupt.

The writer of a futures sells the currency at settlement price. If the price drops, the writer sells the currency at a lower price but has collected the gap between the two prices in terms of variation margins. If the price raises, the writer sells the good at a higher price, but has lost the gap in terms of variations of margins.

The payoff of holding a short or a long position on futures is shown in Figure 8.

**Figure 8: Profits and losses from long and short positions on futures**



Unlike forwards, futures involve a notional principal (initial margin) that we have to include when calculating the values of futures contract at maturity for long and short position:

- Value of a short position at maturity =  $-\text{notional principal} \cdot (\text{spot} - \text{futures})$
- Value of a long position at maturity =  $\text{notional principal} \cdot (\text{spot} - \text{futures})$

To see how futures work in practice, we can compare the payoff of buying a stock and the payoff of buying futures written on that stock. We will find that the difference is the initial margin and insolvency risk. Say, you buy 1.000 shares of the ABC stock for €10 per share. Then you have to pay €10.000 immediately and are fully covering maximum potential risk.

On the other hand, if you buy futures written on 1.000 ABC shares, you have to pay 10 % of the position value in initial margin, i.e. €1000. This means that you have covered risk only up to 10 % and so both buyer and seller are exposed to insolvency risk. The remaining 90 % can be invested in risk-free assets and increase the global result on the whole capital no matter what happens.

Now, suppose timeline of the investment is one year and the interest rate on bonds with one year maturity is 5 %. At the end of the year the price of the stock is €11. We continue comparing the two investments in the following way:

1. Buying 1.000 shares involved investing €10.000. This restitutes to €11.000 at the end of the year, and gives a profit of 10 %.
2. a) Assume the futures price is equal to the spot price. Buying futures involved depositing €1.000 in terms of margins. When price increases to €11, you have a 100 % profit of the money you allocated. Having spent only 10 % of the available money, you can use 90 % on bonds with 5 % interest. The global return is the weighted average of the two returns:  
 $(100 \% \cdot 0.1 + 5 \% \cdot 0.9) = 14.5 \%$
- b) Suppose the stock loses 10 %. Then the futures has a 100 % loss, but the gain on bonds is still achieved. The global return is therefore:  
 $(-100 \% \cdot 0.1 + 5 \% \cdot 0.9) = -5.5 \%$

In conclusion, the leverage allows the investor to gain more or to lose less no matter the direction of the price. Since futures implies an obligation to be assigned to the underlying, companies can also hedge with futures for the simple reason that they will be sure to receive a certain amount of a good with a certain quality at a specified time.

To sum up, forward contracts are tailor-made while futures contracts are standardized. Futures usually makes out the cheapest insurance than the forward contracts in the same way as a standard suit is cheaper than a tailored-made suit. However, it is not always the case that suits fit completely because they are standardized with respect to size and quality.

### 3.7.3 CURRENCY OPTIONS

We say that “a *foreign currency option* is a contract giving the option purchaser (the buyer) the right, but not the obligation, to buy or sell a given amount of foreign exchange at a fixed price per unit for a specified time period (until the maturity date).” See Eiteman et al. (2004).

There are two basic types of options; call options and put options. The holder (buyer) of a call option has *the right*, but not the obligation, to buy the currency for a specified price at a certain date. The holder of a put option has *the right*, but not the obligation, to sell the currency for a specified price at a certain date. (Hull, 1997).

The buyer of the option can choose whether to use the option, and he or she faces a maximum loss equal to the price paid for the option. On the contrary, the writer (seller) of the option does not have this right and is completely dependent on what the buyer chooses to do. The seller collects the price and agrees to maximal potential profits and obligations.

Currency options are characterized by three different prices<sup>35</sup>:

1. The exercise or strike price (the exchange rate at which the buyer of the option can purchase or sell the foreign currency);
2. The premium or option price (the price or value of the option itself);
3. The spot price in the market (the spot rate of the currency).

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<sup>35</sup> Eiteman et al. (2004)

Depending on the relative position of the strike price and the spot price, we can classify options into three categories. For call options, “in the money” means that the goal has been reached, i.e. spot price is higher than strike price. “At the money” refers to the situation when spot price and strike price is more or less equal, whereas “out of the money” means that spot price is lower than strike price. Naturally, the opposite is true for put options.

Options are a type of insurance in the sense that you have to pay a premium in advance. The premium is quoted in points or euros and the premium of a share (or a point) multiplied by the contract size gives the total cost of the option. It is affected by the spot price, exercise price, volatility, time to maturity and risk free interest rates.

Let us provide some examples. If spot price grows, call price increases and put price decreases. If exercise price grows, call price decreases and the put price increases. The higher the volatility, the higher is the probability for options to be “in the money” and hence the higher is the value of the option. Therefore prices are higher both for put and call options. The closer you get to maturity, the lower is the probability that the option will be “in the money”, hence the lower the value. When interest rate increases, the demand for leveraged products such as a call option increase and so the price increases. The demand for put options decreases and so does the price.

Similar to futures, options are characterized by a huge intrinsic leverage. We can see this by comparing a purchase on a stock with a purchase of an option on that stock. You buy 1.000 shares of a stock quoting €23 and the price grows up to €23.3. You have a gross profit of €300. Since you spent €23.000, the gross profit is 1.3 %.

If instead the contract size of options is 1.000 shares and the price of a call expiring within six months is €1.15 a share, it grows up to €1.30 as the spot prices grows from €23€ to €23.3. You have a profit of €150, and since only €1.150 is spent, the gross profit is 13 %. With the same money spent on 1.000 shares, you could buy 20 call options and get a profit of €3000.

## 1. Call Options

When you buy a call option, you buy the right to buy something and exercise this right only if it is convenient for you. Should the currency increase its value at any time before maturity, the buyer of the option could decide to exercise the right he or she bought. Call options at maturity gives the *buyer* following cash flow:

$$\text{Cash flow} = \max[(S_t - X_c - P_c), -P_c]$$

where  $P_c$  is the premium of the call option,  $S_t$  is the spot rate at maturity,  $X_c$  is the exercise price/rate, and  $S_t - X_c$  is the gain. Hence, the call option will only be exercised if the spot rate is higher than the exercise rate, otherwise the buyer will make a loss bigger than the premium.

A call option at maturity gives the *seller* following cash flow:

$$\text{Cash flow} = \max[(X_c - S_t + P_c), P_c].$$

As an illustrative example, suppose that a company has purchased an August call option on Swiss francs with strike price \$0.585/SF and a premium of \$0.005/SF. If the spot rate is higher than the exercise rate, the company exercises the option. It does not exercise the option if the opposite is the case, i.e. if the spot rate is lower than the exercise rate.

The profit when the spot rate was, say, \$0.595/SF at maturity, is:

$$\begin{aligned}\text{Profit} &= \text{spot rate} - (\text{strike price} + \text{premium}) \\ &= \$0.595/\text{SF} - (\$0.585/\text{SF} + \$0.005/\text{SF}) \\ &= \$0.005/\text{SF}\end{aligned}$$

In other words, if the company sells the Swiss francs immediately in the spot market for \$0.595/SF, it receives a gross profit of \$0.010/SF or a net profit of \$0.005/SF.

See Appendix 2 for specifics of options.

Figure 9 plots the areas of limited loss and unlimited profit from buying a call option on Swiss francs, followed by Table 1 that shows the quotations of Swiss franc options.

Figure 9: Buying a call option on Swiss francs

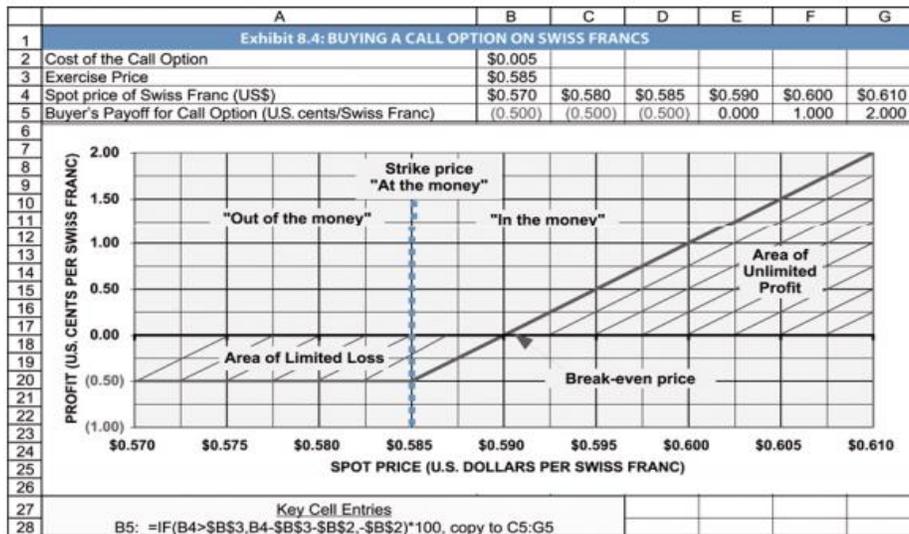


Table 2: Swiss franc option quotations (U.S. cents/SF)

Option and Underlying	Strike Price	Calls—Last			Puts—Last		
		Aug	Sep	Dec	Aug	Sept	Dec
58.51	56	-	-	2.76	0.04	0.22	1.16
58.51	56.5	-	-	-	0.06	0.30	-
58.51	57	1.13	-	1.74	0.10	0.38	1.27
58.51	57.5	0.75	-	-	0.17	0.55	-
58.51	58	0.71	1.05	1.28	0.27	0.89	1.81
58.51	58.5	0.50	-	-	0.50	0.99	-
58.51	59	0.30	0.66	1.21	0.90	1.36	-
58.51	59.5	0.15	0.40	-	2.32	-	-
58.51	60	-	0.31	-	2.32	2.62	3.30

Each option = 62,500 Swiss francs. The August, September, and December listings are the option maturities or expiration dates.

Note that, an “August 58.5 call option” are characterized by the spot rate (58.51 cents- spot dollar price of francs on the day of contract commitment), the exercise price (or strike price of \$0.5850/SF) and the premium (0.50 cents per franc or \$0.0050/SF).

