

WORLD 2 / CHAPTER 2**CASH INSTRUMENTS IN THE MONEY MARKET**

	Page
1. Interbank deposits	5
1.1. Quotation	5
1.2. Start date	7
2. Certificates of deposit	10
2.1. Primary issue	12
3. Eligible bills	14
4. Commercial papers (CPs)	16
5. Treasury Bills	19



CASH INSTRUMENTS IN THE MONEY MARKET

The money market is the interbank market for trading short-term financial instruments. Most of the transactions in the money market have terms up to 3 months, some up to 1 year or more.

The most important money market products are:

- interbank loans / deposits
- certificates of deposit (CDs)
- bills of exchange
- commercial papers (CPs)
- repurchase-agreements (Repos)

In contrast to interbank deposits, certificates of deposits, federal savings bonds (T bills), and commercial papers are negotiable instruments. A negotiable instrument can be sold in the secondary market before maturity (end of the term).

The main goal of banks and other money market participants is to maintain their liquidity. They must, at all times, be able to pay off borrowed money at once, if the need may arise. The existence of a money market for cash products enables banks and other competitors who have a surplus of short-term deposits to earn interest by investing this surplus. On the other hand, those market competitors who demand short-term money can borrow them from a liquid market.

If the money market is very liquid, banks assume that their demand of money can be satisfied easily and immediately. This means that they can work with a smaller amount of capital in order to increase their aggregate earnings.

Banks need liquidity to satisfy statutory regulations as well as to meet the requirement of fully covering their obligations at any time.

The national banks, too, need the money market to fulfill a number of tasks:

- controlling inflation through active policies in the money market
- managing the exchange rate
- controlling the lending operations of the state

Through these actions of the national banks in the money market they can send signals about the future development of interest rates in the money market.

Table: cash instruments in the interest market

	<i>Interbank loans/deposits</i>	<i>CD</i>	<i>Bills of exchange</i>	<i>CP</i>	<i>T - bill</i>	<i>Repo</i>
(main)- issuer	banks	banks	corporates	corporates	government	-
Liability	issuer	issuer	beside the obligation of the issuer: security through goods and an accepting bank	issuer	issuer	A Repo agreement is backed by securities
Interest	interest rate is individually arranged	coupon-instrument	discount-instrument	discount-instrument	discount-instrument	interest rate is individually arranged
Quotation	yield basis	yield basis	yield basis or discount basis (US and GB)	ECP yield basis USCP discount basis	USD, GBP discount basis all others yield basis	yield basis
Secondary market	no	yes	yes	yes	yes	no

1. Interbank deposits

Most banks make deposit deals with each other. The interest rates in the domestic or the euromoney market that are the basis for these operations, depend on the current conditions in the markets and on the volumes that are traded.

1.1 Quotation

The interest rate for all standard terms (from overnight to 12 months) is quoted. The highest volume is achieved in the markets of up-to-3-months.

Banks in the market quote different interest rates, that depend on their current liquidity and their current, open positions. Banks with a surplus of liquidity will quote lower in order to receive fewer deposits and will also be willing to accept a lower lending rate. Moreover, banks with high ratings are able to borrow money from the market on better conditions than banks with lower ratings.

The margin between bid and offer is usually $\frac{1}{8}$ % (12.5 basis points). For the most liquid currencies the margin is often smaller.

For the euromoney market in London, there exists a so-called reference or **benchmark rate**: the **London Interbank Offered Rate** (LIBOR). The LIBOR is an internationally accepted reference rate, that has reached its position due to the importance of the City of London as banking in the money market (eurodollar market).

LIBOR is the most important reference rate, usually used in fixing of certain maturities (FRAs, interest rate swaps, loans, etc.). It embodies the average interest rate of certain reference banks that are chosen for the daily fixing. LIBOR is called the interest rate at which top banks are willing to lend money to one another.

Presently, currencies like USD, GBP, EUR, CHF, JPY, AUD, and CAD are being officially published as LIBOR fixing by the BBA. These rates represent the euromoney market and may differ from the so-called domestic fixing.

