Financial Markets Books

# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

*Treasury*

*Lex van der Wielen*

IN CO-OPERATION WITH MICHIEL VAN DEN BROEK

Financial Markets Books
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# *Introduction*

All organisations have incoming and outgoing cash flows. Managing these cash flows is the core task of the treasury department. The treasury department is responsible for ensuring that an organisation has sufficient financial resources to operate at all times and for optimising interest earnings on any liquidity surpluses. That sounds simple enough. And it would be simple if an organisation's cash flows were entirely predictable. If that were so, a treasurer would be able to determine exactly when and for how long money would have to be borrowed or invested.

Reality, however, is less straightforward. Cash flows are notoriously unpredictable, both in terms of timing and volume. The sales and purchases of companies, for instance, can never be forecast with 100% certainty. But even if that were possible, there might be other uncertainties, such as fluctuations in exchange rates (when operating in international markets) or commodity prices (if these have not been fixed in advance). They will expose a company to FX risk and commodity price risk. Finally, virtually all organisations run interest rate risk because interest payments on their loans in the near and distant future are uncertain. A treasurer's second core task, therefore, is to manage these financial risks.

## *1 Treasury responsibilities*

The treasury department within an organisation is responsible for managing the company's cash flows and account balances, and for managing the associated financial risks. The principal financial risks are liquidity risk, interest rate risk, FX risk and commodity price risk.

### *1.1 Cash & liquidity management*

All companies hold one or more current accounts at one or more banks. The treasury department is responsible for ensuring that the company always has sufficient financial resources to make the required outgoing payments. This is known as liquidity management.

If the company has a liquidity shortage, the treasurer is expected to raise capital to cover the shortfall. Conversely, if the company has a temporary cash surplus, the treasurer is expected to invest these funds or put them on or deposit to earn the best possible return. Alternatively, in the case of a shortfall in one particular currency, the treasurer can also check whether a surplus in another currency would be available to temporarily fill the gap. This is referred to as cross-currency liquidity management.

Treasury is also responsible for the net interest income on the current accounts. This is called cash management. Companies usually receive little or no interest on a credit balance, but are charged a high interest rate on a debit balance. So it obviously does not make sense to keep a credit balance on one account and a debit balance on another. Treasury will, therefore, transfer money from the credit account to the debit account to reduce the debit balance to zero. The difference between liquidity management and cash management is that liquidity management focuses on managing the total of all balances in a specific currency, while cash management aims to ensure the best possible distribution of this balance across the different accounts.

### *1.2 Interest rate risk management*

For companies, interest rate risk usually stems from the fact that some of their loans carry an interest rate that is reviewed from time to time, for instance every three or six months. This is referred to as a floating rate. The drawback of a floating rate is that the

company runs interest rate risk. If the interest rate rises, the company's interest costs go up as well. The advantage, of course, is that the company benefits when the interest rate decreases. Treasury is responsible for measuring and managing the company's interest rate risk. If this risk is too high, it is expected to use financial instruments to fix or set a maximum limit on the interest costs. Interest rate swaps are used to fix the interest rate, while a cap is used to set a maximum limit.

Pension funds and life insurers, also referred to as institutional investors, recognise the fair value of all their future benefit payment obligations on the liabilities side of the balance sheet. This fair value is calculated as the sum of the present values of all future expected benefit payments. The asset side of the balance sheet is used to recognise items in which the pension fund or life insurer has invested the contributions and premiums: equities, property and fixed-income securities, such as bonds. Bonds give rise to future incoming cash flows: coupon (i.e. interest) payments and repayments of principal. The fair value of the bonds corresponds to the sum of the present values of the cash flows that they generate.

For pension funds and life insurers, interest rate risk arises from the fact that investments on the asset side are less sensitive to changes in interest rates than future benefit payment obligations on the liabilities side, one reason being that only some of the pension contributions and insurance premiums have been invested in fixed-income securities, which makes them sensitive to fluctuations in interest rates. The rest has been invested in equities and property. These asset classes are less sensitive to interest rate movements, if at all. On the other hand, fixed-income securities will always have a shorter maturity than the future benefit payment obligations of institutional investors.

The assets of institutional investors are therefore less sensitive to fluctuations in interest rates than liabilities: the longer the maturity, the more the present value of future cash flows will drop due to an increase in interest rates. By contrast, as interest rates fall, the value of the fixed-income securities rises. That may seem like good news, but the

downside is that the value of the obligations will increase even more, and that is bad news.

The capital of institutional investors will decrease as a result of a decrease in interest rates; so they too are exposed to interest rate risk. It is the treasurer's task to keep the interest rate-related fluctuations in the institutional investor's capital within set limits. These limits are set by an Asset & Liability Management (ALM) Committee. In practice, the treasurer of an institutional investor is expected to lengthen the maturities of the assets and shorten the maturities of the liabilities to reduce interest rate risk. This is usually done by transacting interest rate swaps and bond futures.

As for banks, both the asset and liabilities sides of the balance sheet consist almost entirely of interest rate-sensitive items. The items on the asset side (usually loans) have a longer maturity than the liabilities (deposits and bonds). Basically, the interest rate risk profile of banks is a mirror image of that of pension funds and life insurers.

So an increase in interest rates is bad news for banks. At banks, too, the treasurer's task is to keep the interest rate risk within the limits set by an ALM Committee, which is usually called the Asset & Liability Committee (ALCO). In practice, the treasurer of a bank is expected to shorten the maturities of the assets and lengthen the maturities of the liabilities. This is usually brought about by transacting interest rate swaps.

### *1.3 FX risk management*

Many companies import or export goods and/or services. If these are billed in a foreign currency, the company's costs and income as expressed in its own functional currency can be adversely affected by fluctuations in exchange rates. This is referred to as transaction risk.

In addition, some companies have foreign subsidiaries. The parent company is required

to report the value of its subsidiaries in euros every year. If the exchange rate of the foreign currency has decreased, the value of the subsidiary will fall in euro terms and so will the parent's capital. This risk is referred to as translation risk. Added to this, any profit which the subsidiary generates and transfers to the parent company will usually be denominated in the foreign currency. As a result, apart from the translation risk the parent company also runs a transaction risk.

Treasury is responsible for measuring the extent of the company's FX risk. If this risk is too high, it is expected to transact certain financial instruments, such as a FX forward or an FX option, to reduce the exposure.

If pension funds or life insurers have invested some contributions/premiums in countries with a different currency, they are also exposed to translation risk. If the exchange rates of the investment currencies fall, so will the value of these foreign investments in euro terms. The treasurers of pension funds or life insurers will also use FX forwards or FX options to hedge this risk.

Banks, for their part, hardly engage in importing and exporting activities. Their only real FX risk relates to their foreign subsidiaries. Moreover, banks that extend loans in foreign currencies generally raise funding in that same foreign currency for this purpose. The foreign currency asset item, therefore, is exactly matched with a liability item in the same foreign currency.

Alongside translation risk, banks and pension funds also run transaction risk because income from subsidiaries/investments is often also denominated in a foreign currency.

### *1.4 Management of commodity price risk*

Many companies use energy carriers and commodities in their business processes. Production companies, for instance, use fuel and raw materials such as steel, transport companies and airlines are major consumers of fuel, and flour processing plants use

energy carriers as well as vast quantities of wheat and other grains. The prices of commodities fluctuate strongly in the world markets, often even more so than exchange rates. These price movements can have an adverse impact on the financial performance of companies. This risk is referred to as commodity price risk. Fuels, raw materials and agricultural products are collectively known as commodities. Treasurers can hedge the price risk of commodities through commodity derivatives.

## *2 Treasury management policy*

Most organisations have drawn up a Treasury Management Policy. This Treasury Management Policy is a document that formalises all aspects of the company's treasury function.

### *2.1 The goal of the treasury department*

The first aspect that needs to be addressed in the Treasury Management Policy are the goals of the treasury department. Most treasury departments are cost centres. The purpose of the treasury department is then defined as limiting the company's financial risks and achieving the best possible interest income without running extra risk. This purpose applies to the treasury departments of all not-for-profit organisations such as public authorities and housing associations. Most commercial companies actually also adhere to this purpose for their treasury department.

Some, however, see their treasury department as a profit centre. They do not just seek to generate a profit from their production or trading activities, but also from speculative trading in the financial markets. Some large treasury departments even have their own dealing room where traders, for instance, actively buy and sell currencies with a view to benefiting from exchange rate movements.

### *2.2 Risk hedging policy*

If a treasury department is a cost centre, then the Treasury Management Policy sets out how the identified financial risks are to be managed. The most cautious strategy would be to mitigate all identified risks. Sometimes, however, the Treasury Management Policy allows for selective risk hedging. The treasury department then determines whether the risks need to be hedged based on its own assessment of the development of prices and rates on the financial markets.

If the treasury department is a cost centre, then its role is restricted to conducting transactions that will reduce actually identified financial risks.

Organisations that use derivatives to hedge their risks must ensure that the scope of the derivatives contract matches the scope of their risk exposure. If the risk decreases or disappears entirely, there is an over-hedge, as a result of which the derivative that is used to hedge the risk will take on a partially speculative character. The organisation then runs the risk that the value of the derivative may fall sharply during its remaining maturity resulting in a loss. To prevent this, the scope of the hedge must be adjusted to the new situation as soon as an over-hedge has been identified.

If the organisation has purchased options to hedge its risk, on the other hand, it will never run the risk of entering into a speculative position. The option premium, after all, has already been paid and the option's value will not drop below zero during the remaining maturity. The situation is different with written options. They carry a greater risk and are not necessarily suitable for a hedging strategy.

### *2.3 List of approved instruments*

The next aspect in the Treasury Management Policy involves drawing up a list of financial instruments which the treasury department is permitted to use for its activities. When an organisation is faced with financial risks, the use of derivatives is almost

unavoidable. These days, therefore, nearly all organisations are permitted to use derivatives. But derivatives come in many different shapes and sizes. Some, such as a FX forward or an interest rate swap, are easy to understand, but others can be extremely complex. Complex instruments should not be on the list of approved instruments unless the company has a professional treasury department. We would note that even simple derivatives can lead to severe losses – often due to lack of expertise or greed.

### *2.4 List of approved counterparties*

As well as a list of approved instruments, the Treasury Management Policy usually also contains a list of parties which the treasury department is allowed to do business with. In financial jargon, these are called counterparties. Earlier, banks were included in such lists without too many questions asked, but since the credit crunch and, for instance, the Iceland banking crisis, non-banks have become increasingly aware that banks are not by definition super-creditworthy. A counterparty limit is, therefore, set for every approved counterparty. This limit is the maximum amount for which the treasury department can enter into transactions with this party. Counterparty limits place a ceiling on the credit risk. Multinationals often conduct extremely large transactions with more than one bank because the scale of the transaction exceeds the limits for the individual banks.

Most derivatives are conducted over-the-counter (otc), meaning that they take place outside of an exchange with a bank acting as counterparty. This applies to, for instance, forex forwards, interest rate swaps and commodity futures. Over-the-counter contracts give rise to a counterparty risk; if the bank acting as a counterparty fails and the derivatives contract is dissolved as a result, an organisation can lose money. This was what happened when Lehman Brothers went under. For this reason, otc derivatives transactions are subject to a counterparty limit as well.

### *2.5 Supervision*

Finally, the Treasury Management Policy must describe the set-up and control structure of the treasury department. First of all, the responsibilities of the various sub-departments must be formalised. Treasury departments of large companies often have a separate front office and back office. The front office's role is to conduct the transactions, whereas the back office is mainly responsible for confirming the transactions with the counterparty and sending payment instructions. This segregation of duties is essential. If these duties are not segregated properly, an ill-intentioned individual who has both transaction and payment authority can make themselves the beneficiary of a transaction. And if the dealer is also authorised to send confirmations, there is the risk that they will hide these to prevent the transaction from being recorded in the books. This is what went wrong at Barings.

An authorisation list must be drawn up to show who is responsible for what. This list would have to include the authority to make outgoing payments or to conduct certain financial transactions. This authorisation list must also be sent to the bank so that the contact persons there know who they are allowed to do business with. If the company uses an auto-dealing system to conduct transactions directly with the bank, all required technical safeguards and restrictions must be in place to ensure strict segregation of duties and prevent non-compliance.

The Treasury Management Policy also specifies who is responsible for the supervision of the treasury department and how the treasurer is expected to report on the policy pursued. The supervision is often entrusted to the Executive Board or a special Supervisory Committee such as the ALM department. One important condition is that the appointed supervisors must have sufficient financial expertise to understand the highly specialised nature of the treasury activities. Unfortunately, this is not always the case.

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# *Introduction*

The foreign exchange market or FX market is the market on which different currencies are traded against one another. The rate at which the currency are traded is called the exchange rate or FX rate. The FX rate is, in principle, determined by supply and demand which, in turn, are determined by figures about the economy, by market sentiment and, finally, by technical analysis.

Many companies operate in an international environment. As a result they may be exposed to FX risk, which means that the development of the FX rates has an impact on their financial results. These companies can try to reduce their exposure to FX risk by trying to have both their incoming and outgoing cash flows be denominated in one and the same currency. If this is not possible, they first have to assess the level of risk that they are exposed to, next have to develop a policy how they want to deal with the risk, then have to lay down this policy in the treasury charter and, finally, they have to execute this policy by executing FX transactions such as FX spot, FX forward and FX options.

## *1 Terminology*

With most FX transactions, the currencies are traded at the current market exchange rate and settlement takes place on a standard delivery date, usually two business days after the transaction date. These transactions are called FX spot transactions. The current market exchange rate is called the FX spot rate. FX transactions, however, can also be settled on other moments than the spot date, for instance

- on the trade day: FX transaction for *value today*
- on the first trading day following the trade day: FX transaction for *value tomorrow*
- on any other day after the spot date: FX *forward*

The exchange rate between two currencies expresses the value ratio between two currencies as a number and is stated as an is stated as an FX quotation. The currency which is mentioned firstly in an FX quotation is referred to as the trade currency or base currency (the traded good) and the currency which is mentioned secondly is referred to as the price currency or quoted currency.

In FX quotations, currencies are expressed by their ISO codes. ISO stands for International Standardization Organization. The table below shows the ISO codes for some of the most important currencies.

| **Currency** | **ISO Code** |
|---|---|
| Euro | EUR |
| US dollar | USD |
| Chinese yuan | CNY |
| Pound Sterling | GBP |
| Japanese yen | JPY |
| Swiss franc | CHF |

There are international conventions regarding which currency is the base currency and which currency is the quoted currency in an FX quotation. The euro is always quoted as the base currency against other currencies: EUR/USD, EUR/GBP, EUR/JPY, EUR/CHF et cetera.

The British pound and the other currencies of the Commonwealth are the base currency in all exchange rate quotations except in those cases where the euro is the counter currency. The US dollar is the base currency in most exchange rate quotations with the exception of euro and the currencies of the Commonwealth:

USD/JPY; USD/CHF; USD/CNY, however,
EUR/USD; GBP/USD; AUD/USD.

Exchange rate quotations for which these rules are properly applied are referred to as direct quoted FX rates. If these rules are not applied, for instance in the case of GBP/EUR, the quotation is called an indirect quotation.

In most exchange rate quotations, the value of one unit of the base currency is expressed as a number of units of the quoted currency. For example, if the EUR/USD spot rate is 1.1500, this means that 1 euro has the same value as 1.1500 US dollars.

**Example**

On 12 October 2009, the euro-dollar trader at ING Bank buys 10 million euro at spot from the euro-dollar trader at Deutsche Bank. The spot rate is 1.1425.

On 14 October 2009 (= spot value date), ING Bank must transfer an amount of USD 11,425,000 to Deutsche Bank. Deutsche Bank must, in turn, transfer an amount of EUR 10,000,000 to ING.
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As is the case for all prices in the financial markets, there are bid and ask rates for the FX spot rate. The difference between the bid and ask rate is called the spread. For example, when a bank I quoting EUR/USD: 1.1530 - 1.1532, this means that he is willing to buy 1 euro for 1.1530 US dollars and to sell 1 euro for 1.1532 US dollars.

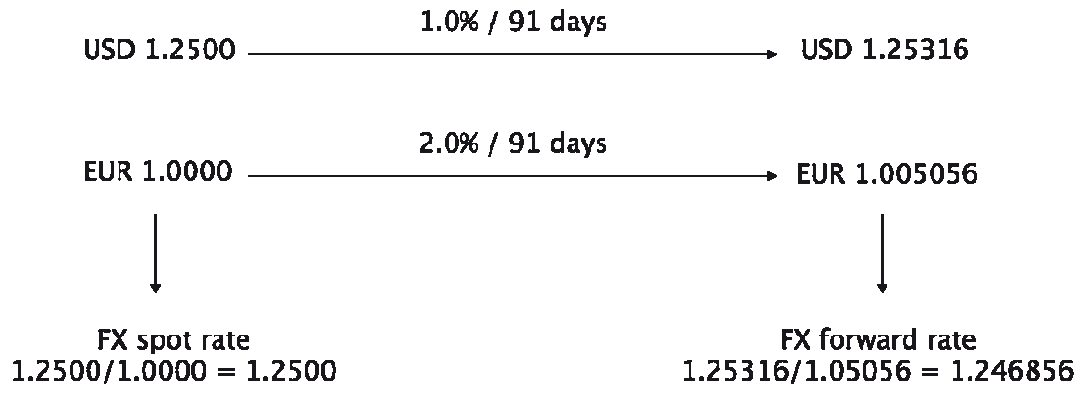
**FX forward rates**

We have already mentioned that the settlement date of an FX transaction can take place on a date later than the spot date. If this is the case, then the FX rate is adjusted for the delay of the settlement. The rate that is used for transactions with a settlement date later than spot is called the FX forward rate.

The FX forward rate can theoretically be calculated by calculating the future value of one unit of the base currency and of the corresponding amount of units of the quoted currency, both on the forward delivery date and by dividing the future value in the quoted currency by the future value in the trade currency.

Figure 1 shows how an FX forward rate can theoretically be calculated for a EUR/USD FX forward contract with a term of 91 days. The FX spot rate for EUR/USD is 1.2500, the three month euro interest rate is 2% and the three month US dollar interest rate is 1%.

Figure 1 Theoretical calculation of the three month forward rate EUR/USD




The future value of 1.2500 US dollars after three months (91 days) is[1]:
1.2500 x ( 1 + 91/360 x 0.01) = USD 1.25316 and the future value of 1.0000 euro after 91 days is 1.0000 x (1 + 91.360 x 0.02) = 1.005056

The FX forward is rate is found by dividing the future value in USD by the future value in EUR: 1.25316 / 1.005056 = 1.246856.

[1] In these types of calculation we use the actual number of calendar days

In the above example, the EUR/USD FX forward rate is 1.2469 (rounded) whereas the FX spot rate is 1.2500. The difference between the FX forward rate and the FX spot rate is 0.0031. The difference is usually expressed in forward points/ swap points. In this case: 31 swap points. The swap points express the interest rate differential between the two currencies. If the interest level in both the euro area and in the USA would be the same, then the FX forward rate would be equal to the FX spot rate and the number of swap points would be zero.

Swap points do not express an expectation about the future development of the FX sport rate, which is a common misunderstanding, and neither do they express an expectation about the future movement of the interest rates. Swap points merely express the interest differential between the two currencies on the moment that an FX forward transaction is transacted.

## *2 Types of FX risk*

Companies can be exposed to two different types of FX risk, i.e. transaction risk and translation risk. Companies that import or export goods or services face transaction risk. This is the risk that their net income is to a more or lesser extent dependent of the development of exchange rates. A Dutch importing company that, for instance, has to pay his Japanese supplier in Japanese yen, has the risk that the Japanese yen will become stronger and, as a result, that his costs will increase. And, on the other hand, a Dutch exporting company that, for instance, has sent an invoice denominated in US dollars and, as a result, has a claim in US dollars, is faced with the risk that the US dollar will become weaker.

Companies that have foreign subsidiaries may be faced with translation risk. A Dutch company that, for instance, has a US subsidiary is required to include this subsidiary in the consolidated balance sheet for the counter value in euro of the US dollar value of the subsidiary. If the US dollar would become weaker, this means that the counter value in euro would decrease and, as a result, that the consolidated capital would decrease. Companies that have taken up or have granted loans in a foreign currency are

also faced with translation risk.

### *3 How to determine the level of FX risk*

The FX risk that organizations run is determined by two factors: the exposure and the volatility of the FX rates. The exposure as a result of transaction risk is calculated as the net sum of outgoing and incoming payments in a specific reporting period. The exposure as a result of translation risk is the net amount of an organization's assets and liabilities in a specific foreign currency. If the exchange rates would not fluctuate, then, even if an organization would have an exposure, there would be no risk. However, usually FX rates constantly fluctuate which means that companies who have cash flows or balance sheet items that are denominated in a foreign currency run an FX risk. The extent to which FX rates fluctuate is expressed by the volatility.

Commonly the following equation is used to calculate the FX risk that an organization runs:

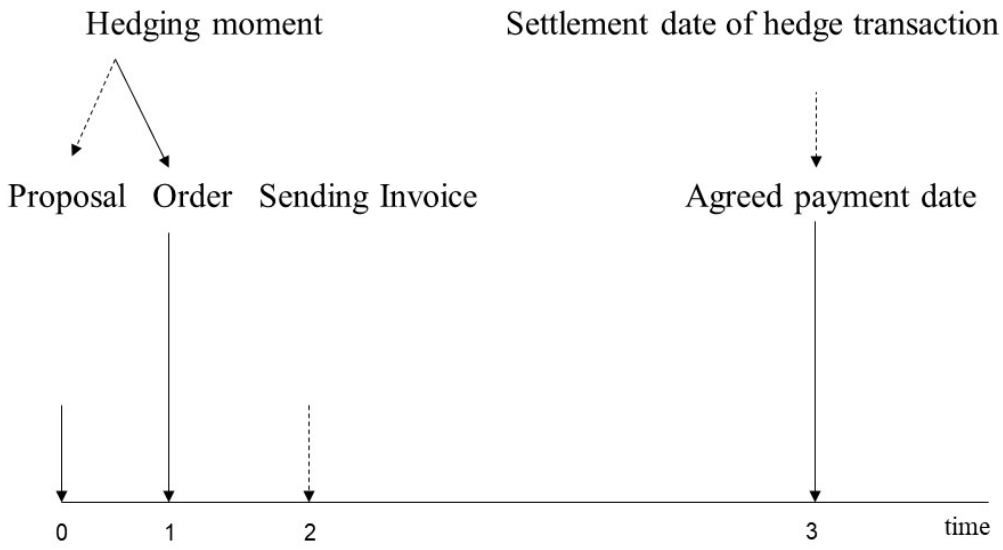
FX Risk = Net exposure x volatility

The exposure as a result of transaction risk is more difficult to determine than the exposure as a result of translation risk. There are two different types of transaction exposures: contract exposures and cash flow exposures.

#### *3.1 Contract exposure*

A contract exposure is a result of a single payment obligation or of a single claim in a foreign currency, usually as a result of a one-off import or export transaction. Figure 2 shows a timeline of a contract exposure. The figure shows the different stages of the purchase to pay cycle.

Figure 2 FX contract exposure



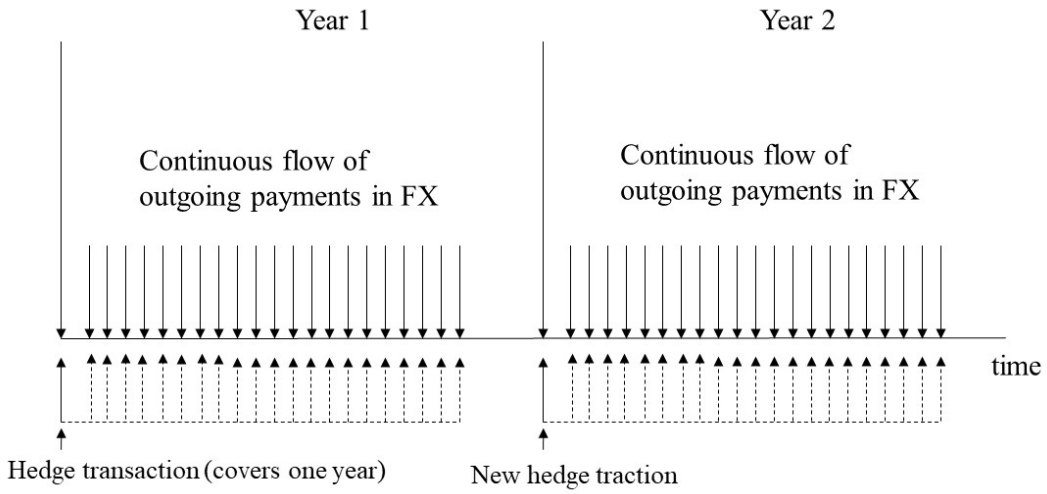

Between period 0, the moment on which the supplier has sent his proposal, and period 1, the moment on which the client accepts the order, it is not clear whether there will be an FX exposure. The exposure starts to exist at period 1, once the proposal is accepted, and will continue to exist until period 3, the moment at which the invoice will be paid.

Only when a proposal is accepted, it is certain that either the seller of the buyer will be facing an FX risk. And, in principal, only from that moment on he can decide to hedge the risk or leave the position open. In the time interval between period 0 and period 1 it is usually unwise to hedge the FX risk. If a company would decide to hedge the potential risk and if the proposal would not be accepted, then the hedge would turn into a speculative position. If a company choses to hedge a contract exposure, it will fit the settlement date of the hedge transaction to the agreed payment date.

### *3.2 Cash flow exposure*

A cash flow exposure stems from a continuous and predictable flow of incoming or outgoing payments in a foreign currency. Examples are the frequent purchase of raw materials or fuel, of which the prices are mainly denominated is US dollars, or the export of magazines to a foreign country, the prices of which are always denominated in the local currency. In case of a cash flow exposure companies usually do not hedge every future cash flow separately but, instead, they execute one hedge transaction to cover all future cash flows in a specific future period simultaneously. Figure 3 show a company that executes only one hedge transaction (an FX forward) each year in order to hedge a continuous stream of incoming payments during the next year. The company can use FX swaps for proportional smaller amounts to fit the settlement date of the hedge transaction to the periods that the cash flows take place (FX swaps will be discussed later in this chapter).

Figure 3 Cash flow exposure



## *4 FX risk management policy*

Companies that have international operations should have a policy regarding FX risk. This policy may be to avoid FX risk completely. Large companies can try to do this by using their bargaining power in order to agree with their business partners that all their incoming and outgoing invoices should be stated in the domestic currency of the large company. By doing this they pass the FX risk on to their business partners.

A second way to avoid FX risk is to match the incoming and outgoing payments in every single foreign currency. If a Dutch company, for instance, invoices in US dollars, then it can try to have its purchases also be denominated in US dollars. Another example is a German car company that decides to produce cars for the US market in the USA.

If a company succeeds in matching the volume of the incoming and outgoing payments in a particular currency, it is most probably still be faced with the problem that the incoming and outgoing payments will not exactly take place on the same settlement date. After all, usually companies first have to pay their suppliers before the will be paid by their customers. If this is the case in for cash flows in a foreign currency, for instance US dollars, it is non sensible for a Dutch company to first buy the US dollars which it needs to pay to the US supplier and later sell the US dollars which it receives from its customers. The company would then still run an FX risk. An better alternative is that the company opens a US dollar account at its banks and takes up a US dollar loan in order to pay its supplier. The company can pay back the loan once the customers will pay their invoices.

Most companies, however, are not able to match all incoming and outgoing payments in foreign currency. The difference between the incoming and outgoing payments in a foreign currency is called the net exposure. For small companies it is rather easy to determine their net exposure. For large companies with many subsidiaries, however, this is more difficult. To overcome this problem these companies sometimes set up a central treasury department that is acting as an in-house bank for all business units. Every business unit is required to report their expected FX cash flows to the central

treasury department which makes is possible for this department to assess the net exposure for the whole company. The central treasury department hedges only this net exposure. Offsetting incoming and outgoing payment is referred to as netting.

Once a company has determined its FX risk, it has to make a decision whether it will hedge the risk or not and, if yes, how it will hedge the risk. Some companies, typically US companies, choose to leave the FX position open. Other companies choose to hedge the FX risk completely (full cover) or partially (selective cover) by using FX forwards and FX options.

## *5 FX forward*

An FX forward contract, in the Netherlands also known as an FX outright contract, is a contract in which two parties enter into a reciprocal obligation to exchange a certain amount of one currency on a future date for a predetermined amount in another currency.

Because settlement only takes place on a moment different from the spot date, the FX spot rate is adjusted. The level of the adjustment is based on the difference in the interest rates for the two currencies involved and is represented by swap points. One swap point for EUR/USD, for instance, is equal to 0.0001. Swap points are the translation of a difference in interest rates between two currencies into the difference between the FX spot rate and the FX forward rate.

**Example**

On 12 May 2019, the ING Bank euro-dollar trader transacts an FX forward with the Deutsche Bank euro-dollar trader in which he buys 10,000,000 euro for US dollars with delivery date 14 May 2020 (one year after the spot date). The EUR/USD cash rate is 1.1475 and the swap points amount to -130. The EUR/USD FX forward rate is thus 1.1345.

On 14 May 2020, ING Bank must transfer an amount of 11,345,000 US dollars to Deutsche Bank and Deutsche Bank must transfer an amount of 10,000,000 euro to ING Bank.

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### *5.1 The application of FX forwards by companies*

FX forwards are commonly used by companies that wants to fix the amount in the local currency of a future cash flow that is denominated in a foreign currency. These future cash flows are usually the result of export transactions or import transactions.

**Example**

A Dutch company has sold goods to a client in the UK. The invoice amount is stated in GBP and amounts to GBP 700,000. The agreed payment date is 8 July. In order to hedge the FX risk, the company has conducted the following FX Forward with its bank: Sell GBP 700,000 against EUR at a GBP/EUR rate of 0.9200. Figure 4 shows the cash flows that will take place on 8 July

Figure 4 Expected cash flows as a result of a sale contract en as a result of an FX Forward


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Figure 4 shows that on a net basis, on 8 July, the company has only one incoming cash flow, i.e. EUR 760,869.57. If neither the client nor the bank will default, the company can be sure of the fact that this is the amount in EUR that it will receive as a result of

the export transaction. Changes in the EUR/GBP rate will have no impact on this anymore.