## 2. Put options

Put options can be considered as an insurance contract to protect a position on shares from the risk of a price drop in the future. A buyer of a put option will face following cash flow at maturity:

$$\text{Cash flow} = \min[(X_p - S_t - P_p), -P_p]$$

where  $X_p$  is the exercise price/rate,  $S_t$  is the spot rate at maturity,  $P_p$  is the premium of the put option and  $(X_p - S_t)$  measures the gain for the purchaser of the option. The lower the spot rate at maturity, the higher is the gain of the put option for the buyer.

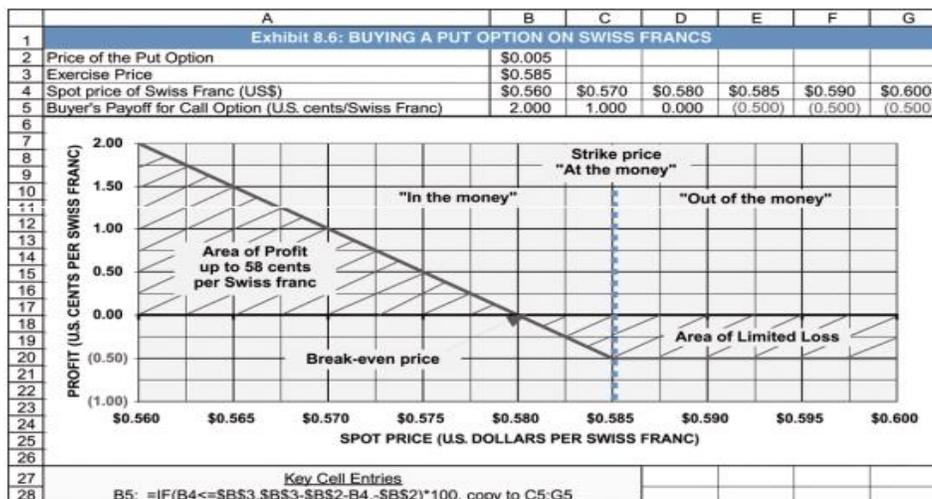
A seller of a put option will on the other hand face following cash flow at maturity:

$$\text{Cash flow} = \min[(S_t - X_p + P_p), P_p]$$

where  $(S_t - X_p)$  measures the gain for the seller of the put option. The higher the spot rate at maturity, the bigger the gain.

Figure 10 shows the area of profit and the area of limited loss for the buyer of a put option on Swiss francs.

Figure 10: Buying a put option on Swiss francs

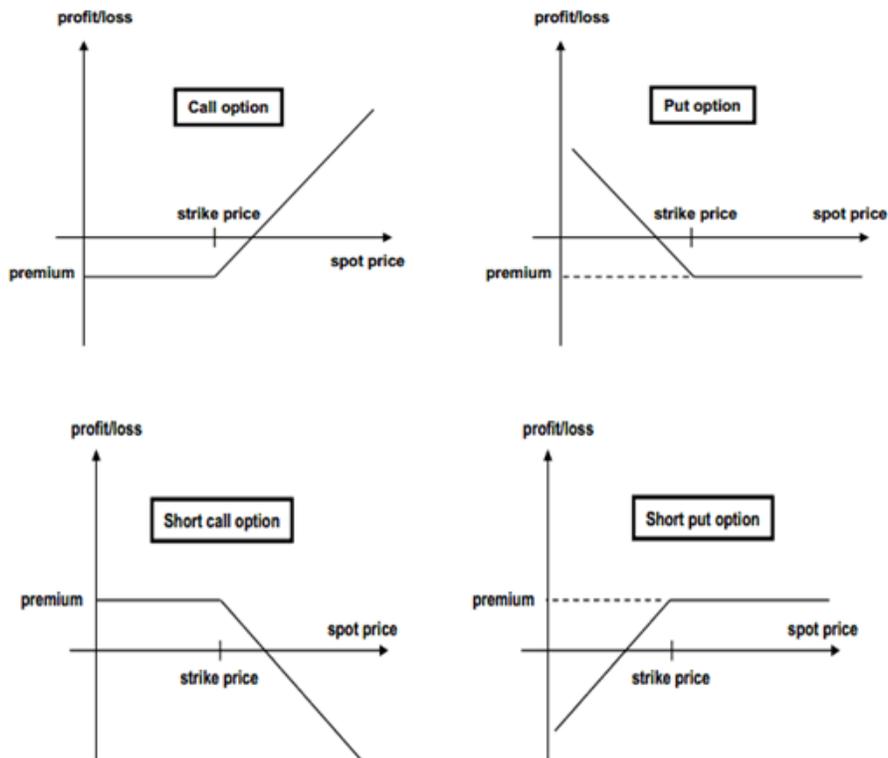


We can summarize the four basic positions possible to hold on options in this way:

1. A long position in a call option gives the right to buy / to get assigned.
2. A long position in a put option gives the right to sell / to deliver.
3. A short position in a call option implies an obligation to sell / to deliver.
4. A short position in a put option implies an obligation to buy / to be assigned.

The first two graphs in Figure 11 shows the buying of a call and a put option, while the last shows the selling of a call and a put option. The “break-even” point for a buyer in the case of a call option is set to [strike price + premium], and in the case of a put option it is set to [strike price – premium].

Figure 11: Simple buying and selling of a call and a put option



### **3. Options strategies**

There are infinite numbers of possible outcomes by combining options with different strike prices. The four basic positions on options given the same maturity can be combined in pairs in order to replicate exactly the payoff of a long or short position on a stock or futures.

Following gives an example of a combination of option positions by comparing it with the purchase of a stock. Assume that a stock quotes €10 per share. A call strike €10 costs €0.35 per share, whereas a put strike €10 costs €0.35. The combination of a long call and a short put makes the same payoff as the stock purchased at €10. The two premiums erase each other. Actually, it does not replicate exactly the payoff of a long position on the stock, but rather that of a long futures on the asset. On the other hand, the combination of a short call and a long put replicates the payoff of a short futures written on that asset.

In conclusion, the main distinction between shares and options is time. Time is the worst enemy for the option buyer because of the maturity. However, the advantage of a currency option as a hedging instrument is that the buyer can choose whether to exercise his right or not depending if it is beneficial for the buyer. The disadvantage may be that the purchaser has to pay a premium when buying the option and this reduces the expected return.

### **4. Options on the OTC-market**

On the OTC-market banks offer flexible foreign currency options and options tailored to the firm's specific needs on all major trading currencies. This means that firms have the possibility to choose between options that vary by amount, strike price, and maturity. Options on this market are most often written by banks for U.S. dollars against British pounds sterling, Swiss francs, Japanese yen, Canadian dollars, and the euro. The premiums are quoted as the percentage of the total amount.<sup>36</sup>

### **5. Options on organized exchanges**

There is an indirect relationship between buyers and sellers on exchanges. The options are arranged through a clearing house that guarantees required payment is made and holds the

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<sup>36</sup> Eiteman et al. (2004)

role as the counterparty to all option contracts. Options can be traded on exchanges such as the Philadelphia Stock Exchange (PHLX) and the Chicago Mercantile Exchange. Exchange traded contracts are particularly attractive for individuals and speculators who normally do not have access to the OTC-market. Banks also trade on exchanges to offset the risk they are exposed to when selling options to clients. Premiums on this market are given as a domestic currency amount per unit of foreign currency.

#### 3.7.4 CURRENCY SWAPS

Swap trade constitutes a dominating part of currency trade today<sup>37</sup>. As Levison (2005) states, “Foreign-exchange swaps involve the sale or purchase of a currency on one date and the offsetting purchase or sale of the same amount on a future date, with both dates agreed when the transaction is initiated.” In other words, it means to transform a loan in one currency into a loan in another currency.

The specified exchange rate for the offsetting purchase or sale is called the swap rate. A swap dealer or a swap bank functions as a middleman that sets up the swap agreement. The firm and a swap dealer decide to exchange the same amount of two different currencies for a specified period of time. Eiteman et al.(2004). The big international financial institutions act as intermediaries, guaranteeing the parties that the swap contract will be fulfilled (Korsvold, 2000).

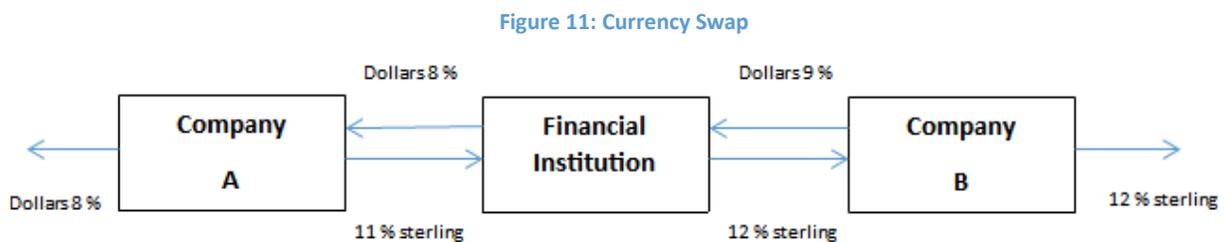
Many swap transactions applies for long-term loans that extend over many years. It occurs when two parties (with a bank as an intermediary) pays interest and installments for each other. Suppose that we have an Italian company that wishes to acquire a loan in USD. The company has little knowledge of the American credit market and has therefore difficulties borrowing directly on its own. If on the other hand there is an American company that needs euro, the two companies can make a swap where they pay interest and installments for each other. The Italian company acquires a loan in USD, while the American company acquires a loan in EUR.

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<sup>37</sup> Triennial Central Bank Survey 2013

Currency swaps permit companies to borrow in markets where they have the greatest advantage and then swap to obtain the desired currency of payment. Horcher (2005) says that an advantage from borrowing in a foreign currency comes from the well-known name of the issuer. For instance, an American company has a comparative advantage because is better known to U.S. investors, whereas a U.K. company is better known to British investors. Other advantages are foreign investors demand for assets in the currency, regulatory or tax advantages and local government programs that favor a particular type of debt.

Swaps can be organized in many different ways. To illustrate how swaps may be arranged, see Figure 12. Suppose company A faces better borrowing rates than company B in both dollars and sterling. A is offered 8 % interest rate in dollars while company B is offered 10 %. In sterling company A is offered 11.6 % interest rate, whereas company B is offered 12 %. Company A borrows dollars and company B borrows sterling.