LIBOR rates are published daily at 11 o'clock GMT by the British Bankers' Association and exist for terms between 1 and 12 months.



LIBID (London Interbank Bid Rate): In contrast to LIBOR, the LIBID represents the so-called deposit rate. LIBOR minus the usual spread yields the LIBID (e.g. LIBOR USD 3-month = 3.50 %, minus spread of $\frac{1}{8}$ % equals to LIBID of 3.375 %). LIBID is the rate banks are willing to borrow money.

Interbank rates are quoted in all major financial centers of the world, too. Furthermore, there is a TIBOR (Tokyo Interbank Offered Rate), PRIBOR (Prague Interbank Offered Rate) and **EURIBOR** (Euro Interbank Offered Rate) that replaces the interbank rates of the 11 Euro-in countries. EURIBOR is derived from the offered rate quotes of 57 panel banks. The highest and lowest 15 quotes are eliminated and the average over the remaining quotes calculated. Currently 47 banks from “Euroland” take part in the panel that will be extended to 64 banks in the future

EURIBOR established a dominant position as reference rate for Euro money market transactions. Euro-LIBOR plays a rather negligible role.

Conventions

1.2 Start date

Usually, the term of a deposit starts two working days after the deal has been concluded.

This does not apply for the following transactions:

Overnight (O/N) – the loan / deposit starts on the same working day on which the deal has been agreed on.

Tom/Next (T/N) – the loan / deposit starts one day after the deal was agreed on.

End date (maturity)

Usually, the term of a loan / deposit of x months ends x calendar months after the start date.

The term of a 3-month loan/deposit with start date on January 3 ends on April 3.

If the end date falls on a weekend or a bank holiday, the end date is the following working day.

If the start date is the last working day of the month, the end date will also be the last working day of the respective month.

Interest period

The time between start date and end date is called interest period.

Interest payments

A per annum, "p.a.", quote has become the standard for calculating the interest on deposits.

For deposits with terms shorter than 1 year, the interest is paid at the end of the term.

Therefore, the repayment includes both principal and accrued interest.

For loans / deposits with terms of more than 12 months, interest is usually paid every 12 months and then at the end date of the deal.



For example, if a bank lends money for 18 months, the first interest payment occurs after 12 months and the second one at the end date.

To compare non-annual interest rates with p.a. interest rates, the different dates for interest payments must be considered. To compare a 3-month interest rate with a 12-month interest rate, one usually employs the concept of effective (real) interest. Thereby, compounding effects are taken into account.



A 1-month deposit at 6 % p.a. (= 0.5 % per month) earns more interest than a 12-month deposit at 6 % p.a.

1-month deposit at 6.00 % p.a. (0.5 % per month)
 comparable annual yield = $(1,005)^{12} - 1$
 = 0.0616778 or 6.16778 %

12-month deposit at 6 % p.a.
 comparable annual yield = 6.00 %

To compare the quoted p.a. interest rates with the respective compound interest rates, consider the following rates for different terms:

<i>Interest period</i>	<i>Interest rate, p.a.</i>	<i>Effective interest rate in %</i>
1 month (31 days)	5 %	5.12 %
2 months (61 days)	5 %	5.11 %
3 months (92 days)	5 %	5.09 %
6 months (183 days)	5 %	5.06 %
1 year (365 days)	5 %	5.00 %

Example

The effective interest rate of the comparable 3-month deposit at 5 % (= 1.25 % quarterly) is:

$$(1.0125)^4 - 1 = 0.0509453 = 5.09453\%$$

The effective interest rate is the same as that in the table above.

Note: The formula to calculate the compound interest assumes a steady rate of interest for the respective term. Since most commercial banks pay their interest on a quarterly basis, the fixed interest rate of 5.00 % for a 3-month deposit equals an effective compound interest rate of approx. 5.09 % p.a. In practice, it is not certain whether one can re-invest at a rate of 5.00 % for the whole term of the deposit. Therefore, the gains realized from interest payments can eventually be higher or lower.