### *5.2 Offsetting FX forward contracts*

Sometimes, an import or export transaction is cancelled. If a company has entered into an FX forward contract, then this FX forward contract will be superfluous. The company will then probably want to undo the FX forward. In fact, in all master agreements between banks and their clients, it is agreed that a client is required to undo the FX forward if the so called underlying position ceases to exist. This is also true if a position becomes smaller. The client is then required to undo part of its FX transaction.

Undoing an FX Forward can be done by concluding a reverse FX forward for the same amount and with the same value date. This is referred to as closing-out the FX forward contract. In contrast to exchange traded transactions, where offsetting automatically leads to the unwinding of the original contract, in case of over-the-counter transactions, such as FX transactions, the two opposing contracts will, in principle, continue to co-exist.

**Example**

A French company has signed an import contract with an American supplier for an amount of USD 2 million. The expected payment date is 10 October. The importer has conducted an FX forward contract with its bank in which it buys the US dollars against a EUR/USD forward rate of 1.1200. On 8 September, the importer hears that the supplier has gone bankrupt and that delivery will therefore not take place. The payment of USD 2 million on 10 October will therefore also not take place.

Since the importer has already purchased the US dollars from the bank, as a result of

the FX forward transaction he now has an undesirable long position in US dollars. To close this position, the importer must conduct a reverse FX forward contract in which he sells USD 2 million value 10 October.

Suppose that on 8 September the EUR/USD spot rate is 1.1385 and the one month premium is 0.0015. The one month FX forward rate is therefore 1.1400. With the settlement of the two FX forward contracts on 10 October, the following transfers are carried out in the bank accounts of the importer:

USD account: debit 2,000,000 and credit 2,000,000
Euro account: debit 1,785,714 (2,000,000 / 1.1200) and credit 1,754,386 (2,000,000 / 1.1400)

On balance, the two transactions result in the debiting of the euro account of the importer with an amount of EUR 31,328. This is a loss for the company.
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### *5.3 The application of FX forwards to hedge the FX risk of investment portfolios*

Asset managers, mutual funds and pension funds regularly use FX forwards in order to hedge the value of portfolios which are denominated in a foreign currency.

**Example**

A Dutch asset manager has a portfolio US shares with a current market value of USD 50 million. The current EUR/USD rate is 1.2500. The counter value in euro of the portfolio is, therefore, 50,000,000 / 1.2500 = EUR 40,000,000.

The asset manager has the vision that the US dollar will become weaker during the next three months, i.e. the EUR/USD rate will rise. If he is right then the counter

value in euro of the portfolio will go down. In order to hedge the position, the asset manager can conduct an FX Forward contract. This contract must compensate the effect on the value of the portfolio of the expected change in the exchange rate. This means that the FX Forward contract must give a positive result if EUR/USD goes up. This is why the asset manager sells USD 50,000,000 forward. We assume that the forward rate is equal to the spot rate, i.e. 1.2500.

We will now discuss to possible scenarios:

1. The USD dollar has become weaker; after three months the EUR/USD rate is 1.3000.

The counter value of the shares portfolio has decreased from EUR 40,000,000 to 50,000,000 / 1.3000 = EUR 38,461,538.46. This means a decrease in value of EUR 1,538,461.54.

After three months the FX forward contract expires which means that the asset manager is required to transfer 50,000,000 USD to the bank. In order to be able to fulfil the settlement requirement, the asset manager has to conduct an FX spot transaction in which it buys USD 50,000,000 at the spot rate of 1.3000. As a result of the FX forward contract, the asset manager receives 50,000,000 / 1.2500 = EUR 40,000,000 and as a result of the FX spot transaction the asset manager has to pay 50,000,000 / 1.3000 = EUR 38,461,538.46.

On balance the result of the hedge is EUR 40,000,000 – EUR 38,461,538.46 = EUR 1,538,416.54. This means that the hedge has completely compensated the loss in the share portfolio.

2. The USD dollar has become stronger; after three months the EUR/USD rate is 1.2000.

The counter value of the shares portfolio has increased from EUR 40,000,000 to 50,000,000 / 1.2000 = EUR 41,666,666.67. This means an increase in value of EUR 1,666,666.67.

After three months the FX forward contract expires which means that the asset manager is required to transfer 50,000,000 USD to the bank. In order to be able to fulfil the settlement requirement, the asset manager has to conduct an FX spot transaction in which it buys USD 50,000,000 at the spot rate of 1.2000. As a result of the FX forward contract, the asset manager receives 50,000,000 / 1.2500 = EUR 40,000,000 and as a result of the spot purchase of USD the asset manager has to pay 50,000,000 / 1.2000 = EUR 41,666,666.67.

On balance the result of the hedge is EUR 40,000,000 – EUR 41,666,666.67 = - EUR 1,666,666.67. This means that the loss of the hedge has completely erased the gain in the share portfolio.

The result of the FX forward is that the value of the shares portfolio has been fixed at EUR 40,000,000.

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## *6 Non-deliverable forward*

For many currencies there is no liquid market which means that these currencies cannot be traded easily. Examples are the Chinese Yuan, the Brasilian real and the Philippine peso. A European company, for instance, cannot buy PHP in order to pay his Philippine supplier. The company can avoid this problem by asking the supplier to state the invoice in euro's instead of Philippine peso. This means that the FX risk now lies with the Philippine company. To avoid this risk, the parties often a so called currency clause.

This means that the invoice amount is not stated in a fixed amount of USD or EUR but in a fixed amount in the counter currency, however the invoice is still paid in USD or EUR for an amount that is the counter value of the amount in the counter currency on the maturity date of the contract (the fixing date).

**Example**

A Dutch company has signed an import contract for an amount of 20,000,000 Philippine peso) PHP but the invoice amount will be paid in EUR. This means that on the payment date an amount in EUR is paid, which is equivalent to PHP 20,000,000 calculated with the EUR/PHP FX rate on the payment date.

If the EUR/PHP FX rate on the payment date would, for instance, be 5.10, then the Dutch company would pay 20,000,000 / 5.10 = EUR 3,921,568.63.

If the EUR/PHP FX rate on the payment date would, for instance, be 4.90, then the Dutch company would pay 20,000,000 / 4.90 = EUR 4,081,632.65.
---

By agreeing a currency clause, the FX risk now lies with the Dutch importer. He can now hedge himself by concluding a non-deliverable forward (NDF). An NDF is an FX instrument in which the difference between the contract FX rate and the spot FX rate on the fixing date is settled. You could say that an NDF is an FX forward contract with cash settlement instead of physical delivery. In theory, the rate for an NDF is determined in the same way as the FX forward rate for a regular FX forward contract.

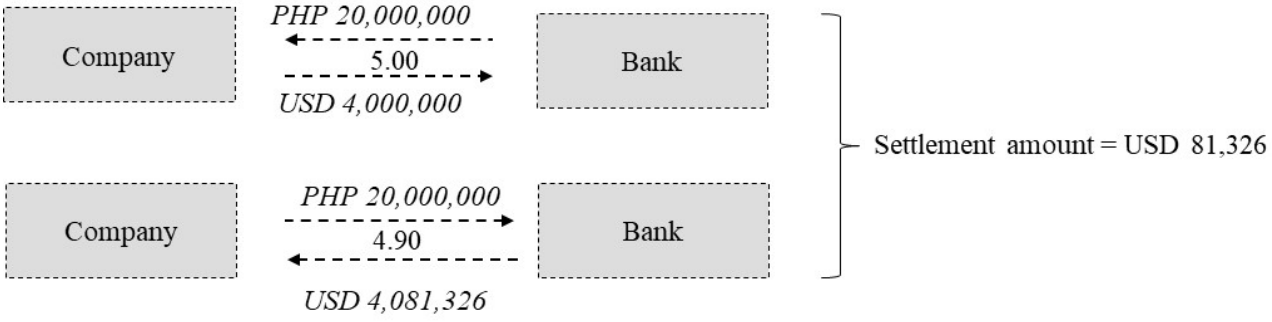
On the expiry date of an NDF contract the two currencies are not actually exchanged at the agreed contract rate. Instead, a cash settlement takes place in the convertible currency based on the difference between the contract rate and the FX spot rate on the maturity date of the NDF contract.

If a company receives an invoice for 20,000,000 PHP to be paid in the EUR against the current EUR/PHP rate after 3 months, then, as we already have seen, the risk is that the EUR will become weaker against the PHP and, as a result, that the company will have to pay more EUR to the Philippine exporter.

In order to hedge itself the company can sell an NDF EUR/PHP for a contract amount of 20 million PHP. Let us assume that the contract rate of the NDF is 5.00 and that the fixing rate after three months is 4.9.

The diagram below shows how the settlement amount of the NDF is calculated. The NDF is represented by a virtual FX forward at the contract rate of 5 and a virtual offsetting transaction at the spot rate on the fixing day of 4.9.

Figure 5 Calculation of the settlement amount of an NDF




The settlement amount of the NDF is (20M / 5.0000) -/- (20M / 4.9000) = 4,000,000 – 4,081,326 = 81,326. The EUR has become weaker and, therefore, the seller of the PHP is receiving the settlement amount from the buyer (i.e. the bank).

On the fixing date, the company also has to pay the invoice (the counter value of EUR 20,000,000), i.e. EUR 20,000,000 / 4.910 = EUR 4,081,326. Together with the cash settlement of the NDF, this leads to a total outgoing cash flow of EUR 4,000,000.

By concluding the NDF, the company has fixed its outgoing EUR cash flow at EUR 4,000,000. This would also be the case if there would have been a liquid market for PHP and the company could have conducted an FX Forward.

## *7 FX options*

Options are instruments whereby one party has a unilateral obligation while, the other party has a unilateral right. The right in an option contract can relate to

- the purchase/delivery of a specific financial value at a pre-agree price;
- the settlement of a difference between an interest rate or price conducted in the contract and the actual interest rate or price at some future moment;
- entering into a transaction against a pre-agreed price or interest rate.

Option contracts with straight forward conditions are called plain vanilla options. In addition to plain vanilla options, there is also a wide range of so called exotic option.

The right under an option can be used as a hedge against adverse price movements without losing the opportunity to profit from favourable price movements. The right, however, can also be used to speculate on favourable price movements without being exposed to possible adverse price movements. Thus, the holder of the right can only win. However, to enjoy such a comfortable position, a price must be paid: the option premium.

The pre-agreed price or interest rate in an option contract is called the exercise price or strike price. The party who receives the right is the buyer of the option, the party providing the right is the seller. Selling options is also called writing.

A right to purchase a financial value or to receive a sum of money if the market price is higher than the strike price is called a call option. A right to sell a financial value or to receive a sum of money if the market price is lower than the strike price is called a put option. The maturity date of an option contract is called the expiry date. On this date the buyer of the option has to decide whether he makes use of his right or not.

Using the right is referred to as exercising the option.

FX options are expressed in a particular way. The reason for this is the fact that FX transactions comprise both a sale of one currency and a purchase of another currency. The right to buy one currency at a specific strike price, therefore, is equivalent to the right to sell another currency. This is why FX options are expressed by mentioning the two rights simultaneously. The right to buy EUR against USD is expressed as follows: EUR call / USD put. And, for instance, the right to sell GBP against US dollars is expressed as: GBP put / USD call.

### *7.1 The option premium*

The market party who buys an FX option, receives a right that he can use to protect against unfavourable developments of exchanges rates, whereas at the same time, he still can profit from favourable developments. This brings him in a position where he can only win. However, in order to reach this position the buyer of the option has to pay a price, i.e. the option premium.

The option premium is usually paid at the start of the contract period. The premium for over-the-counter options can be expressed in different ways:

- as a number of points of a price
- as a percentage of the underlying value
- as an amount to be paid in one of the currencies.

**Example**

A client wants to buy an over the counter GBP call / USD put option. The premium is expressed in points: 500 points (= USD 0.0500). The size of the option contract is EUR 2,000,000. The premium for this option is USD 2,000,000 x 0.0500 = USD 100,000.
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Just like the price of most other financial instruments that are traded on the financial

markets, the price of an option is determined by supply and demand. The price is, amongst others, dependent on the difference between the current FX rate of the underlying currency pair and the strike price and also on the volatility of the FX rate.

### *7.2 Application of FX options*

As an example we take a US company that has to pay an amount denominated in GBP to its UK supplier in three months. The risk of the company is that during the coming period of three months the GBP will become more expensive. The company could hedge itself by transacting an FX forward contract in which it would buy the GBP forward. However, this would mean that the company could not profit if the GBP would become weaker. Put in other words, with an FX forward transaction the company would accept the risk of opportunity loss. If the company does not want to accept this risk, and still wants to hedge against unfavourable changes of the GBP rate, it should buy an option. In this case the appropriate option would be a GBP call / USD put. (If the company would have a strong vision that the GBP would rise, it could better choose for an FX forward because the chance to incur opportunity loss is then very small and the option premium would only be a waste of money).

Let as assume that the current GBP/USD spot rate is 1.3300 and that the US company buys a GBP call / USD put option with a strike price of 1.3500 for a contract amount of GBP 500,000. This means that on the expiry date of the option the company has the right to buy 500,000 GBP at a rate of 1.3500 US dollars.

The table below shows the result of the option under two different scenarios:

| **GBP/USD rate on the expiry date** | **Exercise or not** | **FX transaction** |
|---|---|---|
| 1.3000 | no | The company buys the GBP 'in the market' at the spot rate of 1.3000 |
| 1.3800 | yes | The company buys the GBP from the seller of the option at the strike price of 1.3800 |

The table shows that, if at the expiry date the FX rate would be 1.3000, then the company would not use its right to buy the GBP. The option is now said to expire worthless and to be 'out-of-the-money'. Out-of-the-money (otm) means for a call that the spot rate is lower than the strike price and for a put that the spot rate is higher than the strike price.

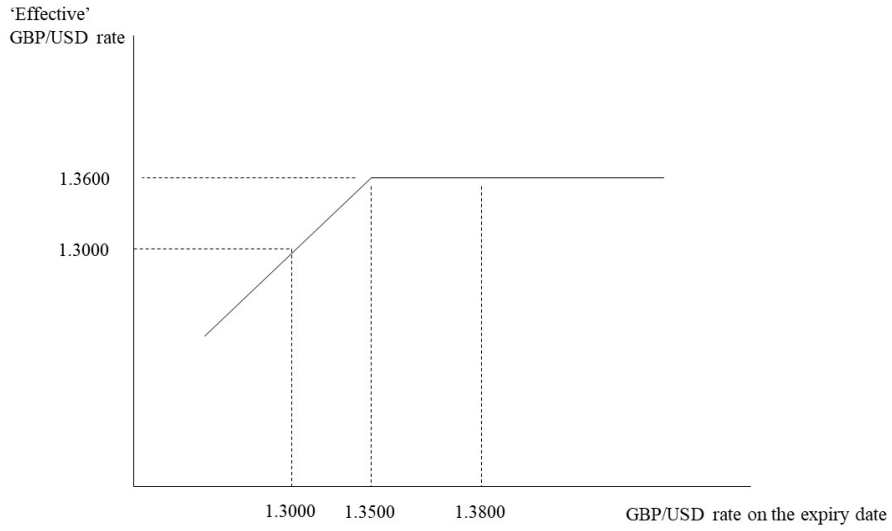
The table shows that if, on the other hand, at the expiry date the FX rate would be 1.3800, then the company would use its right to buy the GBP at 1.3500. The option is now said to be exercised and to be 'in-the-money'. In-the-money (itm) means for a call that the spot rate is higher than the strike price and for a put that the spot rate is lower than the strike price

If we take the option premium into account, we can calculate the effective rate that the company realizes. The effective rate is the rate including all incurred costs. Let us assume that the company has paid a premium of 0.0100 for the option. The table below shows the effective rates under different scenarios.

| GBP/USD rate on the expiry date | Purchase rate | Paid premium | Effective rate |
|---|---|---|---|
| 1.3200 | 1.3200 | 0.0100 | 1.3300 |
| 01.3400 | 1.3400 | 0.0100 | 1.3500 |
| 1.3500 | 1.3500 | 0.0100 | 1.3600 |
| 1.3800 | 1.3500 | 0.0100 | 1.3600 |
| 1.4000 | 1.3500 | 0.0100 | 1.3600 |

The table shows that the maximum rate for the company is 1.3600. For every spot rate lower than the strike price of 1.3500 the company can profit. However because of the paid premium of 0.0100, effectively, it is always paying 0.0100 more than it would have paid if it would not have bought the FX option. Figure 6 shows a diagram of the effective rates under different scenarios for the FX rate at the expiry date of the option.

Figure 6 Effective rates as a result of the purchase of a GBP call /USD put with a strike price of 1.3500




The table below shows the result of three different actions that the company can undertake to handle its FX risk with different FX rates at the expiry date of the option. The three alternatives are:

1. Leave the position open and conduct an FX spot transaction after three months
2. Conduct an FX forward at a rate of 1.3300
3. Buy a GBP call / USD put with a strike price of 1.3500

| GBP/USD rate on the expiry date | Alternative 1 No hedge | Alternative 2 FX Forward | Alternative 3 buy GBP call / USD put |
|---|---|---|---|
| 1.3000 | 1.3000 | 1.3300 | 1.3100 |
| 1.3200 | 1.3200 | 1.3300 | 1.3300 |
| 1.3300 | 1.3300 | 1.3300 | 1.3400 |
| 1.3400 | 1.3400 | 1.3300 | 1.3500 |
| 1.3500 | 1.3500 | 1.3300 | 1.3600 |
| 1.3800 | 1.3800 | 1.3300 | 1.3600 |
| 1.4000 | 1.4000 | 1.3300 | 1.3600 |

The table shows that for every FX rate at the expiry date lower than 1.3300 alternative 1 (no hedge) gives the best result whereas for every rate higher than 1.3300 the FX Forward gives the best result. The conclusion is that the FX option would never give the best result. The table below summarizes the pros and cons of an FX option compared to leaving the position open and compared to the FX Forward.

| | **Advantage of the FX option** | **Disadvantage of the FX option** |
|---|---|---|
| Leave the position open | Company is protected against higher rates (break-even rate = 1.3600) | Company has to pay a premium |
| FX Forward | Company can profit from lower FX rates (lower than 1.3200) i.e. no opportunity loss | Company has to pay a premium |

In the above example the reason for the company to buy an FX option was to hedge itself against unfavourable changes in FX rates but at the same time keep the potential to profit from favourable changes in FX rates.

Another reason for a company to buy an option could be if the company has proposed for an export order denominated in a foreign currency which is not already accepted. During the period between the moment that the proposal is sent and the moment on which the company will know whether the proposal is accepted or not, the company has a potential FX risk. If the company already wants to hedge this risk it makes no sense to buy an FX forward in which it sells the foreign currency because an FX Forward gives the company an obligation to sell the foreign currency. If the order would not be accepted, the company would be left with an open position and would have to buy the foreign currency at the then prevailing spot rate. Instead of hedging this would mean that the company is speculating. In this case an FX put option on the foreign currency would be a better alternative because the option would give the

company only the right to sell the foreign currency and not the obligation.

### *8 Cylinder Option*

When market parties develop a hedging strategy using options, they often consider a combination of different options. An important reason for this is that parties who want to hedge are often reluctant to pay the option premium. With this in mind, banks have developed a number of strategies whereby the protection which is provided by options remains intact but whereby the company or investor does not need to pay a premium. Option strategies whereby the client does not have to pay a premium are referred to as zero cost option strategies. An example of a zero-cost strategy is a cylinder option or risk reversal.

A cylinder option is a combination of a purchased otm call option and a sold otm put option or vice versa. The two options in a cylinder have different strike prices, i.e. one that is higher that the FX forward rate at the moment of concluding the deal and one that is lower than that rate.

A market party who wants to hedge against a rise in a foreign currency can conclude a risk reversal whereby he buys the call option on the foreign currency and, instead of paying premium, sells a put option on this foreign currency. In order to make this strategy zero-cost, both options should be equally out-of-the-money.

**Example**

An American importer wants to hedge himself against a rise of the GBP/USD rate. The current GBP/USD FX forward rate is 1.3300. He chooses to use a risk reversal in which he buys a GBP call / USD put option with a strike price of GBP/USD 1.3600 (out-of-the-money). The size of the option contract is GBP 10 million and the premium is USD 300,000. The importer also sells a GBP put / USD call option with a strike price of 1.3000. This option is just as much out-of-the-money as the purchased GBP call/USD put option and, for a contract size of GBP 10 million, its premium is also USD 300,000.

At the expiry date, the importer will exercise his GBP call / USD put option for each rate above 1.3600 and thus buys GBP 10 million at 1.3600. For each rate lower than 1.3000, the bank will exercise its GBP put / USD call option and sells GBP 10 million to the company at 1.3000. For all rates between 1.3000 and 1.3600, neither of the options will be exercised and the importer can buy the GBP in the market at the market rate. This is shown in the following table.

| **GBP/USD FX rate on expiry date** | **FX transaction on expiry date** | **Effective rate** |
|---|---|---|
| 1.3800 | Importer exercises GBP call option and buys GBP 10,000,000 against the strike price (1.3600) | 1.3600 |
| 1.32400 | Importer buys GBP 10,000,000 in the market against 1.3400 | 1.3400 |
| 1.2800 | Bank exercises GBP put option. Importer has to buy GBP 10,000,00 against the strike price (1.3000) | 1.3000 |

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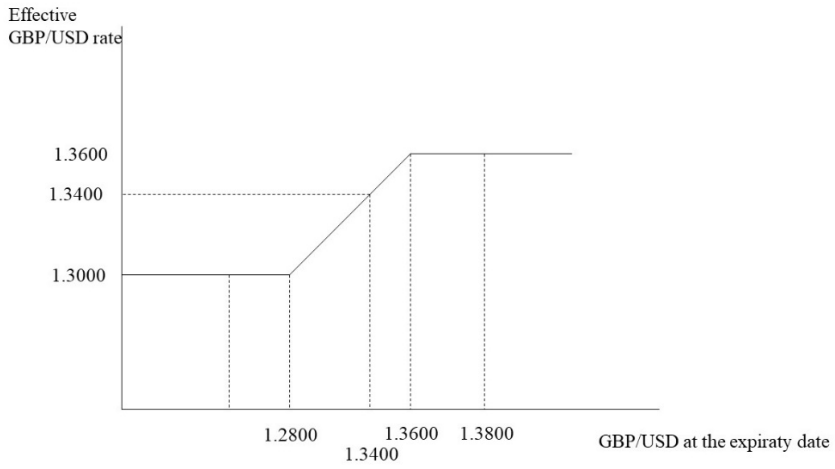
Figure 7 shows a diagram of the above described risk reversal.

Figure 7 Cylinder option or risk reversal




A risk reversal can also be conducted by a party that wants to protect itself against a decrease in the FX rate of a foreign currency. This party would buy an out-of-the-money put option on this foreign currency and simultaneously sell an out-of-the-money call option on this currency.

### *9 FX swap*

An FX swap is an OTC currency derivative contract with a short term, in which two parties enter into a reciprocal obligation to exchange a certain amount of two currencies on the spot date at the FX spot rate and to reverse this exchange in the future at the FX forward rate. The exchange at the beginning of the maturity period is called the near leg (spot leg or first leg), the exchange at the end of the maturity period is called the far leg (forward leg or second leg).

**Example**

A company buys 700,000 US dollars per spot to a bank against 616,740 euros (spot rate 1.1350). At the same time the company agrees to sell back the 700,000 US dollars on 1 August against 615,926 euros (forward rate 1.1365).

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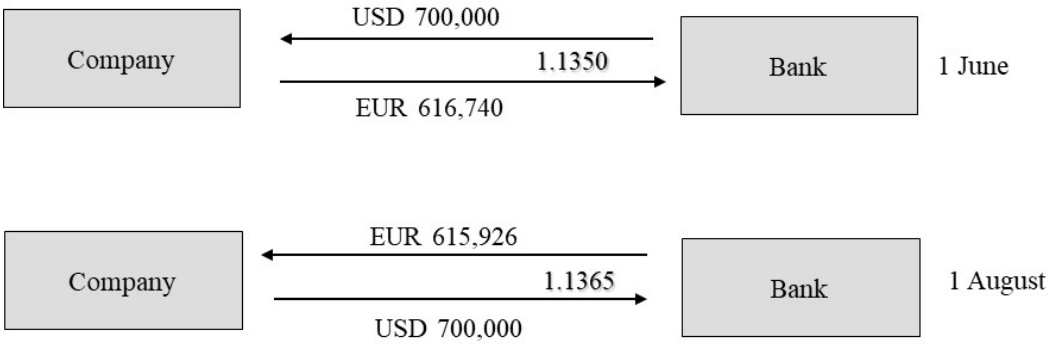
Figure 8 shows the diagram of the FX swap transaction which is discussed in the above example.

Figure 8 FX Swap




Although an FX swap is a combination of two FX transactions which are traded at the same moment, in fact it is not really a currency instrument. The reason for this is that real FX instruments involve a permanent exchange of two currencies. A Dutch company that, for instance, has a long position on its US dollar current account and sells these US dollars via an FX spot transaction, loses these US dollars permanently. And a company that, for instance, buys British pounds through an FX Forward transaction, has, as a result of this transaction, the permanent disposal over the pounds.

In both examples the currency position of the company changes permanently (if nothing else happens).

An FX swap, on the other hand, only results in a temporary exchange of currencies. The transaction that is shown in figure 8 shows that on 1 June the company had a shortage in US dollars which it covers temporarily by the FX swap. It transfers the same amount of US dollars back on 1 August which means that the currency exposure of the company did not change as a result if the FX swap. On the other hand, at the start date of the FX swap the company had a surplus in euro which it will regain at the maturity date.

This means that an FX swap is not an FX instrument but instead a liquidity instrument. The FX swap is, in fact, a combination of two opposite loans in two different currencies for the same initial value. The company that has executed the transaction that is shown in figure 8, for instance, has borrowed 700,000 US dollars from the bank from 1 June to 1 August whereas it, at the same time, it has invested in a EUR deposit of EUR 616,740 during the same period.

If a market party grants a loan to another market party, it will charge interest. The company in the example will thus be charged interest on the USD loan, but, on the other hand, it will receive euro interest over the euro deposit. The two interest amounts are taken together and the difference between these amounts is reflected in difference between the exchange rates of the near leg and the far leg.

Figure 8 shows that the FX rate in the first leg of the FX swap is 1.1350 and that the FX rate in the second leg is 1.1365. The reason for this difference lies in the fact that the euro interest rate is lower than the US interest rate. This means that the company has to pay more interest on the US loan than it receives for the euro investment. The difference between the interest rate in the euro area and in the USA is in this case unfavourable for the company. If the company would have conducted the FX swap the other way around (i.e. first sell the USD and later buy them back), then the company

would have invested the USD at the higher interest rate and would borrowed the euro at the lower interest rate. In this case the interest differential would be favourable for the company.

### *9.1 Rolling over FX forward contracts using FX swaps*

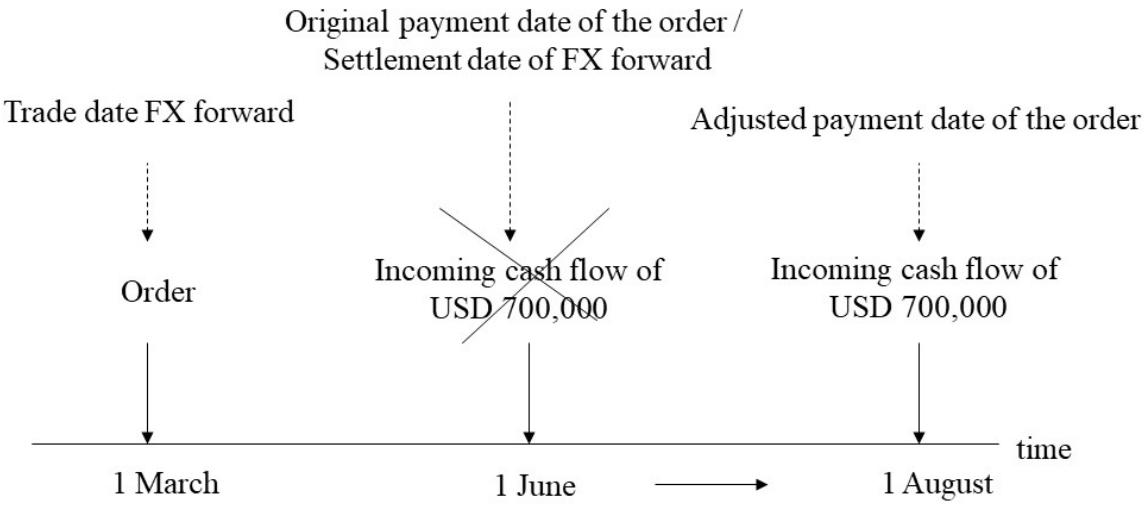
Companies often use FX swaps to change the value date of an FX forward transaction. This is referred to as rolling over an FX forward transaction. Rolling over an FX forward is necessary if an anticipated cash flow, that is hedged through an FX forward, appears to take place at another moment than expected.

**Example**

On 1 March a company has received a confirmation that its US client has accepted an order of USD 700,000. The agreed payment date is 1 June. In order the hedge the FX exposure, the company immediately concludes an FX forward, in which it sells 700,000 US dollar with settlement date 1 June.