Source: Rubinstein (1999)

The U.S. dollar interest rate of 8 % per year can be transformed into a sterling interest rate of 11 % per year for company A, making it 0.6 % better off annually than it would be if it went directly to sterling markets. Equally, firm B ends up 0.6 % better off by exchanging a sterling loan at 12 % for a dollar loan at 9.4 %. The financial intermediary gain 1.4 % per annum on its dollar cash flows and loses 1 % on its sterling cash flows. Ignoring the difference between the two currencies makes a net gain of 0.4 % per annum. Finally, the total gain to all parties is 1.6 % per year. (Rubinstein, 1999).

The firm that enters into a currency swap agreement has the ultimate responsibility to service its own debt in time. If the contract involves exchanging U.S. dollar payments for sterling payments, it anyway makes the firm that holds the dollar debt responsible for payment and debt service if the swap counterparty fails to make the payment. In this case the sterling payments would be stopped because of the right to *offset*. (Eiteman et al., 2004.)

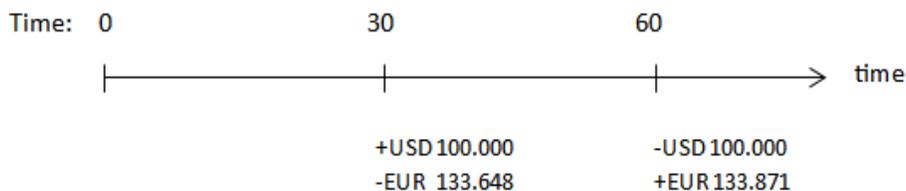
A 30-days *spot-forward* swap contract involves a currency exchange today with return of exchange in 30 days. Suppose an Italian bank wishes to dispose USD 100.000 for 30 days. It can achieve this by purchasing USD 100.000 today and at the same time commit to a 30-days EUR-USD swap. A spot rate of USD 1.32848 and a 30-days swap rate of 1.33648 leaves the bank with EUR 800 (EUR 133.648 - EUR 132.848) net after the transaction. However, this gain is usually reduced to zero because we have to subtract lost interest in Italy and add interest in the United States (Korsvold, 2000). The bank's cash flow is shown in Figure 14.

Another swap transaction is a *forward-forward* contract. For example, a 30-days / 60-days contract for USD 100.000 with 30-days and 60-days swap rates of respectively 1.33648 and 1.33871. The bank commits to a contract in which it can dispose USD 100.000 until day 30. See Figure 15.

Figure 12: A spot-forward swap



Figure 13: A forward-forward swap



A *credit swap* is usually used in conjunction with currency transfers to countries with weak currency or with restrictive currency regulations. Suppose an Italian company wishes to transfer funds for one year to its subsidiary in another country. The company transfers an amount in, for instance, USD to a local bank abroad. The bank, then, transfers an equal (depending on the swap rate) amount in the foreign currency to the subsidiary. There are three different costs associated with this swap transaction:

1. The spot rate is more beneficial for the Italian company than the swap rate.
2. The Italian company does not make interest on its USD-deposit in the local foreign bank, while the foreign subsidiary must pay interest on its loan from the local bank.
3. Return or earnings on the local one-year investment must be transferred to Italy at the current spot rate on the time of transfer.

Carlton Corporation is an illustrative example of a company that uses currency swaps.<sup>38</sup> The corporation decided to make its debt service payments in Swiss francs because they had recently signed a 3-years sales contract with a Swiss buyer. The currency swap was a three-year “pay Swiss francs and receive U.S. dollars” with both interest rates fixed. Carlton had to pay 2.01 % CHF interest rate and receive 5.56 % fixed USD. The notional principal is part of the currency swap agreement and equals 15.000.000 CHF in the target currency (converted from the \$10.000.000 notion principal). It is used to establish the actual cash flows that Carlton has committed to make ( $2.01\% \times 15.000.000 \text{ CHF} = 301.500 \text{ CHF}$ ). With this currency swap, Carlton was committed to three future payments in Swiss Francs and would receive three payments in U.S. dollars.

Summing up, the main use of currency swaps is to acquire cheaper debt by borrowing at the best available rate and then swapping for debt in desired currency. Swaps can be used to hedge the exchange rate fluctuations in the sense that if the companies have already borrowed in the currency for which they need the principal in, then risk is reduced by swapping only cash flows. In this way each company’s finance costs is in the company’s domestic currency.

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<sup>38</sup> Case taken from Eiteman et. (2005), “*Swapping Floating Dollars into Fixed-Rate Swiss Francs*”,

### 3.7.5 CFDs

Contracts for Difference (CFDs) are a flexible way of trading on the fluctuations of currencies. In this type of trading you do not have the physical ownership of the underlying asset. This means that there are no associated costs that you have to pay for physically owning the asset, and you have the possibility to sell an asset and buy it back later, without the need to borrow an underlying instrument to go short.

CFD is a leveraged product with margin rates that can vary between 0.20 % and 20 %, depending on the product.<sup>39</sup> This gives the possibility to “trade on margin”, allowing you to enter large position sizes using only small deposits. When trading on 10:1 margin, traders are only required to deposit 10 % of the total value of the position. These products entail high risk because even if they have potential to increase your profit since position sizes can be much larger than the size of your deposit, it must be stressed that they can equally create possibilities for losses if prices move against you.

To reduce some of this risk traders are recommended to use management tools such as stop loss orders (limit losses by specifying a price at which the position will be closed out if the market moves against you), take profit orders (specify a profit level at which you will close the position) and stop entry orders (enter a trade at a certain price and within a specified time period).

If you buy CFDs in a rising market you believe that the currency will increase in value in the future (you are “bullish”), and you can sell at a profit if your predictions come true. On the other hand, if your prediction is incorrect, you will make a loss. Selling in a falling market means believing that the value of the currency will fall in the future (you are “bearish”). If your predictions come true, you can buy the currency back at a lower price and make a profit. If not, you will make a loss.

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<sup>39</sup> Cmcmarkets, “What are CFDs?”, 25 Sept. 2013, <http://www.cmcmarkets.co.uk/en/cfd-trading/what-are-cfds>

Both losses and profits of CFD trading are realized on the margin account. The difference between buy (opening) and sell (closing) prices multiplied by the amount of CFDs will be added to or subtracted from your margin account overnight as long as your position remains open.

An easy example of CFDs trading is a major oil company that believes prices will go up and buys 10,000 units at 1,950 pence per unit. If the prices reach, say, 1,990 pence, the company decides to close their CFD position by selling at 1,990 and make a profit of 40 pence per unit, i.e. a total profit of £4,000. On the contrary, if the prices dropped by 40 pence, the company has a loss of £4,000.

According to CMC Markets CFD prices are quoted in pairs; the buy price and the sell price. “The spread” refers to the difference between the buy price and the sell price. The sell price refers to those who believe that the price is going to go down, and the buy price is for those who think it will go up.

Figure 16 gives an illustration of how it might look for the UK100 price. In this case, the spread is 1 point for the UK100.

**Figure 14**

<p><b>UK 100 6300 / 6301</b></p> <p><b>Buy at 6,301</b> if you think UK100 will rise in value</p> <p><b>Sell at 6,300</b> if you think UK100 will fall in value</p>
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Normally, a commission is charged to your account upon executing a CFD order. This commission constitutes your position size multiplied by the applicable commission rate.

### **1. Advantages of CFD trading**

You do not have to pay stamp duties and you can trade on both rising and falling markets. CFDs are used as a hedging instrument for many investors’ existing portfolios through periods of short-term volatility, and one of the main advantages of CFDs is the leverage. You can trade

using margins which gives you this leverage. Instead of putting down the full value of a position, you can use the remaining amount for other investments. In this way the money is not tied up in one transaction, and you can more efficiently use your capital.

## **2. Risks of CFD trading**

Trading CFDs implies a high level of risk to your capital compared to other instruments. Since prices may move against you, it is possible to lose more than initial deposit. It may even require you to make further payments. For instance, a position margin of 5 % when buying £1,000 worth of CFDs means that you only have to provide a payment of £50 to place the trade. Your exposure is however the same as if you had spent £1,000 on shares. In other words, no matter the movement in the market it will have a greater effect on your capital than if you had spent the same on shares. If the position moves against you by 10 % you will lose £100 (£1,000 worth of CFDs falls 10 %) which is double your position margin.

Costs of CFDs depend on the position and how long you hold it. Holding positions for a long time may lead to costs that could exceed the amount of any profits. Moreover, if you fail to have sufficient funds in your account to pay total margin requirements at all times, your positions may be automatically closed out if the account balance falls below the close-out level. The risk of market volatility can cause your account balance to change quickly due to rapid fluctuations.

Market volatility can result in gapping which means that prices of the products suddenly change from one price to another. Between the price changes, there may not always be the opportunity to place or execute an order between the two price levels. As a result of this, stop-loss orders may be executed at prices which are higher or lower than you anticipated. A way to limit this risk is to apply a boundary (specify a boundary price range on the order ticket which says that orders will be rejected if the price at execution has moved outside the boundary).

The reasons we put much emphasize on the risks of CFD trading is that no individual or firm should trade CFDs without first understanding the risks involved.

## 3.8 INTERNAL HEDGING

After examining the derivative instruments for hedging, we will here highlight some methods that minimize the currency risk within the company itself. These methods modify business activities and are called internal hedging or natural hedging. They are usually simple in concept and operation, but may involve some effort. Still, it is fully possible to reduce exposure and risk through the use of internal hedging. A proposal from Horcher (2005) is that a company can internally hedge some of the exposure and supplement with derivatives for the remaining exposure.

### 3.8.1 CHOICE OF INVOICE CURRENCY

A way to avoid the total currency risk is to make invoices in the domestic currency. However, the currency risk is in this way only transferred to the foreign importer. Not all foreign importers are willing to be invoiced in the domestic currency of the exporter, unless the importers have other expectations about the future movements in the exchange rate than the exporters. Only in this case way invoice may be written on the domestic currency. It is also highly probable that the importer wants to be paid for taking the currency risk. Which is the party that will end up taking the currency risk also depends on the market power that they have.

An alternative is to implement currency clauses in the agreement between firms. They can agree to share the currency risk on payments involving them, so that the impact of volatile exchange rate fluctuations falls on both parties. This is often the situation between firms with continuing buyer-supplier relationship, and it may help to maintain mutually beneficial long-term trade (Eiteman et al., 2004).

