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INTEREST RATE AND CURRENCY SWAPS IN CORPORATE FINANCE - A CASE STUDY OF A FINNISH INDUSTRIAL COMPANY

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- A CASE STUDY OF A FINNISH INDUSTRIAL COMPANY

Tutkimuksen tavoitteet

Tutkimuksen tavoitteena on analysoida korko- ja valuuttaswap- sopimusten ominaisuuksia sekä selvittää miksi ja miten näitä instrumentteja käytetään osana yrityksen rahoitustoimintoja. Yleisen tarkastelun lisäksi tavoitteena on tutkia korko- ja valuuttaswapin käyttöä kohdeyrityksessä.

Lähdeaineisto

Teoriaosan lähdeaineistona ovat alan ulkomainen kirjallisuus sekä artikkeleita alan ulkomaisista julkaisuista ja kansainvälisten pankkien tutkimuksista. Empiirinen tutkimus perustuu kohdeyrityksen sisäiseen raportointiin ja informaatioon.

Tietojen käsittely

Tutkimus on deskriptiivis-analyttinen. Käsiteltäviä asioita analysoidaan käytännönläheisesti, esimerkein havainnollistaen.

Tutkimuksen tulokset

Korko- ja valuuttaswap ovat rahoitusinstrumentteja, joita voidaan käyttää monipuolisesti ja joustavasti yrityksen rahoituksessa. Niiden avulla voidaan alen-
taa rahoituskustannuksia tai lisätä -tuottoja; hallita korko- ja valuuttariskejä sekä kiertää markkinoiden esteitä. Kohdeyritykselle korko- ja valuuttaswap ovat olleet tärkeitä instrumentteja etenkin rahoituskustannusten alentamisessa ja valuuttamääräisen velkaportfolion riskien hallinnassa.

Avainsanat

Swap, Interest Rate Swap, Currency Swap

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1 INTRODUCTION

The significant increases in the volatilities of market interest rates as well as exchange rates since the late 1970's has resulted in substantially higher risks faced by business firms and financial institutions. As the risks have increased the global financial markets have developed new, more sophisticated methods of hedging against them.

One of the innovations in the management of interest rate and exchange rate risk is a financial swap. A swap is a transaction in which two counterparties agree to exchange two different payment streams over time, the payments being tied to subsequent and uncertain market price developments. The principal tool of this financial innovation is the unbundling or separating of different financial claims and then repackaging or bundling into combinations that better fit the counterparties' needs.

The essence of the swap technique is that it permits a separation between (a) the contracts (securities) that specify the obligations of a borrower (or rights of an investor) with respect to the direct market for funds, and (b) the ultimate cash flow characteristics that they face ¹. The separation allows access to new markets, cost savings on debt issuance, the creation of synthetic assets for investors, and enhanced, more cost-effective tools for asset and liability risk management. It further encourages an evolution of management thinking and decision making away from traditional framework set by product characteristics - which for example, distinguish cash holdings of equities or interest rate futures according to legal form and trading forum - in favour of one delineated by risk fundamentals, a list headed by those shaping a portfolio's mean and variance of prospective return ².

¹ Giddy 1990 p.6

² Hargreaves 1991 p.1-2

As flexible instruments that exploit market discrepancies and inefficiencies, swaps have provided a bridge between the markets integrating differing types of financial instruments and linked national capital markets more closer to each other, thus increasing the efficiency in intermediating financial resources worldwide.

The prominence attained by swaps in the world capital markets is evident from several perspectives : ³

- **The Size of The Swap Market**

The volume of the global swap market has burgeoned on one decade from its birth in the beginning of the 1980's to an estimated USD 2½ trillion as of mid-1990. In sheer numerical terms, the volume of swap activity overwhelms other innovations in capital markets.

- **The Variety of Participants Utilising Swaps**

Participants in the swap market can be categorised in one of two groups: financial intermediaries and end users. Today, virtually every major financial institution has established their own swap group or department committed to the promotion of swap products. At the end users' side the swaps have become a widely accepted and respected technique used by world's most prestigious financial institutions, corporations, supranational or official institutions and, indeed anybody involved in the management of asset and liability portfolios.

- **The Variety of Potential Uses for Swaps**

Swaps' capacity to be utilised in a variety of functions is one indication of their prominence. Swap transactions have been actively used to :

- * capital market arbitrage between various markets around the world,

³ Das 1989 p.3-5
Ardalan 1991 p.3-4

- * manage both interest rate and currency risk of asset and liability portfolios against sharp and unpredictable shifts in exchange and interest rates,
- * circumvent adverse market conditions or regulations which would otherwise make standard capital market transactions difficult or impossible.

- **The Variety of Swap Instruments Available**

As the market has evolved, it has grown in sophistication and has demonstrated the capacity to innovate and develop new financial instruments, within the basic framework and to align itself with evolving capital market opportunities.

Even though, the development of a swap technique has opened up many profitable opportunities for different participants in the market, the growth of these markets has nonetheless placed additional burdens on all those involved. This arises because, although the concepts behind swap transactions are inherently simple, many of the actual transactions themselves have become quite complex. They demand an increasing knowledge of all the different markets, products, and risks that exist in this field of business. And the burden is added to, because greater opportunities to solve problems by using swap techniques also imply greater opportunity costs if they are not used ⁴.

1.1 The Objective of The Study

The objectives of this study are to examine the basic features and mechanics of interest rate and currency swaps and to give reasons why and examples of how these instruments are used in corporate finance to manage financial risks in today's global environment. All these issues are studied from the practical, rather than theoretical, point of view. One purpose of this study is also to project the examined factors to the financial activities of a target company.

⁴ Price & Henderson 1986, "Foreword"

The target company is a Finnish multinational company, which has operations all over the world, main business fields being forestry, pulp and paper industries. As the financial operations of this target company are very internationally oriented, it requires the financial sector continuously to involve in adapting the latest innovations of the global financial markets. Interest rate and currency swap strategies are chosen as examples of this involvement.

This study first provides an overview of the origins and evolution of the swap market, surveys their explosive growth during the ten years of their existence and gives a picture of what the volumes and structures of the market are today. The third chapter of this study introduces the structures of interest rate and currency swaps and goes on to show what other, more complex products are available in the market. Different instruments and the mechanics of how they work are highlighted with illustrative examples.

The economic rationale, the motives for using swaps and methods of how they can be used in corporate finance are examined in the fourth chapter of this study. The fourth part also assesses the different risks that are faced by those involved in swap activities. The study next essays some perspective on pricing and valuation of interest rate and currency swaps. How the swap rate quotations are determined is studied in the light of different models available in theoretical literature and with the help of market practice and data.

The sixth chapter of this study puts all the previous chapters together and examines how interest rate and currency swaps are used in a target company. The motives for swap transactions, the methods of using them and the results of how successful the activities have been, are studied using actual examples and company data.

The final part summarizes the main points of this study and concludes the thesis with a discussion of the likely future developments in the interest rate and currency swap markets.

1.2 The Limitations of The Study

Although this study tries to provide a thorough analysis of interest rate and currency swaps, certain limitations are taken into consideration. The accounting and tax treatments of swap transactions are excluded, as the practices in various markets are still somewhat different. The regulatory and legal aspects are also omitted partly for the same reason. The continuous standardisation of the swap contract has, however, brought the documentation procedures in different markets more closer into line with each other. Examples of standardised documentation terms and conditions are given in the appendices.

The term "swap" means exchange, and it is utilised to describe a wide range of specialised financial market transactions. As the swap markets have developed, the spectrum of different products has increased very heavily. This study concentrates only to interest rate and currency swaps and related instruments. Thus, this study does not include short-term foreign exchange swaps, equity or asset swaps, debt-for-equity swaps, commodity types of swaps, such as oil or gold swaps; nor does it include some of the swap derivatives, such as caps, floors and collars.

Although swap contracts are used in every sector of financial arena, the emphasis of this study is to look the matters from the corporate point of view. This means that the marketmaking and dealing functions of financial intermediaries as well as the special features of the interbank market are excluded from this study, although the bulk of the swap market today is made up of interbank swaps.

This study focuses mainly on the utilisation of swaps to manage the liability side of the corporate's balance sheet. Thus, the creation of synthetic assets by utilizing asset swaps is excluded. This limitation is taken into consideration because most of the interest rate and currency swaps are connected to debts and because the target company's swap strategy is heavily biased toward liability management.

2 THE SWAP MARKETS

2.1 The Origins of The Market

Though swaps were not formally recognized as debt management or hedging instruments until the beginning of the 1980's, similarly structured investment tools existed during the 1970's. The exchange rate instability that followed the collapse of the Bretton Woods system made multinational companies exposed to unwelcome volatility of reported earnings from foreign operations and the accounting valuation of their assets. The controls on international capital movements that most countries maintained in those days also caused difficulties in funding overseas operations and subsidiaries ⁵.

Parallel loan agreements and back-to-back loans were created to circumvent these problems of governmental regulation and to hedge against the foreign exchange movements. A parallel loan agreement typically involved two companies, each in a different country and each having a subsidiary in the other's country. Under this type of loan arrangement, each parent company made a loan to the other's subsidiary in the same country. The loans were equivalent and made in each parent company's currency. The principal amounts of the two loans were defined by the spot currency exchange rate upon initiation; subsequent interest and amortization payments were on negotiated terms denominated in the currencies of the respective loans ⁶.

There were, however, some major drawbacks involved in the use of these loan arrangements. Because the loans were independent instruments, the default of one party did not release the other party from contractually obligated payments. If the balance sheets of the parent and its subsidiary had to be consolidated,

⁵ Hargreaves 1991 p.4

⁶ Hargreaves 1991 p.4

the parallel loan inflated each party's balance sheet. Although the two loans effectively cancel each other out, they remain on the balance sheets for accounting and regulatory purposes ⁷. This type of loan arrangement also required complicated documentation from both parties.

A currency swap contract was developed to overcome these drawbacks. The swap rewrote the separate loan agreements as a single contract for the exchange of principal and interest streams. The default risk was reduced as one counterparty would be released from continuing obligation upon the nonperformance of the other. The default risk could further be reduced by netting the payments, which meant that at each settlement date only the difference between the two interest streams was paid. A currency swap contract did not include an initial exchange of principal and thereby qualified for off-balance-sheet regulatory and accounting treatment limiting disclosure and enhancing measured return on capital ⁸. The documentation related to a currency swap was also less complicated, which further increased the popularity of this instrument.

Along with the evolving of the currency swap markets, the swap technique expanded to other areas as well. A special case of currency swap occurred when both the currencies were the same, the result was an interest rate swap. Its feasibility and value for interest rate risk management first came alive in 1981-1982 amid exceptional US dollar interest rate volatility and a deep U.S recession and was further fuelled by the eruption of the international debt crisis, the liberalization of capital markets worldwide and the new pervasive trading mentality.

The prevailing conditions at those days made it difficult for all but the prime borrowers to get long-term, fixed-rate funding at a reasonable price, so that many borrowers retained effective

⁷ Smith, Smithson & Wilford 1989 p.202

⁸ Hargreaves 1991 p.4-5

access only to short-term, floating-rate credit. Given their poor credit rating, these borrowers that faced structural excess demand for fixed-rate funds had to find something new to solve their problems.

This environment increased arbitrage opportunities based on differential pricing of identical risks in between the fixed and floating rate debt markets. Two parties each borrowed from the markets where they had the best access to or where they could get the lowest relative rates and then swapped their exposure back into the desired form of debt, thereby achieving lower cost funding than they could have obtained if borrowed directly in that market ⁹. The increased need to arbitrage between different markets and to reduce certain types of exposures led to the development of interest rate swap market.

2.2 Evolution of The Swap Functions

As in any type of arbitrage, the continuous and active exploitation of an identifiable arbitrage opportunity gradually eliminates the arbitrage. When market forces started to erode the initial credit arbitrage between fixed and floating rate markets, the search for new opportunities focused on both temporary and sustainable arbitrage opportunities between various markets. The focus on factors other than direct cost savings in raising new funds was increased as the market participants started to realize the other qualities of swap transactions.

First, swap transactions had the attraction of flexibility, as swaps could be specifically tailored to a company's exact requirements, for example from a timing point of view. A borrower could issue into a particular market at the time when the market was most receptive to its issue with the swap being separately entered into later when the swap market was most attractive for the swap transaction. In addition to their inherent flexibility, the speed with which swap transactions could be

⁹ Das 1989 p.168

undertaken was relevant. Third, the fact that swaps enjoyed a high degree of anonymity by virtue of the fact that they were private transactions, also stimulated swapping activities¹⁰.

Currency and interest rate swaps also came to be utilised as an instrument for the active management of organisation's existing liabilities, not just in new issue arbitrage. As more and more participants entered the market with differing needs, the structure of the market broadened to widen the range of instruments available and the depth and liquidity of the market increased.

Initially, swaps were custom-tailored products and brokered or matched case by case, and they involved virtually no direct exposure for the intermediary. The movement away from matched deals began as banks and other intermediaries accepted swap contracts without a counterparty, taking the risks into their own books and hedged them in other markets until they could find matching counterparties. So the role of the intermediaries changed considerably, with less emphasis on arranging the deal and more on transactional efficiency and capital commitment¹¹. Through this process known as "warehousing" the swaps evolved from a customized, client-specific products to standardized products and made swap markets more flexible and liquid.

The evolution of the swap market also corresponds to the expanding liquidity available through the secondary market, which developed as the products became more standardized. The secondary market in swaps includes three different types of transactions:

- Swap Sales to a Third Party

The volume of this activity has remained low, because many swap contracts are highly customised, which makes it difficult to find a party with similar needs.

¹⁰ Das 1989 p.169-173

¹¹ Smith, Smithson & Wilford 1989 p.209

- Cancellation of The Agreement

The counterparties agree to terminate the swap with a final difference amount being determined by the remaining value of the contract and paid in cash.

- Reversing a Position

A counterparty can unwind its swap position by writing a mirror swap to cancel out the original.

2.3 Global Swap Markets Today

Since the first swap contracts made about ten years ago, the interest rate and currency swap markets have dramatically expanded to include all the major currencies and tied together all the major capital markets. Swaps have made it possible for "small" currencies to develop an international investment and borrowing role, which previously could be played only by the currency "majors". Before the innovation of swaps only borrowers with a natural interest in the currency (for example, to finance operations in the country of issue of the currency) would consider tapping its sector of the international bond market. Swaps have made it feasible sometimes for well known borrowers to launch issues in the minor currencies with an incentive of getting an arbitrage opportunity of swapping into other currencies on cheap terms ¹².

These two markets have, however developed somewhat differently. The distinction between these two markets arises from the fact that the interest rate swap market behaves as a highly liquid and well-traded market paralleling fixed interest markets in the relevant currency. In contrast, the currency swap market tends to be a less liquid, more structured market driven by new issues entailing the exchange of comparative advantages in terms of price and/or access to the market segment ¹³. Today,

¹² Brown 1989 p.95-96

¹³ Das 1989 p.351-352

given that most businesses and financial institutions in the large, less open economies are inherently more exposed to interest rate risk, and given too that the interest rate swap is a fundamentally simpler and more standardised tool for both the end users and market makers, it should not be surprising that for most currencies the interest rate swap market has grown substantially larger than the currency swap market ¹⁴.

The largest swap market in the world is the US dollar interest rate swap market. The large size of this market reflects a number of factors including the size of the U.S. capital market itself and particularly the size of the market for fixed rate obligations both within the U.S. and in the Eurobond market. An additional factor is the fact that a large proportion of the global financing flows continue to be denominated in US dollar. The US dollar also functions as the other side of almost all currency swaps.

The most important currencies in the currency swap market are Japanese yen, Sterling, Swiss franc, Deutschmark, ECU, French franc, Canadian dollar and Australian dollar. The Swiss franc, yen and deutschmark swap markets derive their impetus from their relatively low interest rates and the relative ease of access by a wide range of issuers to private and public debt in the international and domestic markets for these currencies. The high interest currencies, such as Sterling and Australian dollar, derive their role in the swap market primarily as speculative vehicles for aggressive debt portfolio managers or companies in the local market which would have to pay a premium to access fixed rate debt ¹⁵.

The following table gives a picture of what the volumes of both the interest rate and currency swap market activities have been in recent years ¹⁶.

¹⁴ Hargreaves 1991 p.6

¹⁵ Das 1989 p.355

¹⁶ Figures taken from Macaskill 1991 p.11
(Initial source: ISDA reports)

Table 1. Total Size of The Interest Rate and Currency Swap Market (Outstanding notional principal, US dollar equivalent, figures in millions)

YEAR	INTEREST RATE SWAPS	CURRENCY SWAPS
1987	682,888	182,807
1988	1,010,203	316,821
1989	1,502,600	434,849
1990	561,468	189,288

Note: 1990 figures give the volume of swaps written in the first half of the year.

In addition to the increases in the sheer numerical factors, there are certain features that have become common to global swap market activities today. These developments include:

- Swaps have become increasingly viewed as a part of a broader family of products designed to manage risk, namely, derivative securities. Derivative products include not only swaps but options as well as hybrid option-linked swaps ¹⁷.
- In the context of increasing uncertainty about the financial health of a number of major financial institutions, companies have devised strict procedures for evaluating counterparty credit risks in the swaps market ¹⁸.
- The regulatory environment, where the credit risk entailed in swap transactions has incorporated in formal capital adequacy requirements forcing greater attention to be directed towards the management of credit exposures entailed in swaps, has become more active and standardised in recent years.

¹⁷ Ardalan 1991 p.9-10

¹⁸ Burchett 1989 p.35

3 THE STRUCTURES AND MECHANICS OF INTEREST RATE AND CURRENCY SWAPS

Simply defined a swap is an agreement between two parties whereby two sets of payments are specified, with each party agreeing to make one set of payments in return for receiving the other. However, usually the swap agreement is merely one component of a larger, more complicated package, with complementing transactions on either side. The principal advantage of swaps is flexibility: subject to some general market limitations, any type of transaction may be devised, nay type of swap may be priced. Nevertheless, there are some basic structures which define the most common swaps, and which usually form the building blocks for more complex ones.

3.1 Interest Rate Swaps

An interest rate swap is an agreement between two parties to exchange a series of interest payments calculated on the basis of different interest rates without exchanging the underlying debt. On each payment date, the two counterparties exchange interests in the same currency at rates which are either agreed upon initiation or for which a fixing procedure is predetermined for the entire term of the swap and which are applied to an amount called the notional amount¹⁹.

A number of essential features of the interest rate swap should be noted:²⁰

- The transaction amount is referred to as the notional principal or amount. It is notional in the sense that it is not usually exchanged as both participants do not obtain the underlying liquidity or funding through the

¹⁹ Banque Indosuez 1988 p.4

²⁰ Das 1989 p.33

swap. In any case, an exchange would be meaningless as each party would provide the other with the same amount in the same currency. The notional amount is important, nevertheless, as it provides the basis for interest calculations under the swap.

- The swap transaction is totally independent from any underlying borrowing transactions for either party. The swap merely affects the coupon flows of a separately undertaken liability.
- Neither lender is necessarily a party to the swap. Each borrower continues to be obligated to its own lender for the payment of both principal and interest. In fact, the lenders would not necessarily be aware that the swap had been undertaken.

An interest rate swap may be used to transform the nature of existing liabilities or assets, or the swap may exist independently enabling a swap participant to tailor its interest obligations to meet its needs in a given rate environment. The basic types of interest rate swaps are a coupon swap, a basis swap and a fixed/fixed swap which differ regarding to what kind of interest payments are being swapped.