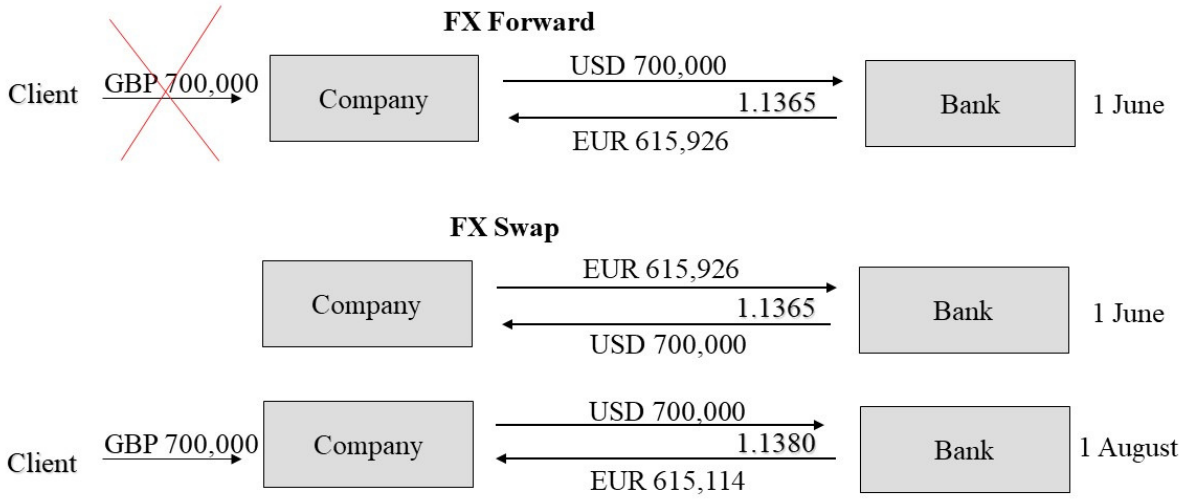
At the end of May the client notifies the company that it is not able to pay and that he expects that he will only be able to pay on 1 August. This situation is shown in figure 9.

Figure 9 Postponement of an expected cash flow in a foreign currency




The company would now prefer to settle the FX forward on 1 August instead of 1 June. To achieve this, it can conduct an FX swap in which the first leg falls on 1 June and the second leg on 1 August. In the first leg, the company buys USD 700,000 million against euro and, as a result, on 1 June the transfers on its US dollar account will cancel each other out. On 1 August, in the second leg of the FX swap, the company sells the USD 700,00 that it will receive as a result of the late payment. This is shown in figure 10.

Figure 10 Rolling over an FX forward contract in case of a delay in payment by a foreign client

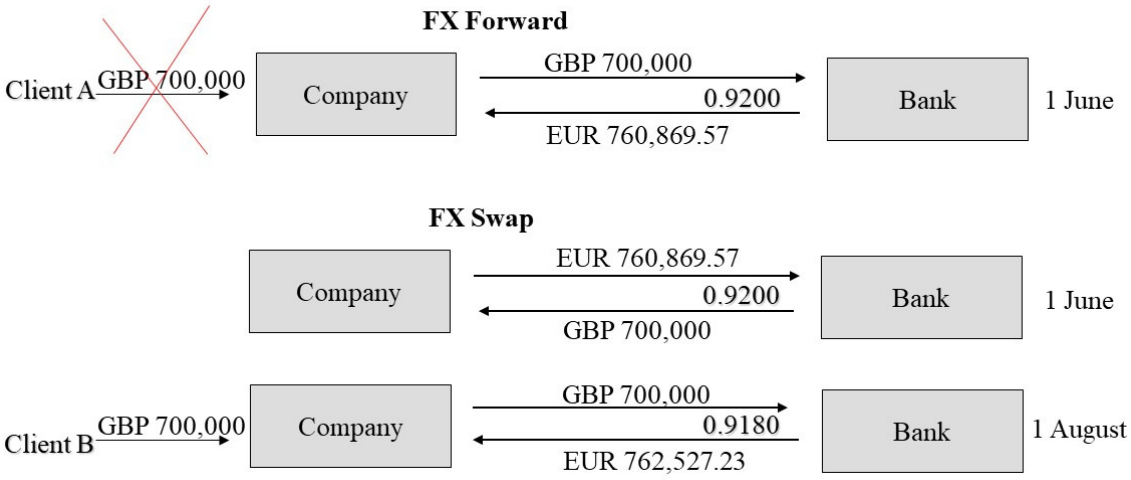



The upper right-hand side of figure 10 shows that the expected incoming client payment of USD 700,000 will not go through. The right-hand upper side of the diagram shows, however, that as a result of the FX forward transaction the company is required to sell 700,000 USD to the bank. If the company would take no other action, then its US dollar current account would become to show a deficit of USD 700,000 which would be charged by the bank with a high interest rate. This deficit would last until the client will eventually pay. This is expected to be on 1 August. To avoid the temporary deficit on its US dollar current account, the company transacts an FX swap in which it buys USD 700,000 in the first leg (settlement 1 June) and sells the USD back on the moment that the client is expected to pay (1 August). The two legs of FX swap are shown in the lower side of the diagram.

If we look at the cash flows on 1 June, it becomes clear that the USD cash flow resulting from the original FX forward is cancelled out by the USD cash flow in the first leg of the swap. And if we look at the cash flows on 1 August, we see that the company can use the 700,000 US dollars that it receives from its client to fulfil the USD payment obligation in the second leg of the FX swap.

FX swaps can also be used if an expected transaction will not go through. In paragraph 5.2 we discussed a situation in which an export transaction was cancelled. The company had conducted an FX forward transaction in which it sold the expected GBP proceeds of GBP 700,000. If the company would expect another export transaction to the UK in the future, then, instead of offsetting the FX forward it can conduct an FX swap in which it buys GBP 700,000 from the bank in the first leg and sells 700,000 GBP in the second leg. The settlement leg is now set at the date that a future export transaction to the UK will take place. This is shown in figure 11.

Figure 11 Rolling over an FX forward in case of default and expected other export transaction

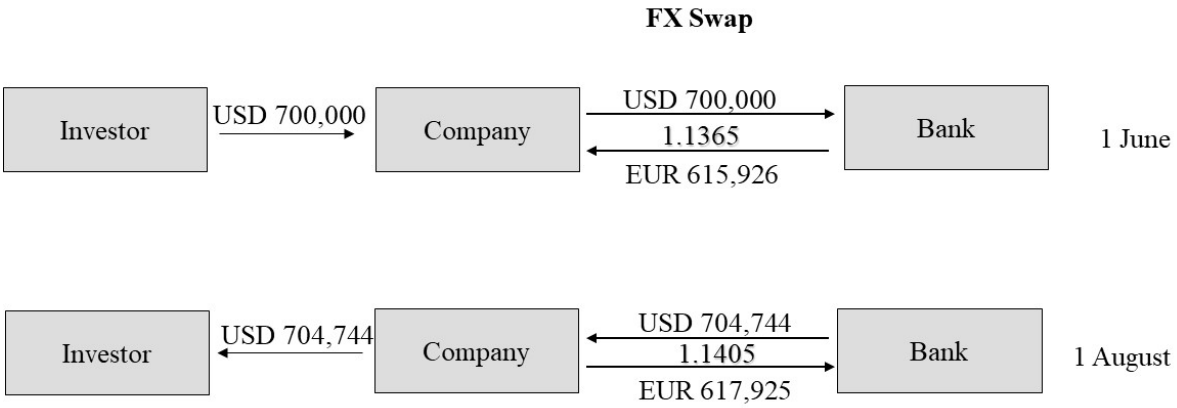



### *9.2 Synthetic short-term euro funding*

If an organization has a funding requirement in its domestic currency, it can consider to conduct a synthetic loan to lower its interest costs. For short terms a synthetic loan can be realized by concluding a money market loan in another currency than the domestic currency and by using an FX swap to convert the proceeds from this FX loan temporarily to the domestic currency. In theory, this should not help the organization much; the interest rate differential between the loans in the two currencies is, after all,

included in the FX forward rate used in the far leg of the FX swap. However, in practice, the implied interest differential in the FX swap points often differs slightly from the FX swap points that should theoretically apply based on the differences between the money market interest rates in the relevant currencies. This is because the money market and the market for FX swaps are two complete separate markets. As a result, arbitrage opportunities may arise. Figure 12 shows an example of a synthetic euro funding.

Figure 12 Synthetic short-term euro funding




The left-hand upper side of the diagram shows that the company has borrowed US dollars from an investor. The right-hand upper side of the diagram shows the first leg of the FX swap in which the company coverts the USD into euro. During the term of the USD loan / FX swap (i.e. from 1 June to 1 August) the company can dispose of the euro amount of EUR 615,926. On 1 August, the company has to pay back the borrowed USD amount to the investor plus the interest amount over the principal amount. This is shown in the left-hand bottom side of the diagram. At the same time, the company is buying the needed USD amount from the bank in the second leg of the FX swap. This is shown in the right-hand bottom side of the diagram.

Let us assume that the company can borrow euro from Dutch investors at 2% and that it can borrow US dollars from US investors at 4%. At first sight, under these conditions, it does not seem to make sense to borrow US dollars instead of euro. However, the interest differential is reflected in the swap points, i.e. in the difference between the FX rate in the first leg of the swap and the FX rate in the second leg of the FX swap. In the FX swap, the company is lending US dollars (theoretically at a rate or 4.00%) and is borrowing euro (theoretically at a rate of 2%). This means that the company is earning the interest differential of 2% in the swap, which means that the effective interest costs of the company are 4% (interest paid to the investors) - 2% (interest differential earned in the FX swap) = 2%.

Without proof we state that the theoretical swap points, under the above mentioned market conditions on the US and euro money market, can be calculated at 0.0038. However, in practice, the swap points do not exactly represent the interest rate differential between the rates that prevail in the different money markets. In our example which is shown in figure 12, the two- month swap points are 0.0040 instead of 0.0038. This means that the interest differential between EUR and USD in the swap is larger than in the money markets. Again without proof we state that the 40 swap points represent an interest rate differential of 2.09%. This means that the effective interest rate for the company is not 2.00% but only 1.91%, i.e. 4% (interest paid to the investors) – 2.09% (interest differential earned in the FX swap) = 1.91%.

At present. many companies make use of the market imperfections in the FX swap market.

### *10 Cross currency swap*

A cross currency swap is an over-the-counter traded derivative in which two interest flows are exchanged in two different currencies. In these types of swaps at the beginning and at the end of the term, also principals in these currencies are exchanged, both at the same exchange rate (the FX spot rate).

A cross currency swap is in fact the same concept as an FX swap. This is because in both cases, there is an exchange of principals in the two currencies at the beginning, which is reversed at the maturity date. The main difference is that, with a cross currency swap, the interest coupons are paid out explicitly during the contract term whereas with an FX swap the interest rate differential is expressed as swap points and with an FX swap the FX rate for the final exchange is the FX forward rate and not the FX spot rate.

The choice for an FX swap or for a cross currency swap only depends on the desired contract term. FX swaps are commonly used for terms shorter than one year and cross currency swap are commonly used for terms longer than one year. Figure 13 shows a diagram in which a company has borrowed 10 million euro from the bank and, at the same time has invested 13,500,000 US dollars in the bank.

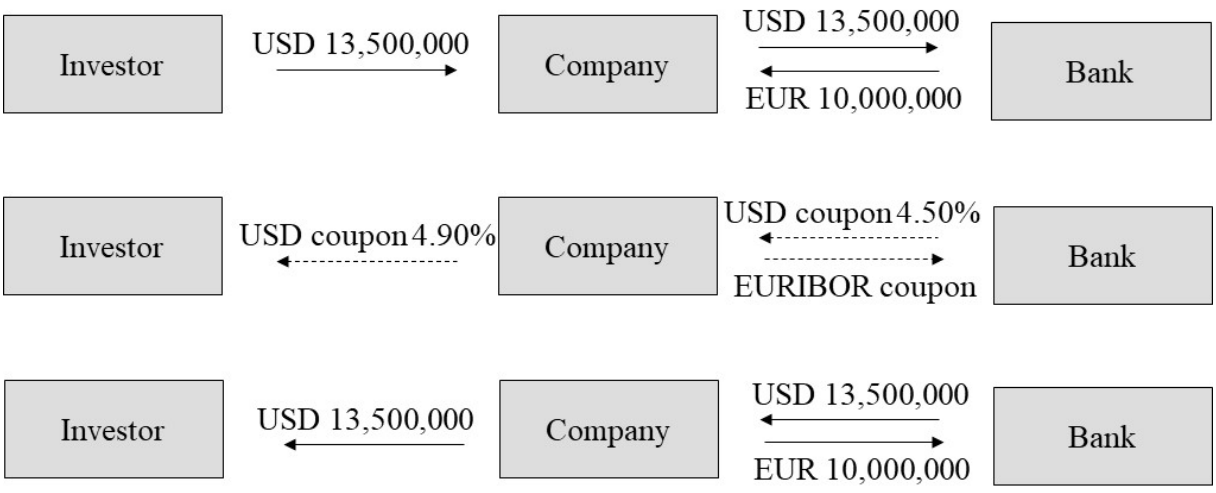
Figure 13 Cross currency swap


The diagram shows a cross currency swap with nominals of EUR 10,000,000 million and USD 13,500,000 million respectively. The principals are exchanged on the start date and are reversely exchanged at the maturity date. During the contract term the company, which has received the EUR principal on the start date, pays a coupon based on EURIBOR whereas the bank, which has received the USD principal on the start date, pays a fixed USD coupon of 4.90%. On the maturity date, both principals are paid

back.

Companies can use cross currency swaps to create synthetic loans for periods longer than one year in order to decrease their interest costs. Figure 14 shows a company that has issued a USD bond with a principal amount of USD 13,500,000. The company pays an interest rate of 4.90% to the investors. In the initial exchange of principals in the cross currency swap, the company converts the issue proceeds in USD to euro. During the term of the cross currency swap, the company is converting the USD coupon that it has to pay to the investors into a EURIBOR coupon. And, finally, at the maturity date of the bond, the company converts the 10,000,000 EUR that it has received as a result of the cross currency swap back to USD in order to be able to pay the investors back.

Figure 14 Combination of a USD bond and a cross currency swap; long-term synthetic euro funding




During the term of the structure, the effective interest costs for the company are: 4.90% + EURIBOR – 4.50% = EURIBOR + 0.40%.

If, for instance, the company would have had to pay EURIBOR + 0.45% for a straight

euro bond then the structure would be rewarding. The company can then profit from the fact that the difference between the rates for interest rate swaps in the two currencies is not the same as the difference between the rates in the bond markets in the relevant currencies. Such differences can arise when foreign investors have a specific interest in certain issuing institutions and see no investment possibilities within their own currency area. They are then looking for foreign issuers and have to settle for relatively low returns in their own currency.


# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

## *Interest Rate Risk Management*

*Lex van der Wielen*

IN CO-OPERATION WITH MICHIEL VAN DEN BROEK

Financial Markets Books
Geelvinckstraat 56, 1901 AJ Castricum

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# *Introduction*

Interest risk is the risk that changes in interest rates have a negative impact on the result or on the capital of an organisation. For asset managers, pension funds and other investors, interest rate risk is the risk that the value of their fixed income portfolios decreases as a result of a change in interest rates. For companies, interest rate risk is the risk that the interest costs increase as a result of a change in interest rates. In order to avoid interest rate risk, many companies choose to fix the interest rates for the complete term of every loan that they take up. Some companies, however, do not choose to fix the interest rate at the start of a loan, and instead choose for a floating rate. This means that they are accepting the fact that they are exposed to interest rate risk. If these companies, during the term of the loan, would change their mind and would like to decrease or eliminate the interest risk of their floating rate loan, they can use interest rate derivatives, for instance interest rate swaps and interest rate options.

## *1 Interest rate swaps*

An interest rate swap (IRS) is an over-the-counter interest rate derivative contract in which two parties enter into a reciprocal obligation to exchange interest coupon payments in the same currency during an agreed period of time without exchanging principals. Interest rate swaps are used to change the interest rate conditions of a financial instrument, from fixed to floating or vice versa.

### *1.1. Product characteristics of interest rate swaps*

The following transaction data should be recorded in an interest rate swap contract:

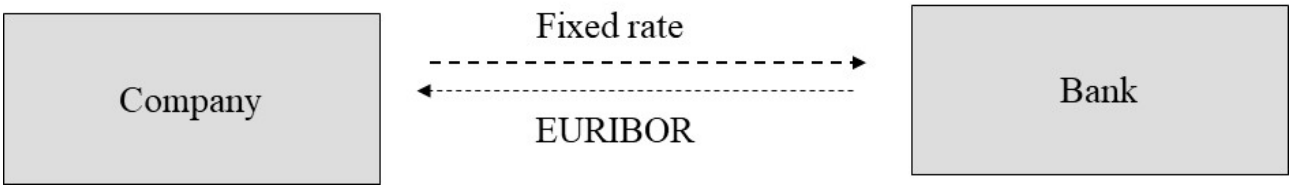
- the notional value or contract amount
- the reference rate for the floating interest rate and the daycount convention (e.g. EURIBOR or LIBOR, actual/360)
- the contractual interest rate; the level of the fixed interest rate and the daycount convention
- the term
- any possible repayment schedule
- who the buyer is and who the seller is; i.e. the fixed rate payer and fixed rate receiver

For the party that pays the fixed rate in an interest rate swap, the swap is referred to as a payer's swap. For the party that receives the fixed rate, the same interest rate swap is called a receiver's swap. Sometimes the terms buying or selling an interest rate swap are used. As usual, the general rule with regard to buying and selling in financial markets applies: a buyer profits from an increase and a seller profits from a decrease in the price determining parameter, in this case the fixed interest rate. The buyer of an interest rate swap is thus the party who pays the fixed rate. He profits from a rise in interest rates.

The term for interest rate swaps can vary from only several days to fifty years. The principal sum can also vary widely. For most transactions, it varies between EUR 1 million and EUR 100 million. The reference for the floating rate for a swap is generally the 1,3 or 6 month EURIBOR rate or LIBOR rate. If these reference rates are used, then the interest rate swaps are referred to as EURIBOR swaps or LIBOR swaps.

Figure 1 shows a diagram of an interest rate swap. The company pays the fixed rate and receives the floating rate.

Figure 1 Interest rate swap



The price or interest rate swap rate for a swap is the fixed rate level. The fixed rate is usually fixed for the entire term of the interest rate swap.

### *1.2 Hedging the interest rate risk of a loan with a floating rate*

Interest rate swaps are often used by organisations which want to convert a floating interest rate of an existing loan into a fixed rate. These swaps are called funding swaps or liability swaps. The combination of the floating rate loan and the interest rate swap gives a synthetic fixed rate loan. It the organisation would unwind the existing floating rate loan and would take up a new loan with a fixed rate, then it would have to re-negotiate loan conditions. The advantage of using an interest rate swap is that the organisation does not have to the need to renew its existing loan or have to make changes to an existing loan agreement. An interest rate swap, in itself, is a standing contract. This means that the interest rate swap does not even need to be conducted with the bank where the loan was taken out as counterparty.

It is important that the conditions of the interest rate swap exactly match the conditions of the loan:

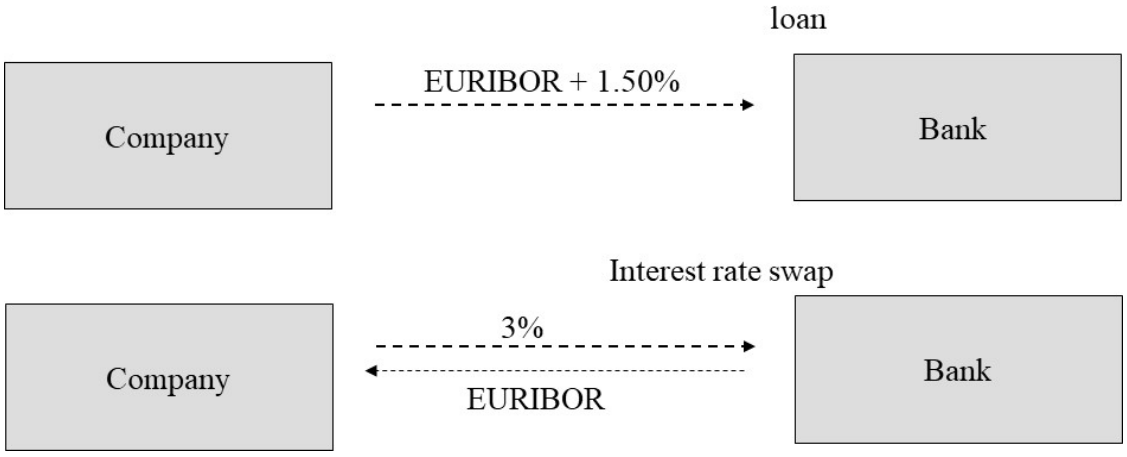
- the contract amount of the interest rate swap should match the loan amount;
- the coupon dates of the interest rate swap should match the coupon dates of the loan;
- the reference rate of the floating leg of the interest rate swap should match the reference rate of the loan;
- if the loan has an amortization scheme, then the interest rate swap should have the same amortizations scheme.

**Example**

A company has a loan with a floating interest rate. The interest rate is based on the 3-month EURIBOR. For the loan a credit spread of 1.50% has been agreed. The

remaining term for the loan is four years. The company wants to cover the interest rate risk of the loan for the remaining term and concludes an interest rate swap. The four-year interest rate swap rate is 3%. The upper side of figure 2 shows a diagram of the loan whereas the lower side of figure 2 shows a diagram of the interest rate swap.

Figure 2 Combination of a loan with a floating rate and an interest rate swap




The effective interest rate during the remaining term of the loan is 3% + 1.5% = 4.5%.

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In the table below the interest costs are calculated which the company incurs with different EURIBOR fixings during the term. The table shows that the interest costs for the company are independent of the level of EURIBOR; the company has fixed its interest costs at a level of 4.5%.

| EURIBOR fixing | Interest costs for the loan (-) | Interest income floating coupon interest rate swap (+) | Interest costs fixed coupon interest rate swap (-) | Total Interest Costs |
|---|---|---|---|---|
| -0.50% | -1.00% | -0.50% | -3.00% | 4.50% |
| 0.50% | -2.00% | +0.50% | -3.00% | 4.50% |
| 1.50% | -3.00% | +1.50% | -3.00% | 4.50% |
| 2.50% | -4.00% | +2.50% | -3.00% | 4.50% |
| 3.50% | -5.00% | +3.50% | -3.00% | 4.50% |

### *1.3 Pitfalls that account managers and treasury advisors should be aware of*

In loan agreements, sometimes a floor is agreed, which means that if the floating reference rate (EURIBOR ore LIBOR) becomes negative, it will be fixed at zero. For instance, if in the above example EURIBOR was fixed at -0.25% then the interest rate for the next coupon of the loan would be set at 0% + 1.50% = 1.50% instead of -2.5% + 1.50% = 1.25%. With interest rate swaps, however, it is not common to agree such a floor. If this is the case, then, in the above example, the floating coupon of the interest rate swap would still be fixed at -0.25% for the next coupon period. This means that the net interest costs for the company with a EURIBOR fixing of -0.25% are not 4.5% but instead the sum of 1.50%, as a result of the loan, and 3% - - 0.25 = 3.25% for the interest rate swap, which adds up to 4.75%. This means that the interest rate costs are not fixed completely. This is shown in the table below.

| EURIBOR fixing | Interest costs for the loan (-) | Interest income floating coupon interest rate swap (+) – *no floor* | Interest costs fixed coupon interest rate swap (-) | Total Interest Costs |
|---|---|---|---|---|
| -0.50% | -1.00% | *0%* | -3.00% | *5.00%* |
| -0.25% | -1.25% | *0%* | -3.00% | *4.75%* |
| 0% | -1.50% | 0% | -3.00% | 4.50% |
| 0.25% | -1.75% | +0.25% | -3.00% | 4.50% |
| 0.50% | -2.00% | +0.50% | -3.00% | 4.50% |

Account managers and treasury specialists should explain the consequences of a floor very carefully to their clients and they have to warn them for the fact that their risk is not completely hedged.

Apart from the problem that may arise as a result of a floor, there is another important issue of which account managers and treasury specialists should be aware of. This is the fact that loan with a floating rate can be amortized on any re-fixing moment during the term. The loan agreement itself does not have to contain an amortization scheme, i.e. the loan is a so-called bullet loan. If a company wants to hedge the interest rate risk of a bullet loan by using an interest rate swap, then the contract amount of the interest rate swap is fixed for the whole period that the company wants to hedge.

If the company decides to make use of the right to pay back the loan partially and it would not, at the same time, unwind the interest rate swap for the same amount, then the company would be 'over-hedged'. This means that a part of the interest rate swap will become to have a speculative character. In the derivative agreements that banks reach with their clients, usually it is stated that the company has the obligation to take the initiative to adjust the contract amount of an interest rate swap if it pays back a loan early. However, although this is an obligation for the client, account managers and treasury specialists are well-advised to check periodically whether the contract amount of interest rate swaps still match with the loan amounts of the loan that they are related to.

Following the derivative agreements with their banks, clients, therefore, are not allowed to be over-hedged. However, on the other hand they are allowed to conduct interest rate swaps for smaller amounts or for shorter periods than apply for their loans. This means that clients are allowed to be under-hedged.

Finally account managers and treasury advisors should be aware of the fact that with interest rate swaps only the floating rate is fixed. Banks often have the right, however, during the term of a floating rate loan to change the credit spread. Interest rate swaps do not hedge that risk. This is not only true, however, for interest rate swaps, but for all interest rate derivatives

### *1.4 Forward start interest rate swaps*

With regular interest rate swaps, the coupon period of both the floating coupon and the fixed coupon will start immediately which means that an organisation that uses an interest rate swap in order to hedge its interest risk is immediately protected. Sometimes, however, the protection is not needed immediately, for instance if a company wants to already hedge the interest rate risk of a loan which it is planning to take up after one year.

Let us take as an example a company that has decided to build a new industrial plant after one year and needs to finance this for a term of seven years. If the treasurer would decide to hedge the interest rate risk for this future loan, he can conduct a forward start swap that starts after one year and has an effective term of seven years. The fixed rate of the forward start swap is agreed at the moment that the contract is conducted. If after one year the company still has a need to finance its activities, then it can take up a loan with a floating rate from the bank with a term of seven years. If the fixed interest rate of the forward start interest rate swap would have been agreed at 5%, then figure 3 shows the coupon flows for the company during the term of the loan.

Figure 3 Loan and forward start interest rate swap

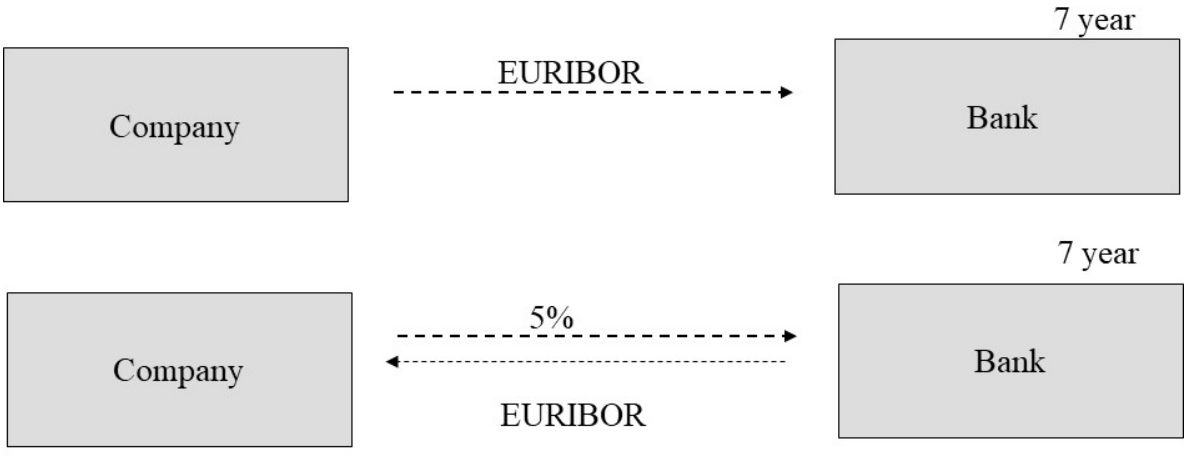


Figure 3 shows that the company is paying 5% during the term of the loan (i.e. EURIBOR minus EURBOR plus 5%). This means that, if after one year the seven years interest rate would be higher than 5%, then, with hindsight, the company is very happy with its decision to conduct the forward start interest rate swap. However, if after one year the seven years interest rate would be lower than 5%, then, again with hindsight, the company is faced with an opportunity loss. It has to pay the agreed rate of 5% as a result of the forward start interest rate swap whereas it could have done better if it would not have hedged the interest rate risk.

Another situation arises if it turns out that the company has no financing need after one year. The company is now over-hedged and the forward start swap contract becomes to have a speculative character.

Following the agreement with its bank, the company has to unwind the forward start swap contract. If the seven year interest rate would be higher than 5%, then the forward interest rate swap contract would have a positive value and, as a result of the unwind, the company would receive the market value of the contract from the bank. However, if the seven year interest rate would be lower than 5%, then the forward interest rate swap contract would have a negative value and, as a result of the unwind, the company would have to pay the market value of the contract to the bank.

### *2 Interest rate options*

Organisations that fix their interest costs by using interest rate swaps know exactly what their interest costs are during the contract term of the interest rate swaps. They are, therefore, protected against increases in interest rates. However, a disadvantage of interest rate swaps is that it makes it impossible to profit from decreases in interest rates. Another disadvantage is that, for instance in case of early redemption of a loan, a company can become in a situation in which it is over-hedged and, as a result, has a speculative position. These disadvantages can be avoided by using interest rate options instead of interest rate swaps. Interest rate options protect against unfavourable changes in interest rates whereas the buyer can still profit from favourable changes in interest rates.

### *2.1 Cap*

A cap is an over-the-counter interest rate instrument whereby one party has the right, at various moments in the future, to settle a coupon amount which is based on the difference between an agreed interest rate (the strike rate) and the reference rate if this reference rate is higher than the exercise price. A cap is actually a series of consecutive options which are referred to as caplets. Caps can be used by parties that hold a floating rate loan and want to cover themselves against rising interest rates but still want to be able to profit from low interest rates.

The characteristics of the caplets which together form a cap are:

- the same contract amount;
- the same exercise price;
- the same reference rate;
- consecutive underlying periods.

The amount paid out on each individual expiry date is calculated by expressing the difference between the level of the reference rate and the strike level as a percentage. This percentage is then applied to the agreed contract amount and settled over the underlying period for the individual option, usually 1 month or 3 months and occasionally 6 months. If the reference rate is lower than the strike rate on an expiry date, the option in question will expire worthless The options with a later expiry date still continue to exist.