### 3.8.2 NETTING

A netting strategy involves netting out exposures in currencies. If a firm has receivables and payables in different currencies they can net out the exposure in each currency by matching receivables with payables. For example a company and its foreign subsidiaries might net off the intra-organizational currency flows at the end of each period, so that only the balance is exposed to risk. Then they can use hedging instruments on this exposed balance.

An illustrative example of netting is given by an Italian company that transfers components of 15 million to its foreign subsidiary. In the same month as this transfer, the subsidiary has to transfer final goods for 30 million to the mother company. Instead of transferring 30, it nets out the values of the respective receivables and payables against each other. The amount transferred is therefore only 15 million, and hence both exposure and transfer costs are reduced.

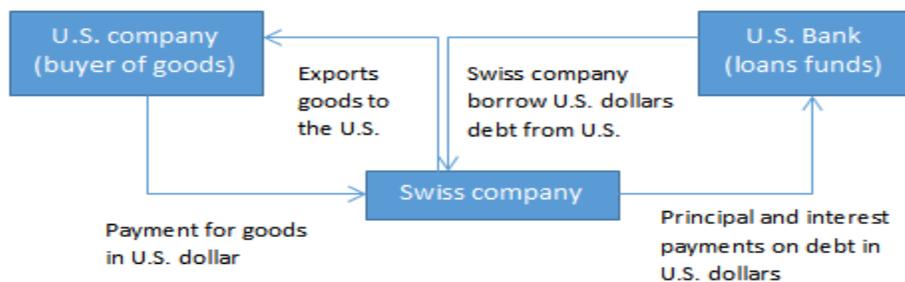
Pike et al. (1999) classify netting as *bilateral netting*, which refers to pairs of companies in the same group that net off their positions without a central treasury, and *multilateral netting*, which involves a central treasury that perform several interactions of subsidiaries netting.

Thus, companies that have foreign currency cash inflows and outflows can identify currency exposure by making cash forecasts for each currency. If there is a cumulative gap (deficit or excess currency) between cash inflows and outflows, then hedging could be needed. In many cases cash flows offset over time, and this is therefore a timing issue. (Horcher, 2005).

### 3.8.3 MATCHING

Matching currency cash flows can refer to a strategy where a company acquires debt in a particular currency to which it expects a long and relatively constant exposure. A typical situation of this is when a company has a continuing long export sale. The cash flow is matched when the company for example receives fairly predictable dollar cash inflow from export sales to the U.S. and uses this to pay the principal and interest payments on the dollar debt (Eiteman et al., 2004). Figure 15 illustrates the procedure of matching by using debt financing as a financial hedging strategy.

Figure 15: Matching



Long-term loan financing in foreign currency is an internal measure since there are no forwards or futures contracts with a scope for periods over 1-2 years. It involves acquiring long-term cash payables (interests and installments) in the same currency as the long-term cash receivables (earnings from the operation). This does not mean that the company ignores the use of derivatives to hedge cash flows that are expected in the short-term, but as a long-term strategy such contracts are not possible (Korsvold, 2000).

A company can reduce the risk of foreign currency debt if it has an offsetting asset (subsidiary) denominated in the same currency, given that the income is adequate to offset the payments on the liability. So, a strengthening in the foreign currency means that the market value of the debt increases, but at the same time the value of the offsetting foreign currency revenues increases (Horcher, 2005).

#### 3.8.4 LEAD & LAG

Another internal strategy is the “Lead & Lag” technique. It involves leading (advancing) payables and lagging (postponing) receivables in “strong” currencies, and conversely, leading receivables and lagging payables in “weak” currencies. This is to avoid losses from depreciation of the soft currency and to benefit from the appreciation of the hard currency. Eun et al. (2007).

#### 3.8.5 BACK-TO-BACK LOANS

Also called a parallel loan or a credit swap, and is an arrangement between two companies in different countries. The parties can borrow each other’s currency for a specific time period and then deliver them back.

#### 3.8.6 CHANGE PURCHASING ACTIVITIES

Other strategies can be to change purchasing and processing activities. The transactions of a company with foreign currency sales can be offset by using different sources or locations of manufacturing, for example use a supplier whose products are priced in the same currency. According to Horcher (2005) many regions have experienced growth in manufacturing because they have exploited the exchange rate differences.

### 3.9 HEDGING STRATEGIES FOR EXPORTING AND IMPORTING COMPANIES

In this section we have considered hedging the currency risk associated with export and import contracts. This kind of contract is practically considered as certain. We therefore assume that the cash flow in foreign currency from an export contract is certain and that customers pay in time.

#### 3.9.1 EXPORTING COMPANIES

Before we consider currency management for an exporting company we must compare following alternatives, according to Korsvold (2000):

1. Do nothing;
2. Use a forward contract;
3. Use the money market;
4. Use an option;

Let us start by giving an example of a sales contract that a Swiss company has signed for export of goods in USD. The conditions of the export contract are as follow:

- Value of the goods is USD 2 mill =  $L_t$
- The foreign importer is paying in 2 months =  $t$

We assume that the current (time 0) exchange rate is 1,200, i.e. one U.S. dollar today is worth 1,200 Swiss francs ( $S_0 = 1,200$ ). A 2-months forward contract rate is  $F_{0t} = 1,2200$ .

Forecasts for the future (2 months) spot rate are:

- Probability 30 % : 1,198
- Probability 40 % : 1,230
- Probability 30 % : 1,249
- Calculated expected spot rate:  $E(S_t) = 1,226$

Standard deviation of the of the spot rate is considered to be  $\sigma(S_t) = 0,1187$ .

## 1. Do Nothing

The company can choose to do nothing, i.e. wait until USD will be received in two months and then exchange it to the current spot rate. In this way the company has a long (open) spot position in USD with cash flows in CHF given as the value of the goods in USD (2 million) multiplied by the spot rate. The company's cash flow in CHF for the different forecasts for future exchange rates is shown in Table 2.

**Table 3: Do nothing**

Local cash flow:  $L = 2$  mill. USD

<b>Probability</b>	<b>Spot rate (<math>S</math>)</b>	<b>Spot position (<math>D</math>) (mill. CHF)</b>
0,3	1,190	2,380
0,4	1,230	2,460
0,3	1,249	2,498
Expected:	1,2237	2,447
Stand. dev.	0,1187	0,2375

We are following going to compare these results with the results of different ways to hedge, respectively with forward contract, money market and options contract.

## 2. Use a forward contract

The company can sell  $H$  USD on a forward where  $H = L$  (the forward contract is for the same amount as the export contract). Expected value consists of the amount exchanged with the forward rate ( $H \cdot F$ ) and the amount paid to buy  $L$  foreign currency units in the spot market ( $H \cdot S$ ). Because  $H = L$ , we have that:

$$E(C_T) = L \cdot F - L \cdot E(S)$$

$$\sigma(C_T) = L \cdot \sigma(S)$$

**Table 4: Forward contract**

Forward rate:  $F = 1,22$

Forward contract:  $H = L$

<b>Probability</b>	<b>Spot rate (<math>S</math>)</b>	<b>Cash flow mill CHF: <math>C_T = L \cdot (F - S)</math></b>
0,3	1,190	0,060
0,4	1,230	-0,020
0,3	1,249	-0,058
Expected:	1,2237	-0,007
Standard deviation:	0,1187	0,2375

The use of a forward contract to reduce the currency risk means that we have to sum the cash flows for the open spot position ( $D$ ) (Table 1) and the forward contract ( $T$ ). Table 4 shows that the open spot position is completely hedged with the forward contract since the exporter will receive CHF 2.44 no matter the spot rate in two months.

In conclusion, the cash flow in CHF will be hedged, i.e. no exposure for currency risk, if the company buys a forward contract to sell an amount in USD that equals the certain amount receivable in USD. The critical assumption for this hedging strategy is that the cash flow in foreign currency is indeed certain. (Korsvold, 2000).

**Table 5: Hedging with forward contract**

Forward contract equals open spot position:  $H = L = \text{USD } 2 \text{ mill.}$

<b>Probability</b>	<b>Spot rate (<math>S</math>)</b>	<b>Spot position (<math>D</math>) (mill. CHF)</b>	<b>Forward contract (<math>T</math>) (mill. CHF)</b>	<b>Hegded <math>D + T</math> (mill. CHF)</b>
0,3	1,190	2,380	0,060	2,44
0,4	1,230	2,460	-0,020	2,44
0,3	1,249	2,498	-0,058	2,44
Expected:	1,2237	2,447	-0,007	2,44
Stand. dev.	0,1187	0,2375	0,2375	0

The standard deviation will always be 0 (all currency risk is eliminated) as long as the forward contract equals the open position.

Suppose that the forward rate is equal to the expected spot rate (uncovered interest rate parity holds), i.e.  $F = 1,2237 = E(S)$ . Then we have that  $C_{D+T} = L \cdot F = 2 \cdot (1,2237) = 2,447$ , which equals  $E(C_D)$ . In other words, expected cash flow of the unhedged open spot position equals the cash flow of forward hedging when the forward rate equals the expected spot rate.

A risk-averse exporter should never hedge less than 100 % if expected spot rate is lower than the forward rate. Only if the expected spot rate is higher than the forward rate it could be applicable to hedge less than 100 % because the expected cash flow in CHF will be higher the less we hedge when the expected spot rate is higher. However, the less we hedge the higher is the also the risk. How much the exporter should hedge in this case depends on the exporter's level of risk aversion. (Korsvold, 2000).

### 3. Use the money market

One alternative to the forward contract is to borrow an amount in USD today which together with interest equals the amount the company will receive from the American client. The money from the sales contract can be used to pay the loan plus interest. This method eliminates the currency risk, but the amount possible to borrow depends on the interests of a 2-months USD loan. Say, the risk-free interest rate is 0,505 % for two months, implying that the company can borrow an amount  $C_f$  in USD that multiplied by 1,00505 equals 2 mill:

$$C_f \cdot 1,00505 = \text{USD 2 million}$$

$C_f$  in this case is USD 1.989.957. The amount of loan will then be exchanged to CHF (the domestic currency) today at the current exchange rate of 1,2. The exporting company receives following cash flow today:

$$C = C_f \cdot S_0 = \frac{L}{\left[1 + (R_f) / \left(\frac{12}{n}\right)\right]} \cdot S_0$$

$$C = \frac{\text{USD 2 mill.}}{1,00505} \cdot 1,2 = \text{CHF 2.387.948}$$

By comparing the money market alternative with “doing nothing” and a forward contract we need to include the risk-free Swiss interest that the Swiss company can get on the borrowed amount for two months. The value of  $C$  in two months will give the same result as forward hedging (2,44) if covered interest parity holds. However, covered interest parity does not always hold for the single company, due to the fact that companies rarely can borrow at risk-free interest rate in the USA. Very often the foreign loan rate is a bit higher and the domestic risk-free interest a bit lower than the covered interest parity suggests. In this case, forward contract can be somewhat better than money market hedging. For safety, the company should calculate it. Since both alternatives are risk-free, the company can exclude the alternative that has lowest value.