3.1.1 Coupon Swap

A coupon swap or fixed/floating interest rate swap is the most usual and the most simple type of a swap transaction. It is also often called as a plain vanilla swap. In the classic coupon swap, the counterparties will typically have borrowed identical principal amounts for the same period, one of them borrowing on a fixed-rate basis and the other borrowing on a floating-rate basis. Through the swap, each party pays to the other an amount calculated by reference to the recipient's borrowing basis. In other words, one party agrees to pay the other party's fixed-rate interest costs in return for the

other party paying the first party's floating-rate interest costs ²¹.

The structure and mechanics of a coupon swap is best explained by means of an illustrative example. Companies AAA and BBB are both in a situation where they need financing for five years. Given the nature of their asset portfolios, views on future interest rates or other preferences, AAA would like to obtain floating rate credit, whereas BBB would rather choose fixed rate credit.

AAA is a well-known multinational company, and is able to issue fixed rate debt at 10.50 % or floating rate debt at LIBOR + 25 basis points (bps). Because BBB is a relatively small and unknown borrower in the market, its credit rating is lower than AAA's and it has to pay 11.75 % for fixed rate credit and LIBOR + 75 bps for floating rate credit. As can be seen company AAA is able to borrow more cheaply than BBB, regardless of whether rates are fixed or floating. The difference in the risk premiums is 125 bps in the fixed rate market and 50 bps in the floating rate market. The net difference 75 bps represents the potential gain from the swap. The initial situation is illustrated in Table 1.

Table 2. Coupon Swap : Initial Situation

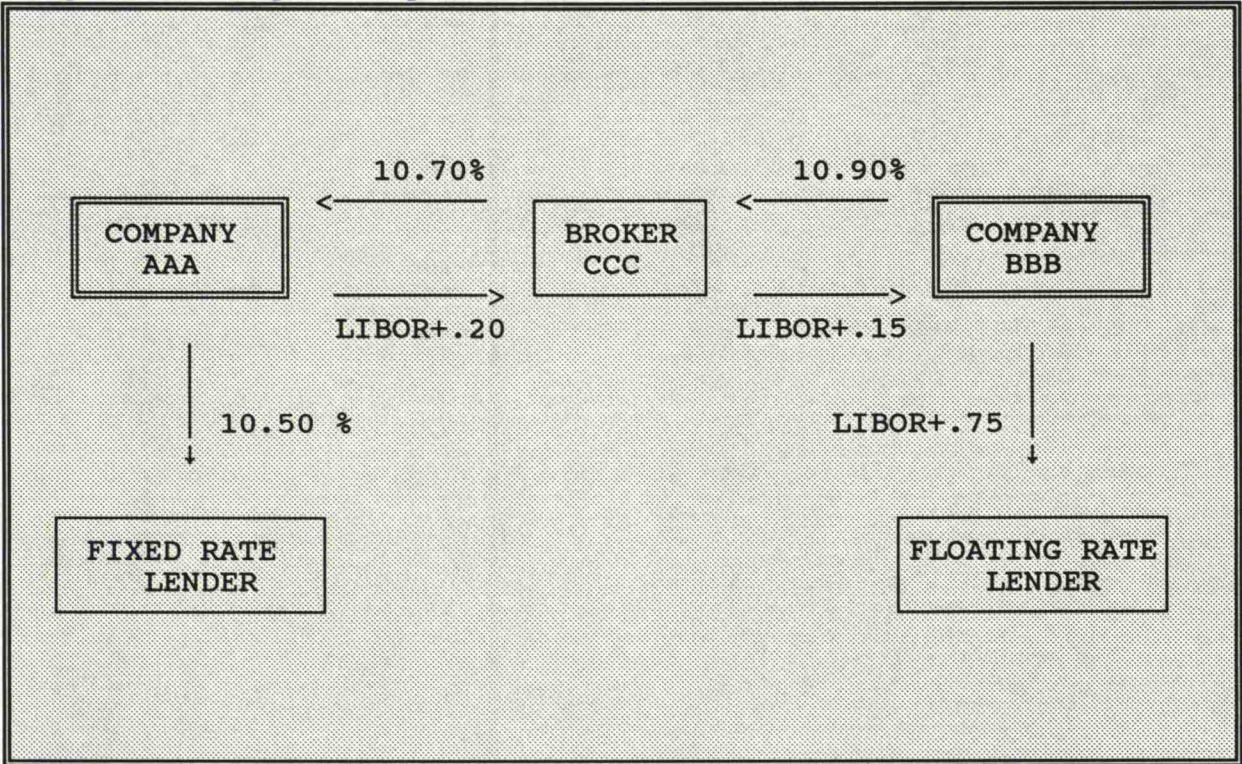
MARKET	COMPANY AAA	COMPANY BBB	RATE DIFFERENTIAL
FIXED	10.50 %	11.75 %	125 bps
FLOATING	LIBOR + 25 bps	LIBOR + 75 bps	50 bps
Net differential = 75 bps			

A financial intermediary CCC has become aware of the needs of these two companies and proposes a following swap transaction. AAA issues fixed rate debt at 10.50 % and BBB issues floating

²¹ Price & Henderson 1988 p. 42-43

rate debt at LIBOR + 75 bps. In the swap, AAA agrees to pay the intermediary CCC a floating rate of LIBOR + 20 bps and CCC promises to pay AAA a fixed rate of 10.70 %. Company BBB agrees to pay the financial intermediary a fixed rate of 10.90 % in return for a floating rate of LIBOR + 15 bps. The transaction is illustrated in Figure 1 .

Figure 1. Coupon Swap : The Transactions



The net payments after the swap transaction are listed in Table 3.

Table 3. Coupon Swap : The Net Payments

	COMPANY AAA	COMPANY BBB
PAYS	10.50 % LIBOR + 20	LIBOR + 75 10.90 %
RECEIVES	10.70 %	LIBOR + 15
NET PAYMENT	LIBOR flat	11.50 %

The result of the swap is that company AAA has effectively issued floating rate debt at LIBOR flat and company BBB has effectively issued fixed rate debt at 11.50 %. If AAA issued floating rate debt directly it would cost LIBOR + 25 bps. Thus via the swap it saves 25 bps. If BBB issued fixed rate debt directly it would be at the rate of 11.75 %. Thus via the swap it saves also 25 bps. The financial intermediary CCC gains 20 bps on the fixed part of the swap and 5 bps on the floating part. Total benefits to all parties sum to 75 bps which is equal to the net differential of the two companies' risk premiums in different markets.

Through this swap arrangement each party, companies AAA and BBB and the financial intermediary CCC, has derived some benefits. AAA and BBB both received the kind of debt that they preferred and besides this they got it cheaper than without the swap. The financial intermediary that was acting as a broker between the two companies received a fee for its services.

In the example above, the two companies could have entered the swap without the financial intermediary and thus would have shared an extra benefit of 25 basis points. The use of an intermediary is, however, a current market practice and most interest rate swaps utilise this structure for several reasons. **First**, it is difficult for companies to find a counterparty that has exactly matching needs. A large commercial bank, on the other hand, has a wide network of customers and it can more easily find parties with corresponding needs. It can also take part of the swap into its own books in case the notional principals or the maturities of the debts do not match. **Second**, if either or both of the borrowers are unwilling to accept the risk of non-payment by the other, the intermediary can guarantee that each borrower will receive the swap payment due from the other. The companies are thereby relieved of the burden of undertaking a detailed credit assesement of the counterparty for possibly many years to come. **Third**, as it deals solely with an intermediary, a company can operate anonymously in the market.

3.1.2 Basis Swap

A basis swap or floating/floating swap is an interest rate swap where floating rate interest payments calculated on one basis are swapped for floating rate payments calculated on another basis. The two floating rates can be linked to two different market indices, such as LIBOR and the United States Prime rate; or the rates can be chosen by using the same index but different reset periods, such as 3-month LIBOR against 6-month LIBOR; or both the indices and the reset periods can be different, such as 6-month LIBOR against 1-month United States Commercial Paper rate.

The market in basis swaps, which is almost exclusively confined to US dollar, originally developed primarily between the United States Prime rate and LIBOR. These transactions arose because non-United States banks were often members of lending syndicates with Prime based loan assets which had to be funded in the LIBOR market, which was their traditional funding source. By entering into a swap where they paid a specified margin under the United States Prime and, in return, received LIBOR, these banks were able to match their assets and their liabilities and lock in the profit margin on the Prime-related loans ²².

The motive to enter a basis swap transaction can also arise for a company that wants to reduce its basis risk and save in costs. A company is running a basis risk when the nature of the income from its floating rate assets differs from the floating rate interest expense on its liabilities.

For example, company AAA has invested in an asset yielding a return that is based on 6-month LIBOR rate and financed this asset by borrowing funds that are priced according to 1-month LIBOR rate. Because the two rates are set at different dates, company AAA faces a risk that the 1-month LIBOR will rise between the six monthly rate setting dates, before the 6-month

²² Das 1989 p.271

LIBOR will be adjusted. By entering into a swap transaction in which the 6-month LIBOR is sampled into monthly intervals, and in which the company receives a payment that is calculated using the average of six monthly rate settings of 6-month LIBOR and paid every six months, the company can eliminate the basis risk it is exposed to in this particular case. This type of basis swap is also known as a reset swap.

3.1.3 Fixed/Fixed Swap

An interest rate swap, where both the interest payments that are being exchanged are determined on the basis of two different fixed rates, is an example of the third basic classification of interest rate swaps. It is used by market participants to tailor their specific needs in the same manner as they use coupon or basis swaps, the only difference being that the rates are fixed. An example of this kind of a swap is a case where a company swaps the interest rate basis of its liability from a normal coupon fixed rate to a zero coupon fixed rate. As fixed/fixed interest rate swaps are not as frequently used as other interest rate swaps, they are mentioned only as one possible opportunity and are not discussed in greater detail in this study.

3.2 Currency Swaps

A currency swap is an agreement between two counterparties to exchange payments denominated in one currency for those denominated in another. When the deal is struck the parties exchange the principal amount of the swap at a mutually agreed foreign exchange rate. This exchange may however be only notional, that is there is no real flow of capital at this stage in case one of the counterparties has already covered its foreign exchange risk, for instance. On each payment date, each party pays the other interests on the notional amount at the rate which has been negotiated upon initiation or for which a fixing procedure is predetermined

for the entire term of the swap. On the maturity date, the counterparties re-exchange the principal amount at the spot rate agreed on at the beginning ²³.

The counterparties do not lend the currencies to each other but sell them to each other with a concomitant agreement to reverse the exchange of currencies at a fixed rate in the future. This is an important point, as it distinguishes a currency swap from a loan and, being a forward conditional commitment makes it a contingent obligation and therefore an off-balance sheet item ²⁴.

Unlike in the interest rate swap, where the two counterparts could easily deal directly with each other, in a currency swap it is more common to use a financial intermediary that acts as a broker between the two counterparts. This need arises from the more difficult assessment of the credit risk of the counterparty in case of the currency swap, because the exchange rate fluctuations have to be taken into account. An unpredictable exchange rate movement could impose a large loss on one counterparty in the event the other counterparty defaulting and leaving the other with a mismatched and losing position.

Currency swaps are used for the same purposes as interest rate swaps. One factor in generating currency swap business, that should not be underestimated, is the importance of speculation on exchange rate movements. Before the innovation of swaps, borrowers who raised finance in a foreign currency were committed to taking a fairly long-term view on exchange rate movement. True, they could reduce their exposure to the foreign currency by building assets in it - but that might be an inefficient use of their capital resources - or by taking positions in the forward exchange market - but that could involve significant transaction costs on roll-over dates and large variations in cash flow and in recorded profits based

²³ Banque Indosuez 1988 p.5

²⁴ Das 1989 p.37-38

on accounting conventions. Occasionally they could call the foreign currency debt for early redemption - but that could involve substantial costs. By entering into a currency swap, in contrast, the borrower can change the currency exposure of his long-term debt at frequent intervals and at low cost based on short-term exchange rate views ²⁵.

3.2.1 Fixed/Floating Currency Swap

A fixed /floating currency swap or cross-currency interest rate swap is an agreement between two counterparties where they agree to exchange interest payments calculated on a fixed rate basis in one currency for interest payments calculated on a floating rate basis in another currency. The technique will be explained by means of an example.

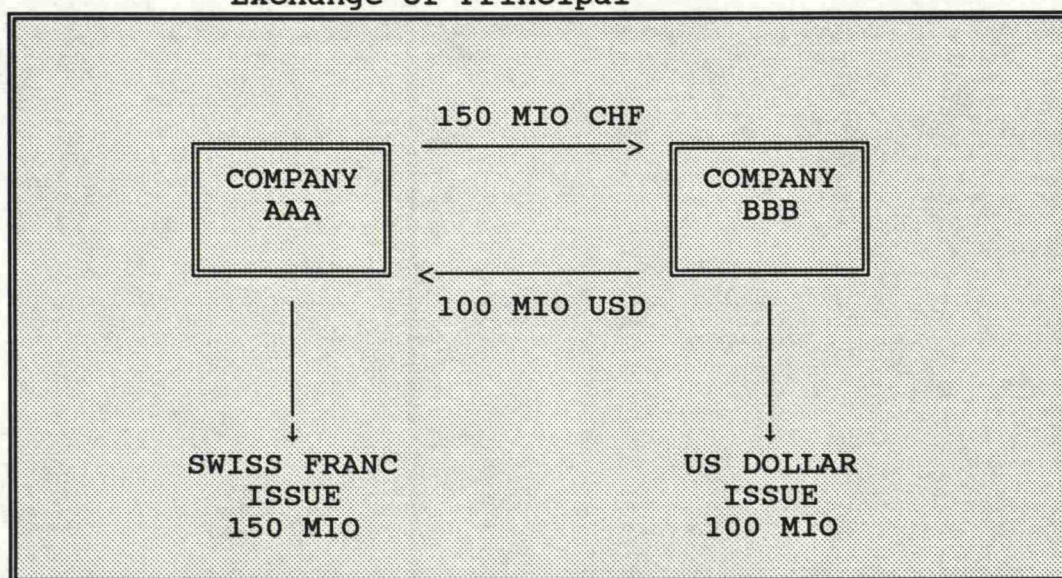
Company AAA, a Swiss based multinational, has a need for U.S. dollars, as it is planning to expand its operations in the United States. It prefers floating rate funding and is able to get it at the rate of LIBOR + 25 bps. Company BBB, a U.S. utility based in New York, wants to open a plant in Switzerland and to finance it with fixed rate Swiss franc debt. To do so directly would cost it 5.75 % per annum.

A financial intermediary CCC has become aware of the needs of these two companies. Knowing that AAA can launch a Swiss franc bond issue at the favourable rate of 5.00 % per annum and, knowing that BBB, on the other hand, can borrow cheaply in the Eurodollar market, namely at LIBOR flat, CCC suggests the following arrangement. Both AAA and BBB will issue debt in the market in which they have their greatest advantage. Then they will exchange the proceeds, and subsequently exchange debt-servicing payments, each in effect paying the other's coupons. At the end they will re-exchange the initial principal amounts, enabling each to repay the debt it has issued. CCC guarantees that the payments will be made even if the payments are not channeled through it. For this guarantee CCC charges a fee from both counterparties.

²⁵ Brown 1989 p.17

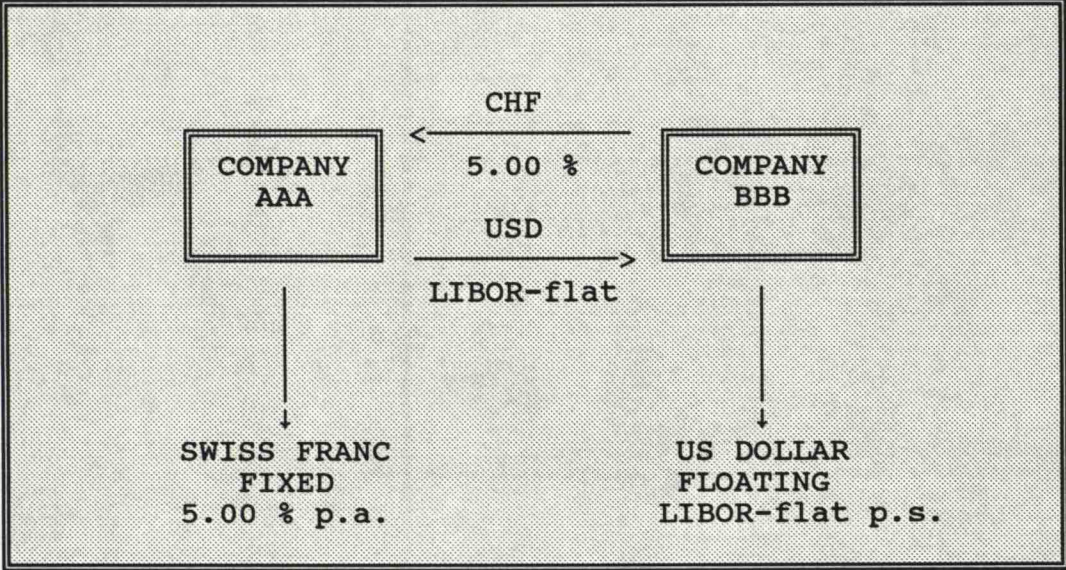
AAA issues a 5-year Swiss franc bond, receiving 150 million Swiss francs. The two parties agree that BBB will borrow an US dollar amount that is equivalent to 150 million Swiss francs at the time the issue is made. As the exchange rate is 1.50 CHF/USD, BBB will borrow 100 million US dollars. After the borrowings are done, the two parties exchange the principal amounts as illustrated in figure 2.

Figure 2. Currency Swap : Initial Borrowing and Exchange of Principal



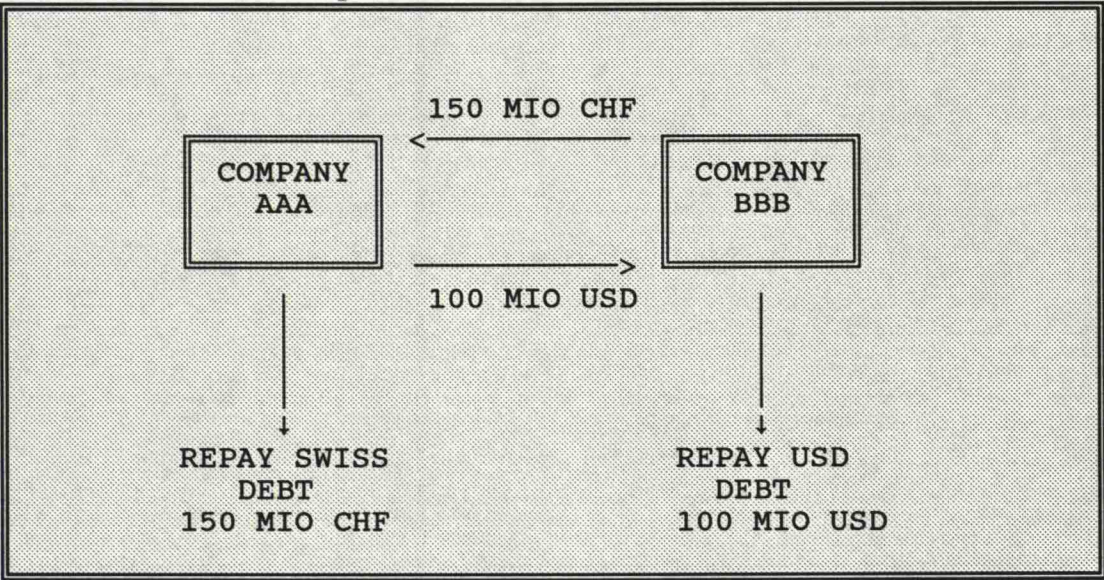
Under the terms of the currency swap, AAA and BBB agree that, on a principal amount of USD 100 million and its Swiss franc equivalent at the time of the swap, AAA will pay to BBB US dollar LIBOR flat every six months, in exchange for which BBB will pay to AAA CHF 5.00 % every year. As is agreed AAA's Swiss interest receipts and payments are a wash, leaving it with only the US dollar LIBOR payments on a net basis. Equally BBB is left with only a net Swiss franc payment. This is exactly the way both companies wanted in the first place. The companies pay the required interest payments in full amounts. The net settlement procedure is less common, because it requires the two swap flows to be translated into a common currency.