**Example**

A company buys a cap with a strike price of 3.5% and a term of five years. The underlying value of the cap is 6-months EURIBOR. The contract amount is two million euro.

Let us assume that, during the contract term, EURIBOR develops as follows:

| 1st coupon period | 2nd coupon period | 3rd coupon period | 4th coupon period | 5th coupon period | 6th coupon period |
|---|---|---|---|---|---|
| 3.00% | 3.40% | 3.80% | 4.10% | 4.30% | 4.40% |

During the first two coupon periods, the cap is out-of-the-money because the EURIBOR fixing is lower than the strike price of the cap (i.e. 3.5%). The company then has no right to receive a settlement amount as a result of the cap. During coupon period 3 to 6 the cap is in-the-money and this means that the company will receive a settlement amount. The table below shows the pay-out schedule of the cap:

| Period | Calculation | Settlement amount |
|---|---|---|
| 1 | n.a. | |
| 2 | n.a. | |
| 3 | 2,00,000 x (3.80% -3.50%) x 1/2 | 3,000 |
| 4 | 2,00,000 x (4.10% -3.50%) x 1/2 | 6,000 |
| 5 | 2,00,000 x (4.30% -3.50%) x 1/2 | 8,000 |
| 6 | 2,00,000 x (4.4% -3.50%) x 1/2 | 9,000 |

---

Just like for any option, for a cap a market party has to pay a premium. This premium can be paid up-front which means that the whole premium is paid at the start date of the contract. Banks, on the other hand, sometimes offer their clients the opportunity to

pay the premium in instalments during the contract term of the cap. This is referred to as amortizing the premium. The amortized premium can be expressed as a annual percentage.

**Example**

Let us assume that the upfront premium for the cap in the previous example is EUR 30,000. If the company decides to amortize the premium, then the company is paying EUR 10,000 each year (contract term is 3 years). Expressed as an annual interest rate that is charged over the contract amount, this gives EUR 10,000 / EUR 2,000,000 x 100% = 0.5%.

---

If a company buys a cap and amortizes the cap premium. It can easily calculate its effective interest rates for different EURIBOR fixings. They can use the following equation for this purpose:

Effective (annual) interest rate = EURIBOR fixing + amortized cap premium + credit spread of the loan.

**Example**

The company in the previous examples has a loan with a remaining term of three years for which it is paying EURIBOR + 1.20%. The effective interest rates for the company under the earlier mentioned interest scenario are shown in the table below:

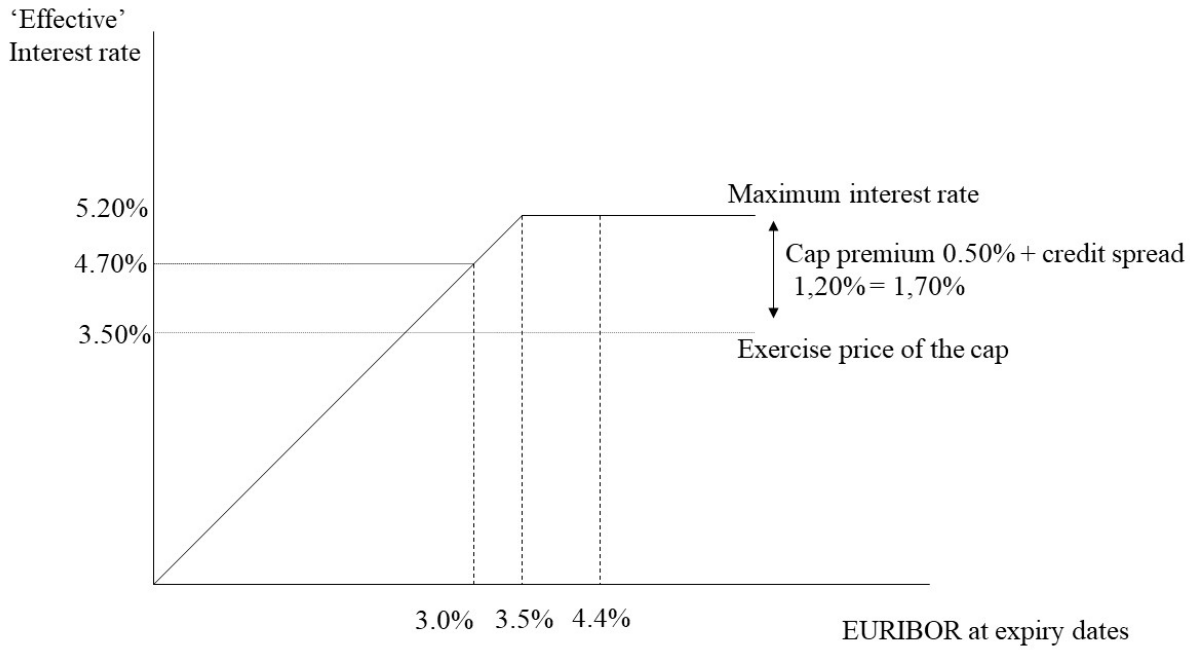
| **Period** | **EURIBOR** | **Interest costs for the loan** | **Cap premium** | **Cap settlement** | **Effective interest rate** |
|---|---|---|---|---|---|
| 1 | 3.00% | 3.00% + 1.20% | 0.50% | 0 | 4.70% |
| 2 | 3.40% | 3.40% + 1.20% | 0.50% | 0 | 5.10% |
| 3 | 3.80% | 3.80% + 1.20% | 0.50% | - 0.30% | 5.20% |
| 4 | 4.10% | 4.10% + 1.20% | 0.50% | - 0.60% | 5.20% |
| 5 | 4.30% | 4.30% + 1.20% | 0.50% | - 0.80% | 5.20% |
| 6 | 4.40% | 4.40% + 1.20% | 0.50% | - 0.90% | 5.20% |

The table shows that the maximum effective interest rate for the company is 5.20%. The maximum effective interest rate can be found by using the following equation:

Maximum effective (annual) interest rate = Cap strike + amortized cap premium + credit spread of the loan.

Figure 4 shows a diagram of the effective interest rates for different EURIBOR fixings.

Figure 4 Effective interest costs in case of a hedge with a cap




## *2.2 Floor*

A floor is an over-the-counter interest rate instrument whereby one party has the right, at various moments in the future, to settle the difference between an agreed interest rate (the strike rate) and the reference rate, generally a 3 or 6 month EURIBOR, if this reference rate is lower than the exercise price.

A floor also consists of a number of consecutive interest rate guarantees with the same exercise price: floorlets. Floors can be used by market parties who have long

investments with a floating interest rate and who want to protect themselves against rate falls.

### *2.3 Collar*

An interest rate collar or simply collar is an option strategy whereby a party purchases an out-of-the-money cap and simultaneously sells an out-of-the-money floor with the same maturity period, reference interest rate and exercise dates (or vice versa). The premium for the floor is used to meet the requirement for the premium for a cap. This results in a strategy whereby the interest costs for the buyer of this strategy remain within a certain range.

**Example**

A company has a medium-term loan with a remaining term of four years and a floating interest rate condition based on three-month EURIBOR. The company believes that the interest rate over the next four years will not go up but also that it will not fall much. The company has a policy to limit interest rate risks and to strive to achieve the lowest possible interest costs. The current three-month EURIBOR rate is 2.55% and the four-year interest rate swap rate is 3.40%.

If the company decides to hedge its interest rate risk by using an interest rate swap, it will fix the interest rate at 3.40% for five years. Compared with the current money market rate, the interest costs will rise immediately by 0.85%.

The company can also opt for a collar: It then buys a 4.50% cap and 'pays' for this by writing a 2.70% floor. The effect of this strategy is that the interest costs for the company will stay in a range between 2.70% and 4.50%.

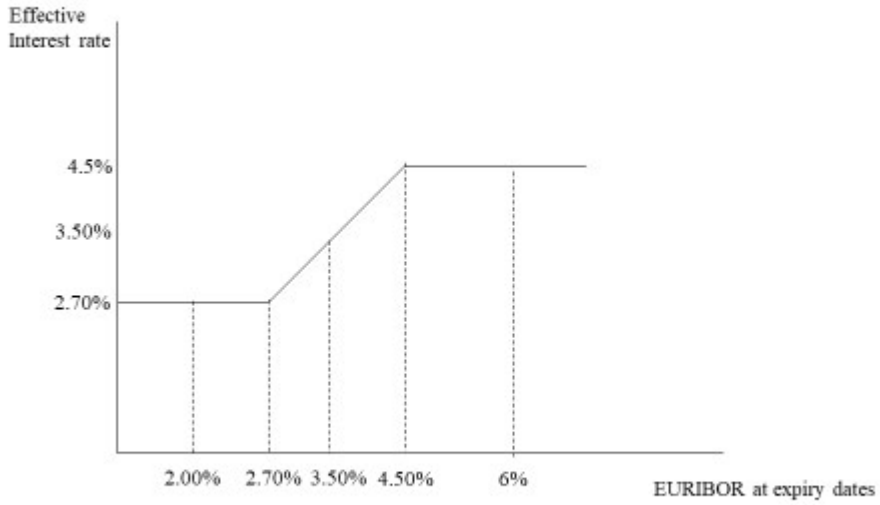
If EURIBOR rises above the strike rate for the cap, for example to 5.1%, then the company pays 5.1% under the loan (excluding credit spread) but receives back 0.60% as a result of the cap. On balance, the company pays 4.50%.

If, on the other hand, a EURIBOR fixing will be lower than 2.70%, for example

2.00%, then the company then pays 2.00% under the loan but is required to pay a settlement amount equivalent to 0.70% to the bank as a result of the sold floor. On balance, the company pays 2.70%.

For all EURIBOR rates between 2.70% and 4.50%, neither the cap nor the floor is in-the-money so that neither option needs to pay out. The total interest costs to the company are then equal to the interest costs under the loan. Figure 5 shows a diagram of the effective interest costs for the company.

Figure 5 Collar

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In the above example we assumed that the credit spread was zero. If, for instance, the credit spread in the loan would have been 0.80%, then the maximum interest costs for the company would be 4.50 + 0.80% = 5.30% whereas the minimum costs would be

2.70% + 0.80% = 3.50%. The effective interest rates for the company for various EURIBOR fixings are then as follows:

| Period | EURIBOR | Interest costs for the loan | Cap settlement | Floor settlement | Effective interest rate |
|---|---|---|---|---|---|
| 1 | 2.00% | 2.00% + 0.80% | - | 0.70 | 3.50% |
| 2 | 2.50% | 2.50% + 0.80% | - | 0.20 | 3.50% |
| 3 | 3.00% | 3.00% + 0.80% | - | - | 3.80% |
| 4 | 3.50% | 3.50% + 0.80% | - | - | 4.30% |
| 5 | 4.00% | 4.00% + 0.80% | - | - | 4.80% |
| 6 | 4.50% | 4.50% + 0.80% | - | - | 5.30% |
| 7 | 5.00% | 5.00% + 0.80% | - 0.50% | - | 5.30% |
| 8 | 5.50% | 5.50% + 0.80% | - 1.00% | - | 5.30% |

### *2.4 Swaption*

A swaption is an over-the-counter interest rate instrument whereby, on the expiry date, one party has the right to conduct an interest rate swap against a predetermined interest rate. A payer's swaption gives the buyer of the option the right to pay the fixed interest rate in the underlying interest rate swap. If, on the expiry date, the swap rate in the market is higher than the exercise price, the buyer will exercise the option and thus concludes the swap. He then pays a fixed interest rate that is lower than the current market rate. A receiver's swaption gives the buyer of the option the right to receive the fixed interest rate in the underlying interest rate swap.

On the exercise date of an in-the-money swaption, the holder can also choose for a cash settlement. He will then receive the market value of the underlying swap.

**Example**

A company expects that it needs to take up a loan with a term of 10 years after a period of one year. The company wants to cover itself against rising interest rates, but at the same time wants to be able to profit from low interest rates. The company therefore chooses to buy a payer's swaption with a contract period of one year and a strike level of 5.5%.

If, after one year, the company really needs to take up a loan, there are several possible scenarios:

The first scenario is that the interest rate swap rate is higher than the strike rate, e.g. 6%. The company will now exercise the swaption and, as a result, concludes a payer's interest rate swap in which it pays a fixed rate of 6.0%. To cover its liquidity position, it takes up a floating rate loan with a term of 10 years.

The second scenario is that the interest rate swap rate is lower than the strike rate, e.g. 4%. In this case, the company will not exercise the swaption and lets the swaption expire worthless. To cover its liquidity position, it takes up a fixed rate loan with a term of 10 years and a fixed rate of 4%.

If, after one year, the company would not need to take up a loan, with the first scenario the company has to cash settle the swaption. With the second scenario, nothing will happen. The company will let the swaption expire worthless.
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*Chapter 4*

# Commodity price risk management

Many companies use energy carriers and commodities in their business processes. Fuels such as petrol and kerosene are, for instance, used by transport companies and airlines, whereas raw materials like grains are used by flour processing plants. The prices of commodities and energy carriers fluctuate strongly in the world markets, often even more so than exchange rates. These price swings can have an adverse impact on the financial performance of companies. Fuels, raw materials and agricultural products are collectively known as commodities.

Companies can hedge the price risk on commodities using commodity derivatives. The most common commodity derivatives are futures, swaps and options. Commodity options are referred to as caps and floors. Derivatives exist for a wide range of commodities, including various types of oil, gas and electricity, metals and agricultural produce such as grains and cocoa (also collectively known as agri or softs) and even for abstract commodities such as carbon emission rights.

## *4.1 Exposure*

Similar to FX risk, a distinction is made between two types of exposure: contract exposure and cash flow exposure. Contract exposure arises when a delivery is a one-off, while cash flow exposure arises if the flow of deliveries is continuous.

Contract exposure typically occurs with suppliers of agri commodities, such as a cooperative of farmers who want to sell their entire crop in a single transaction. Raw materials or fuels, by contrast, are often purchased at regular, e.g. weekly, intervals. Such a series of deliveries gives rise to cash flow exposure. This usually involves companies with continuous business operations, such as production companies or airlines.

The Treasury Management Policy will then stipulate the period for which the commodity price risk is required to be hedged. This could be a year, for instance.

Figure 4.1 shows a continuous commodity procurement flow where a single annual hedge transaction is used to eliminate the price risk for the coming year.

Figure 4.1 Annual hedging of commodity cash flow risk

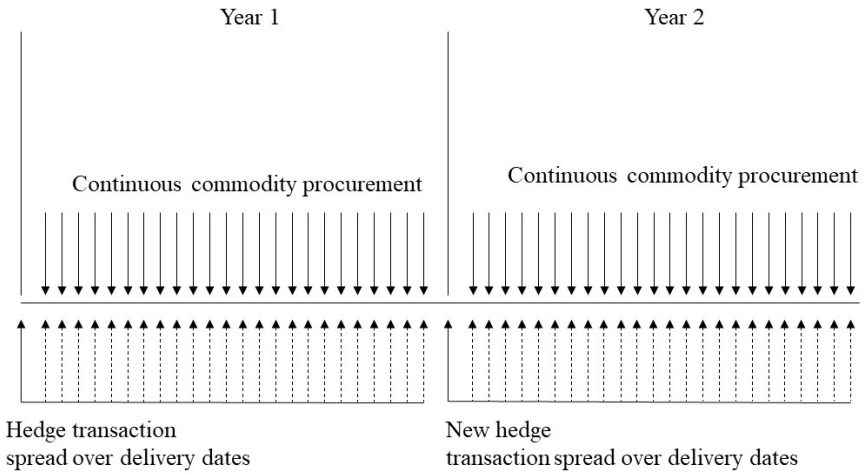


Figure 4.1 shows that, at the start of each year, the company enters into a hedge transaction for the coming year. The moments on which the hedge contract is effective match the times at which the purchases take place.

### *4.2 Commodity futures and commodity forwards*

Commodity futures are exchange-traded contracts where a specific amount of a commodity is traded at a pre-determined price at a particular date in the future.

Some examples of items for which commodity futures can be contracted are given in the below table:

| Commodity | Trade unit |
|---|---|
| USLD ultra low sulfur Diesel | 1.000 barrel (1 barrel = 159 liter) |
| Heating oil | 42.000 gallon (1 gallon = 3.78 liter) |
| Aluminium High Grade | Metric ton (1.000 kilo) |
| Grain | 5.000 bushels (136.000 kilo) |

Metal contracts, for instance, can be traded on the London Metal Exchange, whereas oil contracts can be traded via the Chicago Mercantile Exchange. Contrary to FX forward rates, which are solely determined by the spot rate and the interest rate differential between the currencies, commodities futures are largely driven by expectations. If an abundant grain harvest is forecast, for instance, the future price for grain will be low.

As an example, the futures prices for light sweet crude oil futures on the Chicago Mercantile Exchange as of April 2020 are given below:

| Delivery month | Price (USD dollar) |
|---|---|
| May | 26.28 |
| Jun | 29.13 |
| Jul | 30.62 |
| Aug | 31.20 |
| Sep | 31.53 |
| Oct | 31.86 |
| Nov | 32.34 |
| Dec | 32.78 |
| Jan | 33.08 |
| Feb | 33.49 |
| Mar | 33.85 |
| Apr | 33.87 |

Commodity futures are exchange traded and are physically settled. This means that they involve an actual sale or purchase of the commodity on the expiry date. Commodity forwards are traded over-the-counter (OTC) and are settled in cash. The buyer of an OTC forward is paid an amount if the actual price of the commodity is higher on the contract expiration date than the price agreed in the contract; the buyer will owe an amount to the seller if the actual price is lower than this contract price.

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**Example**

A farmers cooperative expects to deliver 5,000 bushels of grain in three months' time. The current futures price for grain is USD 8,560 per bushel. To lock in this price, the farmers' cooperative enters into a grain future for the physical delivery of the grain.

After three months, the grain price has risen to USD 9,500 per bushel. However, due to the grain future, the cooperative will now have to physically deliver 5,000 bushels of grain at a price of USD 8,650 per bushel.

If the cooperative had entered into a cash-settled forward contract, the contract price (USD 8,560) would be compared with the grain price three months later (USD 9,500) and the difference between these prices would then be settled for the number of bushels agreed in the contract. In this example, the seller of the cash-settled futures contract will owe an amount of 5,000 x USD (9,500 - 8,560) = USD 4.7 million to its counterparty.

4.3 ***Commodity swaps***

A commodity swap is a contract in which two parties agree to exchange the payment of a floating commodity price for the payment of a pre-determined fixed commodity price on the expiration date.

Commodity swaps are typically used to hedge cash flow exposures, for instance by companies that purchase commodities every week. Commodity futures/forwards are commonly used to hedge a contract exposure arising from a

one-off delivery.

Commodity swap contracts are characterised by cash settlement, i.e. there is no physical delivery of the commodity. The cash settlement consists of the payment between parties of the positive or negative difference between the fixed swap price and the floating price calculated over the agreed contract amount. The fixed price in the commodity swap contract is set at the time when the swap is contracted.

The fixed price is determined by calculating the average futures price for the entire period of the swap using the futures prices on the exchange on which the underlying asset is traded.

Based on the prices shown in the table in Section 4.2, the fixed price of a light sweet crude oil commodity swap contract with contract date 1 November and a six-month maturity would be: (26.28 + 29.13 + 30.62 + 31.20 + 31.53 + 31.86) / 6 = USD 30.60. And the fixed price of the same commodity swap but with a one-year maturity would be: (26.28 + 29.13 + 30.62 + 31.20 + 31.53 + 31.86 + 32.34 + 32.78 + 33.08 + 33.49 + 33.85 + 33.87) / 12 = USD 31.92.

The floating price of a commodity swap contract is determined at the end of the swap contract based on the average of the commodity spot prices during the contract term. The parties agree in advance on what source they will use to do set the spot rates, e.g. Bloomberg or Thomson Reuters.

Figure 4.1 shows a diagram of a commodity swap with light sweet crude oil as the underlying asset and a contract term of twelve-months. The fixed price in this swap is USD 31.92 as calculated above. The floating price is the average quoted spot price of light sweet crude oil during the contract period based on a monthly interval.

Figure 4.1 Light Sweet Crude Oil commodity swap


**Example**

A company buys 500 barrels of light sweet crude oil every year. Its purchases are spread evenly across the year. To hedge the price risk, the company enters into a commodity swap contract with its bank for 5,000 barrels light sweet crude oil with a contract term of one-year. The fixed price in the swap is set at USD 31.92.

On the expiration date, the average daily spot price for light sweet crude oil on the Chicago Mercantile Exchange turns out to be USD 44.30.

As a result of the swap contract, the company will now receive an amount of 5,0000 x (44.30 – 31.92) = USD 61,900, i.e. USD 12.38 per barrel.

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As the company spreads its oil purchases evenly across the year, the average purchase price for the oil would probably be USD 44.30. This means that, during this settlement period, the company effectively paid an amount of USD 44.20 - 12.38 = 31.92 for each barrel of light sweet crude oil. This corresponds exactly to the fixed price of the commodity swap contract.

If the average daily spot price during the contract period had been, for instance, USD 28.00, then the swap would have required the company to pay the bank an

amount of 31.92 – 28.00 = USD 3.92 per barrel. Here, too, the effective purchase price of the oil would have been USD 31.92. During the contract period, the company was able to buy the oil for the low average price of USD 28.00 on average, but it now owes the bank an amount of USD 3.92 in settlement of the swap.

### 4.4 *Consequences of incorrect exposure forecasting*

Organisations that use derivatives to hedge their risks must ensure that the scope of the derivatives contract matches the scope of their risk exposure. If the risk decreases or disappears entirely, the derivative contract will no longer match the risk, thereby creating an over-hedge that will cause the derivative used to hedge the risk to take on a (partially) speculative character. This can happen, for instance, when a company overestimates the amount of raw materials it requires for its production and sales activities. The hedge transaction will then not lead to the commodities being purchased or sold for the pre-determined price, but may even cause greater fluctuations in the price that the company actually pays.

To prevent an over-hedge, companies usually only enter into a hedge for the core of their expected production requirements, for instance 80%. An airline, for instance, may buy oil swaps covering only 50% of its fuel requirement

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**Example**

A farmers cooperative expects to deliver 5,000 bushels of grain in three months' time. The current futures price for grain is USD 8,560 per bushel. To lock in the selling price, the farmers' cooperative enters into a grain futures contract for the future sale of its grain. Three months later, it becomes clear that the harvest has failed and the cooperative can only sell 3,000 bushels of grain. Meanwhile, the poor harvest has sent the price on delivery date up to USD 14,320 per bushel.

This is extremely bad news for the cooperative because according to the futures contract the company has to deliver 5,000 bushels and, therefore, has a shortage of 2,000 bushels. It now has to buy 2,000 bushels in the market at the current market price of USD 14,320 in order to sell these bushels at the contract price of only USD 8,560. This results in a loss of USD (14,320 – 6,560) x 2,000 =

USD 28,000,000.

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If a company overestimates its requirements and ends up with an over-hedge, it will be required to gradually reduce this hedge. This obligation stems from the financial derivatives master agreement with the bank. In case of an under-hedge, the company can decide to adjust its hedge, but that is its own free choice and not a contractual obligation to the bank.

### 4.5 *Commodity options*

Companies can also opt for instruments that allow them to set a maximum price for their commodity purchases or a minimum price for their commodity sales and leave the opportunity open to profit from favourable changes of the commodity prices. These options are referred to as commodity caps and commodity floors respectively. The mechanism of a commodity cap or floor is partly identical to that of a commodity swap. The similarity lies in the fact that for most caps and floors the settlement amount is calculated by comparing the contract price with an average price during the contract term. The difference is that a swap, unlike a commodity cap or floor, always leads to a cash settlement at the end of the contract. A cap, on the other hand, only leads to settlement if the average price during the contract period is higher than the fixed price agreed in the cap contract. And a floor only leads to settlement if the average price during the contract period is lower than the fixed price agreed in the floor contract.

A commodity cap or floor may also consist of a single option only. Then there is only one fixing date, which would make such a commodity cap or floor comparable to an ordinary call or put option with cash settlement.

**Example**

A company buys 800 tons of aluminium annually. Its purchases are spread evenly across the year. To hedge the price risk, the company enters into an Aluminium High Grade cap contract for 800 tons with a term of one-year. The company opts for an exercise price of USD 2,100 and pays a premium of USD 100 per ton.

On the expiration date, the average current market price on the London Metal Exchange turns out to be USD 2,215. The cap is now in-the-money. The company will receive an amount of USD 92,000, i.e. USD 115 per ton.

Assuming that the company was able to buy the aluminium from its supplier at the average fixing price of USD 2,215 per ton, the effective price would be: 2,215 - 115 = USD 2,100, plus the premium of USD 100. This would bring the total effective price of the purchased metal to USD 2,200.

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Chapter 5

# *Financial markets and pricing*

Financial markets are markets in which professional parties such as banks, asset managers, investment institutions and hedge funds trade in financial instruments. In addition to these professional parties, other players such as companies and governments also have the need to conduct transactions in financial instruments. They use banks to do so. The bank then enters into a transaction with a company and passes the transaction on to the professional market. There is not really one financial market. There are basically different sub-markets, each with its own dynamics and rules: the money market, the capital market, the currency market and the credit risk market. Alongside the financial markets, there are commodity markets for trading in commodities and commodity derivatives (i.e. products whose value is based on commodities).

## 1 ***The capital market***

The capital market is originally the part of the financial markets where professional parties lend each other money at long to extremely long terms. These terms range from two years to perpetuity. Parties that lend money in the capital market include asset managers, pension funds and private investors. Parties that raise money in the capital market include governments, companies and banks. Long-term bank loans to individuals (e.g. home mortgages) and companies do not fall within the capital market.

The fixed-income capital market is the market in which fixed-income securities are traded. These are negotiable debt obligations of an issuing institution – the institution borrowing money – which promises to pay back the borrowed sum plus interest to the

holder of the fixed-income security. Interest can be paid periodically by means of coupons or as a lump sum at the end of the agreed term. The best-known fixed-income security is a bond. A bond is always listed on a stock exchange, has an annual or semi-annual coupon and is usually repaid in a lump sum at the end of the term. The most common face value of a euro-denominated bond is EUR 1,000.

One key characteristic of traditional capital market instruments is that they do not consist of a loan agreement between two parties but take the form of a security, such as a bond or share. With securities, in contrast with a loan agreement, only the name of the receiver of the funds is fixed. The supplier of the funds receives a credit balance in a securities account in return for providing the money. This securities balance signifies that they are the legal owner of the security and, as such, are entitled to all payments the borrower makes pursuant to the security, such as interest payments and principal repayments for a bond or dividend distributions for a share. The owner of the security can, in turn, sell this security to another party. The balance of the transaction is then debited from their securities account and credited to the buyer's securities account.

Companies or governments raise funding in the capital market through the services of banks. The banks, in their role as the issuing and paying agent, look for investors who are prepared to buy the securities.

Interest rates in the fixed-income capital market are determined through supply and demand, principally of and for government bonds. All other interest rates, e.g. for corporate bonds and interest rate swaps, are based on the interest rates for government bonds.

The supply of government bonds in a single-currency zone is determined by the financing requirements of the governments in that zone. The demand for government bonds, however, depends on the yield that governments offer investors. If the offered yield is too low, investors will not subscribe to the government bonds and the government cannot meet its financing requirements. The government will then have to

raise the offered interest rate.

In other words, it is basically buyers of government bonds who determine the interest rates on the capital market. In general, the inflation outlook is the most important factor in this regard. Investors want to be at least compensated for the expected erosion of the value of their assets as a result of inflation. Since the credit crisis, the supply and demand mechanism in the fixed-income capital markets in the United States and the eurozone has been disrupted by the large-scale purchase of government bonds by the central banks in these regions. The spectacular increase in demand caused bond prices to go up dramatically and pushed interest rates in the capital market significantly lower. At times, the yield on German and Dutch government bonds even turned negative.

### *2 The FX market*

The currency market of FX market is where two different currencies are exchanged at a specific rate of exchange. Banks play a crucial role in the currency market. When non-bank parties want to conduct a currency transaction, almost always a bank acts as a counterparty. A bank will, for instance, buy a certain amount in US dollars from a company that has exported goods to the United States. The bank then sells these US dollars, either immediately or at some time in the future, to another bank in order not to be left with these dollars. And if, at some later time, a party such as an investor needs US dollars to buy US shares, the bank will again act as the counterparty. If it has not yet sold the US dollars from the transaction with the export company, it can use these for the transaction with the investor; otherwise it is required to buy the US dollars from another bank. The advantage for both the company and the investor is that they do not need to look for a party that has exactly the opposite need. They can simply go to the bank to do the exact transaction they require. Banks position themselves as the party with which other parties can always conduct transactions. In this role, they are referred to as a market maker. Market makers make sure there is always a ‘market’.

Exchange rates in the FX market are set in principle through the free interplay of supply and demand. Companies have a role in this process, but the main players are investors and speculators. This creates flexible or floating exchange rates. Most currencies of developed countries have floating exchange rates. The exchange rates can float freely because no arrangements have been made between, for instance, such parties as the European Central Bank (ECB) and the Federal Reserve to fix the euro-dollar exchange rate, nor does either of these central banks intervene directly in the FX pricing mechanism. A decrease in the value of a currency in a system of free exchange rates is referred to as depreciation and an increase is referred to as appreciation. In the short term, the direction of floating exchange rates is mainly determined by shifts in international capital flows. These capital flows are often driven by economic data or other news. Some examples are:

- An interest rate increase by a central bank usually triggers an immediate rise in the exchange rate.
- A low unemployment rate or other favourable economic growth indicator usually triggers an immediate rise in the exchange rate.
- Reports of political unrest normally trigger an immediate fall in the exchange rate.
- An announced trade boycott against a country triggers an immediate fall in the exchange rate.

In theory, a country's exchange rate is also determined by changes in its imports and exports. An increase in exports is believed to cause the exchange rate to rise, whereas an increase in imports causes it to fall. However, given that the scale of export and import-related currency transactions in major currencies, assuming free movement of capital, is only a fraction of the scale of all short-term capital transactions, this effect is negligible in practice. As the short-term capital transactions are partly fed by economic data, there is an indirect effect, however: an increase in exports is good news for the economy and this attracts capital, causing the exchange rate to rise.