#### 4. Use an option

An exporting company also has the possibility to buy a put option with the right to sell USD (or the right to buy CHF). We use three different exercise prices ( $X$ ) in our example and in Table 5 we show the different cash flows for different combinations of spot rate and exercise price. Note that  $P$  is the premium and that the premium of a put option increases with higher exercise price because a high exercise price for a put option gives a better insurance than a low exercise price.

**Table 6: Buying a USD put option ( $O_S$ ),  $L = \text{USD 2 Mill.}$**

Probability	Spot rate $S$	Cash flow mill. CHF : $O_S$		
		$X = 1,200$ $P = 0,06$	$X = 1,219$ $P = 0,09$	$X = 1,238$ $P = 0,12$
0,3	1,190	-0,050	-0,122	-0,144
0,4	1,230	-0,180	-0,101	-0,224
0,3	1,249	-0,218	-0,240	-0,262
Expected:	1,2237	-0,152	-0,149	-0,212

Also note that the expected profits associated with both a forward contract and an options contract is negative. This is due to the transactions costs associated with derivative contracts.

The cash flow in CHF from an option is calculated as  $(X - S_t - P) \cdot L$ . For example, if  $X = 1,238$  and  $S_t = 1,230$ , the option gets exercised and gives following cash flow:

$$(1,238 - 1,230 - 0,12) \cdot (\text{USD } 2 \text{ mill.}) = \text{CHF } - 0,224$$

On the other hand, if  $X = 1,2$  and  $S_t = 1,230$  the option is not exercised because the spot rate is higher than the forward rate.

Hedging with a put option means that we have to sum  $O_S$  (for put option) and  $D$  (unhedged open spot position) in the way that we have done it in Table 6.

**Table 7: Hedging with a put option**

Probability	Spot rate $S$	Cash flow mill. CHF : $O_S + D$		
		$X = 1,200$	$X = 1,219$	$X = 1,238$
0,3	1,190	2,330	2,258	2,236
0,4	1,230	2,280	2,359	2,236
0,3	1,249	2,280	2,258	2,236
Expected:	1,2237	2,295	2,298	2,236

## 5. Conclusion

So, which alternative should the company choose? First of all it might not seem reasonable to buy a put option since this alternative has a lower expected cash flow (respectively 2.295, 2.298 and 2.236) than the sure forward contract alternative (2.44 in Table 3). We compare the alternatives and make following conclusions:

1. The spot ( $D$ ): no hedging and hence the highest risk, but also highest expected cash flow.
2. Put option, low exercise price: lowest hedging and therefore lowest premium, gives high cash flow (but lower than spot) when future spot rate is high.

3. Put option, middle exercise price: somewhat higher hedging and therefore higher premium than alternative 2, but lower cash flow than alternative 2 when the future spot rate is high.
4. Put option, high exercise price: higher hedging and therefore higher premium, but even lower cash flow when future spot rate is high.
5. Forward contract: highest hedging (eliminates currency exposure), but lowest cash flow when spot rate is high.

None of the alternatives mentioned is obviously better than the others because the choice depends on the company's tolerance for risk.

In this example we have assumed that the forward rate (1.22) is lower than the expected future spot rate (1.2237), i.e. uncovered interest parity does not hold. On the other hand, if the company is risk-averse and the forward rate is the same or higher than expected future spot rate, it would be optimal for the exporter to use forward instead of "do nothing". The reason is that the forward contract will give the exporter at least as high expected cash flow as the spot alternative, while the risk is eliminated.

Another reason to hedge with forwards when the company is concerned with downside risk is the transaction costs. Albuquerque (2007) proves that total transaction costs associated with hedging are always lower for forward contracts than for options. He proves that when bankruptcy costs are positive and transaction costs are positive and identical for forwards and options, the optimal hedging strategy relies solely on forward contracts. Albuquerque's analysis of transactions costs for American options and forwards for YEN/USD, EUR/USD and BP/USD proves that transaction costs for options are higher at any traded strike price. Smaller hedge ratio is required from the use of forwards and hence the lower is the risk management costs.

Also surveys conducted regarding firms' use of hedging instruments against foreign exchange exposure submit that forwards are more widely used than options. Millar (1989) says that 99 % of the firms point out that they have used forwards whereas only 48 % say they have used options.

### 3.9.2 IMPORTING COMPANIES

When a company instead expects to pay USD 2 mill, i.e.  $L = \text{USD} - 2\text{mill.}$ , the hedging alternative is either to **buy** USD with a forward contract, or to buy a **call option**. The consequences will be the same as we have previously shown, but with opposite signs in the column for cash flow in CHF. Expected cash flow becomes respectively  $-2,447$  and  $+0,007$  for a spot transaction and a forward contract (assuming that the forward rate is lower than the expected spot rate). In this situation a forward contract is preferred instead of a spot transaction for a risk-averse company (also in the case the forward rate is the same as the expected future spot rate). The reason is that the forward contract implies a certain payment ( $-2,44$ ) which is lower than expected payment of the spot alternative ( $-2,447$ ). As we know from before, the spot alternative also involves a risk.

However, we cannot say without reason that forward contract is preferred to options, since we know that the choice depends on the company's risk-tolerance. Neither can we say whether a forward contract is better than a spot transaction if the forward rate is higher than expected spot rate (the hedged forward contract will imply higher payment than expected payment with spot transaction).

The use of forwards, money market and options to reduce currency exposure implies in practice that the cash flows in foreign currency are short-term and contractual, i.e. without risk. When the foreign cash flow is certain, the currency exposure can be eliminated by buying a forward contract to sell (export contract) or buy (import contract) the foreign currency. It would be optimal for a risk-averse investor if the company hedges export 100 % with a forward contract when the forward rate is higher than or similar to the expected spot rate. Equally, it would be optimal to hedge import 100 % with a forward contract when the forward rate is lower than or similar to expected spot rate.

In case there is relatively high uncertainty about the foreign cash flow, an option could be a better hedging instrument than for example a forward contract. (Korsvold, 2000)

### 3.10 HEDGING STRATEGIES FOR UNCERTAIN LOCAL CASH FLOW

In situations where both the exchange rates and the foreign cash flows are uncertain, different hedging strategies might be needed. A company that has a subsidiary in another country may have uncertain cash flows because it expects transfers of profit from the subsidiary, which depends on the uncertain local turnover of the subsidiary.

#### 1. Forwards

When local cash flows are uncertain it is usually not possible to eliminate currency risk. If the company hedges with a forward contract for the amount  $H = 98,2$  and receives  $L = 100$ , the company is underhedged. The excess amount must then be exchanged at the uncertain future spot rate. On the other hand, if the company receives  $L = 95$ , it is overhedged and must exchange the excess amount at the uncertain future rate.

We here face a portfolio that consists of two elements: a certain part that consists of the forward contract and an uncertain part that consists of the difference between the unhedged amount and the hedged amount. The company will in total receive an expected amount in CHF that equals the sum of these two elements. From the previous example where the forward rate is higher than the expected spot rate, the more a company hedges with a forward the higher is the expected amount in CHF.

As before, which hedging alternative a company chooses in this situation also depends on the attitude towards risk.

#### 2. Options

Hedging currency risk with currency options is suitable in situations where there is relatively high uncertainty regarding the cash flows in foreign currency. This is typically the situation when cash flows are conditioned, i.e. it is uncertain whether the company will have a receivable in foreign currency. Which hedging alternative is the best for the company depends on the probability that the company will have a receivable, the probability that the spot rate deviates from the exercise price and forward price, and as before, the company's risk attitude. Options

are likely to be more interesting if the probability that the company will have the receivable is low and if the company is especially concerned not to have a significant loss.

### **3. Multiple periods hedging**

Till now we have only assumed currency hedging for one period in time. What is more usual is to consider several periods at the time, for example every month in one year. A company can for instance plan at time  $t = 0$  for the periods 1, 2 and 3, and at  $t = 1$  for the periods 2, 3 and 4. We assume that the cash flows occur at the end of each period. The company can estimate the risk-minimizing forward contracts amount for the three following periods, and after the first period the company makes new estimates and revises the estimates from  $t=0$  for period 2 and 3, while the estimate for period 4 is new.

#### **3.11 CFD TRADING STRATEGIES**

As we have previously described, CFDs are a flexible way of trading on the fluctuations of currency rates. There are many types of strategies a company can use with CFDs, but we will here only present the most commonly implemented CFD trading strategies in today's market.<sup>40</sup>

##### **3.11.1 CFDs: long versus short**

Going long means to purchase an asset, going short refers to the selling of an asset with the intention to buy it back later. The former expects that an asset will gain in value; the latter expects the price to fall. Incorrect assumptions will lead to a loss that is equal to the difference between opening and closing price.

##### **3.12 CFDs: short-term versus long-term**

The time frame is another essential feature of CFD trading. Short-term trading, such as intraday trading, gives the possibility to profit from minute to minute price changes. Since financing costs can be more expensive for CFD traders a short-term trading strategy allows traders to limit financing costs. Long-term trading might be the best alternative for some investors due to higher forecasting ability created by the underlying trends governing the market. Long-term

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<sup>40</sup> Intertrader

trades typically last from a month to a year and hence give the advantage of catching larger price movements.

### 3.13 Hedging: a protective strategy

Hedging does not refer to a strategy designed to achieve new gains, but rather to a strategy that is protective. By hedging, you are already in an open position and want to protect this position by taking an opposing position. These trades are inversely correlated, reflecting the fact that one of the trades will make gains and the other will make losses. The result will be a balance that nullifies the overall position bias. By choosing this hedging strategy the company's total position is protected and there is no possibility of new losses as well as no possibility of reward (removes all risk). In times of extreme volatility this strategy is typically implemented to eliminate the potential risks involved.