Figure 3. Currency Swap : Periodic Coupon Exchanges



At the end of five years, when the swap contract expires, the companies re-exchange the principal amounts, enabling each to repay the debt it has borrowed. The rate at which this re-exchange occurs is agreed in the beginning of the swap contract. In this example it is the spot rate that was used in the initial exchange. So what happens is, that AAA pays 100 million US dollars to BBB in return for receiving 150 million Swiss francs. The final part of this currency swap transaction is depicted in Figure 4.

Figure 4. Currency Swap : Final Re-exchange of Principal



The currency swap has enabled both companies to reduce their borrowing costs. AAA's net cost is the Eurodollar offer rate flat, 25 basis points cheaper than it otherwise would have been able to get directly. It borrowed from Switzerland, but has no Swiss franc exposure - all Swiss franc outpayments are precisely matched by Swiss franc inpayments. BBB effectively gets Swiss franc debt at a fixed rate of 5.00 % per annum, lower by 0.75 % than it estimated the all-in cost of raising Swiss francs directly. From the benefits they must deduct the swap arrangement fees for the financial intermediary, which bears the credit risk in this transaction by guaranteeing the payments that are done between the companies.

In the above example the two companies could have used their existing liabilities instead of issuing new debt. They could have also eliminated the initial exchange of principal by using the spot foreign exchange market to generate their desired currencies. However, the elimination of the initial exchange does not obviate the need to set a reference spot rate at which the re-exchange at maturity is to be effected.

The final re-exchange can also be eliminated by the parties undertaking appropriate spot transactions and by a currency difference, reflecting the appreciation or depreciation of the currencies, being paid by one party to the other at maturity ²⁶. So the crucial negotiating terms of the currency swap are the periodic coupon exchanges.

3.2.2 Cross-Currency Basis Swap

A cross-currency basis swap or floating/floating currency swap can be defined as an agreement between two parties under which one party agrees to pay an amount equal to the principal and interest payments under, e.g., the other party's Swiss franc floating rate debt, in return for the other

²⁶ Das 1989 p.40-41

party paying an amount equal to the principal and interest payments due under, e.g., the first party's floating rate US dollar debt ²⁷.

Theoretically cross-currency floating/floating swaps should not exist because a floating/floating swap is nothing more than a series of , for example, six-month forward foreign exchange contracts rolled over every six months until maturity. In practice, however, a floating/floating currency swap can be a far better alternative to a forward foreign exchange transaction. This is because one avoids the spread between bid and offer rates every rollover date and the cash flow effect of the difference between the contracted forward rate and the spot rate at rollover ²⁸. By using the cross-currency basis swap, a market participant can, in addition, achieve a term commitment for several years. This is not usually feasible in the forward foreign exchange markets.

3.2.3 Fixed/Fixed Currency Swap

A fixed/fixed currency swap is an agreement where fixed interest payments in one currency are exchanged for fixed payments in another. The most often used example of this kind of a swap is the currency swap between the World Bank and IBM in 1981. It has become famous as it was not until then, when currency swaps became an established feature of international capital markets. A brief summary of this historic transaction is set out in the following example ²⁹.

This celebrated currency swap transacted against a capital market issue was undertaken in 1981. IBM needed to raise substantial funds and as the amount required was greater than

²⁷ Price & Henderson 1988 p.67

²⁸ Das 1989 p.47-48

²⁹ This example is directly quoted from
Das 1989 p.7

could be raised in any one capital market, IBM launched a worldwide borrowing programme which included raising large amounts in the Deutschmark and Swiss franc capital markets. The proceeds of these loans were sold for US dollar and remitted back to head office where they were used for general corporate funding purposes.

Coincidentally, the World Bank had a declared policy of raising funds in currencies with low interest rates, such as the Deutschmark and the Japanese yen. It was faced with a problem in that its demand for fixed rate funds in these currencies was greater than the capacity of the respective capital markets to support. The third ingredient to this transaction was that the US dollar had appreciated against the Swiss franc and the Deutschmark from the time IBM borrowed these currencies to the time it entered into the swap agreement with the World Bank creating a significant unrealised foreign exchange gain.

IBM was approached to see if it would be interested in locking in the capital gain on its Swiss franc and Deutschmark borrowings and effectively converting these liabilities into simulated US liabilities. At the same time, the World Bank was asked whether it would like to complement its Swiss franc and Deutschmark borrowing programme by raising US dollars and converting the borrowing into Swiss francs and Deutschmarks via a fixed/fixed cross-currency swap with IBM.

The result was that the World Bank issued a US dollar fixed rate Eurobond with a maturity exactly matching IBM's Swiss franc and Deutschmark debt, and at the same time entered into a swap with IBM. Under the swap contract IBM agreed to pay all the future interest and principal payments on the World Bank's US dollar Eurobonds in return for the World Bank agreeing to pay all the future interest and principal payments on IBM's Swiss franc and Deutschmark fixed rate debt.

3.3 Derivative Instruments

The need to incorporate additional flexibility within the basic swap structure to cater for various asset liability management strategies, has led to the development of different derivative swap instruments. The over-the-counter nature of the swap market has allowed the creation of many highly sophisticated products, the development which is limited only by the imagination of the market participants. These variations on conventional swaps involve changes in the basic parameters of interest rate and currency swaps as well as in the form of execution of these instruments.

3.3.1 Forward Swap

A forward swap is, as the name implies, a forward contract to engage in a swap on a particular date in the future on terms decided today. As in normal coupon swap transaction, the party entering into the forward swap transaction can use the swap to convert floating rate liabilities into fixed rate ones or vice versa. There are two types of forward swaps ³⁰ :

- **forward swaps** in which the party entering into the contract is a fixed rate payer; and
- **reverse forward swaps** in which the party entering the transaction is a payer of the floating rate

The risk of a relative funding costs highlights a problem corporate treasurers may face when planning future debt structuring : the company may require financing at some known date in the future and is concerned over interest rate levels at that time. Rather than risk passing up what may be considered a currently favorable interest rate environment, the debt manager may seek to lock in today's funding levels. The company though, may not be in a position to borrow today .

³⁰ Das 1989 p.250

The treasurer has the choice of hedging in the futures markets or in the swap markets. The futures markets alternative has, however some potential difficulties. First, there may not be a futures contract matching the maturity of the company's preferred repayment period, leading to hedging basis risk if the yield curve does not change in a parallel fashion. Second, if the delay period is longer than anticipated, the hedge may expire due to the limited life of the futures contract. Third, if rates ease, the company will still be forced to finance at the locked rate in higher rate ³¹.

A forward swap can be utilized to overcome these difficulties. The company may enter into a forward swap agreement in which it will pay the locked in fixed rate for its desired maturity and receive floating after a specified delay period. All the details of the agreement can be tailored to the company's specific requirements. The cost to the company depends on the current shape of the yield curve. In a flat yield curve environment, the forward swap will not require any payout ; in an inverted environment, the counterparty will be a net payer; and in a positive sloping environment, the company will have to pay a premium.

Forward swaps can also be used to take advantage of, for example, company's inside information about the changes in its credit rating or locking in of existing profits or value in its current portfolio of liabilities.

3.3.2 Options on Swaps

An option on a swap, or swaption as it is also called, is an agreement where in return for an upfront payment (premium), the buyer or holder of the swaption obtains the right but not the obligation to enter an interest rate or currency swap at a pre-specified yield at some date in the future. Swaption usually entails an option on the fixed rate component of a

³¹ Poser 1990 p.9

swap. A payer's swaption (put swaption) enables the buyer to pay fixed rate on the swap; a receiver's swaption (call swaption) gives the buyer the right to receive fixed rate ³².

The size of the swaption premium is a function of general market volatility, with factors such as the period of the option, the period of the underlying swap and the fixed rate of the underlying swap. A swaption may be European style, under which buyers may only exercise the option on a specific day, or American style, under which they can exercise the swaption at any time during the option period ³³.

A swaption allows its users to protect themselves against unfavourable interest rate movements but at the same time to benefit from unforeseen favourable interest rate movements by enabling them to initiate a swap transaction during a specific period at a pre-determined rate ³⁴. For example, if interest rates fall below the strike rate, the buyer of the call option may exercise the contract and receive fixed while paying floating. The swap entered via the swaption will be more favourable to the call swaption holder since the fixed rates received are higher than the market's, while the holder pays market floating rates.

A firm could also use a swaption to lower the effective interest cost of a callable bond. The issuer would write a receiver swaption to expire at the call date with a strike level equal to the bond's coupon rate. If rates fall below the strike level, the issuer will be exercised and enter into a swap with the same coupon already being paid, but has received the upfront premium from the swaption. The swap could then be unwound and the borrower could issue fixed debt at prevailing interest rates ³⁵.

³² Gray 1991 p.11

³³ Ross 1990 p.107

³⁴ Ross 1990 p.107

³⁵ Poser 1990 p.8

Swaptions are much more flexible than exchange traded options markets with the user being able to specify exercise dates, amounts, specific exercise rates and other structural aspects without the constraint of standardised exchange options and their administrative procedures such as deposits and margins. A particular advantage of options on swaps for borrowers or investors who traditionally use swaps to manage their portfolios is that such structures provide an option on the all-in costs of funds and, consequently, avoid the risks associated with changing spreads between swap rates and underlying government bond rates on which exchange traded and over the counter options are available ³⁶.

3.3 Other Swaps

In addition to the swap instruments examined earlier in this chapter there are many other structures that are used in the swap markets. Next, some of these structures will be listed in order to underline the flexibility of the interest rate and currency swaps to be tailored in multitudinous variety to the precise needs of the end user, often as key constituents of elaborate structured financing.

Amortising swaps, as the name implies are structured so that the payments are calculated by reference to an amortising principal amount and are commonly used to hedge a stream of amortising payments.

A **Callable swap** allows the fixed rate payer an option to call (terminate) the swap without penalty. For this right the fixed rate payer has to pay an up front fee, which is in effect an option premium. In the case of the **Puttable swap** a fixed rate receiver has the option to cancel the swap at some future date without further penalty by paying a premium to the provider of the puttable swap ³⁷. Callable and puttable

³⁶ Das 1989 p.279

³⁷ Giddy 1990 p.39-40

swaps are used, for example, by borrowers whose underlying borrowings allow a corresponding early retirement or are otherwise subject to a change in maturity ³⁸.

In an **Extendable swap**, one counterparty gives the other an option to extend the swap for a further period of time at the agreed rate, the decision to extend being at the other counterparty's discretion and taken at the end of the initial maturity date of the swap contract. In exchange for this option the first counterparty usually gets a better than a market rate to be paid in the initial swap transaction ³⁹. Extendable swaps are economically equivalent to callable and putable swaps, for example, a borrower who has a 3-year swap that it may extend to seven years is in the same position as a borrower with a 7-year swap that it may call after three years ⁴⁰.

In a **Zero coupon swap**, the fixed rate payments on one side are only payable at maturity. The notional interest payments are compounded over the life of the swap at the agreed swap rate.

Premium or Discount swaps entail either an up-front payment by the swap provider in return for higher running coupon payments or its reverse, that is, swaps entailing an up-front payment to the swap provider in return for lower subsequent swap payments. The basic rationale for such transactions is the acceleration or deferral of interest payment for cash flow or tax advantages ⁴¹.

Treasury locks guarantee the base level over which the swap will be priced when the delay period has passed. The actual mark-up is not set until the delay period has passed. The firm is betting that either its financial health will improve

³⁸ Strupp 1988 p.122

³⁹ Sorab & Hodgson 1991 p.52

⁴⁰ Strupp 1988 p.122

⁴¹ Das 1989 p.265

so that it can command a tighter spread to Treasuries, or that similarly rated credit risk premiums will narrow during the period that the lock is in effect ⁴².

Spread locks enable an end user to lock in the two components of the swap rate at different points in time. Specifically, they allow the end users to initially lock in the swap spread and defer setting the base Treasury yield on the fixed rate side of the swap to a future point in time ⁴³.

Cocktail swaps are transactions that involve various types of swaps, including both interest rate and currency swaps. They are also called **multi-legged swaps** and they bring together a number of counterparties whose positions net out in aggregate ⁴⁴.

Superfloater swap is a swap where the counterparty pays fixed and receives floating and at the same time sets upper and lower strike rates whereby they can leverage their cover. For example it is possible to set the upper strike so that the floating yield on the roll dates will move at a predetermined ratio. That is, for each point that the bank bill increases above the upper strike the counterparty will receive the benefit of the ratio, effectively lowering the overall cost of funds. Alternatively, in the event that the bank bill falls below the lower strike, the floating rate will fall at a predetermined ratio, effectively raising the cost of funds compared to the floating rate. The superfloater provides the necessary fixed rate protection plus the ability to significantly benefit from any increases in short-term floating rates ⁴⁵.

⁴² Poser 1990 p.10

⁴³ Chandrasekhar 1991 p. 221

⁴⁴ Hammond 1987 p.69

⁴⁵ McKeith & L'Estrange 1991 p.234-235

4 SWAPS IN CORPORATE FINANCE

Interest rate and currency swaps have become an integral part of corporate finance. When first introduced, they were used only by the largest companies which had already established sophisticated policies to manage their asset and liability portfolios. As the swap products and market practices became more standardised, also the smaller companies realised that they can benefit from the swap activities.

This chapter examines the economic rationale for swaps, the motives to enter into these transactions and the methods of how they can be used in corporate finance. Also the risks that the companies may face are studied in this chapter.

4.1 Economic Rationale for Swaps

Companies enter into swap transactions in order to benefit from changing the characteristics of their financial claims. Opportunities to benefit from these activities and to make profits, would not arise if each type of claim could be bought or sold at a price at least as good as the cost of replicating that claim by means of another claim plus a swap. These conditions are not fulfilled, however and so it is the incomplete markets and market inefficiencies that provide the economic rationale for swaps ⁴⁶.

Swaps can flexibly be used to exploit any discrepancies in markets that manifest themselves in different interest and/or exchange rates in different segments of the same market. Various explanations for these differences in interest and/or exchange rates have been given and some of them will be studied in this section.

⁴⁶ Giddy 1990 p.6

4.1.1.1 The Theory of Comparative Advantage

The concept of comparative advantage is used in international trade theory to explain why countries trade. The theory says, that each party should specialise in the production of those goods for which it has a relative comparative advantage. Having done so the parties can exchange these goods through trade for their desired mix of commodities and hence increase their welfare beyond that which would have been possible had they attempted to provide for all their needs directly ⁴⁷.

Swaps provide for the extension of the theory of comparative advantage from the commodity and service markets to the capital markets. As an example of how the theory works, let's take two companies with different credit ratings. A borrower with an AAA-credit rating would be expected to get cheaper financing than a BBB-rated company in all markets regardless of whether rates are fixed or floating. There are, however quality differentials between fixed and floating rate credit which means that usually the credit spread between the AAA and the BBB is higher for fixed than for floating rates.

Even if the BBB-rated company has an absolute disadvantage in both the fixed and floating rate markets, it still pays for it to specialise in borrowing in the markets in which it has a comparative advantage (floating), and then engage in a swap with the AAA, which has borrowed in the markets in which it has a comparative advantage (fixed). Thus both companies can save in borrowing costs.

The following table gives a detailed example of how the theory of comparative advantage works in the case of swaps being used to lower the borrowing costs.

⁴⁷ Ardalan 1991 p.5

Table 4. The Theory of Comparative Advantage

Company AAA can borrow cheaply in both the fixed and floating rate markets, while it costs company BBB more to borrow in both markets. AAA has an absolute advantage in selling both types of securities, but its advantage is greater in the fixed rate market, that is, it has a comparative advantage there. BBB has a comparative advantage in the floating rate market. AAA has a need to get floating rate financing, while BBB needs fixed rate funding.

The net difference between AAA's two advantages is 1.0 % ; this is the quality difference by which the two credit markets price the companies' debt differently, and so this amount represents the potential gain from the swap. The two companies see the opportunity to obtain funds more cheaply than in the absence of a swap, and they make a following arrangement.

AAA and BBB both borrow in the market in which they have comparative advantages and then enter into a fixed/floating interest rate swap contract, where they agree to exchange their debt-servicing payments. AAA borrows fixed and swaps to floating and BBB borrows floating and swaps to fixed.

The rates and the results from these transactions are presented below.

COMPANY	FIXED RATE	FLOATING RATE	SWAP PAY	SWAP RECEIVE	SAVING
AAA	10 %	LIBOR+ 1%	LIBOR+1½%	11 %	½ %
BBB	12 %	LIBOR+ 2%	11 %	LIBOR+1½%	½ %
Diff.	2.0 %	1.0 %			
Net diff.		1.0 %		Total savings	1.0 %

From the borrowing done and the payments on the swap, company AAA ends up with an effective cost of funds of :

$11\% - 10\% - (\text{LIBOR} + 1\frac{1}{2}\%)$, which equals $\text{LIBOR} + \frac{1}{2}\%$, a saving of 50 basis points.

Similarly company BBB's net cost is :

$(\text{LIBOR} + 1\frac{1}{2}\%) - 11\% - (\text{LIBOR} + 2\%)$, which equals 11% , a saving of 50 basis points.

In this example the two parties end up with dividing the net savings, but other combinations are possible as well. In general, the total net savings, however distributed, must add up to the net difference between the two markets, and each party must gain something for the swap to be worthwhile.

The comparative advantage argument can be criticized by taking into consideration the fact that arbitrage eliminates any comparative advantage. For the concept of comparative advantage to make sense as a rationale for swaps, immobility would have to exist in the financial markets. This assumption does not square with observations of the financial markets. The highly integrated capital markets will provide the BBB access to fixed-rate markets, either directly or indirectly by AAA-rated firms borrowing fixed and relending it to BBB-rated firms ⁴⁸. It is true that the swap market has become very competitive, with few barriers to entry. This does not, however, mean that the theory would not hold, it just has an effect that the profits from swapping have been reduced, but they are still significant enough to outweigh the costs and risks involved.

4.1.2 Credit Market Imperfections

The reason for comparative advantages to emerge is due to the fact the credit markets treat market participants differently, in a subjective fashion. This means that there arises some market imperfections that can be exploited by swaps to generate profits. These market imperfections or market inefficiencies can be only temporary ones, but they still make it possible to benefit from swap transactions. The following lists some of the imperfections that appear in different markets ⁴⁹.

Home market effect. Investors consider domestic companies as less risky than foreign companies of equal credit quality. This may be because they are more familiar with the company's name or business or that there is more information available to the investor about the domestic company. There may also be statutory restrictions on institutional investors that forbid them from holding more than a small amount of foreign currency bonds. There may also be effects due to cultural and language differences as well as a certain amount of patriotism.

⁴⁸ Smith, Smithson & Wilford 1990 p.215-216

⁴⁹ The list is mainly adapted from Giddy 1990 p. 9-12 and supplemented by data from Smith, Smithson & Wilford 1990 p.213-220

Familiarity effect. Investors prefer companies they know and are familiar with. A proven or frequent borrower may get credit on better terms than a new issuer to the market, because the amount of information available on familiar companies makes it easier and less costly for investors to monitor their financial performance. A frequent borrower may get better conditions also by launching issues in a wider range of different markets - tapping sources of funds which would not have otherwise been in the borrower's traditional issues, and swapping the proceeds into the appropriate currency.