In the long term, the exchange rate between two currencies is mainly determined by differences in economic growth. If a country's economy strongly outperforms that of other countries over a long period of time, the exchange rate of its currency will rise steadily relative to the other currencies. Prolonged differences in inflation rates between countries can also influence the long-term development of exchange rates. The exchange rate of currencies of countries with sustained low inflation will rise in the long term against the currencies of countries with higher inflation.

Some countries, such as China, manipulate their exchange rate. When the exchange rate of these countries appreciates too much, the central bank will sell large quantities of its own currency in exchange for foreign currency. These transactions push down the exchange rate of the national currency. This phenomenon is referred to as currency intervention. The aim of currency intervention is to keep the exchange rate of the national currency artificially low in order to prevent a deterioration in competitiveness.

## *3 The money market*

The money market is the market in which parties lend each other money for short terms. The transfers resulting from such loans are often conducted via the accounts that banks hold with the central bank in principle. This not only applies to loans between banks, but also to loans between banks and other parties, such as companies or asset managers. The only time when no transfer takes place between the central bank accounts of two banks is when the bank enters into a loan with one of its own account holders. The transfer is then carried out within the bank itself. The money market, therefore, is of crucial importance to the liquidity management of banks.

The total size of the money market is made up of the balances that banks hold with the central bank, such as the European Central Bank (ECB) in the eurozone. Originally, these balances arose from the fact that banks kept their gold with the central bank. Today, the balances are mainly attributable to the fact that the banks can withdraw credit from the ECB, which is paid into their current account at the ECB. To secure

these loans, banks must provide the ECB with collateral, usually in the form of government bonds. The regular loans the ECB provides to the banks are referred to as Main Refinancing Operations (MROs). These loans typically have a term of one week and are usually rolled over from one week to the next. As well as MROs, the ECB also provides loans with a three-month maturity. These are known as Longer-Term Refinancing Operations (LTROs). The interest rate the ECB charges on the refinancing operations is referred to as the refinancing rate or refi rate.

Within the euro money market, a special rule requires banks to maintain a certain minimum balance with the ECB at all times. This required balance is referred to as the reserve requirement or cash reserve ratio. The cash reserve ratio is calculated for each individual bank as a percentage of the bank's short-term obligations to its clients, i.e. the balances that clients can withdraw virtually instantly from the bank. To calculate these obligations, the ECB includes all received deposits and issued debt obligations with a term shorter than two years, with the exception of deposits received from the central bank. The total amount of these short-term deposits and liabilities is referred to as the reserve base. The cash reserve ratio is 2% of the reserve base. The reserve requirement means that every bank is expected to maintain an average balance with the ECB equal to the calculated cash reserve ratio during a one-month period (the so-called maintenance period).

The ECB consistently seeks to allocate to the banks the exact amount of loans that they need to meet the 2% rule. The balances banks hold with the ECB are crucial for their liquidity position, the reason being that the balances banks hold with the ECB are constantly changing due to their clients' payments. As a result, when a bank is suddenly faced with an extremely large volume of simultaneous outgoing transfers, its balance with the ECB may at a certain point be insufficient to meet the 2% rule or, in the most extreme scenario, even drop to zero. If, in this case, the bank were unable to replenish its balance, it could, in the worst-case scenario, be held in default by the beneficiary of the payments and be declared insolvent.

So it is vital that banks are always able to replenish their balances at the central bank to the required level. Banks can do so by borrowing money from other banks. Given that banks collectively maintain an average balance of 2%, the banks that are net beneficiaries of the client transfers have a surplus. This is precisely the role of the money market: banks with a deficit relative to the cash reserve ratio can borrow money from banks with a surplus relative to the cash reserve ratio. Before the credit crisis, the money market worked efficiently. Banks were prepared to lend each other money on a virtually unlimited scale without demanding security. They did so based on EURIBOR rates. In the most extreme case, banks were able to borrow extra money from the ECB.

The ECB pays interest on the balances of banks' current accounts at a rate corresponding to the interest rate it charges for the short-term refinancing transactions. The maximum balance on which the ECB pays this interest is equal to the cash reserve ratio. If banks hold more money in their account than the cash reserve ratio, they are paid a lower interest rate on the surplus. If a bank is unable to meet its cash reserve ratio, the ECB imposes a penalty in the form of interest based on a percentage that is higher than the marginal lending rate. Using this differentiation in interest rates, the ECB encourages banks to maintain a balance that corresponds exactly to the cash reserve ratio. In doing so, it encourages the banks with a cash surplus to lend money to banks with a cash deficit and promotes the efficiency of the money market.

Since the credit crisis, however, banks are no longer willing to lend each other money. When the crisis was at its height, the money market almost completely dried up. The situation was aggravated by the fact that some banks were faced with huge transfers to other banks, particularly in South European countries such as Spain and Greece. These banks thus became entirely dependent on the central bank for extra support. To help these banks, the ECB set up a long-term refinancing transaction known as the Special Term Refinancing Operations (STRO). These loans had a maximum maturity of three years. As a precaution, banks that did not have immediate liquidity problems were also allowed to make use of this facility.

As things currently stand in the money market, North European banks have extremely high balances in their accounts with the central bank whereas South European banks rely almost entirely on loans from the ECB. Dutch banks such as Rabobank, ABN AMRO and ING hold balances with the Dutch Central Bank (DNB) of EUR 65 billion, EUR 25 billion and EUR 20 billion respectively. They are paid a much lower interest rate on these balances than if they were to lend this money to South European banks that badly need it. But most North European banks no longer wish to do business with these banks.

As a result of the cash reserve ratio, the ECB is certain that, as a collective, banks will always be forced to borrow money from it. This effectively allows it to set the interest rates on the money market that best suit its monetary policy purposes. It does so by adjusting its official rates, i.e. most notably the refinancing rate.

The ECB's monetary policy is aimed at influencing the economy and has two main objectives:

- a stable price level (low inflation);
- balanced economic growth.

The first of these two objectives is the most important. Inflation must be brought under control before the ECB can start focusing on the second objective. The ECB aims for an inflation rate of 2%. It does not see the active manipulation of the euro exchange rate through interventions as one of its responsibilities. The assumption is that the euro exchange rate is already given enough support if the two above stated main objectives are achieved. In other words, the ECB focuses primarily on maintaining the internal value of the euro (i.e. its purchasing power) and less on its external value (i.e. its exchange rate).

The ECB does influence the interest rates at banks by adjusting its official rates. This

is how it indirectly determines growth in lending by banks. The level of bank loans, in turn, determines the scale of consumption and investments, job security and price levels in the eurozone. The ECB raises interest rates when it wants to decrease inflation and lowers interest rates when it wants to stimulate the economy.

## *4 Yield curves and forward rates*

The interest rates in the money market and fixed-income capital market are set separately, but the interest rates in these markets are usually shown together in a yield curve. A yield curve is a graphic representation of the relationship between the average term and the associated interest rates. Forward rates can be derived from an ordinary yield curve.

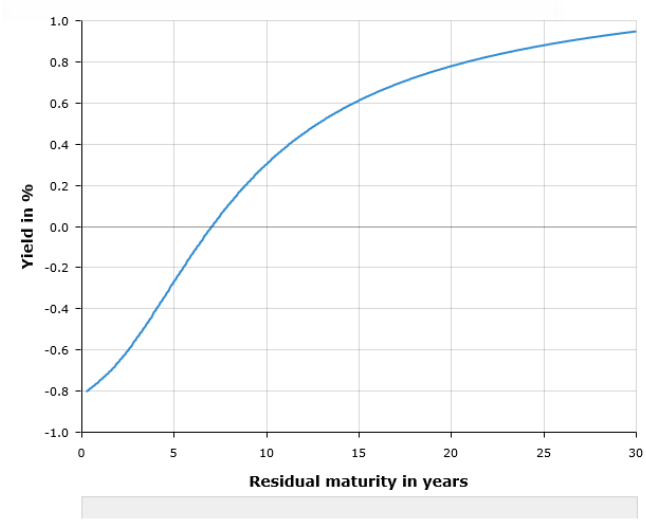
### *5.4.1 Yield curves*

There is not really a single yield curve. Rather, there is one yield curve for government bonds and another for bank counterparties (the curve for interest rate swaps or IRS curve).

Normally speaking, the interest rates for longer maturities are somewhat higher than for shorter maturities; the yield curve then has a gently upward slope. This slope is explained using the liquidity preference theory. Based on this theory, investors demand a higher return to make their money available for a longer period of time. This is understandable as it means they must postpone their own expenditures for longer.

In practice, yield curves tend to rise. That is why a rising yield curve is referred to as a normal yield curve. The yield curve for shorter maturities is usually steeper than for longer maturities. In financial jargon, the yield curve for longer maturities is said to ‘flatten’. Figure 1 shows the yield curve for AAA government paper at 28 December 2018.

Figure 1 Yield curve




We see that the interest rate for the shortest maturities is 0.80% or 80 basis points negative and that the interest rate rises as the maturity of the government paper becomes longer. If, for instance, the Dutch government had issued a short-term negotiable debt security on 28 December 2018 with a maturity of three months (DTC – Dutch Treasury Certificate), it would, for instance, have had to offer a return of -0.70% and if it had issued a ten-year loan (DSL – Dutch State Loan), it would have had to pay an interest rate of about 0.30% to the investors.

Although a yield curve usually has a positive slope, this is not always the case. Sometimes the rates for longer terms are lower than the rates for shorter terms. This is called a negative yield curve. A negative yield curve is commonly regarded as a sign that interest rates will go down and is also regarded as a sign that the economy may go into a recession.

### *5.4.2 Forward rates*

The shape of the yield curve can provide information on the market parties' expectations of the interest rate outlook. If the rates are substantially higher for longer terms than for short terms (more than you would expect on the basis of the liquidity preference theory), the market anticipates a rise in interest rates. And if the rates for longer maturities are lower than for short maturities, the market expects interest rates to fall. This is expressed in the implied forward rates, i.e. interest rates that are used for future periods. In theory, implied forward rates can be calculated from the interest rates for periods beginning after two working days. These are known as spot rates.

If, for instance, the six-month rate is 0.75% and the simultaneous 12-month rate is 1.00%, we can conclude that the market expects the six-month interest rate to be higher after six months than the current interest rates. The current interest rate structure can even be used to calculate exactly how high the market expects interest rates to be after six months. An expected interest rate, known as the implied forward yield, can be calculated for each period starting in the future. The implied forward yield is determined as follows.

Suppose that the one-day interest rate is 0.70% on Monday and the market expects the one-day rate to rise 0.01% each business day in the coming week to reach a level of 0.75% on Friday. If a client wants to invest in a five-day deposit with a bank, the trader expects to earn an average rate of 0.725% during the coming week if they deposit the money in one-day deposits (overnight deposits) every day. This means that, aside from the client margin, they can offer the client a rate of 0.725%. The five-day rate for the period over the next five days starting today is therefore an average of the expected one-day rates for the coming five days.

This principle is universal:

- A five-day rate of 0.725% means that the market expects the one-day rate to average 0.725% over the coming five-day period.

Equally:

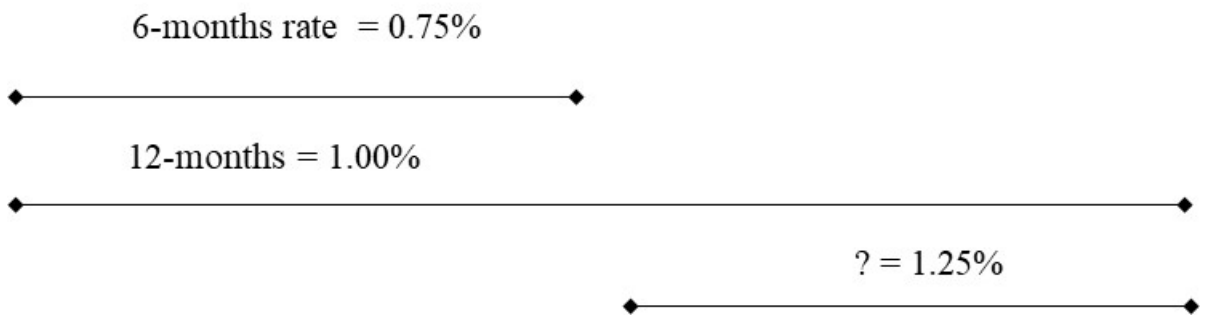
- A six-month rate of 0.75% means that the market expects the one-day rate to average 0.75% over the coming six-month period.

and:

- A 12-month rate of 1.00% means that the market expects the one-day rate to average 1.00% over the coming 12-month period.

But if the market simultaneously expects the one-day rate to average 0.75% over the coming six-month period and 1.00% over the coming 12-month period, this must mean that the market expects the one-day rate for a six-month period starting after six months to be 1.25%. This is the implied forward rate for the six-month period starting after six months. This is illustrated in Figure 2:

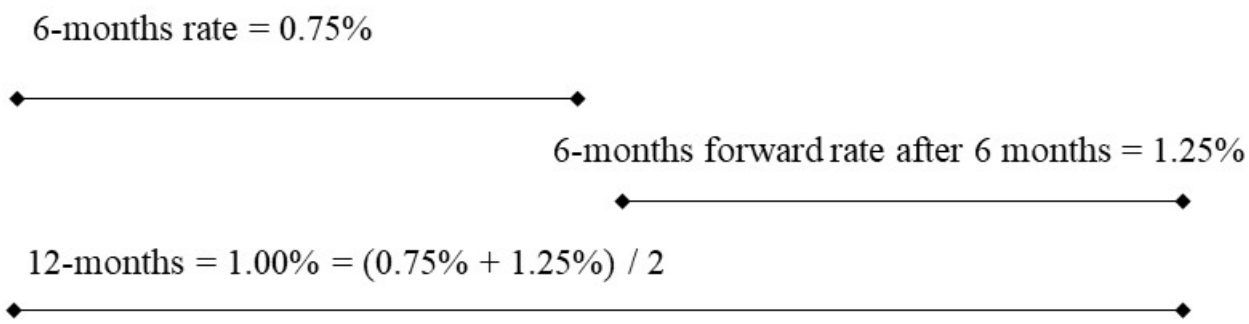
Figure 2 Implied forward yield (6 months rate after six months)




In other words, the 12-month rate should be seen as the average of the current six-month rate (0.75%) and the expected six-month rate in six months' time (1.25%): the

implied forward rate. This is illustrated in Figure 3:

Figure 3 The 'long-term' rate is an average of the expected short-term rates




**Example**

The three-month rate is 0.375% and the six-month rate is 0.50%. The forward yield for the three-month period starting after three months is determined using the following equation:

*Six-month rate = (three-month rate + three-month forward rate) / 2*

If we fill in the assumed interest rates, the result is:

*0.50% = (0.0375% + three-month forward rate) / 2, i.e.:*

Three-month forward rate = 0.50% x 2 - 0.375% = 0.625%.

This means that the market expects the ECB to raise interest rates by 0.25% after three months (i.e. the expectation is that the three-month rate, which is currently 0.375%, will be 0.625% after three months).

---

## *5 The market for credit risk*

Alongside the traditional sub-markets, i.e. the capital market, the FX market and the money market, there is now also a separate market for trading credit risks. The most important product in this market is a type of credit insurance where one party (i.e. the buyer) pays a premium during a certain period of time to another party (i.e. the seller) who, in return, agrees to reimburse the premium-paying party if a specified third market party or group of market parties becomes less creditworthy or even goes bankrupt. This 'insurance' is referred to as a credit default swap. The party whose loss of creditworthiness is insured is called the reference entity.

Credit default swaps are used by parties such as investors and banks. Investors buy credit default swaps if, for instance, they begin to doubt the creditworthiness of an issuer whose bonds they have purchased. If the reference entity's creditworthiness is demonstrably impaired, for instance, if its credit rating is downgraded during the term of the credit default swap, the counterparty in the credit default swap will reimburse the investor for any resulting losses such as a falling bond price. The credit default swap contract may specify, for instance, that, if the reference entity's rating is downgraded, the counterparty will purchase the bonds at face value or that the investor will receive a reimbursement equal to the fall in bond price.

Banks also use credit default swaps in another way, i.e. to change the risk composition of their loans portfolio. A separate type of credit default swap has been developed for this purpose. With this type of credit default swap, the reference entity is not a single organisation but a group of organisations, such as a sector index (e.g. of the chemicals or car industry).

The premiums of credit default swaps are set on the basis of supply and demand. To assess their need for a credit default swap, market parties consult public information on the creditworthiness of individual counterparties or the current situation and outlook for a specific business sector.

## *6 Commodity markets*

Examples of commodities are fuels such as crude oil and diesel, metals such as steel and aluminium, precious metals such as gold and silver, and agricultural products such as grain and soy oil. All commodities are traded on specialised exchanges. This applies both to the products themselves and to the contracts derived from these products such as futures and options (commodity derivatives). However, not all commodity contracts are sold on an exchange; many contracts are also conducted over-the-counter (OTC). The fact that commodities can be traded on an exchange effectively means that the price of commodity contracts comes about through the free interplay of supply and demand on the exchange. The prices of OTC transactions follow the prices that are set on the exchange.

The fact that the physical supply of commodities is, by definition, limited plays a role here. But so do other factors. The supply of oil (and hence the oil price), for instance, is partly driven by political manoeuvring of players such as the OPEC, the US and Russia. These suppliers can manipulate the price of oil.

Alongside specific supply factors, demand factors also influence the pricing of commodities. During periods of volatility in the financial markets, for instance, demand for commodities such as gold and other precious metals increases as they are perceived to be safe investments. However, as commodities are traded all over the world, there is never any question of intervention by a central bank or government.

## *7 Pricing in regulated markets*

Financial instruments can be traded in various ways. The first is through a regulated marketplace. This is an organised meeting place – usually in the form of a computer system – where parties can express their wish to enter into a transaction. The computer system will then look for a counterparty so that the transaction can be conducted. Examples of regulated marketplaces are a stock exchange, a derivatives exchange, a

multilateral trading facility (MTF) and an organised trading facility (OTF). In the Netherlands, regulated markets must have a licence either from the Dutch Ministry of Finance (in the case of an exchange) or from the Netherlands Authority for the Financial Markets (in the case of an MTF or OTF).

In practice, therefore, a regulated marketplace is a computer system where market parties can specify the terms (i.e. price and volume) on which they wish to enter into a transaction. The open outcry system, where traders shout out the transactions they wish to conduct on a physical trading floor, is now largely obsolete. The Dutch stock exchange is Euronext Amsterdam. Dutch derivatives are traded on ICE London, the London derivatives exchange.

The price on a regulated marketplace comes about through supply and demand. The demand-side parties indicate that they want to buy and at what price, and the supply-side parties indicate that they want to sell and at what price. These communications to initiate a transaction are referred to as orders. A regulated marketplace must ensure that all members are able to view these orders (the order book). This is called pre-trade transparency.

As soon as the trading system matches a supply order with a demand order, the transaction is consumed and the regulated marketplace must publish the price immediately afterwards. This is called post-trade transparency. Regulated marketplaces apply the same price to the buyer and seller. In other words, they make no profit on the difference between the buying and selling price. They only charge a fixed fee per transaction for bringing the parties together.

A party must become a member to be able to conduct transactions in a regulated marketplace. Many of the members are banks. When a client of a bank is interested in conducting a transaction on a regulated marketplace, this usually also goes through a bank. The bank then enters the client’s order in the trading system. In this capacity, it acts as a broker. In addition to banks, there are specialist brokers. In the Netherlands,

one of these is DEGIRO. Brokers charge the price that is set on the regulated marketplace to their clients without any kind of margin. However, similar to the exchange, they do charge a fixed fee for their services.

One major advantage of a regulated marketplace is that there are usually lots of parties on both the supply and the demand side. This ensures that there is ample market liquidity, so that transactions can always be conducted.

However, not all traded instruments attract numerous parties on the supply and demand side. In this case, the exchange enlists a market maker or liquidity provider to enable trade in instruments that are low in supply or demand. These parties – typically banks or trading houses – have undertaken to issue a bid price (buying price) and ask price (selling price) at all times. So when a market maker is involved, the price paid by the buyer differs from the price received by the seller. The difference, which is also known as the 'bid-ask spread', is the market maker's reward for its services. It is a reward for the risk it incurs, i.e. of buying an instrument or commodity that cannot be sold right away causing the market maker to have an unwanted open position and being exposed to price risk.

A second advantage of trading in a regulated market is that the counterparty risk is virtually zero. Each transaction is executed through an institution that has been specially set up to act as the counterparty. This institution is called a clearing institution or central counterparty (CCP). The CCP is legally positioned between the buyer and seller. The CCP for Euronext Amsterdam is LCH.Clearnet. The CCP takes measures to protect itself against the risk that its own counterparties are unable to meet their obligations, so its risk of insolvency is zero. The best-known measure is that the CCP settles the gains and losses of all its members' contracts on a daily basis. This is referred to as the margin system.

One drawback of exchange-traded instruments is that trading is confined to

standardised contracts. This means that the choice of contract size, exercise price and expiration date is limited. Another drawback is the transaction fee.

### *5.4 Pricing in the over-the-counter market*

The over-the-counter market (OTC) is a market for concluding transactions outside of the regulated market, for instance a direct transaction between a bank and a client. The OTC market is also referred to as the private market. Many derivatives are traded over-the-counter. Nowadays, transactions in the OTC market are often conducted using dealing systems of banks, with the client transacting directly with the bank via e.g. Dealstation of ABN AMRO or Rabo Corporate Connect or via electronic trading platforms such as EBS, FX All or 360T. But OTC deals are also still executed over the telephone.

One major advantage of OTC contracts is that they are not standardised. Parties can specify the contract size, term, price, market references and legal aspects for each individual deal. In other words, the OTC market can deliver a customised product. One drawback of OTC contracts is that existing contracts cannot be traded; there is no secondary market. A contract party who wants to close its position in an OTC instrument must look for a counterparty to conduct an opposite OTC transaction or try to unwind the transaction with the existing counterparty. Unwinding involves the termination and settlement of the contract based on its market value.

Another drawback is that parties in the OTC market must draft their own contracts. Usually, the bank requests the counterparty to sign a master agreement in order to avoid the need to draft an entirely new and detailed contract for each individual transaction. The master agreement is known as an ISDA for the largest parties and a financial derivatives master agreement for other clients.

Owing to the absence of a central meeting place, trading in the OTC market is only

possible if certain players are prepared to act as market makers. All large banks fulfil this role, which is why they continuously issue bid and ask prices so that their clients can always conduct transactions in such instruments as FX and interest rate products.

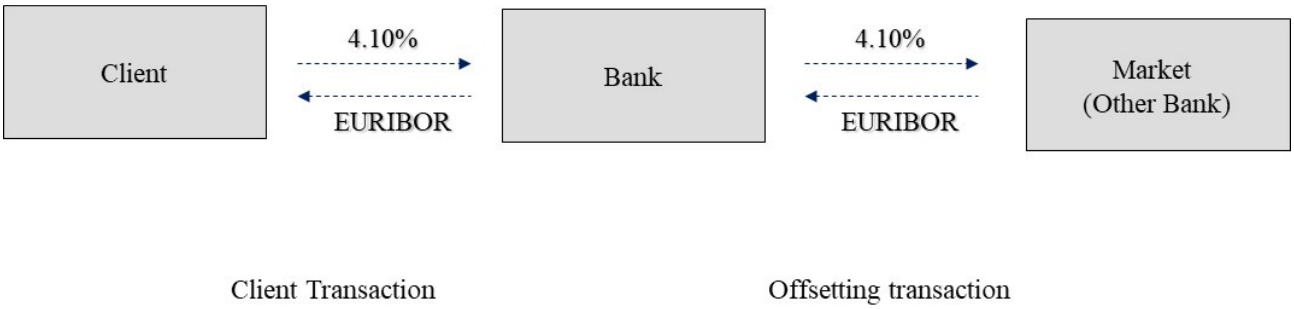
The bid and ask prices banks issue to their clients are based on the prices applicable between professional parties. Individual banks have virtually no influence over these market prices; they are only one of the many market parties who jointly determine the market price. If a trader of a bank conducts a transaction with a client, they must first find out what the market price is and use this as the basis for setting the price for the client.

With each client transaction, the bank basically hedges its risk by conducting the opposite transaction with another professional party. This so-called offsetting transaction is based on the professional market price.

Suppose that the following prices for interest rate swaps with a five-year maturity are prevailing in the professional market: 4.00% - 4.10%. This means that a bank that approaches another professional party to contract an interest rate swap with a five-year maturity receives 4.00% if it wants to receive the fixed rate (receiver's swap) in the swap and pays 4.10% if it wants to pay the fixed rate (payer's swap). The other professional party now acts as market maker and treats the bank as its client (market user). For this reason, the bank receives the most unfavourable rate (from its perspective) of 4% if it acts as the receiver and 4.10% if it acts as the payer.

Suppose that a client wants to contract a five-year interest rate swap from this bank and pay the fixed rate. The bank then knows that it will have to pay 4.10% in the market for an offsetting interest rate swap. The bank could pass this rate on to the client. This is illustrated in Figure 4.

Figure 4 Client transaction and offsetting transaction

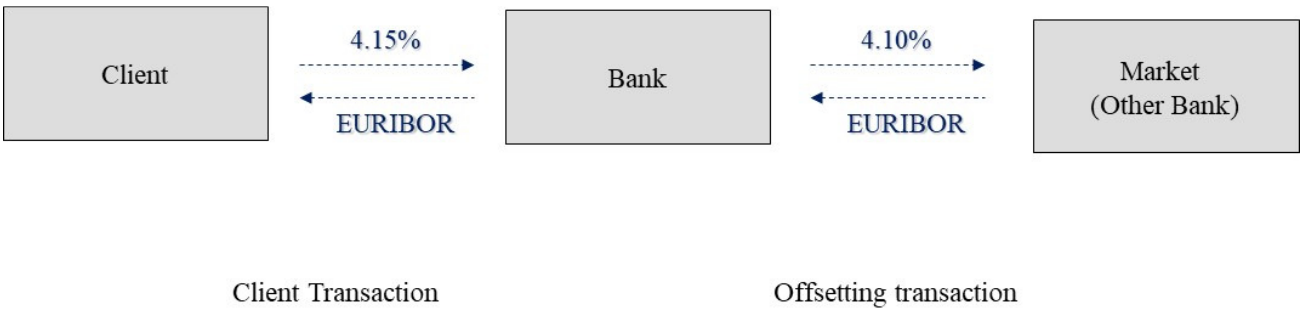



However, if the bank charges the client the price for the offsetting transaction without a margin, it will not earn anything. In fact, it will actually lose out as it will not even make good for all its costs. That is why banks charge clients a worse price than the price they pay in the interbank market. The difference between the market price and the price that the bank charges its client is referred to as the client margin.

The client margin that banks charge their clients usually consists of three elements: the transaction fee, the credit risk fee and a profit margin. The transaction fee consists of direct handling costs and indirect overheads.

In addition to the costs involved in a transaction, banks must also make allowance for the risk of their counterparty going bankrupt and being unable to meet its obligations. The risk that the bank incurs of losing money as a result of default is referred to as credit risk. Banks must make their own estimation of this risk of a possible loss and charge the client accordingly. In addition, a bank is required to maintain capital to ensure that it can still cope with the loss if it has underestimated the credit risk and has undercharged the client. Maintaining capital costs money. Banks also charge these costs (cost of capital) to their clients. Finally, banks are looking to make a profit on top of their fee to cover the costs and credit risk. If a bank applies a client margin, the picture looks as follows:

Figure 5 Client transaction with margin and offsetting transaction




The MiFID stipulates that banks are required to disclose the client margin to their clients; i.e. the difference between the market price and the price they charge to their client. In the case of derivatives, banks are expected to use the mid-price as their market price, i.e. the price that is exactly in the middle between the bid and ask price in the professional market. As the quoted rate on the professional market was 4.0% - 4.10%, the mid-price would be 4.05%. So the client margin in figure 4.5 is 4.15% - 4.05% = 0.10%, i.e. 10 basis points.

Banks generally do not provide a breakdown of the margin by costs, credit risk fee and profit margin, but disclose the total client margin only.

Financial Markets Books

# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

# *The Valuation of Derivative Contracts*

*Lex van der Wielen*

IN CO-OPERATION WITH MICHIEL VAN DEN BROEK

Financial Markets Books
Geelvinckstraat 56, 1901 AJ Castricum

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# *Introduction*

Periodically, banks have to report the market value of derivative contracts, for instance, to their clients or to the regulators or for internal reports. In the financial markets, a distinction is made between linear and non-linear derivatives. Linear derivatives are derivatives for which the future cash flows will certainly take place, assuming that the counterparty will not default. This is opposite to options, where it is not certain whether one or more future cash flow will take place. For the valuation of linear derivatives, treasury systems use the discounted cash flow method. This method calculates the present value of all future cash flows of a financial instrument and takes the net present value of these cash flows as the current value of this instrument. In this chapter we will discuss an easier alternative for this method. For the valuation of options, a more complex model is necessary. An example of such a model is the Black-Scholes model which we will discuss conceptually in this chapter.

## *1 The price determining parameters and the market value of derivatives*

The price of a derivative contract is agreed at the moment on which it is transacted and is based on the prevailing market conditions for the price determining parameters on that particular moment. The table below shows the price determining parameters for FX forwards, for interest rate swaps and for options (excluding the applied credit spread).

| Price determining parameters | | |
|---|---|---|
| **FX forward** | **Interest Rate Swap** | **Options** |
| FX forward rate | Interest rate on the capital market for the term of the swap | Difference between the forward price of the underlying value and the strike price |
| | | Volatility |
| | | (Remaining) term |

The price of an FX forward contract, for instance, is determined by the FX spot rate on the transaction date and the interest rate differential at that time which together form the FX forward rate. The price of an interest rate swap, for instance, is determined by the conditions on the capital market on the moment that the transaction is conducted et cetera.

Immediately after a derivative transaction has been conducted, the market conditions would, most probably, already be different. This is because the prices and rates on the financial markets change constantly. These movements can be either favourable or unfavourable for the contract parties. Put in other words: the derivative contracts become to have a market value. If the market moves in a favourable direction, then a contract becomes to have a positive market value whereas if the market moves in an unfavourable direction, then a contract becomes to have a negative market value.