## 4 PRACTICAL FRAMEWORK / CASE STUDY

In this part of the paper we have examined the case of a Swiss company that is exposed to foreign exchange risk associated with its exports to the United States and Europe. The company is now considering how to build a hedging strategy to reduce the currency exposure. We have conducted an in-depth interview as well as a meeting with the company in order to better understand the problem of the company and to see how currency risk management strategies are applied in practice.

### 4.1 COMPANY A'S CURRENCY RISK

Company A is situated in Mendrisio, Switzerland. The company is trading chemical products for the pharmaceutical industries. Its main area of business is East Europe, Middle East and South America. Our contact person in the company is the chief of administration/ bookkeeping dept. During our meeting with the company he could inform us that the company's basic annual turnover varies from 22 million to 30 million Swiss francs. The turnover is 100 % in foreign currency, respectively USD and EUR. The company has substantial expenses in the U.S. and Europe associated with sales and manufacturing.

The company pays internal management such as plants and mortgages in local currency and employees receive their salaries in Swiss francs. The company has no income in Swiss francs and must convert the surplus into CHF. Because the financial results are measured in terms of Swiss francs, the company's net revenue is exposed to currency risk. The chief of bookkeeping tells us that the net profit of a trading company like theirs is very low – less than 5 % of the company's turnover. The risk to affect the result is therefore high. Every month reports are issued and prudentially a possible loss on exchange rate is already included in the gross profit.

The company views the exposure of currency risk compared to other risks as a medium-high risk and a quite high risk compared to other risks. After the introduction of euro the risk has decreased somewhat, even though the currency risk is high regarding the U.S. dollar. A sudden depreciation of the dollar will have a bad effect on the value of receivables and affect the whole business with large amounts involved.

To the question of which exposure to currency risk the company views as most relevant, we are told that both the economic exposure and translation exposure are high, but that the consequences of the risk on economic exposure are more “dangerous” than the risk of translation exposure.

Also the commercial risk is viewed as a medium-high risk to the company because of clients that pay later than agreed. Especially in times of crisis this is a problem for the company because the company sets a hedging strategy based on the assumption that the client will pay a specific amount at a specific date. However, in this field of business the reputation of bad companies is immediately known by everybody, he says. Commercial risks are announced by the company’s partners or media, so the company often has the time to take measures such as stopping supplies to bad companies or implementing payments in advance. For example, in countries where political risk is higher, the company only sells against payments in advanced.

#### 4.1.1 COMPANY A’S CURRENCY RISK MANAGEMENT

Company A’s main motivation for currency risk management is the depreciation of the dollar since much of their sales are made in USD. The company has earlier tried to sell goods in Swiss francs, but without success. Selling in domestic currency only transfers the risk over to the clients, which could mean losing customers. The currencies used for the business transactions therefore depend on the customers’ request, and it does not give the company any other choice than to follow the customers’ demand. The approach to manage the currency risk now is simply to keep the same currency that is used with their supplier.

In the last 15 years the company has tried different ways to reduce the exchange rate risk. They have been using derivative instruments such as swaps, options and other bank products. The company has experienced that if there was an improvement of exchange rate differences at the end of the year, they could also notice a higher bank cost associated with the products. This cost almost cancelled the benefit of the exchange rates.

During our interview, the company can tell us that their best internal hedging strategy in the last 5 years has been to transfer foreign amounts on a Swiss franc account when there is a good

moment for the exchange rate. By doing this, their goal is to cover the yearly costs in CHF, which is around 2 million CHF. Usually, this goal to cover the costs is reached in 5-6 transfers.

The company admits that it has experienced both big losses and big profits from currency risk management strategies in the past. Their experience is that the cost of currency risk management sometimes is too high compared to gains, and that this can alter the result of the company's business. They also believe that the banking experts get away with most of the profit, and that the company maybe spares something.

The goal of the company's hedging strategy now is to minimize the losses of the exchange rates. They are not interested in making profits and hedging the exchange risk is therefore their only goal.

#### **Net exposure in USD and EUR**

The net exposure of a currency is found by netting out the payables and receivables in that currency. We have derived the net exposure line for the company in euro and dollar based on current information contained in company A's financial statements. We calculated the relative ratio of USD and EUR of total sales and purchases with basis in the balance sheet of September 2013 (see Appendix 3 for the balance sheet of September 2013). We found that around 58.8 % of total sales are made in USD while 41.2 % of total sales are made in EUR. Regarding purchases USD constitutes ca. 63 % of total purchases, whereas EUR constitutes 37 % of total purchases.

The company faces a net balance between cash collections and payments so when the company has to pay a specific amount of USD in the future, they know in which direction they are exposed to exchange rate risk in the next X days. The same applies when the company knows it has to collect a specific amount from sales on a certain date.

According to the bookkeeping chief, company A pays supply within 80 days whereas cash settlement days (the life span of the transaction exposure) of sales are around 75 days.

We first illustrate the problem of the firm with an example. Assume that the company buys supply for 1 million USD on the 2<sup>nd</sup> of January and pays them within 80 days later, i.e. on the 23<sup>rd</sup> of March. When the company receives the supply, it transforms products and is ready to

sell final products around 9<sup>th</sup> of January. If the company sells goods for 1.3 Million USD on the 9<sup>th</sup>, the money will be collected from the customers 75 days later, i.e. on the 25<sup>th</sup> of March. From 9<sup>th</sup> of January until the 23<sup>rd</sup> of March the company faces a net exposure of \$300.000, but as soon as the company pays the supply on the 23<sup>rd</sup> the net exposure jumps to \$1.300.000. The risk for the company is therefore high between 23<sup>rd</sup> and 25<sup>th</sup> of March, risking that the US dollar falls in value so that the collection from sales loses value. However, payments and collections happen on many different days, and so the exchange exposure is very variable.

Before calculating the net exposure for the company in euro and dollar we had to make some assumptions. For simplicity we assume that the monthly amounts of purchases and sales are allocated to three different days every month on which the company buys supply and sells final goods. We have also assumed that the contracts are certain and that the clients pay on the date agreed upon. A situation in which the company pays in advance is not considered here.

Because July is the last month for which we have data, we do not include any purchases and sales committed in August. Only collections and payments are left to be done in August, September and October. The net exposure will go to zero when the last collection or payment has been made.

By proceeding in this way we derived the net exposures for USD as it is plotted in Figure 16 and for EUR as it is plotted in Figure 17. As the figures show, the company's net exposures can be very variable due to different days of collections and payments.

Figure 16: USD net exposure

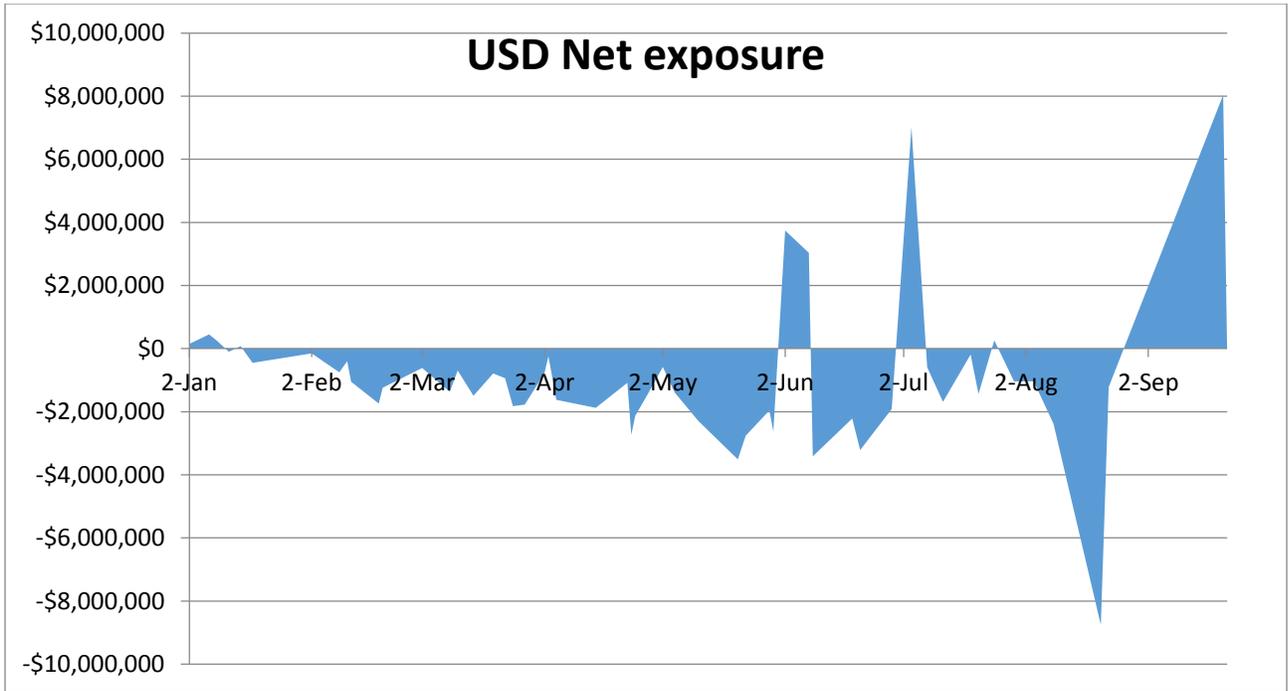
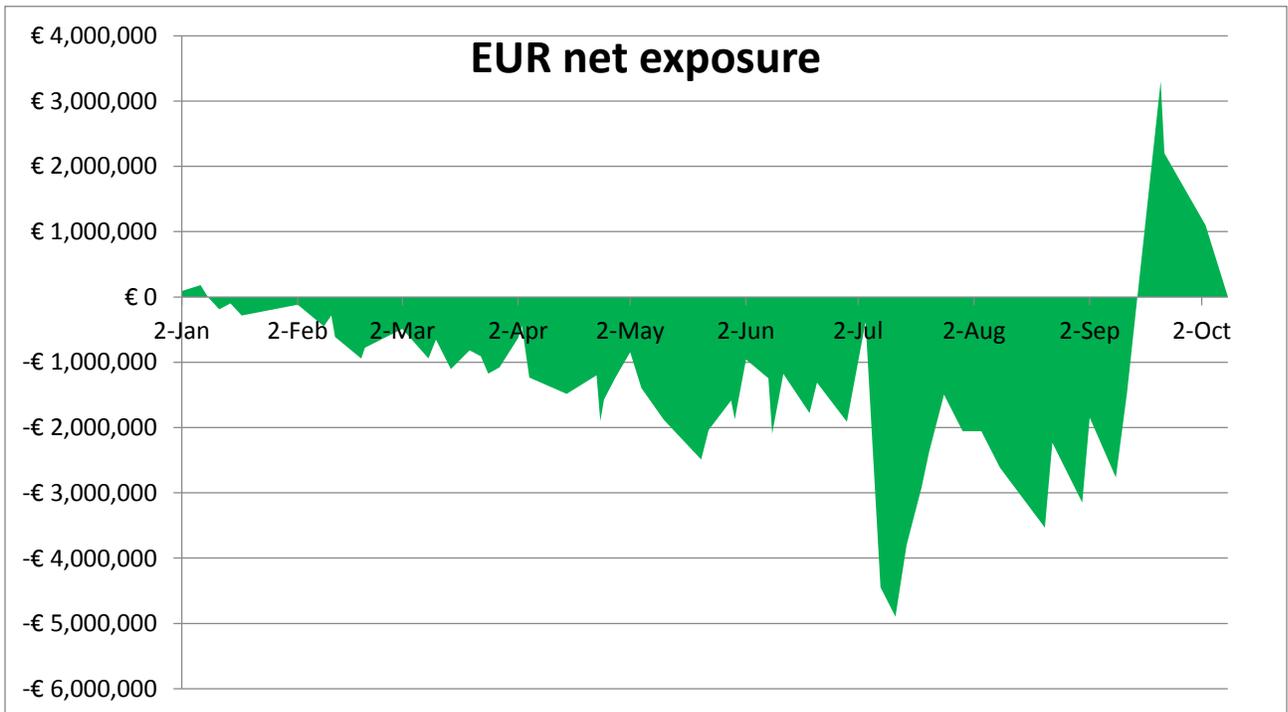