Differing risk perceptions between markets. The public capital market and the bank credit market appear to evaluate and rate companies differently in terms of credit risk. The bank credit market tends to more readily accept the additional risk that a lower quality borrower provides. This may be because banks hold a more diversified portfolio of loans, or because they are in a better position to monitor borrower behaviour and reduce their actual losses on bad accounts by working with the borrower. Partially in contrast to this may be the lower risk premium required on liquid, tradable securities versus illiquid bank loans; but few issues of low quality borrowers can be described as liquid.

Government restrictions. In most markets, there is government regulation that seeks to limit the amount of debt issued by foreign companies to protect domestic investors from increased risk and to preserve market borrowing capacity for domestic companies. An example of this is the queuing system that some countries use to force non-residents to sign up on a wait list until it is determined the market can handle the issue. This is done to keep the market from being overburdened with too many foreign company debt issues. This delay between the decision to issue and the issue itself can be a major problem for the borrower in terms of the evolution of terms and conditions, as well as of immediate treasury needs. A bond swap can get around all this by allowing the non-resident to enter the market directly through a counterparty who has favorable standing in the market.

Tax and regulatory arbitrage. Tax and regulatory arbitrage is a situation in which the company can earn a risk-free profit by exploiting differences in tax or regulatory environments. For example, a company issuing dollar-denominated, fixed rate bonds in the U.S. capital markets has to comply with the requirements of the U.S. Securities and Exchange Commission. In the less regulated Eurobond market, the costs of issuing could be considerably less. However, not all companies have direct access to the Eurobond market. The swap transaction provides companies with access and permits more companies to take advantage of this regulatory arbitrage. The swap market also allows an unbundling of currency and interest rate exposure from the tax rules of different markets in some very creative ways .

A good example of this tax and regulatory arbitrage is the way foreign investors took advantage of special tax and regulatory conditions in Japan. In 1984, zero-coupon bonds received particularly favorable tax treatment in Japan. The income earned from holding the zero-coupon (the difference between the face value of the bond and the price at which the bond was purchased) was treated as a capital gain; and, since capital gains were untaxed, the effect was to make the interest income or the zero-coupon nontaxable for Japanese investors. The result was that a zero-coupon bond sold to Japanese investors would carry a below-market interest rate.

In contrast, the U.S. tax authorities regarded the zero-coupon bond like any other debt instrument. Any U.S. firm issuing such a bond was permitted to deduct the imputed interest payments from income, thereby maintaining its tax shield. As the two tax authorities treated the same instrument differently there existed a tax arbitrage opportunity.

A number of U.S. firms issued zero-coupon yen bonds and were pleased with the savings they achieved in interest expense. However, most U.S. issuers were much less pleased with the yen exposure that came with this bond. The best financial instrument for neutralizing this yen exposure was a currency swap.

Nature of counterparties. The nature of each counterparty will determine the type of assets and liabilities it will want to carry. The most common contrast is that of a commercial bank and an industrial company. The bank's assets are the loans issued to its customers and these are typically short term and on a floating rate basis. However, since banks have high credit standing and normally generate funds from customer deposits, they leave untapped the various bond markets. Their bond issues will have a rarity value that allows them to issue at lower rates. The fixed rate on these bonds is, however undesirable to the bank so it will swap the fixed rate payments for floating rate debt payments to match its assets while still be able to take advantage of the cheap bond financing.

An industrial company, on the other hand, will hold most of its assets in the form of fixed assets and inventory. These assets support operations that typically generate a fixed rate of return from year to year. To offset this, the company will want fixed rate bonds to finance its assets. Often, the capital investment needed will be so high that the market gets saturated with the industrial's bonds, forcing it to pay a high premium or to go to the floating rate credit market. To avoid the premium the industrial corporation will obtain the undesired floating rate financing.

As a result, the bank and the industrial company will be in opposite positions. By swapping, they can both obtain their desired types of debt while taking advantage of lower rates in different markets.

Subsidized financing. A currency swap may allow a company to take advantage of favorable export financing and other government programs that may only be available in a currency not desirable to a company. The company could then swap the the exchange risk out of the subsidized borrowing. Subsidized financing may also be exploited in the interest rate market inside the country, where government subsidizes development area credits, for example.

Information asymmetries. Companies can utilise the inside information of their own credit standing in the future, to create profitable debt arrangements. For example, suppose a company desired fixed rate funding for a project, but the company had inside information indicating that its credit rating would improve in the future. The company does not want to issue in the fixed rate market because the quality differential for its debt is greater there. Instead it will issue floating rate debt and swap to fixed when the improved credit rating materializes and it can get better terms.

Availability of funds in different markets. The supply and demand for funds in one market may not necessarily have the same relationship in another market. This may be because two countries are in different stages of an economic cycle or because reserve requirements for banks are lowered, releasing a large amount of funds into the bank credit market. Excess demand in a market will drive rates up while excess supply will force rates to go down. Obviously, borrowers will want to enter markets where there is excess supply. Those markets may not have the desirable interest rate or currency traits, so a swap can be used to arbitrage the differing economic conditions between markets and provide the desired traits to the borrower.

Other imperfections. A company's banking relationships may also create arbitrage opportunities in different markets. If company's ties are strong with an investment banker, it may be able to place an issue at a lower relative cost. Strong relations with a commercial bank may indicate preferential treatment in the bank credit market at floating rates.

The market imperfections that are listed above and that create quality differentials between different borrowers in different markets are not static conditions, but appear rather as temporary opportunities for market participants. By exploiting these opportunities, the swap transactions, in fact, by their very nature destroy the imperfections that give rise to their use.

4.2 Key Uses of Swaps

The unique characteristics of swaps which allow a fundamental unbundling and restructuring of various aspects of borrowing and investment transactions and the great flexibility and ease of execution of these instruments in different circumstances, have provided the companies with a wide range of new opportunities to increase the efficiency of financial management.

The motives for engaging in swapping activities and the selection of different swapping strategies vary depending on the corporation's attitude toward risk; specific interest rate or exchange rate expectations; the shape of the interest rate and swap yield curves at a given point in time; and on the accounting and tax considerations, including the reported profit or loss on particular transactions. These factors all together determine whether the swaps are used for cash flow management, for hedging interest rate or currency exposure generated from the structure of normal business, for speculation, or whether the swaps are used at all.

The alternative uses of interest rate and currency swaps can be classified under two basic categories, namely new issue arbitrage and asset liability management. Within these basic classifications the swaps can be used in various ways. The purpose of the next section is to analyse these key uses of swaps.

4.2.1 New Issue Arbitrage

New issue arbitrage refers to the role of swaps as a cost competitive new fund raising technique whereby combining the issuance of debt with the concurrent interest rate or currency swap can create a synthetic liability that, in the specific circumstances, can provide financing at a cost less than that available through conventional direct access to the relevant

market. The factors motivating new issue arbitrage include ⁵⁰:

- **Minimisation of borrowing cost.** This objective is self-evident, but it alone is not satisfactory because it does not of itself provide guidance as to the desirability of a transaction per se. Cost minimisation has significance only within a defined asset liability management requirement profile where the relevant currency and interest rate exposure basis of the borrowing has been specified. The desired maturity profile of the debt and liquidity considerations have to be specified also in connection with the minimisation of borrowing costs.
- **Diversification of funding sources.** The desire on the part of borrowers to diversify their sources of funding on a global basis, is also a critical factor shaping the process of new issue arbitrage. The need to diversify the sources of funding for a particular borrower through broadening the investor base in its debt is exacerbated in the case of a number of borrowers whose borrowing requirements relative to the size of their domestic capital market are large.
- **The success of the borrowing transaction and ensuring continued market access.** The need to ensure success of the transaction and to maintain continued market access relates to the desire of borrowers to maximise their arbitrage gains from a particular market segment over a medium to long time horizon. This requirement, while largely vouchsafed by borrowers, has in recent times been sadly neglected with issuers grossly mispricing issues to accomodate their cost targets with resultant investor backlash.
- **Specific factors inhibiting access to particular capital markets.** The major restriction of relevance is regulatory factors such as registration requirements in particular markets which must be satisfied as a precondition to the issue of debt securities.

⁵⁰ Das 1989 p.183-187

- **Flexibility of liability management.** The difference in flexibility between a direct borrowing and a borrowing combined with a swap may derive from a number of sources and may be positive or negative in impact.

Interest rate and currency swaps have become very widely used in connection with new issues of debt. The most extreme example is that of the Eurodollar market, where swap-driven primary issuance accounted for nearly 70 % of the total in 1989, but only for about 3 % of the total as recently as 1985 ⁵¹. The next two examples describe some of the benefits of swap-driven primary issuance in different circumstances.

Example 1. ⁵²

A borrower wants to raise funding in US dollars as cheaply as possible and at the same time diversify its funding source and broaden the investor base of its liabilities. A financial intermediary suggests swapping an Australian dollar/Japanese yen dual currency bond issue. The fundamentals of the issuance and swapping of an AUD/YEN dual currency bond issue are exactly the same as for swapping any other debt issuance, with the exception that the fixed coupons and the redemption of the principal of the bond are in different currencies. This structure is organized to appeal to a particular group of investors and the issuer tries to take advantage of a credit or structural arbitrage based on investors' preferences to obtain low-cost funding through the swap market.

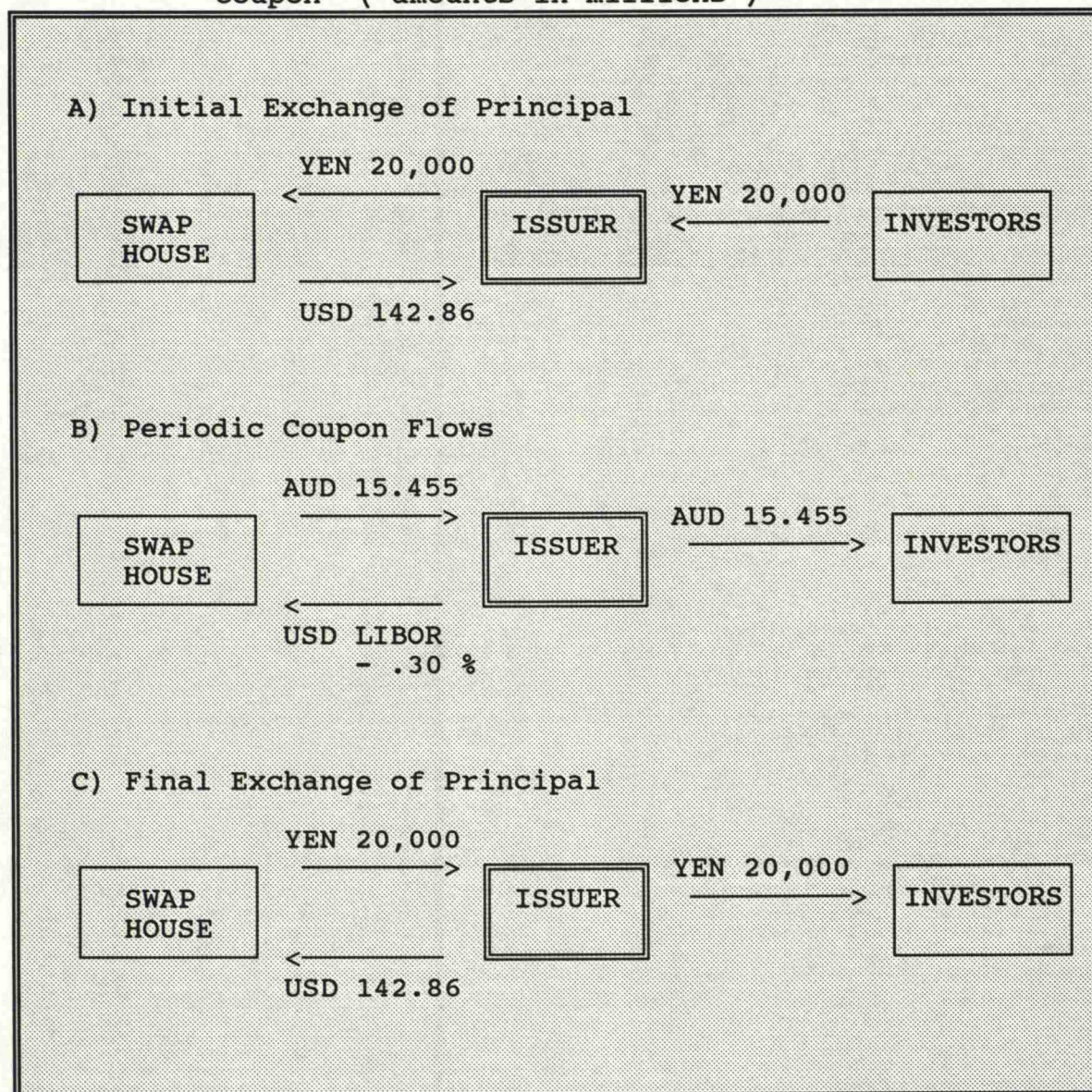
The face value of this hypothetical 5-year dual currency bond is YEN 20 billion carrying 8.50 % AUD annual coupons. This issue is swapped into US dollars with the financial intermediary (Swap House) according to a contract where the USD interest rate is agreed to be LIBOR- .30 % . The relevant exchange rates are YEN/AUD 110.00 and YEN/USD 140.00 . The flows of principal and

⁵¹ Benavides & Lipsky 1991 p.166

⁵² The example is taken from Morley 1991 p.311-319

coupon among the parties to the swap transaction are depicted in Figure 5.

Figure 5. Dual Currency Bond Swap: Flows of Principal and Coupon (amounts in millions)



Through the issuance of a YEN 20 billion bond with AUD 8.50 % annual coupons based on a YEN/AUD exchange rate of 110, the issuer has raised almost USD 143 million in funding at a margin of 30 basis points below US dollar LIBOR via the swap mechanism without carrying out any Japanese yen or Australian dollar exposure on the borrowings. Table 5. shows how the issuer's obligations under the dual currency bond are completely immunised

against interest and exchange rate risks by the customised nature of the swap hedging into a floating US dollar cost of funding.

Table 5. Dual Currency Bond Swap: Issuer's Cash Flows
(amounts in millions)(brackets describe negative cash flows)

Year	Bond Cash Flows	Swap Receipts	Swap Payments	Net Cash Flows
0	YEN 20,000	USD 142.86	YEN(20,000)	USD 142.86
1	AUD(15.455)	AUD 15.455	USD(L-.30%)	USD(L-.30%)
2	AUD(15.455)	AUD 15.455	USD(L-.30%)	USD(L-.30%)
3	AUD(15.455)	AUD 15.455	USD(L-.30%)	USD(L-.30%)
4	AUD(15.455)	AUD 15.455	USD(L-.30%)	USD(L-.30%)
5	AUD(15.455)	AUD 15.455	USD(L-.30%)	USD(L-.30%)
5	YEN(20,000)	YEN 20,000	USD(142.86)	USD(142.86)

For the issuer, this swap-driven primary issuance has offered an alternative low-cost funding source, which is based on sophisticated structuring of the issue. The attraction of the dual currency structure to the investors has enabled the issuer to raise low-cost swapped funding and at the same time diversify away from its traditional investor base.

Example 2. ⁵³

A Finnish corporate is seeking ways to obtain 4-year funding to finance its activities in Japan. Because of the nature of the underlying activities that are being funded, the company desires the debt to be denominated in YEN and the rate to be fixed.

The company has a low credit rating and cannot consequently get good terms in the Japanese credit market. It has already

⁵³ This example, although slightly modified, is taken from Giddy 1990 p.20-21

made two private placements in Euroyen and is uncertain if it can reach a sufficient demand for its name from YEN investors. It does not have a euro-commercial paper program already set up and does not want to implement one because the present funding needs are punctual and accurately defined. If it were to ask a bank loan it would have to pay a margin which it considers too expensive. The company next wants to know if it should try to get the YENs directly or undertake a swap-driven transaction.

The Corporate Treasurer of the Finnish company has asked for advice from several banks concerning different financing options. One Japanese bank has suggested a Euroyen bond. Taking fees into account, the all-in cost of a 4-year YEN deal would be 6.55 %. The Treasurer has also found that the company could obtain a syndicated bank loan facility denominated in USD, at LIBOR + 1/8 % adjustable quarterly. A third possibility would be to rely on fixed rate USD financing at the subsidized rate of 8.00 % from the Finnish Government's export credit agency. The Treasurer has also obtained quotations for 4-year swaps from several banks. The best rates he has been able to obtain are :

- **Interest rate swap.** U.S. Treasury + 75-80 bps, semi-annual.
- **Basis swap.** 6-month LIBOR against 3-month LIBOR + 5-8 bps.
- **Currency swap.** YEN/USD 6.70-6.80 %, annual.

The 4-year U.S. Treasury yield at the time is 7.70 %. The Corporate Treasurer's task is to couple the swaps with the financing alternatives in such a way as to express them on a comparable basis, and then to find the cheapest way to get fixed rate YEN funds for four years. The first step is to lay out the three different ways of achieving fixed YEN debt.

Table 6. Example 2: Different Alternatives

<u>EUROBOND</u>	<u>SYNDICATED LOAN</u>	<u>EXPORT CREDIT</u>
* Borrow fixed rate YEN directly at 6.55 %.	* Borrow floating rate dollars at 3-month LIBOR+ 1/8	* Borrow fixed rate dollars from the government at 8 %
	* convert 3-month LIBOR into 6-month LIBOR via basis swap, and	* convert these into floating 6-month LIBOR via interest rate swap, and
	* convert 6-month LIBOR into 4-year fixed YEN via a YEN/USD currency swap.	* convert 6-month LIBOR into 4-year fixed YEN via a YEN/USD currency swap.

Next, the Corporate Treasurer can obtain approximate costs of the second two alternatives by summing the coupon flows and exchanges, taking care to select the appropriate side of the pay/receive spread in the swap quotations. Swaps are usually quoted on a bid and offer basis; the bid, the lower of the two, is what the market maker would be willing to pay in exchange for 6-month LIBOR, while the higher rate is what the quoting bank would be willing to receive in exchange for 6-month LIBOR. The approximate costs of the syndicated bank loan and the export credit alternatives are depicted in Tables 7 and 8.

Table 7. Example 2: Syndicated Bank Loan

	PAY	RECEIVE
* Borrowing	3-mo \$LIBOR+.125 %	
* Basis Swap	6-mo \$LIBOR	3-mo \$LIBOR+ .05 %
* Currency Swap	4-year YEN 6.80 %	6-mo \$LIBOR
NET COST	4-year YEN 6.875 %	

Table 8. Example 2: Subsidized Export Credit

	PAY	RECEIVE
* Borrowing	4-year USD 8.00 %	
* Interest Swap	6-month \$LIBOR	4-year USD 8.45 %
* Currency Swap	4-year YEN 6.80 %	6-month \$LIBOR
NET COST	4-year YEN 6.35 %	

Thus a first pass at costing out the financing choices favors the Finnish Government subsidized loan. To get a more precise comparison the Treasurer must now take account of the fact that basis points cannot simply be added or subtracted without regard to the timing of the payments or their currency of denomination. Basis points received earlier (every 3 months rather than semi-annually, or semi-annually rather than annually) are more valuable than those received later. And basis points denominated in the stronger, lower-interest currency (such as the YEN) are more valuable than those received in the weaker currency.

The Treasurer will also want a swap that eliminates currency risk to the company - as it stands, the currency swaps would leave the company with basic YEN interest but some net USD flows. Finally, in the second and third alternatives, the two separate swaps will in practice be combined into one - and the company might be able to obtain better terms on the combined quotation. What the Treasurer will now do, therefore, is request quotations for a swap in which the company receives fixed USD 8.00 % annually, and pays fixed YEN annually, for four years. The lowest quote on the fixed YEN side will be the final cost of funds.