On the moment that an FX forward contract or an interest rate swap is conducted, the market value is zero. This is because both market parties enter into an obligation towards each other and these mutual obligations have exactly the same value. If the current FX forward rate is, for instance, 1.1300 and two market parties agree to exchange EUR 1,0000,000 euro against USD 1,300,000 on a future settlement date then one party has the obligation to transfer 1,000,000 euro on that date whereas the other party has the obligation to transfer USD 1,300,000 on that date. However, on the transaction moment, USD 1,300,000 has a value of exactly EUR 1,000,000 which means that the value of the both obligations is the same and that, as a result, the ‘net value’ (the market value) of the FX forward is zero.

### *1.1 Changes in the market value of FX forwards*

In this paragraph we will explain how a change in the FX forward rate will change the market value of an FX forward.

**Example**

On 1 May a Dutch company has conducted an FX forward transaction in which it buys 500,000 USD at an FX forward rate of 1.1300 with settlement date 1 August. This contract rate was based on the market conditions on a May and the counter value in euro is 500,000 / 1.1300 = EUR 442,478.

If, on a specific moment during the term, for instance 1 June, the FX forward rate for 1 August would be 1.1500 this would mean that the company would have to pay less euro if it would not had concluded the FX forward on 1 June but instead would transact an FX forward on 1 June. The counter value in euro would now be 500,000 / 1.1500 = EUR 434,783 which is EUR 7,695 less.

---

The FX forward contract in the example turns out to be transacted under less favourable market conditions than the conditions on 1 June. The difference between the euro contract amount in a transacted derivative contract (in the remainder of this chapter we will refer to this contract as the original contract) and the euro contract amount in a virtual contract which could be conducted on a specific moment during the contract term of the original contract gives the (future) market value of the derivative contract. The market value of the FX forward contract in the example is, therefore, EUR 7,695 negative.

In our example, the Dutch company had bought USD in the FX forward contract, which means that the company has sold euro. During the term, the EUR/USD FX forward rate went up and, as a result, the contract became to have a negative value. If the EUR/USD rate would have gone down, on the other hand, the FX forward contract

would become to have a positive value. The relationship between movements in the price determining parameter (the FX forward rate) and the value of an FX forward contract are shown in the below table.

| | **Buy EUR / Sell foreign currency** | **Sell EUR / Buy foreign currency** |
|---|---|---|
| FX forward rate becomes higher than the contract rate | Positive market value | Negative market value |
| FX forward rate becomes lower than the contract rate | Negative market value | Positive market value |

### *1.2 Changes in the market value of interest rate swaps*

In this paragraph we will explain how a change in interest rates changes the market value of an interest rate swap.

**Example**

On 30 May a company has concluded an interest rate swap transaction in which it pays a fixed rate of 3% and receives 6-month EURIBOR. The term of the interest rate swap is five years and the contract amount is EUR 10,000,000.

If, on a specific moment during the term, for instance after one year, the interest rates would have decreases, for instance to 2%, then this would mean that the company would have to pay a lower interest rate if it would not had already conducted the interest rate swap one year ago but would an interest rate swap one year later. If the company would have conducted the interest rate swap after one year, then it would only have to pay 2% over 10,000,000 = EUR 200,000 instead of EUR 300,000 for the remaining four years. This means that the company is paying EUR 800,000 more in the original transaction during the remaining term of the swap than it would have to pay if it would have conducted the transaction after one year.

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The interest rate swap contract in the example turns out to be transacted under less favourable market conditions than the conditions after one year. The difference between the obligations to pay the fixed coupon in the original contract and the obligations to pay the fixed coupon in a virtual contract which could be conducted on a specific moment during the contract term of the original contract gives the market value of the derivative contract. The (future) market value of the interest rate swap contract in the example is, therefore, EUR 800,000 negative.

In our example, the company was paying the fixed rate. During the term, the interest rates decreased and, as a result, the contract became to have a negative value. If the interest rates would have gone up, on the other hand, the interest swap contract would become to have a positive value. The relationship between movements in the interest rates and the value of an interest rate swap contract is shown in the below table.

| | **Pay the fixed rate** | **Receive the fixed rate** |
|---|---|---|
| Interest rate becomes higher than the contract rate | Positive market value | Negative market value |
| Interest rate becomes lower than the contract rate | Negative market value | Positive market value |

### *1.3. The Option premium*

The value of an option is made up of two parts, the intrinsic value and the time value.

#### Intrinsic value

The intrinsic value of an option is the difference between the (forward) market price of the underlying value and the exercise price viewed from the perspective of the buyer, if positive. If the price of the underlying is the same or lower than the exercise price, the intrinsic value of a call option is zero. If the price of the underlying is higher than

the exercise price, the call option has a positive intrinsic value. If the price of the underlying value rises further above the exercise price, the intrinsic value increases proportionally. In other words, for every unit price increase of the underlying value, the intrinsic value of a call option increases by one unit. The intrinsic value can also be found by answering the following question: 'What would be the value of the option contract if the remaining term of the option contract was zero?'

In the table below, the intrinsic value of a EUR call / USD put option with a strike price of EUR / USD 1.3400 is shown.

| **Spot rate** | **Intrinsic Value** |
|---|---|
| 1.3200 | 0 |
| 1.3300 | 0 |
| 1.3400 | 0 |
| 1.3500 | 0.0100 |
| 1.3600 | 0.0200 |

A put option has an intrinsic value if the current market price of the underlying value is lower than the exercise price. If the price of the underlying value is the same or higher than the exercise price, the intrinsic value of a put option is zero. In the table below, the intrinsic value of a GBP put / USD call option with a strike price of GBP / USD 1.2200 is shown.

| Spot rate | Intrinsic Value |
|---|---|
| 1.2000 | 0.0200 |
| 1.2100 | 0.0100 |
| 1.2200 | 0 |
| 1.2300 | 0 |
| 1.2400 | 0 |

**Time value**

The value of an option is always equal to or greater than the intrinsic value. This is because of the fact that during the remaining term of the option the intrinsic value can change either upwards or downwards. And the probability that the intrinsic value increases during the remaining term is always larger than the probability that the intrinsic value decreases. The difference in these two probabilities is represented by the time value also called expectations value. The option premium is the sum of the intrinsic value and the expectation value. This is shown in the following equation :

Option premium = Intrinsic value + Time value

The table below shows the development of the option premium of a GBP call / USD put option with a strike price of 1.6000 and a remaining term of three months for different GBP/USD FX forward rates.

| GBP/USD forward rate | Intrinsic Value | Time value | Option Premium |
|---|---|---|---|
| 1.5000 | 0 | 0.0125 | 0.0125 |
| 1.5500 | 0 | 0.0260 | 0.0260 |
| 1.6000 | 0 | 0.0475 | 0.0475 |
| 1.6500 | 0.0500 | 0.0260 | 0.0760 |
| 1.7000 | 0.1000 | 0.0125 | 0.1125 |

The time value is determined by the difference in the chance that the intrinsic value will increase and the chance that the intrinsic value will decrease during the remaining term of the option contract. Both probabilities depend on how the price of the underlying value might develop during the remaining term of the option contract. To make an estimation of this development, a stochastic distribution is used, for instance a (log-)normal distribution. The time value is for the greatest part determined by three parameters:

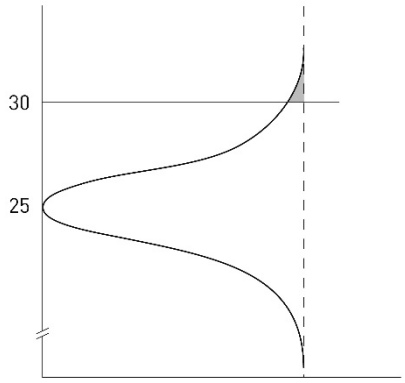
- the price of the underlying value;
- the remaining term of the option contract;
- the volatility of the underlying value.

Volatility is a measure which indicates the degree of price movements of a rate or price. A low volatility indicates that prices or rates do not change much whereas a high volatility indicates that prices move considerably. The potential revenue of an option depends on the chance that an option will be exercised and the level in which the option is in-the-money at that moment. Volatility has an impact on both of these factors, i.e. if the volatility is high, for instance, then both the chance that the option will become in-the-money and how much the option will be in-the-money increase. This means that option premiums are higher in case of higher volatilities.

We will now discuss the relationship between the price determining parameters of options and the option premium. As an example we use a call option with a strike of 30. The diagrams below are based on the Black-Scholes model which assumes that prices and rates on the financial markets follow a (log-)normal probability distribution.

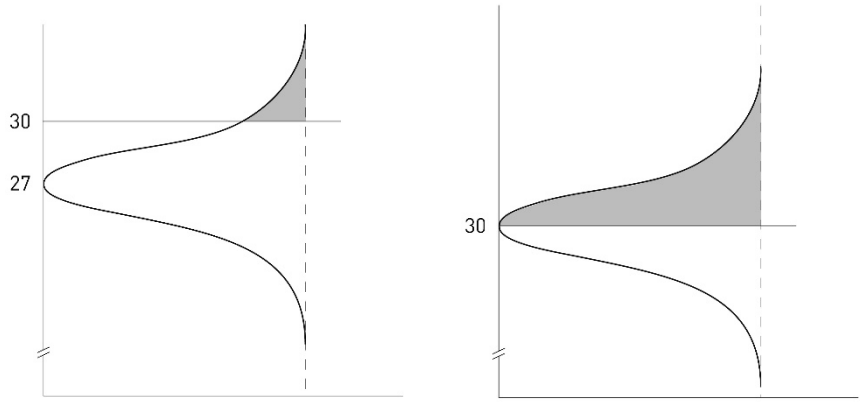
Figure 1 shows the range of possible movements of the price of an underlying value during the remaining term (according to a normal probability distribution) for a call option with a strike price of 30 if the current price of the underlying value is 25. Because the current spot rate is lower than the strike price of the call option, the intrinsic value of this option is zero. The chance that the option will end up in-the-money and thus will become to have an intrinsic value is represented by the shaded area above the strike level. Since the option has no intrinsic value, the downward potential for the intrinsic value is zero. The time value of this option therefore is completely determined by the shaded area above the strike level.

Figure 1 Time value of a call option with a strike of 30 if the price of the underlying value is 25.



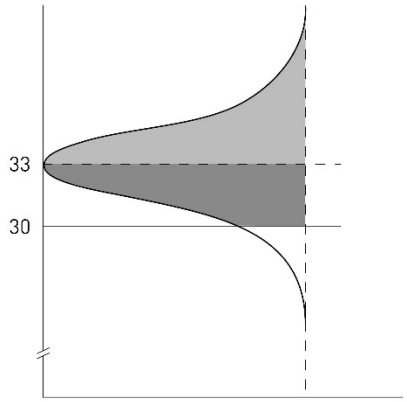

If the price of the underlying value increases then the time value of an out-of-the-money call option will also increase. After all, the upward potential for the intrinsic value increases whereas the downward potential is still zero. Note that the intrinsic value of an out-of-the-money option is always zero. This is shown in figure 2 for prices of the underlying value of 27 and 30.

Figure 2 Time value of a call option with a strike of 30 if the price of the underlying value is 27 and 30




If the price of the underlying value increases above the strike price, then the option will start to have an intrinsic value. This means that, from that moment, there is not only an upward potential for the intrinsic value, but also a downward potential. After all, the holder of the option can now also lose his intrinsic value. Figure 3 shows the time value of the call option if the price of the underlying value is 33. The upward potential for the intrinsic value is represented by the light shaded area and the downward potential is represented by the dark shaded area. The expectation value, i.e. the difference between the upward and the downward potential of the intrinsic value, is represented by the non-shaded area below the horizontal line which represents the strike price of 30.

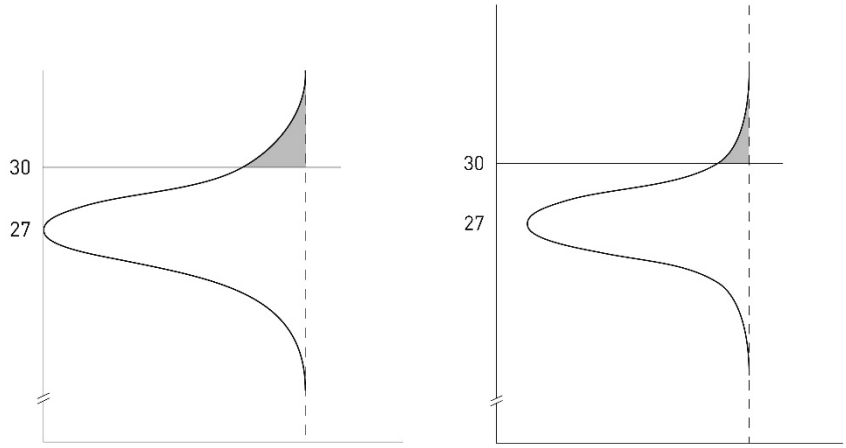
Figure 3 Time value of a call option with a strike of 30 if the price of the underlying value is 33




Although the time value of in-the-money call options decreases if the price of the underlying value increases, the total value of the option still increases. This is because of the fact that the intrinsic value increases and that the increase in the intrinsic value is always larger than the decrease of the time value.

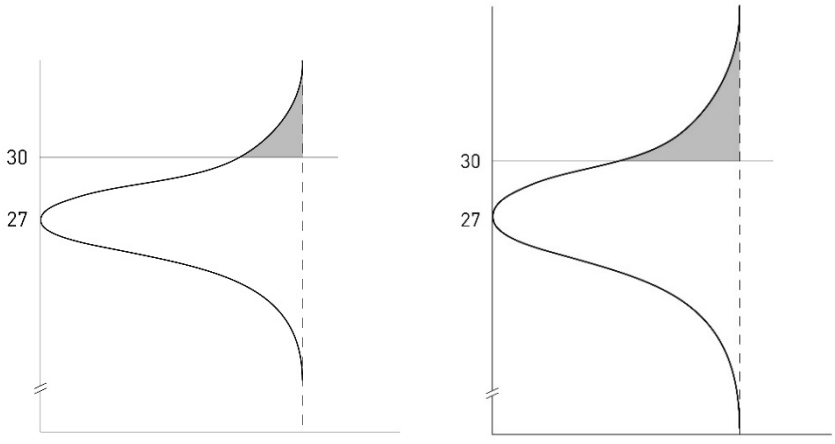
The second parameter of the time value is the remaining term. During the term of the option contract, the time value decreases. The reason for this is that, during the term of the option contract the diagram which represents all the possible price movements of the underlying value moves to the right. This is shown in figure 4. The time value is again represented by the shaded area.

Figure 4 Time value of a call option with a strike of 30 for different remaining terms




During the term of an option contract, the volatility changes constantly. If the volatility of the underlying value increases, then the time value will also increase. In figure 5 the increase in the volatility is represented by a wider shape of the curve.

Figure 5  Time value of a call option with a strike of 30 for different volatilities



In the table below we summarize the relationships between the price determining parameters and the option premium.

| **Price determining parameter** | Higher | Lower |
|---|---|---|
| Price of the underlying in case of a **call** option | Option premium ↑ | Option premium ↓ |
| Price of the underlying in case of a **put** option | Option premium ↓ | Option premium ↑ |
| Volatility | Option premium ↑ | Option premium ↓ |
| (Remaining) term | Option premium ↑ | Option premium ↓ |

### *2 The interpretation of the market value*

The market value of non-option derivative contracts is, in principle, zero on the moment on which they are conducted. However banks charge spreads to cover their credit risk and their costs and, on top of that, take some profit. Because of this the market value at the start of a derivative contract is usually positive for the bank and negative for the client. Let us assume, for instance, that the current EUR/USD forward rate is 1.2510 and hat the bank charges a client spread of 0.0010. If a client wants to conduct an FX forward in which it buys USD 1,000,000 (sells euro), then the bank will set the contract rate at 1.2500 instead of 1.2510. According to the contract, the client would have to pay 1,000,000 / 1.2500 = 800,000 euros. If the market rate would have been applied, this would only be 1,000,000 / 1.2510 = EUR 799,360. This means that the market value of the FX forward contract at the start date immediately is negative; i.e. minus 640 euro.

During the contract term, the market value of a derivatives contract changes constantly and it can become positive or (more) negative. We will now discuss what the consequences are of a negative market value. Our first remark would be that a negative market has no impact whatsoever on the future cash flows of the market party resulting from the transacted contract. A negative market value means nothing more for a market party other than the fact that he still has to comply with the obligations resulting from the contract, which in retrospect are not so favourable. The negative market value merely means that the market party could have conducted a deal under better conditions now than the conditions which were prevailing on the moment that he or she conducted the transaction. In other words: a negative market value only represents an opportunity loss.

If a derivative contract has a negative market value, this has no impact on the future cash flows that are agreed in the contract, but it may have an impact on the liquidity position of the market party. This is because sometimes banks apply a margin system which means that a client is required to deposit an amount of money with the bank that is equal to the negative market value. The reason why banks apply a margin system is because they want to cover the risk of default of their clients. They will pay the margin back if the market value of the contract increases or at the maturity date of the contract, once the client has fulfilled the obligations as a result of the derivative transaction. This means that the effect on the liquidity position of the client is only temporary.

Options are rights and this means that the value of an option is always positive. If a client of a bank buys an option, then he or she must pay a premium. The premium represents the market value of the option; positive for the buyer of the option and negative for the seller (after all during the option term only the seller has a potential future obligation; the buyer has already fulfilled his obligation by paying the option premium on the start date of the option contract).

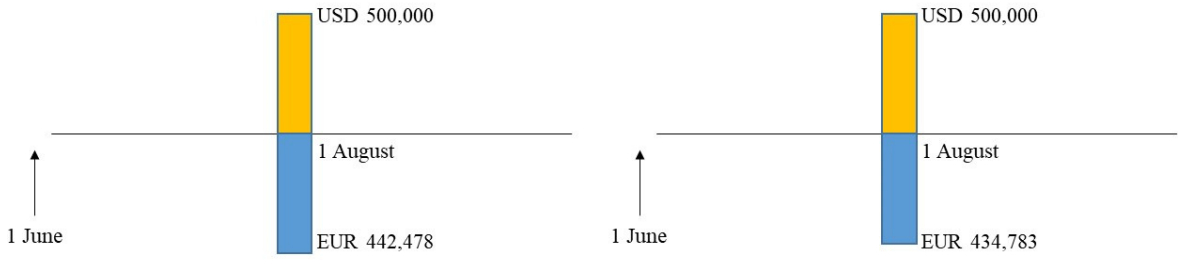
## *3 Example of the calculation of the market value of an FX Forward contract*

Treasury systems calculate the market value of a linear derivative contract (i.e. derivatives which are no options or contain no options) by calculating the present value of each individual future cash flow that results from the derivative contract. If a future cash flow is denominated in a foreign currency, then the treasury system converts the present value of this cash flow to the reporting currency by using the FX spot rate on the valuation date.

There is, however, an alternative and more easier way to calculate the value of a linear derivative contract. In this alternative way, the cash flows of a derivative contract are compared with the cash flows of a virtual contract with the same contract amount and term for which the market conditions on the valuation date apply.

We will first explain how this alternative works for an FX forward contract in which a client buys USD 500,000 against EUR 442.478 (i.e. contract rate is 1.1300) for value 1 August. The valuation date is 1 June and the EUR/USD FX forward rate on 1 June is 1.1500. Figure 6 shows the cash flows of the original contract and the cash flows of a virtual contract under the market conditions of 1 June. Note that we keep the value of the foreign currency the same, i.e. USD 500,000.

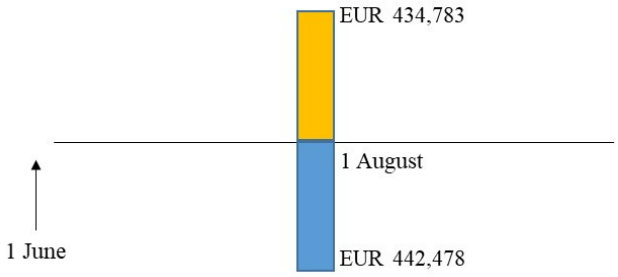
Figure 6 Cash flows of the original FX forward contract and of the virtual FX forward contract




In order to calculate the value of the derivative contract, the cash flows of the virtual contract are mirrored and are set opposite to the cash flows of the original contract.

Because of the fact that we made the USD amount for the virtual contract the same as the USD amount in the original contract, the net USD amount is zero. Therefore we only have to look at the future EUR cash flows. The EUR cash flows are shown in figure 7.

Figure 7 EUR cash flow of the original FX forward contract and mirrored EUR cash flow of the virtual FX forward contract



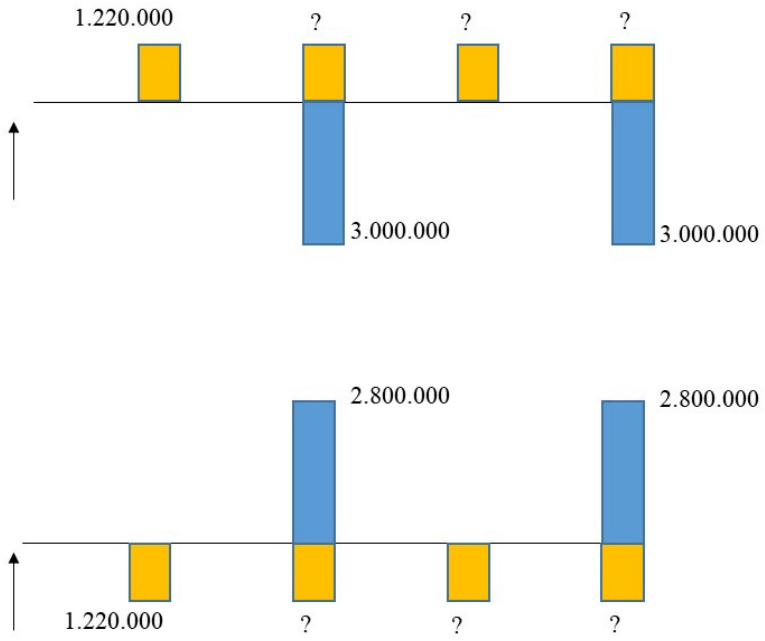

Best we calculate the net EUR cash flow; figure 8 shows that the net EUR cash flow on 1 August is EUR 7,695. In order to determine the market value we have to take the present value of this amount on 1 June. Assuming on 1 June the 2-month (61 days) interest rate is 2%, then the present value of the net cash flow is EUR 7,695 / ( 1 + 61/360 x 0.02) = EUR 7,669. This is the market value of the FX forward contract on 1 June.

Figure 8 Net cash flow used for valuation

## *4 Example of the calculation of the market value of an interest rate swap contract*

In this paragraph we will determine the market value of an interest rate swap with a remaining term of exactly two years and a contract amount of EUR 100,000,000 in which the client pays a fixed rate of 3% and for which the rate for the next coupon period of six month is set at 2.4%. The next coupon period has 183 days and, therefore, the amount of the next coupon payment is EUR 100,000,000 x 183/360 x 0.024 = EUR 1.220.000. The current two-year rate on the market for interest rate swaps is 2%. The upper side of figure 9 shows the cash flows of the original contract and the cash flows of a virtual contract which would be transacted under the market conditions of 1 June. Note that we already have mirrored the cash flows of the virtual transaction.

Figure 9 Cash flows of the original irs contract and mirrored cash flows of the virtual IRS contract

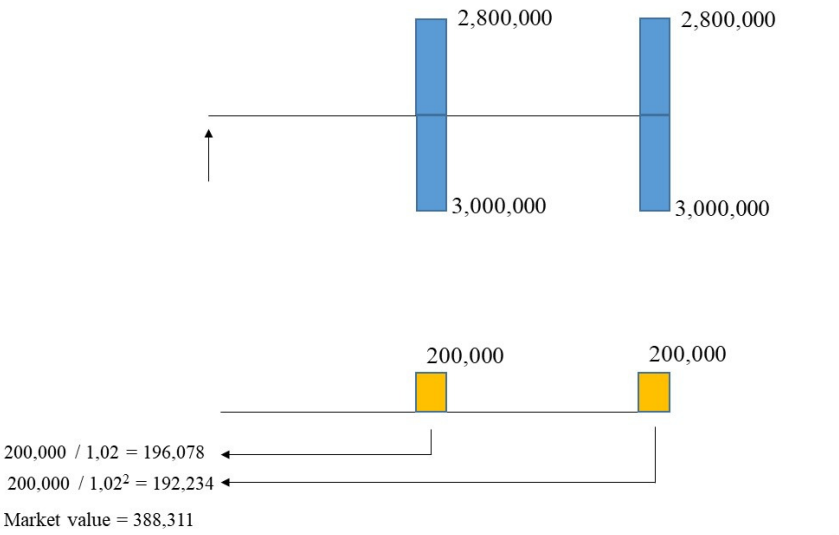



The floating coupons of both the original transaction and the virtual transaction are equal. This is because of the fact that the contract amount is the same and the fact that the fixing dates for the floating coupon are the same. This means that the floating coupons cancel each other out and that we only have to look at the fixed coupon

payments.

The upper side of figure 10 shows the fixed coupon payments of the original contract and the mirrored fixed coupon payments of the virtual contract.

Figure 10 Fixed coupons of the original irs contract and mirrored fixed coupons of the virtual irs contract / Net EUR cash flows




1

The bottom side of figure 10 shows the net future cash flows after one year and after two years. If we assume that the discount rates for every period longer than or equal to one year is 2% (flat yield curve), then the market value of the interest rate swap can be calculated as follows:

Present value net cash flow after one year: EUR 200,000 / 1.02 = EUR 196.078
Present value net cash flow after two years: EUR 200,000 / $1.02^2$ = EUR 192.234

The market value of the interest rate swap is the sum of both amounts; EUR 388,311. And since the net cash flows are positive, the market value is also positive.

Financial Markets Books

# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

## *Derivatives Accounting*

*Lex van der Wielen*

IN CO-OPERATION WITH MICHIEL VAN DEN BROEK

Financial Markets Books
Geelvinckstraat 56, 1901 AJ Castricum

ISBN 978-9492648-03-7

# *Introduction*

When the first major derivatives failures came to light in the 1980s, it suddenly became apparent that derivatives were not recognised in the financial statements; they were off-balance sheet instruments. Today, things are different. Companies are expected, in principle, to disclose derivatives in their balance sheet and statement of profit or loss (p&l). IFRS (International Financial Reporting Standards), US GAAP (Generally Accepted Accounting Principles) and Dutch GAAP (Dutch Accounting Standard (RJ 290), for instance, all have rules for how to account for derivatives.

## *1 Standard reporting rules*

Under IFRS, US GAAP and RJ 290, financial instruments must be recognised at fair value when the company becomes party to the contract. However, with the exception of options, the cost of derivatives at contract inception usually corresponds to zero[3]. For this reason, most derivatives are not recognised at inception. The clean market value is always used for accounting purposes.

The cost price of an option is the premium and a purchased option must be recognised as an asset and a sold option as a liability. The value corresponds to the option premium in both cases.

[3] Not including the client margin.

**Example 1**

A company purchases an interest rate option for 50,000. The entries in the financial accounts are as follows:

| | |
|---|---|
| Derivatives (balance sheet) | 50,000 dt |
| To Bank (balance sheet) | 50,000 cr |

---

Under US GAAP and IFRS, derivatives must be recognised at fair value during the term of the contract, irrespective of whether this value is positive or negative. A positive fair value must be reported on the asset side of the balance sheet and a negative fair value must be reported on the liabilities side. In addition, all changes in the fair value between two reporting dates must be recognised through profit or loss.

Under RJ 290, derivatives must in principle be recognised at the lower of cost or fair value over the term of the contract. This means that non-option derivatives can only be disclosed on the liabilities side of the balance sheet (i.e. they are only recognised if the fair value is negative). Changes in negative fair value must be recognised through profit or loss.

**Example 2**

A company has calculated that, after inception, a commodity swap had a negative value of 35,000 on the first reporting date. As the initial fair value of the derivative corresponded to zero, it makes the following entries in the financial statements (under IFRS, US GAAP and RJ 290):

| | |
|---|---|
| Result on financial instruments (statement of p&l) | 35,000 dt |
| To Derivatives Credit (balance sheet) | 35,000 cr |

If, in the next year, the value of the commodity swap rises to € 10,000 negative (i.e. becomes less negative), the organisation must make the following entries (under IFRS, US GAAP and RJ 290):

| | |
|---|---|
| Derivatives Credit (balance sheet) | 25,000 dt |
| To Result on financial instruments (statement of p&l) | 25,000 cr |

If, in the next year, the value of the commodity swap rises from 10,000 negative to 12,500 positive, the organisation must make the following entries under RJ 290:

| | |
|---|---|
| Derivatives Credit (balance sheet) | 10,000 dt |
| To Result on financial instruments (statement of p&l) | 10,000 cr |

However, under IFRS and US GAAP, the entries should be as follows:

| | |
|---|---|
| Derivatives Credit (balance sheet) | 10,000 dt |
| \|Derivatives Debit (balance sheet) | 12,500 dt |
| To Result on financial instruments (statement of p&l) | 22,500 cr |

---

If the value of a purchased option falls below the cost price, the debit item (Option) must be reduced in the balance sheet (credited). At the same time, the item 'Result on financial instruments' in the statement of profit or loss must be debited for the negative change in value.

If the option's value rises again in the next reporting period, the loss recognised in earlier financial statements must be offset against a profit. Under RJ 290, the option's value is never to exceed its cost, the reason being that, under this regime, options are recognised at the lower of cost or fair value.

**Example 3**

A company purchases an interest rate option for 50,000. If, the next year, the option's value has fallen to 20,000, the organisation must make the following entries:

| | |
|---|---|
| Result on financial instruments (statement of p&l) | 30,000 dt |
| To Derivatives (balance sheet) | 30,000 cr |

If, in the next year, the option's value has risen from 20,000 to 60,000, the organisation must make the following entry under IFRS or US GAAP:

| | |
|---|---|
| Derivatives (balance sheet) | 40,000 dt |
| To Result on financial instruments (statement of p&l) | 40,000 cr |

However, if the company reports under RJ 290, it must make the following entries:

| | |
|---|---|
| Derivatives (balance sheet) | 30,000 dt |
| To Result on financial instruments (statement of p&l) | 30,000 cr |

If the option's value rises above 50,000, RJ 290 stipulates that it is to be recognised at its initial cost of 50,000 in accordance with the 'cost or lower fair value' accounting principle.