Figure 17: EUR net exposure



From these figures we can say that when the company faces a net debt (the areas with positive sign) in USD or EUR the risk is that USD or EUR will appreciate against CHF so that the value of the payment becomes higher than expected. In this case the company needs to open a long position on USD or EUR versus CHF. The higher value of the payment will then be erased by the profit of the hedging position, and vice versa.

If the company has a net credit (the areas with negative sign) in USD or EUR, it faces a risk that USD or EUR gets devalued against CHF. In these situations company A needs to open a short position on USD or EUR versus CHF.

#### 4.1.2 APPROACHES TO HEDGING STRATEGIES

An effective hedging strategy first starts with selecting a functional currency for the company. There are multiple strategies for managing foreign exchange risks. How a business best manages its FX risks will depend on the company's objectives and which currency exposures it views as the most relevant.

According to J.Chen at J.P. Morgan Treasury Services<sup>41</sup> there are four common strategies or key approaches to managing FX risk:

1. The 'do nothing' approach (currency pair's movements cancel each other out and buying FX contracts means incurring unnecessary costs).
2. Hedging cash flow items (objective to lock down projected cash payments and receipts).
3. Hedging balance sheet items (primary objective to protect from translation FX gains and losses).
4. Hedging balance sheet and cash flow items (lock down both translation and transaction exposures).

Since company A views both economic and translation exposure as high risks, they can choose approach 2, 3, or 4. However, the economic exposure is viewed as more dangerous than the translation exposure. An unexpected change in exchange rates will change the present value of

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<sup>41</sup> [http://www.jpmorgan.com/tss/General/To\\_Hedge\\_or\\_Not\\_to\\_Hedge\\_/1312755547007](http://www.jpmorgan.com/tss/General/To_Hedge_or_Not_to_Hedge_/1312755547007)

the company and so affect future operating cash flows through sales volume, prices, and costs. We have been told that the commercial director in the company issues a sales budget that is calculated at present exchange rate with prudential estimation. Upon this calculation the company decides if it is necessary to cut, reduce services or costs, or to bear new ones. A long-lasting deterioration of the exchange rate would affect the liquidity of the company because the depreciation of their assets in foreign currencies will grant the company a bank credit line. The benefit of cutting more costs will only be seen in a second time.

Companies that view economic exposure as the most relevant risk will follow the 'hedging cash flow items' approach. This strategy implies that a company hedges committed and forecast cash flows over a particular time horizon (typically 3, 6 or 12 months) in order to lock down projected cash payments and receipts. Calculated monthly net flows are hedged with FX contracts that have maturities that match the payment dates.

Company A already knows which currencies it should hedge since they are exposed to both EUR and USD. The next step, then, is to find the proper hedging instruments for their use. Further questions concern the amount needed to hedge, the right time period for hedging and for how long. Before we proceed, we have to stress the fact that there is no single 'best practice' foreign exchange strategy. Indeed, the company may use different strategies across different parts of the business.

#### 4.1.3 SUGGESTIONS OF HEDGING STRATEGIES

The company admits problems in building a hedging strategy also due to difficulties in estimating the sales budget and we therefore believe that the company first of all needs a flexible instrument. The fact that the company does not have the guarantee to have enough money on the USD account, and the risk of late payments from customers complicates the building of a proper strategy. What they need is a strategy that can be easily modified according to the changed scenario. Because the expected value of the money line at some date will shift to a new date, the company needs to reset the strategy.

As we know, the currency exposures can be very variable. Not all instruments that we have examined in this paper are the best for this purpose, since each has its strengths and weaknesses. The basis risk with derivatives contracts such as futures and options is that they involve fixed maturities and standardized contract sizes. This means that the contracts might not fit the need of the particular company. Maturities of regulated derivatives often do not coincide with dates at which the company will have to deliver or buy a good, or pay an amount in a foreign currency. The same applies to the contract dimensions because they often do not coincide with the amount of the position at risk.

To illustrate with an example, imagine that company A has to cover the risk of a payment of USD 68.000 on August the 1<sup>st</sup>. The first problem is that the regulated EUR versus USD futures contract expires in September and the company therefore has to cover itself for a time period much longer than the needed. The second problem is that the contract is valued USD 125.000, which means that the company over-hedges itself if it uses the futures to hedge the risk. If the amount of the asset to be delivered is too large, then investors who want to hedge small exposures cannot use the exchange. If the size is too small, the fixed costs of the contract can make trading expensive.

Moreover, sometimes there are no derivatives written on the asset that the company needs to hedge. In terms of currencies, some contracts are only offered for a limited amount of currencies. Contracts such as futures might also be considered as inefficient and troublesome because the positions are marked to market every day of the duration of the contract.

As we have already discussed, the advantage of forward contracts compared to futures and options is that they are more tailor-made to the customer's need. They offer the possibility to adjust the quantity of currency and the maturity, and because of this, many firms prefer to use forwards to futures when reducing their currency exposure.

We therefore assume that forwards can be an alternative. This is because the company's exposure is very variable, and they need an instrument with flexible maturities and contract sizes. Forward contracts are frequently used by corporations that deal with foreign exchange. There is no cash transaction at the time of entering a forward contract. After the contract is entered into, it can have a negative or positive value. If the foreign exchange rate increases, it will give a positive value of holding a long position and a negative value of holding a short position.

Another flexible way to deal with the variable net exposure of the company can be to use FX-instruments such as CFDs. These instruments have no fixed maturities and involve contract sizes that can be as small as micro-lots (the smallest tradable lots). Indeed, the possibility of trading with low margin, no marking to market and no delivery makes these instruments attractive for many companies. However, they carry risk due to trading with low margins and must be handled carefully.

Hedging with CFDs does not refer to a strategy designed to achieve new gains, but rather to a strategy that is protective. By hedging, the company is already in an open position and wants to protect this position by taking an opposing position. The CFDs trades are inversely correlated, reflecting the fact that one of the trades will make gains and the other will make losses. The result will be a balance that nullifies the overall position bias. By choosing this hedging strategy the company's total position is protected and there is no possibility of new losses as well as no possibility of reward (removes all risk).

A hedging strategy could be to set thresholds for the exchange rates. A threshold refers to the maximum decline in the value of the company's position that the company is willing to risk. Generally, the larger the decline, the less expensive is hedging. The risk of setting too small thresholds is that it can be expensive in a way that makes the cost of hedging greater than the loss the company is trying to hedge. The company can also set intervals in between which it does not perform any hedging. When the exchange rate moves outside these intervals, the company starts hedging.

The company can, for example, use a 20 % decline threshold, as fund manager John Hussman proposes. According to him, “An intolerable loss, in my view, is one that requires a heroic recovery simply to break even... a short-term loss of 20 %, particularly after the market has become severely depressed, should not be at all intolerable to long-term investors because such losses are generally reversed in the first few months of an advance (or even a powerful bear market rally).”

Given that the company is in a position where it has to pay or receive USD 1 million on a date in the future, we can compare some strategies concerning how often the company should hedge. The first hedging strategy implies to hedge at the start of each month and the second hedging strategy implies to rebalance the hedge at the start of every day (daily hedging). If the exposure to USD/CHF rates is less than \$200.000, the company does not sell or buy USD. By performing a single purchase or sale of US dollars at the opening of each day will decrease the exposure to the exchange rates.

The third hedging strategy is an intraday strategy which implies to rebalance whenever the currency exposure reaches the maximum permitted level. Also here the threshold can be set to \$200.000. Even if this strategy can imply more rebalances than once per day if markets are volatile, it may provide a tighter hedge on currency risk and a more frequent hedge may result in smaller FX losses. Although there will be months where returns are improved by hedging the foreign positions, there will also be time where the hedging decreases returns.

Whether to choose between a daily and intraday hedging strategy depends on the resources and capacity of the company. Company A is a small company and does not have the resources to constantly watch the currency rates. A daily hedging strategy could therefore be preferred to intraday hedging, whereas a daily hedging is probably more effective than monthly hedging.

At the moment company A usually covers portions of their risk as the exchange rate moves a while. Assume the company has to pay USD 1 million within 30 days. Say, the exchange rate is 1.2 CHF per USD. When the exchange rate increases it means that the USD is revaluing against CHF, so the company has to cover this risk. Instead of covering the entire amount immediately, they can cover just a portion. If the exchange rate moves to 1.22 they can cover USD 200.000, if it moves to 1.24 they cover another amount of USD 200.000 etc. When the exchange rate has reached 1.3, the company needs to cover the whole amount, and the average rate applied would be 1,256 instead of 1.3. The same applies also the other direction, when the company knows it will be paid USD 1 million.