The eurocurrency market

Apart from the interbank market for loans/deposits in the domestic currency, there exists also the eurocurrency market. A eurocurrencies are a foreign currencies that are traded outside the borders of those countries where the foreign currencies serve as domestic currencies. On the eurocurrency market, eurocurrencies are lent and borrowed.

The major foreign currency is the US Dollar. Apart from the Dollar, there are also liquid markets for other euro-currencies, e.g. Eurodeutschmarks, Euroyen, Euroswiss, and Eurosterling. Main centers of eurocurrency trade are in London, New York, Luxembourg, Singapore, and Hong Kong.

Previously, the spread between bid and offer rates in the eurocurrency market was narrower than in the domestic market. Today, this is no longer true, because the differences between domestic currency market and eurocurrency market have grown smaller.

Transactions in the eurocurrency market include foreign currencies, and therefore the supply of those loans is a little delayed. In the eurocurrency market, loans are paid to the borrower usually two days after the deal has been agreed on.



2. Certificates of deposit (CDs)

A certificate of deposit is a bearer instrument documenting the placing of a deposit for an agreed term at a given interest rate. Therefore, it serves as an obligation of the borrower to pay an agreed amount of capital -including interest- to the owner at the maturity date.

Certificates of deposit originally come from the domestic US Dollar market. In the euromarket, CDs are very closely related to common interbank loans/deposits.

Originally, CD issues were on paper. Nowadays, there are data processing systems (e.g. Euroclear) in the market that guarantee the clearing of CDs as well as electronic bookings with the borrowers and creditors.

In London, this has led to the founding of the Central Money Markets Office (CMO), an institution of the Bank of England that serves as an international clearing unit for CDs. This in turn, has led to the almost complete elimination of CDs on paper.

Comparison of certificate of deposit vs. deposits

With a clean deposit, the depositor places an agreed amount of capital at a bank for an agreed period. At the end of the term (maturity date), the debtor gets back both the initial amount and the interest payment.

A CD is a certificate that entitles the holder to enter a deposit deal: It is a bearer security (this includes electronic data carriers, too). The underlying amount of capital may be traded by the bearer before maturity.

The main advantage of CDs compared to clean deposits is that the bearer of a CD possesses a negotiable liquid instrument in the secondary market. Therefore, the bearer of a CD has the possibility to invest a deposit if there is sufficient demand. At the same time he remains a flexible liquidity position during the whole term of the CD.

For this flexibility, the borrower usually has to accept lower interest rates than the market interest rates. Usually, the difference between these rates is $\frac{1}{16}\%$ (6.25 basis points) or $\frac{1}{8}\%$ (12.5 basis points).



The nominal amount of capital can vary between a minimum of USD 25,000 and several millions of USD.

Markets and Conventions

CDs are issued and traded in all major financial centers of the world. The main center is London. The Bank of England authorizes top banks in London to issue CDs in a number of currencies: GBP, USD, JPY, AUD, CAD, and EUR. Provided that the domestic national bank raises no objections, it is also possible to issue CDs in other currencies.

Terms of CDs

While most CDs are issued with terms of 1, 3, or 6 months, "broken-date" are also possible. Often, CDs are part of an issuing program of a bank-consortium, where terms of 1 year or between 3 and 5 years are also possible.

CDs are quoted on an interest rate basis upon their issue. Usually, interest payments are due at the end of the term. CDs, running longer than 1 year, have the interest paid annually.

1.2 Primary issue

CDs are issued as interest instruments. For example, bank A demands refinancing of 20 Mio EUR for a period of 6 months. Through a broker, they find a lender at 6 %.



Example

Bank A agrees to issue a CD and the deal is agreed for EUR 20 Mio (4 x EUR 5 Mio). In other words, four CDs are issued, each for an underlying amount of EUR 5 Mio. The investor pays the bank EUR 20 Mio (EUR 5 Mio per CD).

We assume that the interest period is 183 days. Each CD guarantees the bearer the original amount of capital of EUR 5 Mio plus interest of EUR 152,500.