---

At the end of the term of a derivatives contract or in the event of early termination, the contract must be eliminated from the balance sheet and the difference between this contract's fair value at the end date and the last-measured value is to be recognised through profit or loss. This applies to both gains and losses.

The fair value of an interest rate swap is zero at the end of the term. Any cash flows arising at the end of the term are payments from accrued interest, which is why they do not represent fair value. If the fair value in the preceding report was positive, it would not have been reported under RJ 290. In this case, no entry is required on the end date. If the fair value in the preceding report was negative, a contra entry must be reported for this negative value.

**Example 4**

An interest rate swap matures on 15 May. On 31 December of the preceding year, the negative fair value of this swap was 45,000. Upon termination of the swap, the following entries must be made:

| | |
|---|---|
| Derivatives (balance sheet) | 45,000 dt |
| To Result on financial instruments (statement of p&l) | 45,000 cr |

If the interest rate swap had had a positive value of 45,000 on 31 December, no entry would have been required under RJ 290, given that the swap would then not have been recognised in the previous year. Under US GAAP and IFRS, however, the interest rate swap would have been recognised as a debit item of € 45,000 in the balance sheet and the following entries would have been required:

| | |
|---|---|
| Result on financial instruments (statement of p&l) | 45,000 dt |
| To Derivatives (balance sheet) | 45,000 cr |

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# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

## *Client Protection / MiFIDII*

*Lex van der Wielen*

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ISBN 978-9492648-03-7

# *Introduction*

In the past, the operation of the financial system was left to free market forces and self-regulation. Based on this hands-off principle, financial institutions were able to steadily expand their scope of activity. The market, so it was thought, had sufficient self-regulating capability to keep away from irresponsible risk-taking. But then a succession of calamities undermined that assumption. Self-regulation had fuelled a proliferation of new financial products that caused severe problems for clients around the world. In response, the European Commission decided to change the supervisory system dramatically. New regulations were drawn up to protect clients and make the markets more transparent and secure. These included duty of care rules for banks, the most important of which are set out in MiFID II.

## *1 History of MiFID II*

The Investment Service Directive (ISD) of 1993 laid the groundwork for conduct of business supervision in Europe. ISD was designed to improve investor protection, make financial markets more transparent and increase competition between trading platforms. Though well-intentioned, ISD proved to be insufficient and was ultimately replaced with the Markets in Financial Instruments Directive (MiFID) in 2007. However, major changes in the capital markets soon prompted a revision of the MiFID. It was found that MiFID had serious weaknesses in such key areas as transparency, supervision of over-the-counter (OTC) trading and technology (e.g. high-frequency trading – HFT). Investor protection also needed to be raised to a higher level. And, finally, stricter rules were required for trading in derivatives and structured products. MiFID II is the European Commission's answer to all these challenges.

MiFID II consists of two parts:

- The revised MiFID Implementing Directive[4], which largely consists of rules for improved investor protection.
- The MiFIR Implementing Regulation[5], which focuses primarily on rules for transparent trading in financial markets.

The overriding objective remained unchanged in MiFID II, i.e. to make European financial markets more efficient, transparent and secure for investors. With these objectives in mind, MiFID II has given national supervisors a more active and prominent role in ensuring market compliance. Concrete actions to put MiFID II into practice include:

1. The launch of the Organised Trading Facility (OTF), a new type of trading platform to make market structures more robust and efficient.
2. Regulations to address the challenges of new technologies, such as control for high-frequency trading (HFT).
3. New operational requirements for investment firms and trading platforms.
4. Tighter trading transparency rules for equity markets and new transparency rules for trading in non-equity markets.
5. Stricter conduct of business supervision for investment firms.

[4] A Directive is binding, as to the result to be achieved, upon each Member State to which it is addressed, but national authorities are free to choose a form and methods. To implement this European Directive, every Member State must introduce its own laws.

[5] A Regulation is directly applicable in every Member State. Member States are not required, or permitted, to introduce their own laws.

## *2 The scope of MiFID II*

The MiFID regime applies to regulated markets and investment firms, and relates to financial instruments, including certain structured deposits. A securities exchange (regulated market) and other trading platforms[6] do not qualify as investment firms, but come under a separate set of MiFID rules.

Section 1:1 of the Dutch Financial Supervision Act (Wet op het financieel toezicht – Wft) defines which products are financial instruments. These include: equities, bonds, units in investment funds, options, futures and derivatives contracts, greenhouse emission rights, commodity derivatives, money market instruments and structured deposits. One example of a structured deposit is a deposit whose return is not linked to an interest rate but to the performance of an equity index. A financial product that does not qualify as a financial instrument does not fall within the MiFID regime for investment firms. This concerns such products as current account balances, deposits or savings accounts and FX transactions deliverable within two business days (FX spot, FX value tomorrow, FX value today).

### Complex and non-complex instruments

MiFID II differentiates between complex and non-complex instruments. Non-complex financial instruments include equities that are traded on a regulated market, units issued by investment funds, money market instruments, bonds and securitised debt. However, as soon as a financial instrument leads to risks that are difficult to understand for a client, it is considered to be complex. Derivatives are one example. Structured products that include a derivative also qualify as complex.

In the Netherlands, MiFID II applies to investment firms only. MIFID II defines an investment firm as a firm that:

[6] Multilateral Trading Facility (MTF) and Organised Trading Facility (OTF).

A. engages in portfolio investments for its own risk and account; and/or
B. provides investment services to or on behalf of clients.

Providing investment services to or for clients can consist of:

a) the reception and transmission of orders in financial instruments and structured deposits;
b) the execution of orders in financial instruments and structured deposits on behalf of the client (execution-only);
c) asset management services;
d) investment advice (treasury advice);
e) underwriting or placing of financial instruments on or without a firm commitment basis.

Before entering into a relationship with a prospective client, an investment firm must paint a clear picture of the services it provides. The treasury services of banks mainly consist of execution-only and advisory. All services referred to in the rest of this chapter exclusively concern these two types of services. The term 'advice' is used as short-hand for investment advice within the meaning of MiFID II.

### *2.1 Execution-only*

Execution-only concerns the reception and transmission or execution of orders in financial instruments at the client's request. Clients determine their own financial requirements, make their own assessment of the product information and make their own investment decisions without receiving personalised advice. During the contract term, clients are responsible for determining whether the instrument is still appropriate to their situation and whether any adjustments are necessary or expedient in view of changes in circumstances. The bank's involvement is restricted in principle to the transmission and/or execution of orders placed by the client on their own initiative. As

all transaction decisions are made entirely by the client personally, the bank bears much less responsibility when providing this type of investment service than it does providing other investment services. With certain client categories, i.e. retail clients and elective professionals, the bank must perform an appropriateness screening to establish whether or not execution-only is a suitable service for the client.

Figure 1 Execution-only; shopping around in the financial world

## *2.2 Investment advice*

Advisory involves recommending one or more specific financial instruments to a certain client. In other words, advisory services go beyond the mere provision of product information and the reception or execution of orders on the client's behalf. Here, the bank provides personalised advice to a client. Before providing advice, the bank must perform a suitability screening to learn about the client's financial situation,

objectives, risk appetite and knowledge and experience insofar as relevant to the advice.

In the view of the Netherlands Authority for the Financial Markets (AFM)[7], investment advice is provided if the following five cumulative conditions are fulfilled:

1. There must be a recommendation, and not just a sharing of information. This is the case if an explicit or implicit opinion is given about the presented information that steers the client in a certain direction. The presentation of a specific solution – such as the most suitable choice from a range of investment funds – is also regarded as a recommendation for investment advice purposes, the reason being that this solution is directly aimed at an individual client rather than at the public in general. A recommendation is specifically aimed at a client if, among other things, it is based on the client's requirements or is specifically addressed to the client. The factual presentation of information (i.e. without issuing an opinion) is seen as a sharing of information and not as a recommendation for investment advice purposes.
2. It must be a recommendation aimed at a transaction in a specific[8] financial instrument.
3. The recommendation made (i) conveys the suggestion that it is appropriate for the individual client, or (ii) is given on the basis of the client's personal situation.
4. The recommendation is aimed at the individual client.
5. The recommendation must be aimed at an investor (or their authorised representative).

[7] AFM Guideline on Qualification of Innovative Service Provision, 23 August 2016

[8] Meaning not a type of financial instrument, such as equities or options, if this is not specified in further detail.

Several banks in the Netherlands have opted to exclusively provide execution-only services to treasury clients. This means that all employees of these banks, including the treasury specialists, can only provide information and must refrain from any form of advisory assistance. ABN AMRO and ING, for instance, exclusively provide execution-only services. Rabobank does offer advisory services, e.g. in the field of interest rate derivatives. These banks may of course make different choices in the future.

### *2.3 AFM's views on execution-only or advice*

In 2014, the AFM published a brochure[9] in response to grievances in the SME sector about interest rate derivatives they had been offered. Several case studies were described in this brochure to clarify the difference between execution-only services and advice. With each case study, the AFM explained how it classified the service based on the available information. Two of these case studies are outlined below.

**Case 1: Execution-only**

A company has taken out a floating-rate loan. The account manager at the bank informs the company of its exposure to interest rate risk and the bank's derivatives specialist gives a presentation on interest rate movements and how interest rate derivatives can be used to mitigate their consequences. Based on this information and its own risk hedging assessment, the company decides which interest rate derivatives best suit its financial position and risk appetite. It asks the bank to quote prices for an interest rate swap and an interest rate cap. After a comparison, the company opts for an interest rate cap.

[9] Recommendations of Interest Rate Derivatives Services, February 2014

AFM's standpoint on Case 1

AFM classifies this service as execution-only. The client makes its own assessment of the interest rate risk and the extent to which it wants to hedge this risk. Based on general information, the client narrows the choice down to two alternatives. Next, based on a comparison of price and conditions, the client develops a preference for one instrument. This qualifies as execution-only, but only if the client is under no impression whatsoever that the bank has given some form of advice (e.g. during the transaction in question).

**Case 2: Advice**

During meetings with the company, the bank fails to explain that it will not provide advice on interest rate derivatives. The bank does educate the company about various instruments, emphasises the benefits of a combination of a floating-rate loan and a derivative over a fixed-rate loan, and makes a personalised recommendation. When the transaction is conducted, the conditions state that it was based on execution-only services.

AFM's standpoint on Case 2

The mere fact that the conditions state that the interest rate derivative transaction was based on execution-only services does not in itself entail that this is actually true. In this example, the bank made a personalised recommendation. That is why, in this particular case, its service is classified as advice.

***3 Client onboarding***

Onboarding involves all procedures that need to be completed before transactions can be conducted with a client. Under MiFID II, banks are required to arrange the following matters before services can be provided to an individual client:

1) Categorising the client as a retail client, a professional client or an eligible counterparty;
2) Providing information on the services and instruments; and
3) Setting up a customer file.

### *3.1 Client categorisation*

Banks must categorise their clients and counterparties as professionals or retail clients. The bank is required to inform the client of how they have been categorised and about its consequences for the level of protection that they enjoy. MiFID distinguishes between three categories of clients:

a) Retail clients
b) Professional clients
c) Eligible counterparties

#### *3.1.1 Retail clients*

Retail clients are all natural persons, small companies, government institutions, local public organisations and authorities, municipalities, foundations and small and medium-sized enterprises (SMEs). Depending on the legal framework they come under, certain semi-public organisations are also categorised as retail clients, such as housing associations. Retail clients enjoy the highest level of protection. Banks usually offer retail clients a limited range of instruments, consisting of the least complex instruments.

### *3.1.2 Professional clients*

Professional clients are clients who are assumed to have sufficient knowledge, experience and expertise to make their own investment decisions and assessment of the associated risks. Clients that are professional by definition are categorised as per se professional clients. These include:

- banks, investment firms and insurers;
- managers of an investment fund or a pension fund;
- national or regional public bodies or public bodies that manage the public debt;
- central banks;
- legal persons or undertakings meeting two of the following size requirements[10]:
    - total assets of at least € 20,000,000;
    - revenue of at least € 40,000,000;
    - equity of at least € 2,000,000.

Banks offer professional clients a larger range of instruments than retail clients.

### *3.1.3 Eligible counterparties (ECPs)*

An eligible counterparty is a highly professional client. A party can exclusively be categorised as an ECP in the case of services where the bank

- receives and transmits orders or provides associated services or
- deals on own account or
- executes orders on behalf of the client (execution-only) or
- underwrites or places financial instruments without firm commitment basis.

It follows that a client who is provided with advice can never be categorised as an eligible counterparty. Private persons and companies will never qualify as eligible

[10] These size requirements concern the entity that conducts the transaction and not the consolidated figures of a holding company to which the entity may belong.

counterparties either. Eligible counterparties have the lowest level of client protection.

Banks offer eligible counterparties all instruments in their product range.

### *3.1.4 Changing a client categorisation (opting-up/opting-down)*

Clients can submit a request to be categorised in a higher or lower category, which is referred to as opting-up and opting-down respectively. Banks must inform their clients in advance of this option and of the consequences for the level of client protection they will enjoy. A bank is not required to accept an opting-up request, but it will generally accept an opting-down request, unless there are legal or other objections not to do so.

Figure 2 Client request for opting-up or opting-down

An opting-up request is usually made when the client seeks access to a broader range of instruments. A retail client can, for instance, request to be categorised as a professional client for all transactions or for a certain transaction only (elected professional or opt-up). This opting-up can only take place following a client's request and only if the client has sufficient expertise, knowledge and experience to make investment decisions and assess the associated risks. The bank must perform a separate

appropriateness screening for this purpose. The details of this screening will be discussed in great detail later on. Apart from screening the client, the bank must document in the retail client records the reason why the new categorisation/instrument to be used is suitable for the client and matches his objectives, knowledge and experience, risk appetite and capacity to absorb losses.

In addition, the client must meet at least two of the following three criteria[11]:

a) the retail client has on average conducted ten transactions of significant size in the relevant market in each of the preceding four quarters;
b) the retail client's portfolio of financial instruments and cash deposits is worth more than € 500,000;
c) the retail client has at least one year's experience working in the financial sector in a role requiring knowledge of asset management.

A professional client can also submit an opting-up request for a certain service or transaction, provided that the client is not a natural person. The European Securities and Markets Authority (ESMA), however, has advised against allowing a second opting-up request (i.e. from retail to elected professional and later from elected professional to eligible counterparty).

### *3.2 Bank's duty to investigate*

The bank has a so-called duty to investigate in order to provide clients with sufficient protection. This concerns the duty to establish whether the service or scope of a proposed contract makes allowance for the client's interests. In other words: the bank

[11] The conditions for opting-up to professional client status are not applied to determine whether the client can be categorised as a professional in the first instance.

must know its clients in order to provide them with a good service (know your client – KYC).

The bank must fulfil its duty to investigate by performing:

- an appropriateness screening for execution only-services/opting-up requests; or
- a suitability screening if it provides advice.

### *3.2.1 Appropriateness screening and duty to warn*

If a retail client wishes to conduct transactions in complex instruments, the bank must determine whether execution-only is appropriate. It does so by requesting the client to take an appropriateness screening. Based on this screening, the bank determines whether the client has sufficient knowledge and experience to understand the risks associated with the financial instrument and whether the client can take decisions independently. The bank must inform the client of the importance of being screened and the screening must be signed by an authorised representative of the client.

An appropriateness screening is not required for non-complex financial instruments, provided the client requests the service and the bank informs the client before providing the service that it has not assessed whether the service is appropriate.

The appropriateness screening for treasury services contains the following elements:

1. The client must specify whether derivatives are to be used for hedging or speculative purposes.
2. The bank:
    i. indicates that it offers derivatives for hedging market risk;
    ii. warns the client that derivatives transactions can result in significant gains and losses;
    iii. indicates that it is important that the client has sufficient knowledge of and/or experience with derivatives in order to choose the correct risk hedging instrument;
    iv. informs the client that extensive product descriptions are available of the derivatives that it offers (every bank offers product information brochures on its website);
    v. emphasises that the services qualify as execution-only.
3. The client must answer questions for each instrument to test its knowledge and experience so that the bank can assess whether the client is able to use the derivatives without advice.

Under MiFID II, banks must define target groups for their instruments. Banks will only offer a limited range of instruments to retail clients, a less limited range to professional clients and their full range of instruments to ECPs. MiFID II does not prescribe a specific product list per client category, so that banks may interpret this obligation differently in practice.

Typical instruments for retail clients are:

- FX: FX forward, FX swap, non-deliverable forward (NDF);
- interest rate: interest rate swap, cap;
- commodities: forward, swap, cap.

The bank usually uses a Client Assessment Form (CAF) to perform the appropriateness screening. An example of an appropriateness screening for FX derivatives is given below:

| | Forward | | Swap | | NDF | |
|---|---|---|---|---|---|---|
| | yes | no | yes | no | yes | no |
| Does your organisation understand the working and the risk of this product? | | | | | | |
| Is your organisation able to take an independent investment decision in order to buy the product? | | | | | | |
| Has your organisation conducted transactions in this instrument during the last 12 months? | | | | | | |

The product range for professional clients is broader than for non-professional clients.

Retail clients who elect to opt up often do so to make use of one or more instruments from this broader range. The appropriateness screening then focuses on the extra instruments that they want to contract from the broader product range. The screening must demonstrate that these instruments are appropriate for the client.

**Duty to warn**

If the appropriateness screening shows that execution-only is not appropriate, the bank will still be permitted to offer the services as it does not have a duty to refuse. The bank does have a duty to warn, however; it must inform the client in writing of the outcome of the appropriateness screening and let the client know that it believes that the service is not appropriate for the client.

Figure 3 Bank's duty to warn if execution-only is not appropriate

### *3.2.2 Suitability screening and 'duty to refuse'*

An adviser must perform a suitability screening before providing advice. The adviser must provide the client with a suitability report each time they provide advice. This report must specify whether the advice ties in with the client's preferences, objectives and specific characteristics.

In the brochure that we earlier referred to, the AFM noted the following in relation to the information an adviser must demand from or give to the client before providing advice:

1. If the bank provides advice, it is required to obtain all information about the client's financial situation, knowledge and experience, objectives and risk

appetite that is relevant to the advice. The amount of information on the client's knowledge and experience must be proportionate to the type of client, the nature and scale of the investment service, the instrument and its complexity, and the associated risks. The advice must be based, in part, on the obtained information.

2. The obtained information must enable the bank to establish that its advice meets the client's investment objectives, that the client can bear the financial risks of the investment and that the client understands and accepts the risks associated with the transaction (risk tolerance). If this is not the case, the bank is not permitted to give advice. This is sometimes referred to as a 'duty to refuse'.

3. The bank explains what the client can expect from the advice and the information it needs from the client to provide suitable advice.

The knowledge and experience screening is designed to determine whether the client is able to assess and understand the advice as well as the transaction and its potential consequences.

In addition to information about the client's risk appetite and knowledge and experience, the adviser must gather information about two concrete aspects, i.e. the client's risk position, or objective in MiFID II terms, and its financial situation.

**Client's objective**

In order to provide proper advice on derivatives, the bank must, for instance, have an understanding of what MiFID II calls the client's objective, e.g. the exact interest rate risk that the client wants to hedge. In the case of interest rate risk, it is important to know whether the risk concerns a current or future exposure and how long the hedging period will be (e.g. the entire term of the loan or just the initial period when the

outstanding amount is still high). The repayment schedule and voluntary repayment option (if applicable) are important factors in this context.

**Client's financial situation**

In performing the suitability screening, the adviser must also determine whether the client can absorb any losses that may arise from the advice. In practice, banks use financial ratios for this purpose. The most common ratios are:

1. Leverage ratio (equity/total assets)

This ratio provides insight into the company's solvency. Equity is necessary to absorb future losses. The larger the equity, the greater the company's capacity to absorb losses. As the size of potential future losses is not necessarily directly related to the company's total assets, banks do not apply the same minimum leverage ratio to all types of companies. In general, the lower limit is 20% to 40%, depending on the type of company.

2. Net debt/EBITDA

Net debt is the amount of loans (borrowings) less cash and deposits. EBITDA stands for earnings before interest, taxes, depreciation and amortisation. This ratio provides insight into the company's profitability. The lower this ratio, the higher the profit in relation to the size of the loans. Banks often apply a maximum ratio of 3.

3. Debt service coverage ratio

This ratio divides actual incoming cash flows by the sum of interest payment and principal repayment obligations (i.e. the debt service obligations).

As a rule of thumb, banks stipulate that actual incoming cash flows must be structurally higher than the annual debt service obligations. In practice, banks aim for a debt service coverage ratio between 1 and 1.5.

Banks therefore need information from the client to be able to give advice. But on the other hand, a client has a disclosure obligation. It is required to provide any information an adviser request to receive. If the client does not meet this disclosure obligation, the adviser cannot provide any advice. The adviser is then sometimes said to have a duty to refuse.

Figure 4 Bank cannot provide advice if client fails to provide information

The client will always be responsible for deciding whether to follow the advice or not and for the consequences of this decision. A client should not go ahead with a transaction if it cannot answer the following questions in the affirmative:

- Is the advice clear?
- Does he or she understand:

- why the bank has advised this instrument;
- the pros and cons of the instrument compared to possible alternatives;
- how the instrument works;
    - how the instrument may respond to different interest rate conditions;
    - its obligations, such as informing the bank of relevant changes in circumstances.

- Is it clear why the advice is the best alternative?

### *3.3 Bank's duty to provide information*

We have already seen that, before providing any services, banks must inform their clients of the client category in which they have been ranked (retail, professional or eligible counterparty) and of the nature of the service (execution-only or advice). But banks must also provide other kinds of information, such as:

- information about instruments;
- information about advice given;
- information about service conditions;
- information about order execution.

#### Information about instruments

Banks also have a general duty to provide information[12], which means, among other things, that they are required to indicate whether a specific financial instrument is aimed at retail or professional clients in accordance with the identified target market.

MiFID I already included the requirement that banks must give correct, clear and non-misleading product information in a language that the client can understand and that

[12] This is also permitted in a standardised form in the Netherlands.

the risks must be presented in a similar manner to the potential gains. The information must be complete, so that the client can understand how the instrument works, also in a negative scenario. As the client must be able to compare instruments, the bank must list the product characteristics, costs, risks and any additional obligations in a clear manner so that the client is able to select the solution that is most appropriate to its situation, needs and wishes. This requirement did not change in MiFID II.

Regarding the duty to provide information in relation to instruments for retail clients, the new European Packaged Retail and Insurance-based Investment Products Regulation (PRIIPs) became effective alongside MiFID II on 1 January 2018. Following to this regulation, when offering derivatives to retail clients, banks are required to provide a Key Information Document (KID) that is publicly available, for instance via their website. The KID is comparable with the former financial information leaflet (Financiële Bijsluiter).

The purpose of an KID is to help clients understand the nature, risks, costs, possible gains and losses of an instrument and to allow comparison with other instruments. In addition to information about the instrument, the possible objectives and target group, the KID casts light on the risks by means of a risk indicator, which illustrates the risk level compared to other instruments. This indicator shows the probability that investors in the instrument might lose money due to market fluctuations. There are seven risk categories, with Class 7 denoting the highest risk. The KID for derivatives assumes speculative use, which is why all interest rate, FX and commodity derivatives are categorised in Class 7.

Figure 5 AFM risk class indicator


Alongside the risk classification, the KID provides insight into the maximum expected loss and the possible gain on the instrument with examples of various scenarios based on different price movements. Finally, the KID provides other information, such as on transaction costs, counterparty risk and the complaints procedure.

## Information about advice

Under MiFID II, banks must ensure that clients receiving advice understand how the various instruments work, how the instruments differ from each other and the potential positive or negative impacts of these differences in the future. The bank must also explain its reasons for recommending this solution, the available alternatives and which elements make this the best solution. This advice and explanation can also be provided in writing, so that the client can read and consider the information at their leisure.

## Information about service conditions

Before providing their services, banks conclude a derivatives master agreement with their clients. This is a document setting out the conditions under which banks enter into

derivatives contracts with their clients. In the case of professional counterparties, banks use an ISDA agreement, which has been drawn up by the International Swaps and Derivatives Association and is based on English law. They use their own master agreements for other clients. MiFID II does not explicitly require that such a master agreement be drawn up and signed, but it does form part of the package of measures that a bank can take to meet the duty to provide information under MiFID II.

The conditions in a master agreement are partly based on MiFID II but also call explicit attention to the client's responsibility. Below are summed up some examples of the articles in a client master agreement.

- The bank is not required to give the client advice, information or guidance (on request or otherwise).
- At the start of the relationship, the bank must gather information about the client's financial situation, knowledge and experience with transactions, investment objectives and risk appetite in relation to transactions.
- The client is categorised on the basis of this information.
- The client must provide the bank with the requested information as fully and in as much detail as possible. The client is deemed to be aware that incorrect and/or incomplete information can lead to the bank advising transactions that are not appropriate or even, potentially, harmful to the client.
- The bank is not required to check the correctness of the supplied information.
- The advice to the client must be based on the supplied information.
- The decision whether to enter into a transaction is made under the client's own responsibility and authority. The client is deemed to have a full understanding of the potential consequences of its decisions and accept the associated risks.
- The advice is not a guarantee of success. In addition, the advice is determined by the situation prevailing at that time and the client must bear in mind that it is valid for a limited period only.
- The bank is not liable for any loss that might arise from any advice given by the bank, unless this advice should not, within reason, have been given at the time. The bank

does not guarantee the correctness and completeness of information insofar as this is based on external sources and accepts no liability for this.

Many master agreements usually also contain the following three specific provisions:

1. Silent consent
   This entails the client agreeing to a confirmation if it does not respond to this confirmation within a set time limit.

2. Portfolio compression (netting)
   This provision entails multiple transactions being contractually seen as a single transaction. In the case of multiple contracts, some contracts may have a positive market value while others simultaneously have a negative market value. With contractual netting, the bank has the right to set off all positive and negative balances against each other if the client defaults on its obligations. The negative market values act more or less as collateral for the positive market values.

3. Margins
   Banks force their clients to deposit a certain amount of cash or securities to serve as collateral for the fulfilment of their obligations. This is generally referred to as the margin. In addition, the client is also often required to issue a 'negative pledge', an undertaking not to provide security to third parties without prior consent from the bank.

**Information about order handling**

Formerly, when the bank processed orders in financial instruments on behalf of the client, it was not always clear to clients whether they had paid a fair price for the financial instruments. Today, under MiFID II, banks have a best execution obligation to take all sufficient steps to achieve the best possible result for their clients. The

procedure for the proper execution of orders must be set out in an order handling policy that banks must communicate to their clients. Banks usually do this by posting the document on their website.

This order handling policy contains their rules for processing orders, including:

- Description of the possible trading venues for client orders
  With treasury instruments, the bank usually acts as the counterparty, but Rabobank, for instance, also accepts FX transaction orders from professional clients, which it forwards to trading platforms such as Currenex, FX All, 360T, Bloomberg FXGO and FX Connect.
- The selection of precisely this trading venue must be justified on the basis of the following factors:
    - price for handling the order;
    - costs of order execution;
    - speed of execution;
    - likelihood of execution and settlement;
    - size of the order;
    - order type (e.g. a limit order).

Where retail clients are concerned, only the price and costs play a role in determining whether best execution has taken place.

### *3.4 Record-keeping*

Banks are only allowed to enter into derivatives transactions with a client if they have set up a client record. MiFID II does not provide any rules regarding the format of such a record, but does stipulate that it must be readily available to the client. In the past, the records that banks kept of clients were not always complete, nor were they always shared with all relevant employees. As a result, employees often lacked the information they required to fulfil their duty of care.

Figure 6 Banks must keep an extensive record on each client

In the AFM's opinion[13], proper records must:

- specify the category in which the client has been ranked.
- give a clear description of the type of service being provided.
- confirm that the client was warned in cases where execution-only was considered inappropriate and document the client's reaction.
- provide insight into the client categorisation and, if applicable, the arguments for departing from the standard categorisation.
- provide insight into the client's knowledge and experience (for execution-only clients).
- provide insight into the client's financial situation, objectives and risk appetite, the advice given and the client's reaction to the advice (for clients receiving advice).
- give insight into the reasons of both the bank and the client for the transaction.
- list the written information that has been provided to the client.
- provide insight into movements in the value of derivatives during the term and any relevant information exchanged about this between the bank and client.

[13] Recommendations of Interest Rate Derivatives Services, February 2014

In addition, the inclusion of various documents in the client record is obligatory, including the signed master agreement. The investment firm must also have the client's Legal Entity Identifier (LEI) code. The LEI code enables the investment firm to meet its obligation to report all conducted transactions to the AFM and the trade repository.

Under EMIR, all derivatives transactions must be reported to a trade repository. Banks usually take care of the reporting obligations for their clients. Clients do have to give their consent for this by signing a form. This form must be added to the client record. The client must also fill in forms so that the bank can prove whether the client is a US person pursuant to the Dodd Frank Act and FATCA. These forms must also be added to the client record.

The bank is expected to continuously update the records. Every communication between a bank employee and the client about derivatives must be documented in the record, even if that communication takes place in an informal setting such as a round of golf, a business lunch or a tennis tournament.

### *4 Obligations during the client relationship*

The bank's duty of care to the client lasts throughout the entire period of the relationship. As well as detailed record-keeping, this obligation includes:

- providing information on changes in information given;
- monitoring suitability and appropriateness;
- providing information about order handling;
- providing information about costs and charges;
- providing information about a substantial fall in value;
- reporting transactions to the AFM;
- retaining transaction data.

All communications about these matters between the bank and the client must be documented in the client record.

## Providing information on changes in information given

The AFM states furthermore that, throughout the term of a contract, the bank must inform both execution-only clients and clients receiving advice of any essential changes in the information provided at the start of the relationship so that the client can make an adequate assessment of the financial instrument or service at all times.