These two examples have described how interest rate and currency swaps can be used in connection with raising new funding for the company's purposes. The development in awareness of the arbitrage opportunities of new issue swaps has inevitably reduced the differentials in borrowing costs between markets. For example, in the US dollar market, whereas the first swap transactions

routinely generated floating rate funding for banks and prime sovereign borrowers at LIBOR less 0.625 - 0.75 % pa, those same institutions would now be struggling to achieve funding at LIBOR less 0.125 - 0.25 % pa through a straight Eurodollar bond issue combined with an interest rate swap. The reduced arbitrage opportunities are the result of an elimination or narrowing of arbitrage gains through the process of active exploitation, a change in market environment and an increased understanding of the process of new issue arbitrage with a great number of borrowers now seeking to avail themselves of more limited arbitrage opportunities ⁵⁴.

However, the capacity of borrowers to react more quickly to opportunities has lead to swap-driven issues appearing whenever swap "windows" facilitate particularly attractive funding levels. The pattern of issuance has consequently become less homogeneous and more concentrated on specific currencies and maturities at any one time ⁵⁵.

4.2.2 Asset and Liability Management

The opportunities brought about by the liquidity and availability of the swap markets are such that any portion of existing assets or liabilities is exchangeable into other types of assets or liabilities, from interest and/or exchange rate points of view. Consequently the components of existing assets or liabilities can be entirely modified, keeping in mind of course that there are no ideal or everlasting structures.

Moreover, because the international monetary and financial systems are characterised by highly volatile rates, an active asset liability management policy is a necessity. Borrowers or investors can no longer be just actors on primary markets but

⁵⁴ Das & Martin 1991 p.171

⁵⁵ Shah & Bass 1991 p.291

must also be traders on secondary markets, traders of interest and exchange rates, in order to reduce their exposures according to their views on the evolution of such rates. Interest rate and currency swaps are major instruments when it comes to carrying out such an active management policy.

The use of swaps in asset liability management applications is predicated on using these instruments to convert fixed rate exposures to floating rate or vice versa, and/or to convert assets and liabilities from one currency to another. The underlying decision to alter the interest rate basis and/or the currency of the liability is dictated first by changes in fundamental business circumstances, such as the purchase and sale of assets denominated in particular currencies, and secondly, by interest rate and/or currency exposure management considerations whereby the swap contract is used to convert the underlying portfolio to a basis more consistent with interest and currency rate expectations ⁵⁶.

The trend to more active management of assets and liabilities was allied to an increasing acceptance by a wide variety of corporations of a philosophy whereby the minimisation of financing costs came increasingly to be viewed as a component of the competitive positioning of an entity, and on the other hand, a philosophy which legitimised the active management of an organisation's financial flows in a manner designed to generate profits in its own right. This included, in its most extreme form, corporations entering into transactions for purely speculative reasons, totally unconnected to their underlying business activities or, in more modest forms, to organisations actively trading specific exposures generated by their core business activities in an effort to generate profits as a by-product to the actual minimisation of exposures that was the primary motivating factor in such activity ⁵⁷.

⁵⁶ Das & Martin 1991 p.170

⁵⁷ Das & Martin 1991 p.172-173

The key factors in the emergence of swaps as an asset liability management instrument include ⁵⁸:

- The incomplete nature of market structures whereby swaps are utilised to fill in gaps in the range of available instruments.
- Swaps allow unbundling of funding (or investment decision) from currency or interest rate basis determination.
- Non-economic benefits such as flexibility, lower critical transaction size, execution speed, anonymity, ease of documentation and absence of regulatory requirements.

As was stated in the Introduction Chapter, this study focuses on analysing swap transactions as an instrument for managing liabilities. The difference between a liability and an asset swap is minimal. The qualities of the swap instrument are equally relevant to asset swap transactions, where swaps are used as an instrument for creating synthetic assets. So taking into consideration this limitation of the study, the following examples take up for closer look only the liability based swaps in the management of companies' portfolios.

The corporate's asset liability management using interest rate and/or currency swaps can be approached from two different frameworks. First, the swap portfolio can be regarded as an integral part of the liability portfolio, i.e., the underlying debt in conjunction with the swaps equate to a synthetic debt portfolio. Under this first approach, the focus of portfolio management is on the end cash flows to be managed. Second, the underlying debt and swap portfolios can be treated as two separate portfolios, each having different cash flow characteristics and different value characteristics which are totally time specific ⁵⁹.

⁵⁸ Das 1989 p.215

⁵⁹ Das & Martin 1991 p.174

Next, a number of swap portfolio management strategies under a variety of market conditions are set out to illustrate the second group of key uses of interest rate and currency swaps.

Using Swaps in Gap Management. Different institutional requirements and different market conditions as well as the differences in market participants' nature of business and in their current state have resulted in distinctly different compositions of their balance sheets. These differences in inter-firm asset/liability composition may represent opposite kinds of gaps in balance sheets, for which swaps can provide an economic mechanism whereby two counterparties can benefit from a reduction in their respective balance sheet gaps and a decrease of exposure to interest rate or currency risks.

For example, a company may have a gap management problem wherein there is an economic need to shorten the duration of its liabilities to reduce the mismatch of its balance sheet. Specifically, the company has fixed rate funds readily available but prefers floating rate liabilities to fund its assets. Another company may have an opposite problem. Through a swap arrangement, in which they convert the fixed rate liabilities into floating and vice versa, they can both reduce their balance sheet gaps with a subsequent decrease in their exposures to interest rate risk ⁶⁰.

Using Swaps to Unlock The High Cost of Existing Fixed Rate Debt. An interest rate swap can be utilised to unlock the cost of existing high coupon debt, enabling a company to achieve significant cost savings. This can be achieved either where the previous fixed rate debt was the result of a borrowing on fixed rate terms or, alternatively, was a result of an earlier swap transaction to convert floating rate liabilities to fixed.

⁶⁰ Bicksler & Chen 1986 p.648

For example, a borrower may have existing fixed rate debt at 14.00 % per annum. The current market swap rate for the borrower to receive fixed rate and pay floating rate for the remaining maturity of the original fixed rate liability is 12.50 %. The borrower can, under these circumstances, enter into a swap whereby it receives fixed at 12.50 % pa and pays 6-month LIBOR. As a result of this transaction, the borrower would achieve an effective floating rate liability at 1.50 % over LIBOR. If six month LIBOR averages less than 12.50 % pa over the remaining term of the underlying liability the borrower would achieve an absolute interest cost saving equivalent to the margin by which 6-month LIBOR is less than 12.50 % pa.

This type of transaction would be utilised, for example, where the borrower expected that a floating interest rate would provide it with lower cost of funding for the relevant term. The use of swap to unlock the high cost of existing fixed rate debt may be particularly attractive where the relevant borrowing cannot be repaid and, subsequently, refinanced or alternatively, where the pre-payment penalties applicable and/or the costs associated with refinancing would be significant ⁶¹.

Using Swaps to Manage The Cost of Floating Rate Liabilities.

When a company is currently borrowing on a floating rate basis, it bears a risk of a change in the shape of the yield curve, particularly an inversion of the yield curve.

For example, where the yield curve is negatively sloped, that is, 6-month LIBOR is at 15.00 % pa while the swap rate for a party to pay fixed rate is 12.50 % pa, the borrower could lower its funding cost by entering into a swap under which it pays a fixed rate of 12.50 % pa and receives 6-month LIBOR. If the yield curve changes and becomes positively sloped, the initial swap can be reversed by entering into an offsetting swap where the borrower receives fixed rate in return for paying 6-month LIBOR ⁶².

⁶¹ Das 1989 p.217-218

⁶² Das 1989 p.219

Using Swaps to Hedge Foreign Currency Exposures. For example, where the borrower has an existing liability in a currency which is expected to strengthen, it can hedge its exposure by entering into a currency swap to convert the currency denomination of its liability to another. Currency swaps can also be used to lower the cost of debt by converting existing liabilities in a particular currency determined on the basis of fixed interest rate to a liability in a different currency determined on the basis of floating interest rate or vice versa ⁶³.

Using Swaps to Lock in Foreign Currency Gains. For example, if the borrower had borrowed in US dollar and the dollar has depreciated against the Finnish markka since the liability was incurred, the borrower could enter into a currency swap whereby it converted its exposure from US dollar into Finnish markka and would, by the virtue of the fact that the initial currency exchange and subsequent re-exchange would be undertaken at the then prevailing USD/FIM exchange rate, enable the foreign exchange gain to the borrower to be locked in irrespective of subsequent movements in the exchange rate ⁶⁴.

The examples described above were chosen to consider some of the possible strategies under selected market environments, reflecting the fact that the development and execution of specific transaction strategies are, to a large extent, unique and situation specific. Generally corporates use more complex structures to manage their asset liability portfolios. They also often use swap secondary markets and other instruments as well, when dealing with issues regarding active asset liability management.

⁶³ Das 1989 p.221

⁶⁴ Das 1989 p.221

4.3 The Risks Related in Using Swaps

The risks faced by those involved in swap activities depend on their precise role in the swap market. For a broker, once the fee charged for bringing two counterparties together is received, there is no more risk. An end user or intermediary bank, on the other hand, faces **credit risk**, which is the risk that the counterparty defaults, together with various types of **market risk**, which include the risk that interest rates and exchange rates move adversely after the deal is struck.

4.3.1 Market Risks

A company faces a market or position risk when entering into a swap agreement, as it becomes exposed to movements in interest rates and, in the case of currency swaps, exchange rates. Every change in interest rates or exchange rates affects each party to a swap, in equal and opposite ways. At first the value of the swap is zero. As soon as market rates change, however, the swap becomes "in the money" for one party and "out of the money" for the counterparty. The greater the movements of market rates, the greater the likely exposure of one party to the other. There are three main features of market risk :⁶⁵

- market risk varies over the life of a deal according to movements in interest and/or exchange rates
- market risk can be either positive or negative
- market risk cannot be determined in advance

The market risk in swap activities can be classified into three basic dimensions, namely interest rate risk, currency risk and mismatch risk. These risks can be addressed to an individual swap contract or all the swaps of the company can be thought of as constructing a portfolio against which the relevant risk dimensions are projected. The individual types of market risk are considered in detail below ⁶⁶.

⁶⁵ Hammond 1987 p.69

⁶⁶ Das 1989 p.461-465

Interest rate risk. Interest rate risk usually encompasses any actual exposure related to changes in interest rates as well as the risk associated with hedging that exposure. A company that is receiving fixed rate and paying floating rate is in situation equivalent to being long fixed rate bonds and short floating rate bonds. If the interest rates go up the company's position decreases in value as it becomes a net payer. The opposite is true if the interest rates decrease.

Currency risk. Currency swap transactions entail interest rate risks as well as exposures to movements in exchange rates. A company that is receiving fixed Deutschmarks and paying fixed US dollars is in a situation equivalent to being long Deutschmark fixed bonds and short US dollar fixed rate bonds. If the USD appreciates against the DEM the company's position decreases in value. The opposite happens if the USD depreciates against the DEM.

Mismatch risk. A company is exposed to a mismatch risk if the structure of the swap it is about to enter is significantly different from its precise requirements, concerning

- notional principal, for example if a USD 20m five year debt is swapped with a USD 18m five year debt ;
- maturity, for example if a USD 20m five year debt is swapped with a USD 20m four year debt ;
- floating index, for example if the company receives LIBOR-based rate but pays Commercial paper-based rate ;
- floating rate index reset dates and payment frequencies, for example if the company receives 6-month LIBOR but pays a rate that is based on 1-month LIBOR ;
- payment dates, for example if the company receives payments annually but pays itself semi-annually.

4.3.2 Credit Risk

A swap counterparty is exposed to a risk that, on a payment date when each party has an obligation to make a payment, the other party will default and fail to make its required part of the swap contract. This risk is called a credit risk or a default risk.

If the present value of all future amounts to be received, less the present value of all future payments to be made, is positive, the counterparty's swap position is said to be "in the money". Every "in the money" swap entails credit exposure, because the value of the swap is an amount owed by the other party. The greater the movements of market rates, the greater the likely exposure of one party to the other. Thus credit risk is intimately tied to market risk ⁶⁷.

The basic concept used to measure credit exposure is replacement cost. The replacement cost method of analysis estimates the economic impact on the swap counterparty from a default as a function of the original contract fixed rate and the market or replacement rate that would be used when finding a substitute counterparty. The loss or gain is effectively the difference between the original contract fixed rate and the replacement rate discounted to the termination date. This method of analysis implicitly assumes that the counterparty is unable to recover damages from a defaulting of the other as specified in the swap agreement and closes out its exposure arising from a defaulting swap by writing a replacement swap or selling the now unmatched swap in the secondary market ⁶⁸.

Swaps are less risky than loans because the principal is not usually at risk. In contrast, a significant component of the default risk of a loan has to do with the potential failure to repay the principal. Another difference is that default on

⁶⁷ Giddy 1990 p.36

⁶⁸ Das 1989 p.522

swaps requires that two conditions exist simultaneously, whereas default on a loan requires the persistence of only one. Default on a loan requires that the firm be in financial distress. Default on a swap requires both that the party to the swap be in financial distress and that the remaining value of the contract to that party be negative. Hence, the probability of default on a swap is a joint probability. Therefore, this joint probability on a swap will be less than would be the simple probability for a loan ⁶⁹.

Even so, a default may result in a significant loss to one of the counterparties. The loss (or gain) in the event of a default depends on the direction of movement in interest rates or exchange rates. A rise in interest rates boosts the value of the swap to the fixed rate payer, while the same increase depresses the value of the swap for the floating rate payer. Thus, a swap default in such a case results in a loss only to the fixed rate payer, as a replacement swap would cost more. To illustrate the usual calculation of a replacement cost, consider default on a swap in which one of the participants pays 8.5 % fixed and the other a floating rate based on 6-month LIBOR. If interest rates have moved up and if a similar swap against 6-month floating rate LIBOR now costs a fixed rate of 10.0 % and the contract still has six years to run, the loss to the fixed rate payer would be 1.5 % per year, with a present discounted value of 6.65 % of the principal. The larger the principal and the longer the maturity of the swap, the larger would be the loss ⁷⁰.

Swap credit risk is not static over time. At the time a swap is written its replacement cost is nil but, as time elapses, the potential deviation between the contract rate and the replacement rate increases. On the other hand, as the remaining life of a swap shortens and more swap payments are made, the number of payments which remain exposed to any adverse movement in rates decreases to zero at maturity. These two offsetting

⁶⁹ Smith, Smithson & Wilford p.244-245

⁷⁰ Aggarwal 1991 p.13

effects suggest that over the life of a swap the credit risk may rise and subsequently fall to zero at maturity ⁷¹. The return of replacement cost to zero need not occur in, e.g., the case of a currency swap prescribing a final exchange of principal.

Companies use financial intermediaries to avoid the potential credit risk emerging upon the non-performance of the other party to the transaction. Given the increasing uncertainty of the health of a number of major financial institutions and the deterioration of their credit quality, however, has made the assessment of the credit risk to gain greater attention before corporations enter into sizeable swap transactions and commitments with anybody.

4.3.3 Swap Risk Management

Swap risks are essentially important to financial intermediaries that make markets in different swaps, as they often take the swap into their own books without a matching counterpart transaction. This is why these institutions have created specific swap hedging systems that are part of their formal risk control and risk limit allocation and administration processes allowing the financial risk of such transactions to be estimated and managed ⁷².

The management of the credit risk is also important for both the end users and the intermediaries. They can use some specific credit exposure management techniques to reduce and control this particular risk. These techniques include:

- **Netting of exposures.** Credit risk may be lessened if it can be assumed that gains and losses will be netted on multiple deals with a single counterparty should that counterparty be declared bankrupt ⁷³.

⁷¹ Cooper & Watson 1987 p.28

⁷² Das 1989 p.481

⁷³ Burchett 1989 p.35

- **Collateralisation.** In certain swaps, weaker counterparties are required to post collateral at the inception of the swap. The exposure on the swap is constantly monitored and if the level of collateral falls below certain level, the counterparty would be required to post further collateral to maintain the cover⁷⁴.
- **Swap Insurance.** A special insurance scheme can be developed where a counterparty pays fees to an insurance company calculated with reference to the credit exposure under a nominated set of swaps which are marked-to-market each week. In the event of default the insurance provides the funds needed to reconstitute the swap at the then prevailing market levels. This method is used, e.g., by the World Bank ⁷⁵.

5 PRICING AND VALUATION OF SWAPS

Early swap transactions were anything but standardized and typically were arranged between two end-user counterparties with no risk-taking intermediary. Pricing was subject to protracted negotiation. And the ultimate terms, which usually included fees for the arranger, were more a matter of mutual acceptance than of precise alignment with those for financing alternatives, if available. Still, it was inevitable with time that moves toward standardization and increasing competition would render the pricing of swaps keenly sensitive to that of alternatives ⁷⁶.

As the swap market matured, the major participants in the market moved to being principals in transactions rather than only agents structuring transactions on behalf of counterparties. This shift accelerated the creation of a secondary market in swaps as these institutions began to act as market makers routinely quoting two-

⁷⁴ Das 1989 p.537

⁷⁵ Das 1989 p.538

⁷⁶ Hargreaves 1991 p.12

way prices on swaps . As the market developed and competition increased, the market rapidly evolved to a spread market with intermediaries earning the spread between the rate they paid on one side of the swap and the rate they received on the matching counterparty trade ⁷⁷. This development which has led to more standardised pricing practices across the global swap markets has further increased the liquidity of the market.

When evaluating the possible benefits from a swap transaction, whether they are cost savings in issuance of new debt or in the management of existing liabilities, the price of the swap contract at a certain point of time and the likely development of this price through time are of obvious relevance to decision makers in these markets. Some perspective on pricing of a swap and valuation procedures as well as pricing conventions and swap market quotations are studied next.