Calculation of interest:

$$5.000.000 \cdot 0,06 \cdot \frac{183}{360} = 152.500$$

Secondary market



Example

Assume, that the buyer of the CDs (bank B), is willing to sell two of the CDs 3 months after the purchase. Bank B finds a buyer who is willing to buy the CDs at a yield of 5% for the rest of the term (91 days).

Each CD has a value of EUR 5,152,500 at maturity. There are several ways to calculate prices in the secondary market for these instruments.

$$PV = \frac{FV}{1 + \left(r \cdot \frac{D}{B} \right)}$$

- PV = present value (capital)
FV = future value
r = interest rate, in decimals
D = number of days
B = day basis for calculation

Example

The buyer of the certificate of deposit (CD) demands a yield of 5%. Each CD is therefore sold for a price of

$$\frac{5,152,500}{1 + \left(0.05 \cdot \frac{91}{360} \right)} = 5,088,191$$

The CD's selling price in the secondary market may be higher or lower than the original buying price, depending on the current yield curve.

As a rule, the re-selling price of a CD should be higher than the original purchase price. With a stable yield curve, the price of a CD should rise steadily. Though, if the rates of interest rise, the value of the CD will fall.

3. Eligible bills

An eligible bill is a certificate (several formal regulations have to be adhered to) by which the issuer obliges himself to pay a specific amount of money at a given place and time to the bearer. He has to fulfill this obligation either himself or through someone else.

Convention

Originally, eligible bills were specified by the underlying deal. This means, that an exporter drew a bill on the importer to finance a specific shipment, and then presented it to his bank for acceptance. As soon as the bank signed and therefore accepted the bill, the bill carried both the risk and the quality of the accepting bank. The accepting bank obliged itself to pay at maturity.

Now, the accepting bank was able to give the bill for acceptance to another bank, that - provided it had better ratings than the original bank- could accept the bill and thereby raise the certificate's value.

The quality of the accepting bank is the main determinant for the interest rate at which the bill is signed. The higher the quality of the bank, the lower would be the interest rate.

Eligible bills are discount instruments that are traded on the same basis as T-bills and commercial papers. The main difference risk concerns credit risk. With a commercial paper, only the issuer is liable, but in the case of an eligible bill, the bank assumes responsibility, too.

Quotation

 Example

An eligible bill was drawn for CHF 10 Mio, maturity date is the 30th of September

On the 1st of August (time to maturity: 61 days) the bill is presented to a bank that rediscounts it at 3½ %.

The bank pays on the 1st of August

$$1,000,000 - \left(1,000,000 \cdot 0.035 \cdot \frac{61}{360} \right) = 994,069.44$$

With those two payments (1,000,000 = end value; 994,069.44 = cash value) we can use the following formula to calculate the interest rate:

$$r = \frac{(FV - PV) \cdot B}{PV \cdot D}$$

$$= \frac{(1,000,000 - 994,069.44) \cdot 360}{994,069.44 \cdot 61} = 3.52088 \%$$

Alternatively, one can also calculate the yield on the basis of the discount rate of 3½ %:

$$r = \frac{r_d}{1 - \left(r_d \cdot \frac{D}{B} \right)} = \frac{0.035}{1 - \left(0.035 \cdot \frac{61}{360} \right)} = 3.52088 \%$$

4. Commercial papers (CPs)

Commercial papers are short-term bonds that are negotiable as bearer certificates. At maturity, the issuer of a commercial paper pays the capital plus interest to the bearer. For companies, commercial papers are an example of "securitization", i.e. they can borrow money without drawing on their bank deposits. When issuing, the banks act as a broker by passing on CPs to potential investors without investing on their own. In this way, funds go directly from investor to debtor/creditor without placing a deposit in the bank.

Conventions

Commercial papers are issued as a series of notes, where each note guarantees the bearer a fixed amount of capital at maturity. Each note possesses the following specifications:

- the name of the issuer
- the note's underlying nominal amount of capital
- the issue date
- the maturity date
- the proof of authenticity (evidence of origin by the arranging bank)

Apart from this, each note carries the clause that it is negotiable and that the bearer is entitled by the issuing company to pay or receive payment through the arranging bank.