## Monitoring suitability and appropriateness

A client who decides to enter into derivatives transactions with the bank on an execution-only basis takes on a great responsibility – not just at the start of the relationship but throughout the term of the transactions. The bank does not have a continuous duty of care to execution-only clients in respect of ongoing transactions.

The situation is different with clients receiving advice. When it comes to advice on interest rate derivatives, the AFM[14] states that it would be expedient for the bank to perform a regular review to ensure that current derivatives are still consistent with the client's financing situation and to check whether an over-hedge has arisen, for instance due to extra repayments. The AFM also states that a proper follow-up by the investment firm includes a periodic review to check whether the instrument still meets the company's needs.

According to MiFIDII, with elected professional clients (opt-in clients), it is sometimes necessary to perform a new appropriateness screening, for instance if the client appoints a new contact person. This person must then prove that they have sufficient knowledge and experience.

[14] Recommendations of Interest Rate Derivatives Services, February 2014

## Duty to provide information about order handling

Banks are required to process client orders on a best execution basis. Banks must report annually on their best execution performance via a publicly accessible information source, such as their website. This report must provide information on the quality of order handling and list five trading venues where the largest trading volumes were executed, broken down by type of financial instrument and client category. The best execution obligation only applies to retail and professional clients. The best execution criteria are price and costs for retail clients, and price, cost, speed and likelihood of execution for professional clients.

With OTC instruments, the bank must explain the price-setting process and best execution compliance is determined on the basis of 'overall counterparty performance', i.e. the sum of the price and costs (including costs of credit risk and costs of the obligation to maintain capital). These costs are agreed in advance with the client. To determine the correct 'bare' price, a bank must gather market data and, if possible, compare its price with prices of similar or comparable OTC instruments.

## Duty to provide information about costs and charges

Banks must provide clients with insight into the overall costs of their services and the costs of the recommended or sold financial instrument (e.g. transaction costs). In this context, before providing its services, the bank must give their clients information on all expected costs of the service and the financial instruments, both as an amount and as a percentage. This information is usually available on the bank's website.

To ensure the client has insight into the expected costs, the bank must provide an ex ante statement of costs that is specific to the client or potential client and in line with the client's characteristics. The client or potential client must receive this statement well before the commencement of the services[15]. Information is provided before each

[15] Source: AFM 13 February 2018, FAQs on cost transparency.

transaction for execution-only services, and before each advice for advisory services. The transaction costs can consist of explicit transaction costs, such as broker's commissions, and implicit transaction costs. Implicit transaction costs represent the difference between the price offered to the client and the fair value of an instrument, such as the mid-price in the interbank market.

In case of an ongoing relationship, the investment firm must send the client a statement at least once a year, listing the overall costs and charges incurred in the preceding reporting period, based on the client's personal situation and the actual costs incurred. These costs and charges are aggregated and expressed in an amount and a percentage. At the client's request, a breakdown by category can also be provided.

**Duty to provide information about a substantial fall in value**

The bank has a duty to inform retail clients as soon as the value of a financial instrument falls by 10%. With some financial instruments, this can be a problem as the value of the instrument at the start of the transaction is zero. The bank must then indicate how the 10% loss in value was measured.

**Requirement to report transactions to the AFM**

Under MiFIR, banks must report the data of all executed transactions irrespective of the trading venue. In other words, OTC transactions that banks enter into with their clients also fall under this reporting requirement.

The purpose of this reporting requirement is to make the pricing mechanism more transparent. The most important data to be reported are the price of the transaction and the exact time of execution (up to the millisecond). To put the price into perspective, banks.

## Obligation to retain transaction data

Banks must retain data on all their services and investment activities in order to allow supervision of compliance with the MiFID requirements. The required retention period is five years, meaning that every recorded communication relating to a specific transaction, such as a three-month FX forward, must be retained for five years after the expiration date of the transaction.

## *5 Product governance*

Banks have a duty of care during the onboarding process and for as long as the relationship with the client lasts. But the bank's duty of care starts even before the onboarding process as MiFID II sets out product governance requirements for instruments that banks manufacture and decide to include in their product range.

These requirements differentiate between companies that act as manufacturers or as distributors. Both manufacturers and distributors must ensure that they only offer and/or recommend instruments that are in the client's best interest. When it comes to treasury instruments, banks act both as manufacturers and as distributors.

## Product manufacturer

An bank is regarded to be a product manufacturer if it is involved in the creation, development, issuance and/or design of financial instruments, which also includes the provision of advice on the issuance of financial instruments. A manufacturer must implement a product approval process for each new instrument (or significant modification of an existing instrument), in which process the instrument must be assessed in relation to the envisioned target market. During this product approval process, the manufacturer is expected to:

- evaluate all risks that the instrument may pose for the target group;
- tailor the distribution strategy to the identified target markets;

- determine a negative target market, i.e. the client group with which the instrument is not compatible in terms of requirements, characteristics and objectives.

Figure 7 Determining a target market for each instrument


**The company announced plans to expand its target market.**

From a client protection perspective, manufacturers are expected to:

- create instruments that are suitable for an identified target group within the relevant client category;
- tailor the distribution strategy to the identified target market;
- take all reasonable steps to ensure distribution to the identified target market.

## Product distributor

Products are distributed when a bank sells financial instruments to the client. From a client protection perspective, distributors must understand the instruments they offer and/or recommend and assess whether the instruments meet the client's requirements, taking account of the identified target market. Before adding an instrument to its

offering, the distributor must describe the target market and distribution strategy for each instrument. This description must include at least six aspects: client category, knowledge and experience, financial situation, risk tolerance, client objectives and client requirements.

The determination of target markets and negative target markets is also designed to prevent the client's interests from being jeopardised by commercial pressure or funding requirements. Distributors must determine the target markets and negative target markets, making allowance for several factors that apply proportionately. This means that with less professional clients and/or more complex instruments, the target market must be determined in greater detail. To illustrate: with eligible counterparties (ECPs), there is no need to ascertain the client's objectives in detail.

The following factors play a role in determining the target market

- Client categorisation: retail, professional, eligible counterparties.
- Knowledge of the client group. The following questions might be asked:
    - What are the client's needs in this target market?
    - Is the target market capable of understanding the basic risks, i.e. FX, interest rate, liquidity, counterparty and country risk?
    - Does the target market understand which factors determine the price of a contract (FX rate or interest rate)?
    - Does the target market understand the risk profile of the instrument?
    - Does the target market understand the concept of hedging and how the instrument can be used for hedging?
- The level of experience with the instrument

A negative target market is, for instance, a group of clients:

- that lacks the required knowledge and experience; or
- that in general: has been categorised as retail investors
- for which one or more of the following operational causes apply:
  - no LEI number; or
  - no account with the bank; or
  - not a legal person.

**Monitoring obligation**

As circumstances can change, manufacturers and distributors have a monitoring obligation: they are expected to perform regular reviews to check whether the presented instruments are still compatible with the target market. Examples of changes in circumstances are huge price swings or a sharp fall-off in trade. Manufacturers and/or distributors must take action if the monitoring process reveals that changes in circumstances may have a material impact on the potential risks for the identified target market. Manufacturers, for instance, must inform the supervisory authorities and the distributors or their clients. Distributors may have to adjust their target market.

Financial Markets Books

# Treasury Services

IN COMPLIANCE WITH THE ESMA GUIDELINES

## *Other Regulations*

*Lex van der Wielen*

IN CO-OPERATION WITH MICHIEL VAN DEN BROEK

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# *Introduction*

In addition to the MiFID conduct of business rules, banks are confronted with an large number of other regulations relating to their client contacts and activities in the financial markets. The most important are:

- EMIR – EU legislation to reduce counterparty risk associated with derivatives
- Dodd-Frank Act – US legislation to improve client protection and reduce counterparty risk associated with derivatives
- FATCA – US regulations to prevent tax evasion
- AMLD – EU regulations to prevent money laundering
- Dutch Sanctions Act – Dutch legislation for the enforcement of sanctions
- MAR – EU legislation to prevent market abuse
- Dutch Banking Code – Dutch guidelines to assure the professionalism, stability and integrity of the banking industry

## *1 EMIR*

After the bankruptcy of Lehman Brothers and the bail-out of AIG, the G20 leaders undertook to make the trade in, and risks of, OTC derivatives more transparent. One measure involved the introduction of mandatory central clearing through central counterparties (CCPs) for certain derivatives contracts. Another was to impose the requirement that all parties to a derivatives contract were to report their transactions to a trade repository. Policy-makers in Europe and elsewhere in the world set to work to implement these G20 requirements. The European Commission, for instance, drew up the European Markets Infrastructure Regulation (EMIR).

EMIR lays down rules requiring OTC derivatives to be settled and cleared through CCPs where possible as this is perceived to be safer than bilateral settlement and clearing. The central clearing obligation currently applies to certain plain vanilla derivatives such as interest rate swaps, FRAs and certain basic FX swaps and is mainly relevant for financial institutions. The European Securities and Markets Authority (ESMA) keeps a public register of the types of derivatives and currencies that are subject to central clearing[16]. Non-financial institutions may also be subject to this obligation, but only if they are very large, the reason being that the mandatory use of a CCP is restricted to parties that exceed a certain threshold. Moreover, only OTC derivatives contracts that were conducted for non-hedging purposes are included in the threshold calculation. The threshold values must be calculated for each category of derivatives. ESMA has set the following threshold values:

- Interest rate derivatives gross notional value of € 3 billion
- FX derivatives gross notional value of € 3 billion
- Commodities derivatives gross notional value of € 3 billion

When one of the threshold values is exceeded, the financial counterparty is regarded as systemically important.

### *1.1 Requirements for bilateral settlement*

CCP clearance is not possible for all OTC derivatives, nor is it required for most client transactions. This means that a vast number of transactions are cleared through bilateral settlement. EMIR does, however, set strict conditions for the latter form of settlement. The three following basic requirements apply to derivative contracts that banks enter into with non-financial institutions below the threshold for instance:

[16] https://www.esma.europa.eu/sites/default/files/library/public_register_for_the_clearing_obligation_under_emir.pdf

- Timely confirmation
- Portfolio reconciliation
- Dispute resolution

**Timely confirmation**

Derivatives transactions that are not centrally cleared must be confirmed by the two parties to the contract as quickly as possible and, where available, by electronic means. Financial institutions must report all OTC derivatives transactions that are not confirmed in a timely manner by their counterparty to their supervisor (in the Netherlands: AFM or DNB) on a monthly basis. This report must list the transactions that have been outstanding for more than five business days after the confirmation deadline.

**Portfolio reconciliation**

Banks must reconcile the key trade terms of their OTC derivatives contracts with their clients from time to time. Key trade terms include: valuation, maturity date, payment date, notional value, currency and underlying value. The prescribed frequency is as follows:

- once every three months, if the counterparties have more than 100 outstanding OTC derivatives contracts with each other at any time during the three-month period;
- once a year, if the counterparties have 100 or fewer outstanding OTC derivatives contracts with each other.

**Dispute resolution**

Banks entering into OTC derivatives contracts with each other are required to have in place detailed dispute resolution procedures and processes. These procedures must

comprise the identification, documentation and monitoring of disputes relating to the recognition or value of the contract and the exchange of collateral between parties.

The duration of the unresolved dispute, the counterparty and the disputed amount must be documented in all cases. In addition, a specific process must be in place for disputes that are not resolved within five business days. Dutch banks are required to report all disputes relating to an OTC derivatives contract, its valuation or the exchange of collateral to the AFM or DNB if the amount or value exceeds € 15 million and the dispute lasts at least 15 business days.

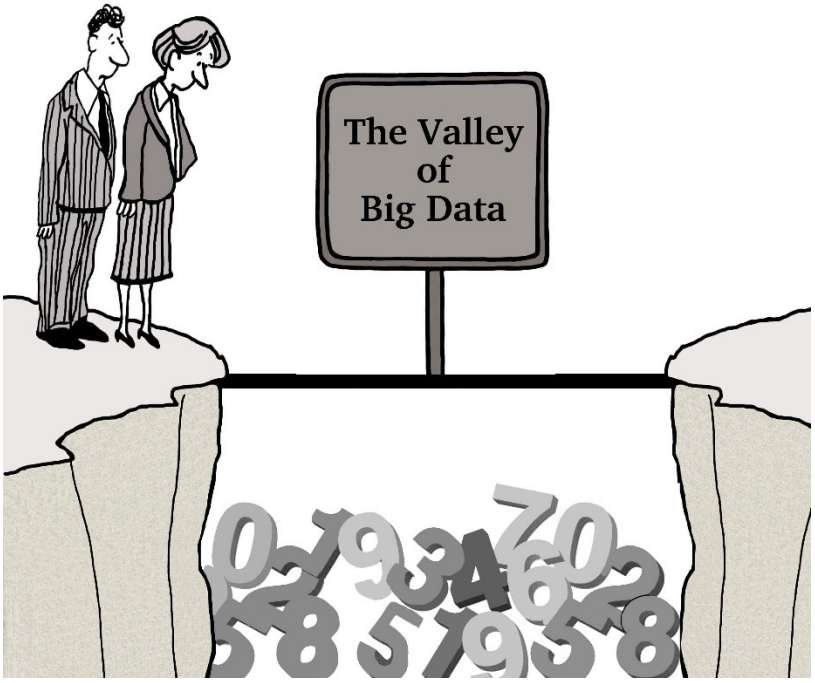
### *1.2 Reporting obligation*

EMIR requires all parties to a derivatives contract to report the details of the transaction to a trade repository. This is an entity that centrally collects and maintains reported derivatives trades in a transaction register. Trade repositories must be accessible for ESMA, national competent authorities and relevant central banks. This allows regulators to strengthen their oversight of counterparty risk and identify potential problems, such as a concentration of risk, at an early stage. The reporting requirement applies to all derivatives and not just to OTC derivatives.

Both banks and their clients are responsible for reporting derivatives transactions to a trade repository, including the details of each contract as well as any changes or termination of the contract. The details must be reported no later than on the day following the business day on which the transaction was executed or cleared, or the contract was amended.

This report must at least identify the parties to the contract (by means of a Legal Entity Identifier) as well as the key characteristics of the contract, including the type, underlying value and notional value as well as a UTI (Unique Trade Identifier).

Figure 1 Trade repositories process vast amounts of transaction information




Clients are permitted to delegate the reporting of the derivatives contract data to a bank. There are roughly five options:

- Each counterparty reports directly to the trade repository.
- The two counterparties agree that one party reports on behalf of both.
- One of the counterparties delegates the reporting requirement to a third party while the other counterparty reports directly.
- Both counterparties delegate their reporting requirement to different third parties.
- Both counterparties delegate their reporting requirement to the same third party, such as the CCP.

Counterparties (and CCPs) must ensure that the details of a derivatives contract are not reported more than once to the trade repository.

There are a number of differences between the reporting requirements under MiFID and EMIR. These differences relate to the reporting purpose, the types of reported instruments, the reporting entity and the recipient of the report. The differences are shown below.

| | EMIR | MiFIR |
|---|---|---|
| Purpose | Insight in positions and monitoring of systemic risk | Monitoring market abuse |
| Type of instrument | Only derivatives, regardless of where they are traded | All instruments that are listed on a regulated market, regardless of where they are traded |
| Reporting entity | Every counterparty / delegation is allowed | Banks |
| Receiver | Trade Repository | EU supervisor in the country where the trade takes place |

## *2 Dodd-Frank Act*

The Dodd-Frank Wall Street Reform and Consumer Protection Act or Dodd-Frank Act regulates a wide range of issues in the United States. The Act consists of 15 parts, of which Titles VII and IX correspond with EMIR and MiFID II:

- Title VII – Swaps and Derivatives Regulation (Wall Street Transparency and Accountability)
- Title IX – Investor Protections and Improvements to the Regulation of Securities

Under Title VII, all derivatives must be cleared centrally where possible and all derivatives must be reported, i.e. to the Commodity Futures Trading Commission (CFTC).

Similar to EMIR, the Dodd-Frank Act differentiates between different parties and sets specific obligations for each category. The categories are:

- Swap Dealers (SDs) – Organisations that trade in derivatives or act as a market maker in derivatives
- Major Swap Participants (MSPs) – Non-SDs holding sufficiently large derivatives positions to pose a systemic risk
- Financial entities – Banks, insurance companies, pension providers and other organisations that primarily engage in financial activities
- Non-financial or commercial end users – Organisations that are not SDs, MSPs or other financial entities, but enter into derivatives for risk hedging purposes

Similar to EMIR, the last category, i.e. that of end users, is exempt from the central clearing obligation. However, these end users are in fact subject to several new obligations. They are required, for instance, to put up collateral, for which they are expected to conclude new master agreements. The provisions of the Dodd-Frank Act are not just applicable to US persons but also to certain non-US persons who have received a guarantee from a US person (guaranteed affiliates). That is why Dutch banks often request their clients to sign a statement confirming that they have no direct or indirect obligations under the Dodd-Frank Act.

### *3FATCA*

FATCA stands for Foreign Account Tax Compliance Act. This US Act is designed to prevent tax evasion by US taxpayers worldwide. The Dutch government has entered into an agreement with the United States to facilitate the implementation of FATCA. Under this agreement, Dutch banks are required to check whether their clients have

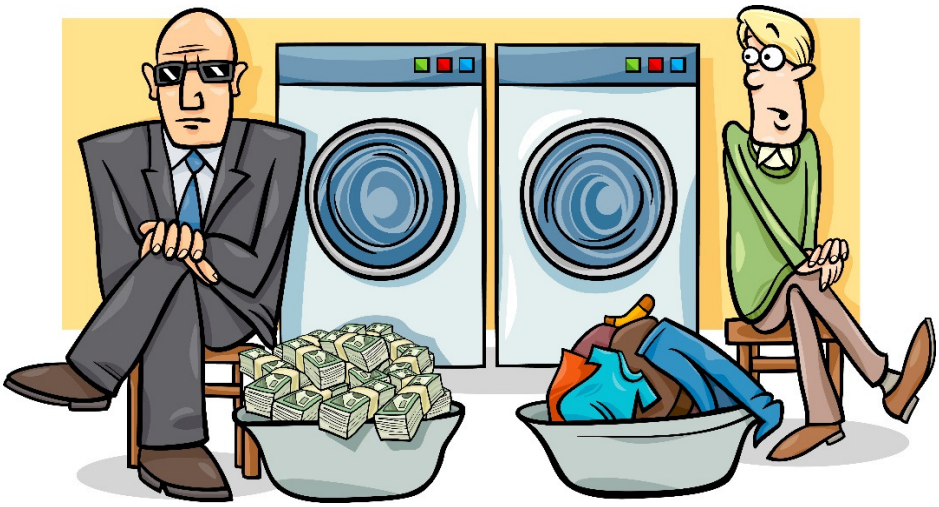
any tax obligations in the United States. The US Internal Revenue Service (IRS) describes a US taxpayer as a US person.

Banks make their clients complete forms indicating whether or not they qualify as a US person. If a client qualifies as a US person, the bank must record their Tax Identification Number (US TIN) or Employer Identification Number (US EIN). The bank must also send the client's account details to the Dutch Tax and Customs Administration, which will then forward the information to the IRS. This concerns information about personal bank accounts, bank accounts a person is authorised to use, investment accounts, pension accounts and other financial accounts. Banks must report using an internationally agreed format: the Common Reporting Standard.

### *4Anti-Money Laundering Directive (AMLD)*

Money laundering is the process of making money generated from illegal activities appear to have come from legal activities. Criminal money is usually cash. To launder this money, it must be paid into a bank account in some way or other while concealing its origin.

Figure 2 Money laundering …



The term money laundering goes back to Al Capone who, in addition to his empire of illegal distilleries, also ran a chain of laundromats. He artificially inflated the income from these laundromats in his accounts and, just like any law-abiding citizen, paid tax on this extra fictitious revenue so that the money appeared to have been earned legitimately with laundry services rather than partly through the sale of bootleg whisky. As a result, he was able to pay his criminal cash together with his legitimate laundry takings into his bank account, after which it could be freely used for above-board activities.

Banks are required by law to establish the origin of their clients' assets. The depth of this investigation depends on the risk of money laundering arising from the type of client, business relationship, manufacturing activity or transaction.

Some countries make insufficient efforts to prevent money laundering and terrorist financing. This poses a country risk. Banks must be extra vigilant when they receive money from one of these countries. To determine the country risk of a client, the bank must use the publications of the Financial Action Task Force (FATF) in which high-risk countries are identified.

Banks have an obligation to disclose unusual transactions. In the Netherlands, every cash deposit above € 15,000 must, for instance, be reported to the Financial Information Unit (FIU-Netherlands). Abnormal transaction patterns must also be flagged up. Even the slightest suspicion of money laundering or terrorist financing is sufficient to trigger the reporting requirement.

### *5Dutch Sanctions Act*

Sanctions are commonly used as a policy enforcement tool in the international political arena. The United Nations (UN) Security Council has the highest authority to impose sanctions. These are set out in UN Resolutions. The European Union (EU) always adopts the UN Resolutions in EU Regulations, but can also impose sanctions independently. Individual countries, too, can impose sanctions. In the Netherlands, for instance, countries can be put on the National Terrorism List.

Sanction regulations set out the nature of the sanction, the countries, regions, individuals or entities being sanctioned, and the financial sanctions imposed, such as:

- an order to freeze the assets of designated individuals or organisations;
- a ban on making funds available, whether directly or indirectly, to these individuals or organisations;
- a ban or restriction on the provision of financial services.

The countries, regions, individuals or entities being sanctioned are usually mentioned in a sanctions list. The Electronic Combined Targeted Financial Sanctions List (or EU freeze list), for instance, contains the names of individuals and entities whose assets must be frozen pursuant to EU financial sanction regulations.

To avoid acting in contravention of sanction regulations, banks are expected to screen new clients and periodically check existing clients against the sanctions lists. If the check produces a hit, the applicable order or ban must be determined. In some cases, assets must be frozen; in others, the bank must refrain from providing specific financial services, such as insurance.

If a Dutch bank check matches a client with a natural person or legal entity on a sanctions list, it must report this to the AFM without delay and immediately freeze the assets of this client until the relevant sanction regulation is lifted and the obligation to freeze the assets ceases to exist or until the AFM sends notification that the sanction is not effective. This also applies to other sanctions, such as a ban on the provision of a financial service. If the AFM does not send any notification, the bank must assume that the hit is valid and that sanctions are in force.

## *6 Market abuse*[17]

The European Market Abuse Regulation (MAR) was created to improve the integrity of the financial markets and protect investors. The term 'market abuse' is taken to include market manipulation and insider dealing.

### *6.1 Market manipulation*

Pursuant to Article 15 MAR, a person is not to engage in or attempt to engage in market manipulation. The MAR provides for four prohibitions in respect of market manipulation:

1. *Market parties are forbidden to enter into a transaction or place an order that gives false or misleading signals as to the supply of, demand for, or price of a financial instrument or is likely to secure the price of a financial instrument at an abnormal level.*

Examples:

- The purchase or sale of financial instruments, at the closing of the market, in order to influence the closing price of the financial instrument.
- The placing of an order or orders with a higher or lower price than the preceding order without any intention to trade. The purpose of the orders is to give a misleading signal as to the supply of or demand for the specific financial instrument. The orders are subsequently cancelled before they can be executed.
- Pretending to engage in market activity by performing transactions on a public trading facility and thereby giving a false impression of active trading in or a price movement of a financial instrument.

[17] The examples in this section were taken from the public AFM brochure on market manipulation.

2. *Market parties are forbidden to enter into a transaction or place an order that affects the price of a financial instrument by employing or any form of deception.*

Examples:

- The large-scale purchase or sale of a financial instrument at the expiration time of a related derivative or vice versa.
- The large-scale purchase or sale of a financial instrument at the time at which an index is being reweighted while simultaneously holding a short or long position to benefit from the reweighting of or change to the composition of the index.
- The simultaneous purchase and sale of financial instruments by the same person (that is, trading with yourself) at a price that deviates from the normal trading bandwidth, particularly if that person simultaneously holds a position in a related financial instrument (e.g. derivatives).

3. *Market parties are forbidden to disseminate information that gives false or misleading signals as to the supply of, demand for or price of a financial instrument that secures the price at an abnormal level. Market parties are forbidden to disseminate rumours which they knew, or ought to have known, to be false or misleading either.*

Examples:

- Taking a long or short position that leads to the dissemination of a false or misleading positive or negative report and subsequently closing the position.
- Entering into a position, and thereby incurring an obligation to notify, only to close the position immediately after the notification is made.
- Benefiting from access to the media to disseminate an opinion on a financial instrument or institution, after having taken positions in this financial instrument, and deriving a gain from the effect of this opinion on the price of the financial instrument, without disclosing this conflict of interests.

4. *Market parties are forbidden to transmit false or misleading information or provide false or misleading inputs in relation to a benchmark if they knew, or ought to have known, that this information or input was false or misleading. They are forbidden to manipulate the calculation of a benchmark in any way either.*

Examples:

- The transmission of false or misleading information on a financial instrument or a company via a press release or website posting.
- Giving misleading signals in a manner other than via means of communication/media, for instance by moving or storing commodities in order to misrepresent the actual supply of or demand for the commodity.

### *6.2 Insider dealing*

Pursuant to Article 14 MAR, a person forbidden to engage or attempt to engage in insider dealing. Moreover, it is prohibited to recommend that another person engages in insider dealing or to induce another person to engage in insider dealing. Finally, it is prohibited to unlawfully disclose inside information.

Inside information is information of a precise nature, which has not been made public, relating, directly or indirectly, to an issuer of the financial instruments or to information, which has not been made public, about the trade in these financial instruments. In addition, if it were made public, this information would be likely to have a significant effect on the prices of such instruments. Significant, according to MAR, means that a reasonable investor would be likely to make their investment decisions partly on the basis of this information.

For persons charged with the execution of orders, inside information also consists of information of a precise nature about pending orders from a client, relating, directly or indirectly, to one or more issuers or to one or more financial instruments. As before, the public disclosure of this information might have a significant effect on the prices of these instruments.

The above description of inside information makes reference to information of a precise nature. Information of a precise nature means information about:

- a set of circumstances which exists or which reasonably may be expected to come into existence or an event which has occurred or may reasonably be expected to occur; and
- that is specific enough to enable a conclusion to be drawn as to the possible effect of that set of circumstances or event on the prices of financial instruments.

### *7 Dutch Banking Code*[18]

The Dutch Banking Code as issued by the Dutch Banking Association (NVB) was introduced on 1 January 2010. This code of conduct contains a set of basic principles for achieving, amongst others, better risk management and a responsible remuneration policy at banks. The Dutch Banking Code aims to promote client centricity and the stability of the Dutch economy.

## Expertise

The members of a bank's Executive Board and the Supervisory Board have sufficient knowledge to fulfil their role. They engage in lifelong learning to ensure their expertise remains at the required level. Lifelong learning is the responsibility of the chairmen of both Boards. The members of the Executive Board and the Supervisory Board complement each other and act collectively. The composition of both Boards is diverse.

[18] Copied from the Dutch Banking Association.

## Customer focus

Customer focus is necessary to safeguard the bank's continuity. The management of the bank makes allowance for the interests of all of the bank's stakeholders, including its clients, shareholders and employees. The client is treated with due care at all times. The Executive Board embeds the statutory duty of care for the client in the bank's procedures. Every bank has in place a product approval process, which ensures that its products are marketed only after a careful assessment of the associated risks and duty-of-care obligations towards the client.

## Risk management

The Supervisory Board appoints from among its members a special committee that prepares every discussion about risk management. The Executive Board ensures that a balanced assessment is made of the bank's commercial interests and the risks of proposed actions. One of the members of the Executive Board is charged with the special task of preparing the Board's decision-making on risk management issues. Following a proposal of the Executive Board, the bank's risk appetite is put to the Supervisory Board for approval at least once a year. Any changes to the bank's risk appetite in the intervening period are put separately to the Supervisory Board for approval.

## Remuneration

The bank exercises due care in pursuing a sound and sustainable remuneration policy. This policy is in line with its strategy, risk appetite, objectives and values, and makes allowance for the bank's long-term interests, international standards and social acceptability. The remuneration policy also provides for the award of remuneration packages for the appointment, retention and exit of employees.

The total income of a member of the Executive Board is commensurate with the bank's adopted remuneration policy. This total income is set just below the median of the

remuneration for comparable positions in and outside the financial sector, including in other countries. The award of the variable remuneration (also known as 'bonus') to a member of the Executive Board depends in part on the bank's profitability and continuity. The variable remuneration is partly conditional and will be paid out after three years at the earliest. The variable remuneration for a member of the Executive Board does not exceed 100% of their fixed remuneration. The Supervisory Board has the right to claw back any variable remuneration that is awarded to a member of the Executive Board on the basis of incorrect financial information.

**Banker's oath**

Every member of the Executive Board is required to pledge a banker's oath. The management of the bank ensures that this oath is transposed into principles for the actions of all employees. The employment contract draws explicit attention to these principles so that every newly hired employee knows what they are and that they are required to comply with them.

The Maas Committee recommends the following wording for the banker's oath:

Figure 3 *I declare…*

"*…. that I will perform my duties as a banker with integrity and care. I will carefully consider all the interests involved in the bank, i.e. those of the clients, the shareholders, the employees and the society in which the bank operates. I will give paramount importance to the client's interests and inform the client to the best of my ability. I will comply with the laws, regulations and codes of conduct applicable to me as a banker. I will observe secrecy in respect of matters entrusted to me.*

*I will not abuse my banking knowledge. I will act in an open and assessable manner and I know my responsibility towards society. I will endeavour to maintain and promote confidence in the banking industry. In this way, I will uphold the reputation of the banking profession.*"

## Compliance

The Dutch Banking Code is applicable to all banks with a Dutch banking licence. Every bank must report each year in its annual report how it complied with the principles of the Dutch Banking Code in the preceding year. Every bank posts this report on its website. Compliance with the Dutch Banking Code is assessed annually by an independent monitoring committee set up by the Dutch Banking Association in consultation with the Dutch Ministry of Finance.

In principle, banks must ‘comply or explain’. The banks in scope of the Dutch Banking Code differ in many aspects. They operate in different markets and may have a national or international focus. As a result, departures from the Code can be justified but must be explained stating reasons.