5.1 Different Approaches on Swap Pricing

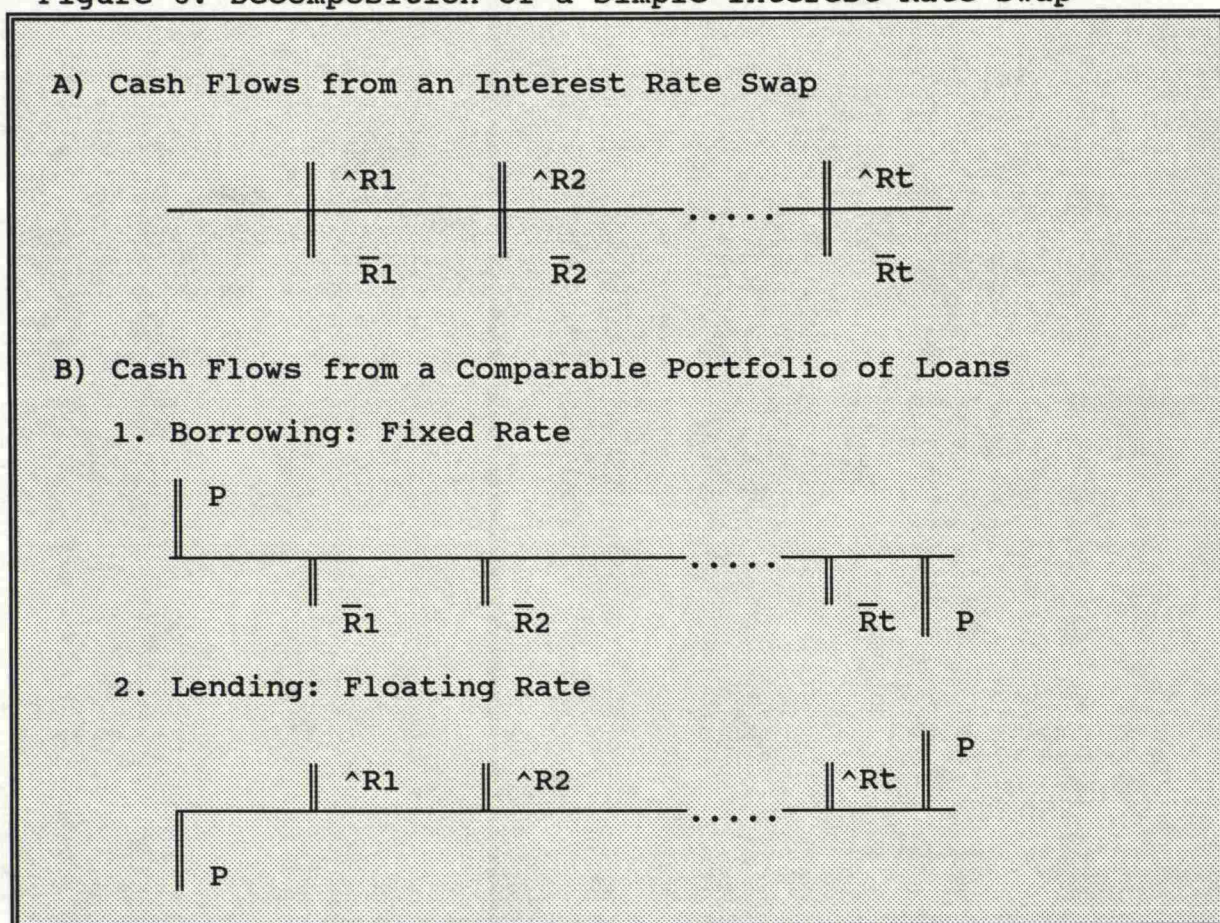
The pricing of a swap contract can be approached from several perspectives depending on whether a swap is thought to be decomposed into a portfolio of loans or a portfolio of forward contracts or whether a swap is handled in an options framework or whether swaps are analysed as means for financial arbitrage. The complexity of the issue of swap pricing derives from the fact that it is multi-dimensional and the inter-relationships between different markets and different instruments make it dependent on numerous factors.

To provide insights into the pricing of a swap contract, the concept of a swap is next used as an equivalent to a portfolio of two loans ⁷⁸ . This approach is depicted in Figure 6 below.

⁷⁷ Das 1989 p. 449,451

⁷⁸ This section, although slightly modified, is taken from Smith, Smithson & Wilford 1990 p.229-234

Figure 6. Decomposition of a Simple Interest Rate Swap



In a fixed/floating interest rate swap the fixed rate payer can be viewed as the seller of a fixed rate bond and the buyer of a floating rate note, while the floating rate payer is in the opposite situation. The implication of this approach is that if you can price loans, you should be able to value a swap contract. Put another way, if you know the mechanics of pricing loans, you should be able to determine the appropriate fixed rate in the swap illustrated in Figure 6.

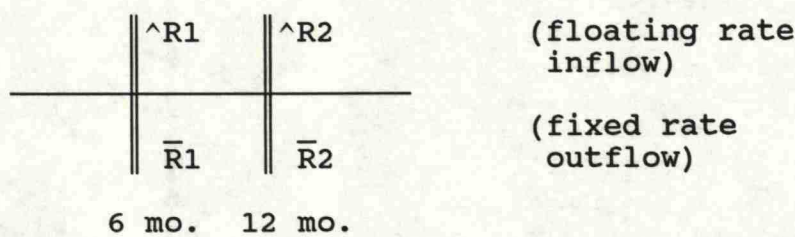
The loans in Figure 6 are both zero-expected-NPV (net present value) projects. Consequently, since the swap is nothing more than a long and a short position in loans, the expected NPV of the swap must also be zero. Hence, if the actual or expected floating rate payments at time periods $1, 2, \dots, t$ can be determined and if the term structure of interest rates is known, the NPV of the swap can be set equal to zero, and we can solve for the fixed rate. This procedure is explained in an example below.

Example 3

Company AAA wishes to enter into a swap in which it will pay cash flows based on a floating rate and receive cash flows based on a fixed rate. AAA requests a quote from the BBB bank on the following simple swap:

Notional Principal	\$100
Maturity	One year
Floating Index	Six-month LIBOR
Fixed Coupon	? %
Payment Frequency	Semiannual
Day Count	30/360

From these terms, we know what AAA will pay: At the six-month settlement, AAA pays a coupon determined by the six-month LIBOR rate in effect at contract origination. At the twelve-month settlement, AAA's payment is determined by the six-month LIBOR prevailing at month six. What is missing is how much AAA will receive - how much BBB will pay. Suppose that according to the LIBOR yield curve prevailing at the origination of this swap the six-month rate is 8.00% and the twelve-month rate is 10.00%. To determine the appropriate fixed rate, BBB must consider the expected cash flows from this swap.



The floating rate inflow that BBB will receive at the first settlement date, \hat{R}_1 , is determined by the six-month rate in effect at contract origination: 8.00%. Hence, at the six-month settlement, BBB expects to receive

$$\hat{R}_1 = \$100[(180/360)0.08] = \$4.00$$

To obtain the expected floating rate inflow at the twelve-month settlement, we need to know the six-month rate in six months - i.e. the six-month forward rate (6R12). Arbitrage guarantees that

$$(1 + R_{12}) = [1 + \frac{1}{2}(R_6)] \times [1 + \frac{1}{2}(6R_{12})]$$

where R_{12} and R_6 are, respectively, the current twelve-month and six-month zero rates. Using this arbitrage condition, the six-month and twelve-month rates of 8.00% and 10.00%, respectively, require that the forward rate $6R_{12}$ be 11.50%. Therefore,

$$^{\wedge}R_2 = \$100[(180/360)0.115] = \$5.75$$

Hence, the contractual/expected floating rate inflows to BBB are as illustrated below.

	\$4.00	\$5.75	(floating rate inflow)
	\bar{R}_1	\bar{R}_2	(fixed rate outflow)
6 mo.	12 mo.		

What BBB needs to determine are the outflows, the appropriate fixed rate payments. At origination, the expected net present value of this at-market swap is zero. That is,

$$\frac{\$4.00 - \bar{R}_1}{1 + \frac{1}{2}(0.08)} + \frac{\$5.75 - \bar{R}_2}{1.10} = 0$$

where $\bar{R}_1 = \bar{R}_2$. Solving this equation, $\bar{R}_1 = \bar{R}_2 = \4.85 . Hence, the appropriate fixed rate is 9.70%.

As this example illustrates, pricing an interest rate swap requires that the cash flows be identified and then discounted by the zero-coupon interest rate. To obtain the expected cash flows for the floating payments, it was necessary to obtain the forward interest rates from the forward yield curve. Finally in

the case of this simple, at-market swap, the appropriate fixed rate was simply the par rate. The par rate is that coupon rate that would put the bond trade at par. In this example, the compounded annualized par rate could have been determined by solving the equation

$$100 = \frac{\frac{1}{2}\bar{R} \times 100}{1 + \frac{1}{2}(0.08)} + \frac{\frac{1}{2}\bar{R} \times 100}{1.10} + \frac{100}{1.10}$$

which gives the one-year par rate 9.70%, precisely the rate that was determined earlier.

This example gives an insight into the pricing of a swap in a very simple environment. In actual pricing decisions the situation is much more complicated as many of the details concerning maturity, payment dates, principal amounts, rate indexes, currencies, etc. are negotiable and are determined specifically to fit the counterparties exact requirements and positions at the time when the contract is made. As the theoretical literature on swap pricing and the pricing models is just beginning to emerge, and little empirical work has been done on these issues, and on the other hand, because of the practical approach of this thesis, the more closer discussion of different pricing mechanisms is excluded from this study.

5.2 Valuation of a Swap Contract

After origination the value of the swap contract depends on what happens to the market interest rates or in the case of a currency swap to the relevant exchange rates. For example, the value of a fixed/floating interest rate swap increases to the fixed rate payer when the interest rates rise. Similarly the value of a dollar/sterling currency swap to the party paying dollars rises (falls) as the value of sterling rises (falls).

As an example of swap valuation after origination, let's look at the swap that was priced in the preceding example when the interest rates change ⁷⁹. Suppose that on the next day after the deal was struck, the LIBOR yield curve shifted up by 1.00%, so that the six-month floating rate was 9.00% and the twelve-month rate became 11.00%.

The terms of the swap contract specified that BBB will pay at an annual rater of 9.70%. BBB's floating rate receipt was determined at origination, so the \$4.00 BBB will receive in six months is unchanged. For this one year swap, the only cash flow that will be changed is the expected floating rate inflow at one year. With the new term structure, the forward rate or the six-month rate in six months is 12.40%. Thus, the expected floating rate inflow in one year is \$6.22 and BBB's expected cash flows are:

	\$4.00 (8%)	\$6.22 (12.4%)
	\$4.85 (9.7%)	\$4.85 (9.7%)

The value of the swap to BBB has risen from zero at origination to

$$\frac{\$4.00 - \$4.85}{1 + \frac{1}{2}(0.09)} + \frac{\$6.22 - \$4.85}{1.11} = \$0.42 .$$

5.3 Pricing Conventions and Swap Quotations

The price on an interest rate or currency swap of a given maturity is conventionally quoted as a fixed rate (for example, 15.00 % pa) against a floating rate index, quoted flat (that is, with no margin over or under the index, for example six-month LIBOR flat). Swaps are usually quoted on a bid and

⁷⁹ Smith, Smithson & Wilford 1990 p.236-237

offer basis; the bid, the lower of the two, is what the market maker would be willing to pay in exchange for the floating rate, while the higher rate, the offer, is what the quoting market maker would be willing to receive in exchange for the floating rate in question ⁸⁰. Thus a typical interest rate swap quotation for a given maturity could be, for example,

" Sterling 12.10-12.20 annual against six-month GBP LIBOR flat ".

In a number of markets the price on an interest rate swap is quoted as a spread over a **fixed rate index** against the floating rate index flat. This is the case in the US dollar swap market where the relevant fixed rate index used is the US Treasury Note. The floating rate in a dollar swap, as usually in any other swap is six-month LIBOR.

Swap market makers use US Treasury Notes to hedge the interest rate exposure resulting from the fixed rate side of the swaps that they trade. Consequently it is a widespread market practice to quote the fixed rate of a swap as a number of basis points (called the swap spread) over the yield of a Treasury Note. The Treasury Note which is used as an index is the most recently issued Treasury Note having the closest maturity from the term of the swap. This Note is called the "on-the-run" note. The on-the-run notes generally trade close to par and are by far the most liquid issues, which explain why they are used to hedge and price other instruments such as swaps ⁸¹.

The **spread** added on top of the Treasury Notes yield is not a credit margin. It reflects the balance between the supply and the demand for fixed or floating rates in the market, which itself is a function of rates expectations, volume of bond issues, difference between US domestic and Euro- rates and other factors that make the prediction of such spreads fluctuations particularly difficult ⁸². As in many mature financial markets it is the bid-

⁸⁰ Giddy 1990 p.16

⁸¹ Banque Indosuez 1988 p.11

⁸² Banque Indosuez 1988 p.11

offer spread that provides the market makers' sole compensation, arrangement fees being a thing of the past. Under the impetus of fierce competition the typical spread has narrowed sharply over the years. Some goes to cover transaction costs - now greatly diminished by progress in standardization of swap contract language, technological advance and economies of scale. The remainder remunerates the capital needed to support price and credit risks on swap books ⁸³.

In the other swap markets the principles of swap pricing are the same as in the US market, although the factors determining the actual swap price are not as easily defined as in the US market. The general bases for swap rates are usually the relevant government bond yields, such as the Gilt yield in the U.K. and the Bundesanleihen yield in Germany ⁸⁴. In markets where the relationship of swap rates to the comparable government securities rate is inconsistent and weak the fixed rate is quoted as an absolute percentage number which includes the swap spread.

The basic pricing conventions of currency swaps are similar to interest rate swap yield methodology, although they entail some additional complexities regarding the comparison of interest rates in different currencies. For this reason the US dollar LIBOR has become a bridge between different swap markets and a basis for currency swap pricing in a case where the two currencies are, for example Swiss franc and Deutschmark. In this case the swap is divided to two separate swaps, namely Swiss franc/US dollar and US dollar/Deutschmark, and priced accordingly.

An example of the typical swap market quotation is shown in Table 9. This table is a page from the Reuters screen and quotations like this are available from all the major market makers.

⁸³ Hargreaves 1991 p.12-13

⁸⁴ Walker & Halla 1988 p.11

Table 9. Example of a Typical Swap Quotation Sheet

0820 BABCOCK FULTON PREBON LTD			071-638-0143 SWAP		
NEW YORK 212-952-2676			LUXEMBOURG 27671 213-622-1141		
YAMANE TANSHI			PRODUCTS TOKYO 03-5640-0627		
US TREAS		USD AMM	D MARK	CHF	ECU
ACT/365		ACT/360	30/360	30/360	30/360
2 YRS	T+ 34-30	5.27-22	8.91-87	7.00-94	9.53-48
3 YRS	T+ 63-59	6.01-96	8.58-54	6.85-79	8.20-15
4 YRS	C+ 64-60	6.52-48	8.38-34	6.75-69	8.94-89
5 YRS	T+ 55-51	6.92-88	8.28-24	6.65-59	8.88-83
7 YRS	T+ 56-52	7.36-32	8.14-10	6.65-59	8.75-70
10YRS	T+ 56-52	7.79-74	8.12-07	6.65-59	8.71-66

REUTER DEAL SWAP

The standard market prices, such as those made available on Telerate, Reuters etc., screens, are usually confined to transactions of a standard type which in reality are rarely undertaken. The most important variations cover: commencement dates, transaction size, spreads above or below the floating rate indexes, various mismatches, premium or discounts or reimbursement if issue fees and expenses. Price adjustments are usually necessary to accommodate these variations ⁸⁵.

Comparison of rates quoted by banks at different times is not possible. If a bank is asked in the morning to give a an indicative price for a US dollar swap, it will use the yield of the relevant Treasury Note at the time it quotes. If another bank is called later in the day, the Treasury Note yield will probably have changed which makes the comparison meaningless. The right way to put banks in competition is to compare swap spreads, not absolute levels. Timing is also of essence. A target fixed rate that a customer may have set for its swap can sometimes be reached only if the US Treasury market moves enough up or down. In such a case, the best thing to do is to leave a firm order for several hours or even overnight to a bank with a global 24-hour trading capability. The bank will monitor the Treasuries market and deal the swap when the customer's target can be hit ⁸⁶.

⁸⁵ Das 1989 p.107

⁸⁶ Banque Indosuez 1988 p.11

6 THE USE OF SWAPS IN A TARGET COMPANY

The target company is a Finnish forest products company, the principal business of which is the production of a wide range of basic and higher value forest products including paper, paperboards, pulp, sawn timber and other wood products. Today, based on production and net sales, the target company is one of the leading forest product groups in Europe and also one of the largest industrial groups in Finland. As the operations of this target company are very internationally oriented (over 80 per cent of its production in Finland is exported and it has production units abroad), the financial activities must have been structured to meet the requirements of an international environment.

The financial decisions are implemented through the financial department in the company headquarters. It deals actively in both the domestic and global money markets, foreign exchange markets as well as in the capital markets. As the environment in which it operates is very volatile and sensitive to changes in both the domestic and the world economies, and as new techniques and instruments are developed very rapidly, it requires the financial department continuously to involve in adapting the latest innovations in the global financial markets.

Interest rate and currency swap strategies are examples of this involvement. Swap instruments have become an integral part of the company's financing operations and they are actively used either separately or in connection with other instruments to achieve the objectives of the company's financial management. As interest rate and currency swaps are, by their very nature, closely linked with long-term liabilities, the Manager of Long-Term Finance is also responsible for the implementation of swapping activities in the target company.

The empirical data for this study is taken from the company's swap reporting system and the details of the contracts are taken from the actual documentation that is done between the company and its swap counterparties. The material consists of the swap contracts that are outstanding at the 1st of October 1991, so the contracts that had already matured or have been made after that date are excluded from this study.

6.1 Structure of The Swap Portfolio

The company's swap portfolio consists of 35 swap contracts, 12 of which are interest rate swaps and 23 of which currency swaps. The company has not used any swap derivatives, so all the contracts have been made using the basic swap structures.

In addition to these 35 swap contracts there are some swap arrangements that are components of special loan agreements, but as these swaps do not involve any specific cash payments or receivables they are not reported in the company's swap portfolio. An example of this so called "invisible" swap is given later in this chapter.

The maturities of the swap contracts reflect the maturities of the underlying debts and they vary from 3 to 5 years. At the time, when this study was made the shortest time to maturity was 1 month and the longest was 4 years and 9 months. The swap currencies that the company has used are : USD, GBP, DEM, ECU, FRF and DKK. The USD stands as one leg of all the currency swaps the company has made.

The swap counterparties are mainly foreign commercial or investment banks, whose share of the total number of swap deals transacted is 75 per cent. One reason for the relatively low use of domestic banks as swap counterparties is, perhaps, that they do not have as much personnel actively committed to selling innovative arrangements for the company's requirements as some of the foreign banks have.

6.1.1 Interest Rate Swaps

The company's interest rate swap portfolio consists of twelve contracts, ten of which are fixed/floating swaps and two of which floating/floating or basis swaps. Of the ten fixed/floating swaps eight are contracts where the company pays fixed rate and receives floating rate; and two where it receives fixed rate.

Both the basis swaps are connected to new fund raising whereby combining the issuance of debt with a basis swap has created a synthetic liability which has provided financing at a cost less than that available through direct borrowing. The fixed/floating interest rates are all made against existing liabilities. As a background for these swap agreements is the company's view of the possible future developments of the relevant interest rates.

Interest rate swaps are made in four different currencies. The currencies and the notional principal amounts of the contracts as well as the relevant interest rates are depicted in Table 10. The floating interest rates are all 6-month LIBOR rates.

Table 10. Target Company's Interest Rate Swaps

CURRENCY	NOTIONAL PRINCIPAL	COMPANY PAYS	COMPANY RECEIVES	"CURRENT POSITION"
USD	70,000,000	LIBOR+.325	LIBOR+.35	***
USD	30,000,000	8.36 %	LIBOR	-
USD	30,000,000	7.94 %	LIBOR	-
USD	20,000,000	8.39 %	LIBOR	-
USD	20,000,000	7.94 %	LIBOR	-
USD	20,000,000	LIBOR	LIBOR+.07	***
GBP	10,000,000	9.85 %	LIBOR	+
GBP	10,000,000	9.76 %	LIBOR	+
GBP	10,000,000	9.70 %	LIBOR	+
DEM	10,000,000	LIBOR	5.65 %	(-)
DEM	10,000,000	5.20 %	LIBOR	(+)
DKK	150,000,000	LIBOR -.02	10.0 %	+

The fourth column in the Table 10. (CURRENT POSITION) states whether the specific interest rate swap is "in-the-money" or "out-of-the-money" at the time of examination. The positive sign indicates that the swap receivables during the current interest period are greater than the swap payments - the swap is "in-the-money" and thus successful. The negative sign means that the swap payments are greater than the receivables from the swap contract - the swap is "out-of-the-money" and thus unsuccessful, at the time of this examination.

It should be emphasized that this comparison of floating and fixed rate payments is made at a specific point of time. As the estimation of the profitability of these swap deals does not consider the maturities of the deals, circumstances under which the contracts were entered into or give any further details of the contract structures or overall exposures, the following way to interpret the results is somewhat limited. Nevertheless, it reveals to some extent how well the company has managed in taking a view of the future interest rates.