The issue of commercial papers is made by investment banks; CPs are made negotiable for customers -mostly large companies- and are offered to a great number of potential customers. The margin of a bank's CP dealer is calculated on the basis of the turnover volume. This margin usually is not more than 2 basis points. For EUR 1 Mio, issued for 90 days, the margin would be EUR 50.

The buyer of a commercial paper buys an unsecured debt of a corporate. Since he buys the CP through a bank dealer, he can be sure that if he wants to materialize the CP, the bank accepts the commercial paper at the current market rate. This obligation is not legally binding, though.

Origin of the commercial paper market

Like certificates of deposits, commercial papers were developed in the US capital markets. Due to the situation in the US banking market ten to fifteen years ago, companies usually had better ratings than domestic banks. Among these companies, a market for the supply and demand of money developed which was run by the banks. The role of banks as simple agents had some advantages for investors as well as for creditors:

- Creditors were able to re-finance cheaper in this way than directly from the bank
- Investors received better yields than the potential yields from a bank deposit operation

Terms of commercial papers

Usually, commercial papers have terms between 7 days and 1 year (US commercial papers between 1 and 270 days). The average term in the market is around 60 days.

In the US market, a CP issue is only possible in USD; the benchmark rate is the "Federal Reserve Composite Rate".

In the euromarket, issues are done in different currencies: USD, GBP, EUR, JPY, CHF; approx. 80 % of all issues are, however, done in USD.

Settlement of CPs is on the same day. All issuers must have a credit rating.

Yields of commercial papers

Interest rates for US commercial papers are quoted on a discount basis, just as for T-bills and eligible bills. In all other commercial paper markets, yields are quoted as discounts from the end value of the amount of capital. In the euromarket, commercial papers are issued on yield basis and can be calculated just like a certificate of deposit.

Ratings for commercial papers

Investors have neither the possibility nor the time to collect all information concerning the risks of their investments. Therefore, they must rely on the ratings of international agencies that determine the rating of the issuing corporations. A properly working market for CPs can only exist if there are standard ratings of all issuing corporations. Those ratings are mostly made by the two leading agencies Standard and Poor's and Moody's. To make a commercial paper attractive to investors, it needs a rating of at least A1/P1.

5. Treasury bills

Treasury bills (T-bills) are short-term debts (terms up to 1 year) that are issued within the framework of an auction. Due to their high liquidity, T-bills are the most important money market instruments in the US. T-bills are discount instruments; i.e. they do not have a fixed interest rate. The yield is computed by using the length of the term and the difference between buying price and nominal value.

Quotation in the primary market

T-bills are issued by price tenders. Since they are discount instruments, the prices that are quoted during the auction, are the prices at which banks are willing to accept the T-bills.

Example

At a tender for a 1 Mio, 90 days, US T-bill, a price of 985,350 is quoted. Therefore, the discount is 14,650. With this data, one can easily calculate the discount rate:

$$\frac{14,650}{1,000,000} \cdot \frac{360}{90} = 5.86000\%$$

To compare the yield to a normal interest rate, one has to convert the 5.86 %.

$$r = \frac{r_d}{1 - \left(r_d \cdot \frac{D}{B} \right)} = \frac{0.0586}{1 - \left(0.0586 \cdot \frac{90}{360} \right)} = 5.94713\%$$

Quotation in the secondary market

In the secondary market, T-bills are quoted in terms of discount rates. In this case, one has to convert the discount rates into yield rates in order to compare T-bills with interest rates of time deposits.

**Example**

Assume that the discount rate of a US T-bill, with 61 days to maturity, is 6.0 %, the yield can be calculated in the following way:

$$r = \frac{r_d}{1 - \left(r_d \cdot \frac{D}{B} \right)} = \frac{0.06}{1 - \left(0.06 \cdot \frac{61}{360} \right)} = 6.06163\%$$