We believe that the current method that the company is applying is a possible strategy. Another way they could do it is to adapt the step of hedging according to the current volatility of the exchange rate. With this we mean that the higher the volatility, the smaller the step of hedging. If the speed of change in the currency rate is high, then the company can hedge more frequently. If the speed is slow, the company can “take it easy” and increase the steps.

Since we are dealing with a small company, they do not have resources or capacity to follow exchange rates every minute. Therefore, it could be optimal to set intervals indicating that in between these limits the company does not hedge. Hence, when the exchange rates lie inside, nothing is done. Each time it moves outside the interval, the company starts hedging. With this strategy it is not necessary to constantly watch the exchange rates. Instead, the company will receive email alerts each time the exchange rate approaches the interval limit.

Finally, a last suggestion for the company in order to increase the certainty of payments and hence reduce the variability of currency exposure could be to use cash discount and other incentives to influence early payments. Encouraging early payments from clients could help implementing a proper hedging strategy for the company or to better achieve their current strategy applied.

## 5 CONCLUSIONS

This paper presents both a theoretical view and a practical view of approaches to hedging. We have discussed corporate hedging and motivations for hedging. We found that the main aim of hedging is to minimize volatility of returns and to make companies' results more stable. Firms can more accurately predict future cash flows, improve planning capability and carry out good investment opportunities when the variability of cash flows is reduced.

One of the reasons why corporations reject hedging is the costs associated with hedging. Sometimes the costs involved outweigh the benefits of hedging. It is therefore every firm's and individual's goal to find the best way to manage their exposure to currency risk. There are multiple strategies for this purpose and not just a single approach. How a business best manages its currency risks will depend on the company's objectives and which currency exposures it views as the most relevant. It also depends on the costs and the payoffs from hedging. Finally, what must be stressed is that hedging is a protective strategy and is not aimed to make gains.

We have conducted an in-depth study of a Swiss company that is exposed to a variable currency exposure. In order to manage this risk, we have tried to look for a flexible hedging strategy. In this way the company can adapt their strategy to changes regarding their everyday business activities. We have suggested the company to adapt their hedges according to the volatility of the exchange rates. In times of high volatility the company can reduce the step of hedging (smaller step) and hedge more often. Another proposal is to continue the way they are currently managing the risk, hedging only parts of their exposure as the exchange rate changes.

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## 7 APPENDIX

### APPENDIX 1: SPECIFICS OF OPTIONS

#### SPECIFICS OF OPTIONS

<u>SPECIFICS OF OPTION CONTRACTS</u>	<u>AN EXAMPLE: FTSE MIB CALL 16000 DECEMBER 2013</u>
type:	call
underlying:	FTSE Mib index
strike price, or exercise price, or basis:	16000
style:	european
premium:	765 points, valued 2.5€ each
maturity:	third friday of december 2013
settlement and exercise:	cash settlement, exercise at maturity only
intrinsic value and time value:	(depending on the spot price)
moneyiness:	(depending on the spot price)
contract size:	a half FTSE Mib index

**APPENDIX 2: COMPANY A'S BALANCE SHEET, SEPTEMBER 2013**

Details	CASH FLOW BUDGET			Cash movements			
	2013 yearly	2013 pro rata	CHF	USD	EUR	2013 September	Δ diff.
Salaries net paym.	685.000	513.750	413.613			413.613	-100.137
Social securities	270.000	202.500	286.039			286.039	83.539
Other employers' costs	500	375	418			418	43
Building expenses	52.000	39.000	65.584			65.584	26.584
Leasing	18.000	13.500	16.417			16.417	2.917
Travel, mkt.credit card exp.	40.000	30.000	36.105	2.058	8.721	48.765	18.765
Representative office costs	140.000	105.000	19.413	15.720		34.138	-70.862
Exhibition	70.000	52.500	380		45.354	56.189	3.689
Office expenses	180.000	136.000	107.431	607	34.674	150.666	16.666
Bank charges	90.000	67.500	1.914	31.230	7.834	40.806	-26.694
Bank commissions	16.000	12.000	10.394		3	10.398	-1.602
Interest on current acc.	50.000	37.500	22.311	86	155	22.582	-14.918
Interest on bank loan	72.000	54.000	36.297			36.297	-17.703
Interest on mortgage	125.000	93.750	123.430			123.430	29.680
Interest receivable	-100	-75	-256		-24	-285	-210
Taxes	100.000	75.000	-30.705			-30.705	-105.705
Shareholding profit	-110.000	-82.500				0	82.500
Office rent, receivable	0	0				0	0
Mc Kruger costs	0	0				0	0
VAT receivable on costs	-30.000	-22.500	8.698			8.698	31.198
<b>Total expenses</b>	<b>1.768.400</b>	<b>1.326.300</b>	<b>1.117.483</b>	<b>49.701</b>	<b>96.719</b>	<b>1.283.050</b>	<b>-43.250</b>
Building investments	70.000	52.500			27.000	33.224	-19.277
Furniture purchase	0	0				0	0
Stationery purchase	1.000	750				0	-750
Vehicles	0	0				0	0
Investments on R & D	0	0				0	0
Shareholding investment	0	0				0	0
Loans to third parties	0	0	136.000		22.800	164.055	164.055
Unpaid bonus	12.000	9.000	10.000			10.000	1.000
Bank loan	0	0				0	0
Mortgage	140.000	105.000	140.000			140.000	35.000
Taxes allowance	0	0				0	0
<b>Total Investment</b>	<b>223.000</b>	<b>167.250</b>				<b>347.279</b>	<b>180.029</b>
Shares' sell	0	0				0	0
Loan repayment	-3.600	-2.700	-4.800			-4.800	-2.100
<b>Investments net</b>	<b>219.400</b>	<b>164.550</b>				<b>342.479</b>	<b>177.929</b>
Loan from shareholders	0	0				0	0
Mark-up on cap. increase	0	0				0	0
Capital increase	0	0				0	0
<b>Total Funding</b>	<b>0</b>	<b>0</b>				<b>0</b>	<b>0</b>
<b>Not operative expenses</b>	<b>219.400</b>	<b>164.550</b>			<b>49.800</b>	<b>342.479</b>	<b>177.929</b>
<b>TOTAL NEEDS</b>	<b>1.987.800</b>	<b>1.490.850</b>				<b>1.625.529</b>	<b>134.679</b>

Details	CASH FLOW BUDGET			Cash movements			
	2013 yearly	2013 pro rata	CHF	USD	EUR	2013 September	△ diff.
Purchases	14.800.000	11.100.000		9.363.139	4.084.299	13.796.182	2.696.182
Other exp. on purchase	5.000	3.750	500	0	9.533	12.230	8.480
Commissions and O.P.	340.000	255.000		223.169	286.139	561.136	306.136
Forwarding agents	220.000	165.000	193.984		28.471	229.018	64.018
Other exp. on sale	45.000	33.750	34.469	3.352	-16.015	17.902	-15.848
VAT receivable on goods	-140.000	-105.000	-139.374		-2.222	-142.108	-37.108
<b>Tot. operative expenses</b>	<b>15.270.000</b>	<b>11.452.500</b>				<b>14.474.360</b>	<b>3.021.860</b>
Sales	-17.200.000	-12.900.000		-10.829.725	-5.584.724	-17.016.206	4.116.206
Commiss. receivable	-90.000	-67.500				0	-67.500
<b>Tot. operative income</b>	<b>-17.290.000</b>	<b>-12.967.500</b>	<b>89.579</b>	<b>-1.240.066</b>	<b>-1.194.519</b>	<b>-17.016.206</b>	<b>4.048.706</b>
<b>Operative Cash Flow</b>	<b>-2.020.000</b>	<b>-1.515.000</b>				<b>-2.541.846</b>	<b>1.026.846</b>
<b>Net Cash Flow</b>	<b>-32.200</b>	<b>-24.150</b>	<b>1.207.062</b>	<b>-1.190.365</b>	<b>-1.048.000</b>	<b>-916.317</b>	<b>892.167</b>

9

0,9367

1,2305

## **APPENDIX 3: INTERVIEW QUESTIONS**

### **COMPANY AND RESPONDENT INFORMATION:**

1. What is your job title?
2. What are your job assignments?
3. How many years have you been in this position?
4. What is your academic / company education?
5. What is the company's main area of business?
6. How much is the basic annual turnover of the company? How many percent of the turnover is in foreign currency? Does it vary through the years, or is it a constant percentage?
7. What are the company's business transactions?
8. Which currencies are used in the business transactions? Why this choice? Has this changed throughout the years?

### **CURRENCY RISK EXPOSURE AND MANAGEMENT:**

9. How would you categorize the company risk?
  - Product risk
  - Political risk
  - Commercial risk
  - Financial risk
  - Currency risk
10. What is the company's view on currency risk? How big is it, and how is it compared to other risks?
11. Which of the following three exposures to currency risk does the company see as the largest, and why?
  - Transaction exposure
  - Economic exposure / Operating exposure
  - Translation exposure / Accounting exposure
12. How long are cash settlement days?
13. What external currency risk management strategies are used, and why? Who decides the choice of strategy? Have there been any changes over the last years? If yes, what were the reasons for the changes?
  - Forwards

- Futures
  - Options
  - Swaps
14. Does simplicity of the instrument have an impact?
  15. Is internal hedging methods used? What internal strategies are used, and why? Who decides the choice of strategy? Have there been any changes over the last years? If yes, what were the reasons for the changes?
    - Netting:
    - Matching:
    - Lead & Lag:
    - Choice of Invoice-currency:
  16. What are the goals of the company's hedging strategies?
  17. What are the motivations for the hedging?
  18. What is the risk aversion level of the company?
  19. How is currency risk management strategies applied in practice?
  20. Costs of currency risk management:
    - How is the company result affected by currency risk management?
    - Has currency risk management strategies previously lead to costs or revenues? Cost/benefit: are costs too high compared to gains?
  21. What is the company's experience with banking experts regarding hedging strategies?
  22. Do banks demand special hedging policies to secure cash flows?

#### **EVALUATION OF THE HEDGING ACTIVITIES**

23. How does the company report the hedging activities in terms of accounting?
- 24.** How does the company evaluate the performance in terms of successful hedging?