At the time of the study, the 6-month US dollar LIBOR rate was 5.5625 %. As the fixed rate payments that the company would pay according to the US dollar swap contracts were all above this level, the USD swaps were all "out-of-the-money". The opposite was true concerning the GBP swaps. The 6-month sterling LIBOR rate was 10.125 % which would have made the incoming cash flows greater than the outflows, if the payment date was set at 1st of October 1991. The same would have happened in the DKK swap deal, as the 6-month DKK LIBOR quoted was 9.8125 %. The two DEM swaps are linked together which explains the large deviations of the fixed rates from the 6-month DEM LIBOR, which was 9.3750 %. The two basis swaps are connected to special loan agreements, and thus the comparing of interest payments separately in this context is not relevant.

If all the cash flows were calculated using the rates valid on 1st of October and translated into Finnish markkas, the company would be a net payer. This indicates that the value of the total interest rate swap portfolio is negative and that the company's views have not materialized as desired.

6.1.2 Currency Swaps

The company's currency swap portfolio consists of 23 contracts four of which are fixed/floating and 19 of which are contracts where two floating rates are swapped with each other. The swaps are listed in Table 11. The table shows into what currency the USD-denominated liabilities are swapped, the notional principal, the exchange rate as well as the reference rate that stands as the basis for the company's swap payments.

Table 11. Target Company's Currency Swaps

CURRENCY (FROM USD TO ...)	NOTIONAL PRINCIPAL (USD)	EXCHANGE RATE	INTEREST RATE (RECEIVE USD 6M LIBOR, PAY ...)
GBP	50,000,000	1.7070	6M LIBOR + 0.080
GBP	50,000,000	1.7158	6M LIBOR + 0.020
GBP	50,000,000	1.7241	6M LIBOR + 0.040
DEM	10,000,000	1.6490	6M LIBOR + 0.150
DEM	10,000,000	1.6273	6M LIBOR + 0.150
DEM	20,000,000	1.6390	6M LIBOR + 0.145
DEM	10,000,000	1.6280	6M LIBOR + 0.125
DEM	20,000,000	1.6887	6M LIBOR + 0.140
DEM	30,000,000	1.6385	6M LIBOR + 0.160
DEM	30,000,000	1.7095	6M LIBOR + 0.090
DEM	20,000,000	1.7055	6M LIBOR + 0.070
FRF	35,000,000	6.0405	6M LIBOR + 0.150
FRF	35,000,000	6.0456	6M LIBOR + 0.140
ECU	11,000,000	1.1342	6M LIBOR + 0.050
ECU	40,285,000	1.1510	6M LIBOR + 0.060
ECU	40,302,500	1.1515	6M LIBOR + 0.045
ECU	34,590,000	1.1530	6M LIBOR + 0.050
ECU	50,000,000	1.2105	6M LIBOR + 0.025
ECU	50,000,000	1.2105	6M LIBOR + 0.035
DKK	5,000,000	7.2850	10.02 %
DKK	5,000,000	7.2780	10.20 %
DKK	30,000,000	7.2675	10.20 %
DKK	5,000,000	7.2780	10.40 %

To consider the profitability of these currency swap deals, it requires not only the relevant contractual interest rates to be compared with each other but also the Finnish markka equivalents of these payments as well as those of the notional principals to be calculated and compared. This is because the company keeps its books denominated in the Finnish markka. The FIM equivalent swap interest payments are reported in the Income Statement as interest income or interest expenses, while the changes in the value of the FIM equivalent notional principal are regarded as currency translation gains or losses.

Assuming that the payment dates were set at the point of time when this study was made, the net balance of all currency swap interest payments would be negative. This follows from the fact that interest rates in US dollar, that is, rates that determine the basis for interest rate receivables for the company, were at a lower level (compared to changes in other currencies' interest rates) than when the contracts were entered into. The exchange rate effect to the values of notional principals would also show a negative balance. This results from the relatively stronger appreciation of FIM against USD than against other contractual currencies after the swaps were entered into.

To get a better picture and to make a more justified judgement about the profitability of the company's currency swapping activities, one must take into account the structure of the company's foreign currency long-term debt portfolio against which the deals were made; as well as the environment in which the swaps were entered into and the objectives that have been reached by these decisions. Also should be emphasized, that one day cross section does not provide any information about the longer-term effects of these activities. These matters will be analysed later in this chapter.

The company has also made currency swaps that are invisible in the sense that they do not involve any payments or receivables per se, but have been built in to a loan agreement to lower the borrowing costs of the underlying debts. All these contracts

have the same basic structure : the initial borrowing is done in the Japanese market and the proceeds are swapped into US dollars. As the financial intermediary, that has arranged the deal, takes care of all the payments denominated in YEN, the company faces only US dollar exposure and treats the loan as a normal US dollar floating rate loan. This is the reason why the company does not include these special swaps to its total swap portfolio.

6.1.3 Swap Reporting System

The swap reporting system that the company uses to manage the interest rate and currency swap portfolio is technically fairly straightforward. All the relevant details of the swap contracts are, firstly, put up in a tabular form as single contracts, and secondly, combined into a table that shows the overall exposures in each currency. By updating the system with relevant interest and exchange rates it is easy to calculate the swap payments at each payment date and follow how the contracts are developing. The swap portfolio can also be included in the total portfolio of loans which makes it possible to analyse the net exposure resulting from these two components together.

The specific details that are inserted into the system include: interest rates, exchange rates, notional principal amounts, all the payment dates until maturity, interest payments and the swap counterparties. All the payments in currency swaps are also expressed in Finnish markkas so as to take into account the exchange rate effect.

The company is planning to acquire a more sophisticated swap reporting system in the near future. The new system would be a part of the larger back-office system where, for example the swap portfolio could better be managed in connection with the loan portfolio. By updating such a system with relevant interest rates as well as exchange rates, it would also make it possible

to obtain more accurate and more detailed reports, which would further improve the financial managements' capabilities of managing the asset and liability as well as the swap portfolios, either each independently or all of them together.

An improved back-office system would also contribute to more standardized accounting treatment of swap contracts as the swap payments and exposures could be directly transferred to the company's accounting system.

6.2 Motives for Using Swaps

The principal motives for the company to enter into interest rate and currency swap market activities have been to lower the borrowing costs and to more flexibly manage its existing liabilities. As was mentioned earlier, most of the swaps are used for changing the interest rate or currency structure of **existing** debts, only two interest rate swaps are used in connection with an initial borrowing. In addition there are the "invisible" YEN/USD currency swaps which are all related to new issue arbitrage.

In this context, it should be noticed that interest rate and currency swaps are not the only instruments available for the company to be used in asset and liability management. Swaps are used in circumstances where other instruments, such as forward rate agreements, futures or option contracts, do not offer features that the company prefers in a certain situation.

6.2.1 Lowering Borrowing Costs

By combining a swap agreement with the issuance of a debt, the company has been able to get cheaper funding than through the issuance of traditional forms of debt. The following example gives one structure under which the company has managed to lower its borrowing costs.

In this case, the company has used an interest rate swap with LIBOR rates set in arrears. The objective of this arrears reset swap is to reduce the cost of borrowing in a positively sloping yield curve. LIBOR rates set in arrears means simply that the interest amount due for payment at each floating rate roll date will be based on the LIBOR rate of the following period instead of the previous one.

In order to illustrate the perceived advantage of such a swap we need to compare future floating rate payments using projected LIBOR rates (or FRA's). First, a hypothetical example ⁸⁷:

In the following three year US dollar swap against 6-month LIBOR it is assumed that US dollar rates will rise exactly as predicted by today's yield curve throughout the swap period. The 6-month LIBOR is 4.85 % and the FRA's are :

Period	<u>6/12</u>	<u>12/18</u>	<u>18/24</u>	<u>24/30</u>	<u>30/36</u>	<u>36/42</u>	
LIBOR rate	4.95	5.70	6.45	7.15	7.50	7.80	%
Payments under a normal swap	4.85	4.95	5.70	6.45	7.15	7.50	rates
	6	12	18	24	30	36	months
Payments under arrears swap	4.95	5.70	6.45	7.15	7.50	7.80	rates
	6	12	18	24	30	36	months
Difference in payments	0.10	0.75	0.75	0.70	0.35	0.30	%

The present value of the differential cash-flows in this case is around 136 basis points, which is the equivalent of around 50 basis points per annum spread over the swap period. The payer of the floating rate will be compensated for this difference by paying LIBOR - 50 bps over the entire period.

⁸⁷ Royal Bank of Canada 1991 p.2

The target company used this structure in connection with a three year Floating Rate Note-issue with the following results. The initial floating interest rate that the company would pay for the investors was LIBOR + 35 basis points. A financial intermediary that was arranging the deal then suggested a swap arrangement with LIBOR rates set in arrears, as a "sweetener" for the target company, to make the effective cost of funds more favourable without the loan being unattractive from the investors point of view.

According to the swap contract the company would pay LIBOR rates set in arrears and receive LIBOR rates based on the previous periods rate. As the yield curve was expected to be positively sloping, the target company was compensated by 25 basis points. The spreads over LIBOR were set so that the company would pay LIBOR + 0.325 % while receiving LIBOR + 0.350 %. As the amount that it would receive was exactly the same as the floating rate it would have to pay for the original issue, the effective cost of this Floating Rate Note became LIBOR + 0.325 %.

In the preceding example, the target company took the view that the future LIBOR rates would be lower than (or at least move as implied by the yield curve) the FRA market rates at the time when the deal was done. If this view were to be correct, the company would save not only the 25 basis points but also the net-present value of all the differences in interest rates in case the yield curve turns out to be negatively sloping.

The YEN/USD currency swaps were also structured to lower the borrowing costs. The company was seeking US dollar funding and "borrow YEN swap to USD - alternative" led to the lowest rate. The reason for these arbitrage opportunities to emerge was the tax and regulatory environment prevailing in Japan at the time of the company's debt issues. The specific details behind these arbitrage opportunities vary in each case and some of them are not even known in the target company. One possible structure is presented in section 4.1.2.

6.2.2 Liability Management

Most of the swap agreements that the company has made are connected to management of existing liabilities. Interest rate swaps are used to alter the interest rate basis of certain debts from fixed to floating or vice versa, and currency swaps are primarily entered into, to change the currency composition of the liability portfolio. In each case the company has taken a view of the probable movements in future market rates and acted accordingly.

If the company expects that the interest rates in a certain currency are going to move up, it has a motive to swap the interest rate basis from floating to fixed. Under opposite future expectations, the motive is to change the interest calculation basis from fixed to floating. This has been the main principle of the company's interest rate swap strategy. Another motive is to keep the relation between the fixed rate and the floating rate liabilities at a certain level.

Despite the speculative nature of these swapping activities, the company has not been a keen risk taker in the market, but rather used swaps on a hedging basis. This can be seen in the amount of total notional principal of interest rate swaps, which is relatively small compared to the size of the total debt portfolio. This strategy is dictated by the company's general policies concerning financial risks.

A natural objective is also to have liabilities in foreign currencies that are depreciating in value. Or, put another way, the objective is to have a debt portfolio against which the changes in value of the Finnish markka would cause least risks to the company. Currency swaps have been a flexible and effective tool for changing the exposures to different currencies in the debt portfolio.

This objective has been particularly important at the time of this study, as the Finnish markka was linked to the ECU in June 1991, changing the currency basket of the FIM index,

and as there was a lot of speculation about the possible devaluation of the Finnish markka following that decision. How the ECU-linking affected the target company's long-term liability portfolio and especially how swaps were used to alter the currency composition of that portfolio, can best be illustrated with the following example.

The composition of the company's long-term foreign currency debt portfolio is given in Table 12. The first column gives the amount of debt in each currency and the second represents the percentage of the total value of foreign currency debt expressed in FIM.

Table 12. Target Company's Long-term Foreign Currency Debt Portfolio

CURRENCY	AMOUNT MIO	% of TOTAL
USD	712.7	41.7 %
GBP	64.5	6.6 %
DEM	380.8	13.4 %
SEK	5.0	0.1 %
DKK	300.0	2.7 %
NLG	0.4	0.0 %
FRF	604.0	6.2 %
CHF	203.3	8.2 %
BEF	2,600.0	4.5 %
ECU	229.7	16.6 %

Table 13. shows the relevant amounts of the currency swaps in each currency and the percentage values of these exposures calculated against the FIM equivalent total foreign currency debt portfolio. The brackets refer to a negative value and in this context mean that currency exposures are swapped from this currency to another.

Table 13. Target Company's Currency Swap Portfolio

CURRENCY	AMOUNT MIO	% of TOTAL
USD	(641.2)	(37.5) %
GBP	87.4	9.0 %
DEM	251.9	8.9 %
DKK	327.2	3.0 %
FRF	423.0	4.4 %
ECU	192.3	13.9 %

By combining these two tables we get a portfolio which sets out the effective exposures in each currency. The results are given in Table 14.

Table 14. Target Company's Effective Exposures, Long-term Debts + Currency Swaps

CURRENCY	AMOUNT MIO	% of TOTAL
USD	71.5	4.1 %
GBP	151.9	15.3 %
DEM	632.7	22.0 %
SEK	5.0	0.1 %
DKK	627.2	5.6 %
NLG	0.4	0.0 %
FRF	1,027.0	10.4 %
CHF	203.3	8.1 %
BEF	2,600.0	4.4 %
ECU	422.0	30.0 %

The tables show how currency swaps have enabled the company to alter the effective currency composition of its long-term debt portfolio without prepaying its existing debts or drawing new ones. The alternative process would have been slow, expensive or even impossible. Again it is the speed and ease of execution of swap instruments that has been the driving force behind these activities.

If we take a look at the specific currency composition of the long-term debt portfolio with and without the swap contracts and compare them to the currency compositions of the Finnish markka indices prior and after the ECU-linking, the connection between these two can easily be seen. The following table sets out the percentage shares of the most important currencies in the old and new FIM indices.

Table 15. Currency Composition of FIM Indices

USD - BASKET	CURRENCY	ECU - BASKET
8.6 %	USD	-
12.6 %	GBP	12.2 %
19.4 %	DEM	30.7 %
18.7 %	SEK	-
4.5 %	DKK	2.5 %
5.0 %	NLG	9.6 %
6.9 %	FRF	19.2 %
2.4 %	CHF	-
3.3 %	BEF	7.8 %

By using currency swaps the company has lowered the relative share of its US dollar exposure and changed it to currencies that more closely fluctuate together with the European Currency Unit. These currencies include DEM, FRF and GBP. In addition, a considerable amount of debts has been swapped to ECU itself.

The company's motive to alter the currency composition of its foreign currency liabilities has been to make the portfolio less exposed to unpredictable changes in exchange rates. This is not, however, the only criteria for structuring the debt portfolio. One important characteristic that has an effect on the decisionmaking is the currency composition of the company's invoicing.

6.3 Summary

The target company has used both interest rate and currency swaps as a tool for the financial management. Swaps are used in addition to other instruments whenever they offer features that other instruments lack. The most important advantages of interest rate and currency swaps have been :

- **Cost savings on debt issuance.** By raising new funds and executing a swap transaction, the company has managed to save in borrowing costs.
- **Flexibility in interest and currency exposure management.** By restructuring its debt portfolio using swap contracts and changing existing cash flows, the company has been able to manage its exposures more flexibly than by paying off existing debts and raising new funds. This has been particularly important as the company has altered the currency profile of its long-term debt portfolio after the Finnish markka was linked to ECU in June 1991.
- **Speed and ease of execution of swap instruments.** When swap market practices and documentation between counterparties has become more and more standardized, it has increased the company's opportunities to react quickly to changes in market conditions. The financial management has also been able to operate more independently in the markets, since entering into a swap deal does not require permission from The Board of Directors, which is required in case of a big loan arrangement.
- **Swaps have offered long-term covering.** Unlike forward rate agreements, futures or options contracts; the swap contract offers maturities that can be extended to many years.

To estimate the success of the target company's swapping activities, the individual interest rate and currency swap contracts were analysed in a given market environment at a certain specific point of time. Although this method of

interpreting the results does not give a thorough picture of the issue, it reveals some information about the current state of these instruments on 1st of October 1991.

The GBP fixed/floating interest rate swaps were all in-the-money which means that the company's view had been correct. The US dollar fixed/floating interest rate swaps on the other hand were all quite heavily out-of-the-money. This shows how the company's expectations about the increasing USD interest have not been realized.

Due to decreasing USD interest rates and changes in exchange rates, the currency swap portfolio showed a negative balance when translated into Finnish markkas. By using the currency swaps the company has, however, managed to restructure the effective currency exposure of its long-term debt portfolio, an exposure that more closely follows the changes in the FIM currency index and thus makes it less risky to volatile exchange rates.

To more effectively manage its swap portfolio, the company is considering to acquire a new swap reporting system. This investment would enable the company to obtain more detailed and updated reports of the current state of the swap portfolio. This is very important as the interest rate and exchange rate markets are very volatile and it is essential to be aware of all changes in the swap portfolio in real time.

The company should also consider more dynamic involvement in the swap markets. By utilising the many characteristics of swap derivatives to create innovative arrangements and by being more active in the secondary markets, the company could gain more experience and achieve better results. The active involvement should not be prioritised for the sake of a charm of novelty, but because it is essential to support the company's financial activities in ever competitive markets. This could also lead to the next cross section of the company's swap portfolio to be heavily in the profit !

7 SUMMARY

A financial swap is a transaction in which two counterparties agree to exchange two different payment streams over time, the payments being tied to subsequent and uncertain market price developments. In most swaps the prices concerned are interest rates and exchange rates. Swaps allow interest rate and exchange rate risks, liquidity and geographic market considerations, all to be managed separately - and also independently of the underlying cash market stakes.

This risk separation has encouraged an evolution of management thinking and decision making away from traditional framework set by product characteristics in favour of one delineated by risk fundamentals. As the risks have increased in the global financial markets, interest rate and currency swaps, with their capacity to repackage financial claims into combinations that better fit the counterparties' needs, have provided an important tool for financial engineering.

The emergence and growth of swap markets have also had a fundamental economic basis. Swaps have tied together various national and international money and foreign exchange markets and eroded price discrepancies caused by differences of credit standing and liquidity across markets. All this has been a gain for global efficiency.

Interest rate and currency swaps were formally recognized as debt management or hedging instruments in the beginning of the 1980's. Since then the size of the market, the variety of potential uses for swaps and the variety of swap instruments available have all increased very rapidly.

Swap contracts can be tailored to meet the exact requirements of the two counterparties. A large portion of swaps embody a wide variety of variations on the conventional swap concept as different derivative features can easily be added. Nevertheless,

the basic types of interest rate and currency swaps that form the building blocks for more complex ones, can be classified as follows. In the Table 16.⁸⁸ are summarised the theoretically feasible types of interest rate and currency swaps.

Table 16. Basic Types of Swaps

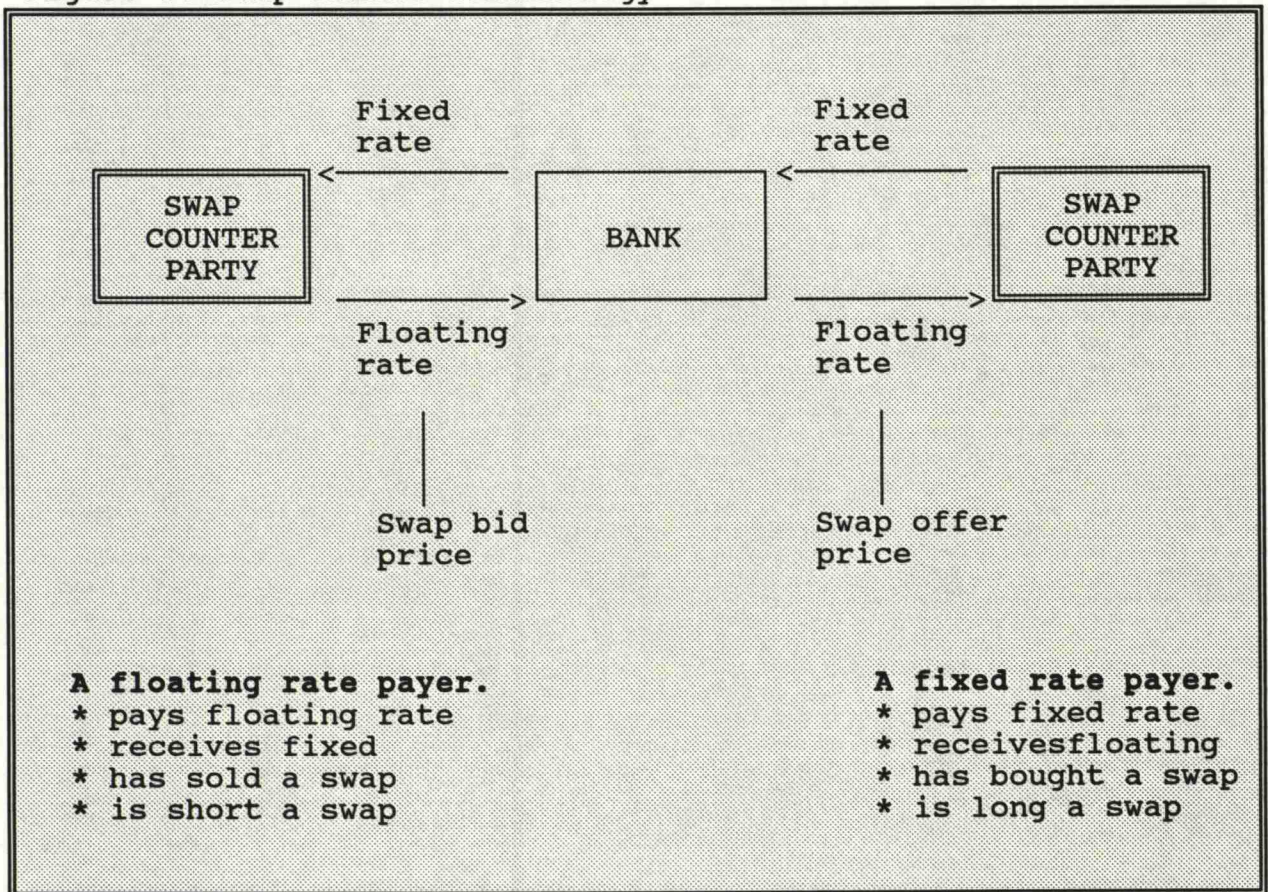
TYPE	PAY	RECEIVE	CURRENCY	EXAMPLE
COUPON SWAP	Floating	Fixed	Same	Swapping the interest cost of a floating rate Eurodollar loan into fixed rates
BASIS SWAP	Floating	Floating	Same	Swapping interest rate basis of USD Commercial Paper funds into USD LIBOR based funds
FIXED-TO-FIXED SWAP	Floating	Fixed	Same	Swapping interest rate basis from a normal coupon fixed rate to a zero coupon fixed rate
CROSS-CURRENCY INTEREST RATE SWAP	Floating	Fixed	Different	Swapping fixed rate proceeds from a CHF bond issue into floating rate USD
CROSS-CURRENCY BASIS SWAP	Floating	Floating	Different	Swapping interest rate basis of floating rate AUD bank bill funds into USD LIBOR funds
CROSS-CURRENCY FIXED-TO-FIXED SWAP	Fixed	Fixed	Different	Swapping fixed rate proceeds of a CHF bond issue into fixed rate USD

⁸⁸ Das 1989 p.45

Counterparties to swap transactions are given particular names depending on whether the counterparty wishes to receive or pay the fixed rate. The market normally "talks the fixed rate", so that if a swap expert says he wants payers in the five years, he means he wants counterparties who will pay fixed rate on five year funds.

The usual swap market terminology is given in Figure 7. in connection with a description of a simple fixed/floating swap structure.

Figure 7. Swap Market Terminology



End users enter into swap transactions in order to benefit from changing the characteristics of their financial claims. Opportunities to benefit from these activities arise as the financial markets are incomplete and inefficient. This has allowed the theory of comparative advantage to be used as an

economic rationale for swap market activities. According to this theory each counterparty should borrow or invest in the market where it has a relative comparative advantage and then obtain the desired interest rate or currency basis of the debt or investment through an accompanying interest rate or currency swap.

Depending on their attitude toward risk; specific interest rate or exchange rate expectations; the shape of the interest rate and swap yield curves, the end users can use swaps to⁸⁹ :

- to obtain lower cost financing,
- to obtain high yield assets,
- to hedge interest rate or currency exposure generated from the structure of their normal business,
- to implement asset liability management strategies, or
- to speculate.

Swap market activities expose counterparties to various risks which have to be taken into consideration when operating at these markets. Market risks indicate the exposure to movements in interest rates or exchange rates as well as to mismatches between the swap and the underlying obligation. Credit risk or default risk is a risk that the other party will default and fail to make its required part of the contract.

Swap prices are conventionally quoted as a fixed rate against a floating rate index, quoted flat. Swaps are usually quoted on a bid and offer basis. Thus, a typical interest rate swap quotation for a given maturity could be, for example,
 " FIM 12.10-12.20 annual against six-month HELIBOR flat ".

⁸⁹ Das 1989 p.177

The fundamental economic basis of the swap market and the established market practices necessarily mean that there exists potential for future development in the interest rate and currency swap markets. While the basic rationale remains the same, there will be some changes in the way that the market operates.

The more demanding customer requirements will continue to put pressures on developing new swap products or new variations to existing products. The range of swap currencies will continue to widen, as the integration of the financial markets reaches the now less developed markets.

The tax and regulatory environment will continue to become more unified across the different geographical swap markets. The capital adequacy requirements concerning off-balance-sheet transactions in general and swaps in particular will continue to be standardized. The documentation procedures will also become even more standardised.

The ongoing decline in credit quality throughout many industry sectors as well as the increasing uncertainty of the financial health of major swap market makers, have made the issue of the feasibility of a swap clearing house important and swap market participants cautious. In the future, the swapping activities are likely to concentrate mainly to well rated institutions. Further it cannot be doubted that over the long term credit differentiation will become as established in the swap market as it already is in the lending markets.

Whatever the changes in the future market conditions, the swap instruments will continue to be an integral part of the global financial set of tools. This stems from the adaptability of the swap concept to be used in different market conditions.

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Examples of Swap Documentation :

D. SINGLE CURRENCY FIXED/FLOATING INTEREST RATE SWAPS (Cont.)7 (a) EXAMPLE OF CONFIRMATION TO BE EXCHANGED BETWEEN THE PARTIES

FIXED RATE PAYER BANK PLC,
Main Street,
LONDON, E.C.2.

To: Floating Rate Payer Bank Inc.,
Moorgate,
London, E.C.2.

Date: 26th September, 1984
Our Ref: XYZ0001

CONFIRMATION OF SINGLE CURRENCY FIXED/FLOATING
INTEREST RATE SWAP AGREEMENT

We hereby confirm particulars in respect of the following single currency fixed/floating Interest Rate Swap Agreement entered between us subject to the British Bankers' Association's Recommended Terms and Conditions ("BBAIRS Terms") dated August, 1985.

Contract Date:	26th September 1984
Fixed Rate Payer:	Fixed Rate Payer Bank PLC
Floating Rate Payer:	Floating Rate Payer Bank Inc.
Direct/Broker:	Broker
Commencement Date:	28th September 1984
Maturity Date:	30th September 1985
Currency:	U.S. Dollars
Notional Principal:	U.S. \$20 Million
Fixed Rate Payments:	
Fixed Rate:	12.12500% per annum
Floating Rate:	First period 11.50000%, thereafter 3 months BBAIRS Settlement Rate
Fixed Rate Payment Dates:	Maturity Date
Floating Rate Payment Dates:	19/12/84 - 20/03/85 - 19/06/85 - 30/09/85
Variation to BBAIRS Terms:	None
Fixed Rate Payers Account:	ABC Bank, New York
Floating Rate Payers Account:	XYZ Bank, New York

PLEASE TELEPHONE OR CABLE US IMMEDIATELY SHOULD THE PARTICULARS OF THIS CONFIRMATION NOT BE IN ACCORDANCE WITH YOUR UNDERSTANDING.

For _____

(title)

D. SINGLE CURRENCY FIXED/FLOATING INTEREST RATE SWAPS (Cont.)7 (b) EXAMPLE OF BROKER'S TELEX NOTIFICATION

To: Fixed Rate Payer Bank PLC,
Main Street,
LONDON, E.C.2.

and

To: Floating Rate Payer Bank Inc.,
Moorgate,
LONDON, E.C.2.

Date: 26th September, 1984

NOTIFICATION OF SINGLE CURRENCY FIXED/FLOATING
INTEREST RATE SWAP AGREEMENT

We hereby notify particulars in respect of the following single currency fixed/floating Interest Rate Swap Agreement arranged by us and entered into between you subject to the British Bankers' Association's Recommended Terms and Conditions ("BBAIRS Terms") dated August, 1985.

Contract Date:	26th September 1984
Fixed Rate Payer:	Fixed Rate Payer Bank PLC
Floating Rate Payer:	Floating Rate Payer Bank Inc.
Commencement Date:	28th September 1984
Maturity Date:	30th September 1985
Currency:	U.S. Dollars
Notional Principal:	U.S. \$20 Million
Fixed Rate Payments	
Fixed Rate:	12.12500% per annum
Floating Rate:	First period 11.50000%, thereafter 3 months BBAIRS Settlement Rate
Fixed Rate Payment Dates:	Maturity Date
Floating Rate Payment Dates:	19/12/84 - 20/03/85 - 19/06/85 - 30/09/85
Variation to BBAIRS Terms:	None
Fixed Rate Payers Account:	ABC Bank, New York
Floating Rate Payers Account:	XYZ Bank, New York
Brokerage	

PLEASE TELEPHONE OR CABLE US IMMEDIATELY SHOULD THE
PARTICULARS OF THIS CONFIRMATION NOT BE IN ACCORDANCE WITH
YOUR UNDERSTANDING.

Regards,

Broker

E. CROSS CURRENCY INTEREST RATE SWAPS (Cont.)7 (a) EXAMPLE OF CONFIRMATION TO BE EXCHANGED BETWEEN THE PARTIES

CURRENCY A PAYER BANK PLC
Main Street,
LONDON, E.C.2.

To: Currency B Payer Bank Inc.,
London Branch,
Moorgate,
LONDON, E.C.2.

Date: 12th October, 1984
Ref: XYZ 002

CONFIRMATION OF A CROSS CURRENCY INTEREST RATE SWAP AGREEMENT

We hereby confirm particulars in respect of the following Cross Currency Interest Rate Swap Agreement entered into between us subject to the British Bankers' Association's Recommended Terms and Conditions ("BBAIRS terms") dated August, 1985.

Contract Date:	12th October, 1984
Currency A:	Dollars
Currency B:	Swiss Francs
Currency A Payer:	Currency A Payer Bank PLC
Currency B Payer:	Currency B Payer Bank Inc.
Direct/broker:	Broker
Commencement Date:	18th October, 1984
Maturity Date:	18th October, 1986
Currency A Amount:	U.S. \$9,797,775.00
Currency B Amount:	Sw.Fr. 25,000,000.00
Foreign Exchange Rate Reference:	N/A
Initial Exchange:	Yes/ No
Currency A Rate:	6 months BBAIRS Settlement Rate
Currency A Payment:	N/A
Currency A Payment Dates:	18/4/85 - 18/10/85 - 18/4/86 - 18/10/86
Currency B Rate:	N/A
Currency B Payment:	equal annual amounts of Sw.Fr. 1,475,000.00
Currency B Payment Dates:	18/10/85, 18/10/86
Variation to BBAIRS Terms:	None
Currency A Payer's Account:	A/c 000123 with X Bank - Zurich
Currency B Payer's Account:	A/c 000456 with Y Bank - New York

PLEASE TELEPHONE OR CABLE US IMMEDIATELY SHOULD THE PARTICULARS OF THIS CONFIRMATION NOT BE IN ACCORDANCE WITH YOUR UNDERSTANDING.

For _____

(title)

E. CROSS CURRENCY INTEREST RATE SWAPS (Cont.)

7 (b)

EXAMPLE OF BROKER'S TELEX NOTIFICATION

To: Currency A Payer Bank PLC,
Main Street,
LONDON, E.C.2.

and

To: Currency B Payer Bank Inc.,
London Branch,
Moorgate,
LONDON, E.C.2.

Date: 12th October, 1984

Ref: PQR 001

NOTIFICATION OF A CROSS CURRENCY INTEREST RATE SWAP AGREEMENT

We hereby notify you of particulars in respect of the following Cross Currency Interest Rate Swap Agreement arranged by us and entered into between you subject to the British Bankers' Association's Recommended Terms and Conditions ("BBAIRS terms") dated August, 1985.

Contract Date:	12th October, 1984
Currency A:	Dollars
Currency B:	Swiss Francs
Currency A Payer:	Currency A Payer Bank PLC
Currency B Payer:	Currency B Payer Bank Inc.
Commencement Date:	18th October, 1984
Maturity Date:	18th October, 1986
Currency A Amount:	U.S. \$9,797,775.00
Currency B Amount:	Sw.Fr. 25,000,000.00
Exchange Rate Reference:	N/A
Initial Exchange:	Yes/ No
Currency A Rate:	6 months BBAIRS Settlement Rate
Currency A Payment:	N/A
Currency A Payment Dates:	18/4/85 - 18/10/85 - 18/4/86 - 18/10/86
Currency B Rate:	N/A
Currency B Payment:	equal annual amounts of Sw.Fr. 1,475,000.00
Currency B Payment Dates:	18/10/85, 18/10/86
Variation to BBAIRS Terms:	None
Currency A Payer's Account:	A/c 000123 with X Bank - Zurich
Currency B Payer's Account:	A/c 000456 with Y Bank - New York
Brokerage:	

PLEASE TELEPHONE OR CABLE US IMMEDIATELY SHOULD THE PARTICULARS OF THIS CONFIRMATION NOT BE IN ACCORDANCE WITH YOUR UNDERSTANDING.

Regards,

Broker

**Introduction, Standard Paragraphs and Closing for a
Letter Agreement or Telex Confirming a Swap Transaction**

Heading for Letter

[Letterhead of Party A]

[Date]

Swap Transaction

[Name and Address of Party B]

Heading for Telex

Telex

Date:

To: [Name and Telex Number of Party B]

From: [Party A]

Re: Swap Transaction

Dear :

The purpose of this [letter agreement/telex] is to confirm the terms and conditions of the Swap Transaction entered into between us on the Trade Date specified below (the "Swap Transaction"). This [letter agreement/telex] constitutes a "Confirmation" as referred to in the Interest Rate and Currency Exchange Agreement specified below.

The definitions and provisions contained in the 1991 ISDA Definitions (as published by the International Swap Dealers Association, Inc.) are incorporated into this Confirmation. In the event of any inconsistency between those definitions and provisions and this Confirmation, this Confirmation will govern.

1. This Confirmation supplements, forms part of, and is subject to, the Interest Rate and Currency Exchange Agreement dated as of [date], as amended and supplemented from time to time (the "Agreement"), between you and us. All provisions contained in the Agreement govern this Confirmation except as expressly modified below.

[INSERT RELEVANT ADDITIONAL PROVISIONS FROM EXHIBITS II-A THROUGH II-G.]

[3. agrees to provide the following Credit Support Document [or agrees to provide the following in accordance with [specify Credit Support Document]:]

[4.] Account Details

Payments to Party A:

Account for payments in [first
currency]:

Account for payments in [second
currency]:

Payments to Party B:

Account for payments in [first
currency]:

Account for payments in [second
currency]:

[5. Offices

(a) The Office of Party A for the Swap Transaction is ; and

(b) The Office of Party B for the Swap Transaction is .]

[6. Broker/Arranger:]***Closing for Letter***

Please confirm that the foregoing correctly sets forth the terms of our agreement by executing the copy of this Confirmation enclosed for that purpose and returning it to us or by sending to us a letter or telex substantially similar to this letter, which letter or telex sets forth the material terms of the Swap Transaction to which this Confirmation relates and indicates agreement to those terms.

Yours sincerely,

[PARTY A]

By: _____

Name:

Title:

Confirmed as of the
date first above written:

[PARTY B]

By: _____

Name:

Title:

**Additional Provisions for a
Confirmation of a Swap Transaction that is a
Rate Swap Transaction or Cross-Currency Rate Swap Transaction**

[See Exhibit I for the introduction, standard paragraphs and closing for the letter agreement or telex.]

2. The terms of the particular Swap Transaction to which this Confirmation relates are as follows:

[Notional Amount:]

Trade Date:

Effective Date:

Termination Date:

[, subject to adjustment in
accordance with the [Following/Modified
Following/Preceding] Business Day
Convention]*

Fixed Amounts:

Fixed Rate Payer:

[Party A/B]

[Fixed Rate Payer Currency Amount:]

Fixed Rate Payer Payment Dates [or
Period End Dates, if Delayed Payment
or Early Payment applies]:

[, subject to adjustment in
accordance with the [Following/Modified
Following/Preceding] Business Day
Convention]**

Fixed Amount [or Fixed Rate and
Fixed Rate Day Count Fraction]:

Floating Amounts:

Floating Rate Payer:

[Party B/A]

[Floating Rate Payer Currency
Amount:]

Floating Rate Payer Payment Dates
[or Period End Dates, if Delayed
Payment or Early Payment applies]:

[, subject to adjustment in
accordance with the [Following/Modified
Following/Preceding] Business Day
Convention]**

[Floating Rate for initial Calculation
Period:]

Floating Rate Option:

Designated Maturity:

Spread:

[Plus/Minus %] [None]

Floating Rate Day Count Fraction:

* If the parties want to provide that the Termination Date will be adjusted in accordance with a Business Day Convention (and, accordingly, that the final Calculation Period will be shortened or lengthened), the appropriate Business Day Convention must be specified.

** Bracketed language is not necessary if Payment Dates and Period End Dates are to be adjusted in accordance with the Modified Following Business Day Convention, as provided in the 1991 ISDA Definitions.

Reset Dates:	[, subject to adjustment in accordance with the [Following/Modified Following/Preceding] Business Day Convention]***
[Rate Cut-off Dates:]	
[Method of Averaging:]	[Unweighted/Weighted Average]
Compounding:	[Applicable/Inapplicable]
[Compounding Dates:]	
[Discounting:	
Discount Rate:	
Discount Rate Day Count Fraction:]	
[Initial Exchange:	
Initial Exchange Date:	[, subject to adjustment in accordance with the [Following/Modified Following/Preceding] Business Day Convention]†
Party A Initial Exchange Amount:	
Party B Initial Exchange Amount:]	
[Final Exchange:	
Final Exchange Date:	[, subject to adjustment in accordance with the [Following/Modified Following/Preceding] Business Day Convention]†
Party A Final Exchange Amount:	
Party B Final Exchange Amount:]	
[Business Days for [first currency]:]	
[Business Days for [second currency]:]	
[Business Day Convention:	[Following/Modified Following/Preceding]]††
Calculation Agent:	

*** Bracketed language is not necessary if Reset Dates are to be adjusted in accordance with the Business Day Convention applicable to Payment Dates.

† Bracketed language is not necessary if this date is to be adjusted in accordance with the Modified Following Business Day Convention, as provided in the 1991 ISDA Definitions.

†† If a Business Day Convention is to apply to all dates that are stated in the 1991 ISDA Definitions to be adjusted in accordance with the applicable Business Day Convention, that Business Day Convention can be specified here.