

## Money market instruments

### Learning objectives

1. Understand the **characteristics** of money market instruments
2. Understand the principles for calculating **benchmark interest rates**
3. Understand the **remuneration principles** of money market instruments
4. Understand the **main risks** associated with investing in money market instruments

### Characteristics

- The money market can be defined as the market where supply meets demand for short-term financial assets; in other words, assets where the maturity is generally **less than one year**.
- The money market is divided into several segments, characterised by the financial asset traded in that segment:
  - the **deposits** market, where market players lend each other money for a very short period;
  - the market in **debt register claims, treasury bills (T-bills)**, or any other financial instrument issued by a government to finance its short-term activities;
  - the repurchase agreements (**repo**) market, which allows economic agents to obtain liquidity for a given period by selling a financial asset to a counterparty at  $t$  and simultaneously undertaking to buy back that asset at a later date at a price set at  $t$ ;
  - the commercial paper (**CP or asset-backed CP**) market, where commercial entities obtain liquidity by issuing short-term debt (Shorts).

Non-profit entities issue asset-backed commercial paper (ABCP). These issues are intended to finance the purchase of long-term assets through a special investment vehicle (SIV) or conduit. The interest paid on asset-backed commercial paper is therefore higher due to the maturity transformation carried out by the special investment vehicle. Note that the issuance of this type of financial instrument has considerably declined since the 2007 crisis, due to the liquidity problems that this type of structure has faced.
- The secondary market for **bonds** with a residual term to maturity of **less than one year** is also part of the money market, as is the **foreign exchange market**.
- The **escrow** (also referred to as *fiduciary* deposit) is a fixed-term investment in Swiss francs (CHF) or another currency made in the bank's name on the customer's behalf with a bank outside Switzerland. It is essential that the customer signs a written escrow agreement for tax reasons. The tax authorities accept that interest is not paid by the Swiss bank, but directly by the non-Swiss bank. It is the customer who assumes the counterparty default risk and the fund transfer risk, even if the bank selects the borrowing bank. The tax approval does not allow the bank to give guarantees to the customer.
- A **dual currency deposit (DCD)** is a deposit made in a **base currency**, but where the interest and principal may be repaid in an **alternate currency** at an exchange rate determined when entering into the contract.

The repayment currency of the dual currency deposit is chosen by the bank that accepts the deposit. A dual currency deposit can be represented in the form of a certificate or mandate entered into by the customer and the contracting bank. In Switzerland, the deposit may be made by the bank on a fiduciary basis.

The deposit interest rate is fixed during its negotiation. It is higher than an equivalent traditional deposit.

For the customer, the cash flow of a dual currency deposit is similar to that of a portfolio consisting of a deposit in the base currency plus a sale of foreign exchange options (*cf. Options*). The interest rate of a dual currency deposit is thus composed of the interest rate of a traditional deposit in the base currency plus the premium received from the sale of foreign exchange options.

### Economic role

- Issuer (borrower): to find a source of funding for less than one year
- Investors (lenders): to lend money for less than one year

### Interest calculation conventions

- Interest on *money market* instruments is calculated on the basis of the **annual interest rate negotiated** and the term of the loan/borrowing, expressed as a fraction of a year.
- The practice for **quoting** annual interest rates according to their maturity is as follows:

Name	Abbreviation	Loan value date	Maturity date
Overnight	ON	t	t+1
Tom/Next (Tomorrow-against-Next-Day)	TN	t+1	t+2
Spot/Next (Spot-against-Next-Day)	SN	t+2	t+3
1 week	1W	t+2	(t+2) + 7 calendar days
1 month	1M	t+2	(t+2) + 1 calendar month
2 months	2M	t+2	(t+2) + 2 calendar months
and so on.			

where t is the quotation date (arrangement of the underlying loan at the interest rate).

#### Example

1-month rate: the funds must be transferred to the borrower on the spot value date, i.e. at t+2. They must be repaid one calendar month after the value date of the loan.

For example, a 1-month rate quoted on Wednesday 26 October concerns a loan with a value date of Friday 28 October, which must be repaid on Monday 28 November. The term of the loan is therefore 31 calendar days.

- The **interest** (= nominal × interest rate) over  $\tau$  days is calculated from the annual interest rate negotiated  $R_{\text{nom}}$  as follows:

$$\text{Interest over } \tau \text{ days} = \text{Nominal} \times R_{\text{nom}} \times \frac{\tau}{360 \text{ or } 365},$$

For example, EUR, USD, CHF, SEK, DKK, NOK, HUF and CZK use the convention *Act/360*.

GBP, HKD, AUD, CAD, SGD, TWD, MYR and ZAR use the convention *Act/365*.

JPY uses the convention *Act/365* for the domestic market and *Act/360* for the European market.

#### Example

Mr Weber invests USD 1 million for a period of six months at a rate of 2 percent. The actual number of calendar days of this loan is 182 days.

The interest earned by Mr Weber on this deposit is USD 10,111.11 ( $= 1,000,000 \times 0.02 \times (182/360)$ ).

The capital appreciation rate over 182 days is therefore 1.011 percent ( $0.02 \times (182/360)$ ).

### Benchmark interest rate on the money market

- Benchmark interest rates are very **important** for the economy as they are used:
  - to index interest rates to other financial assets (e.g. mortgages, floating-rate bonds, derivatives, etc.)
  - by central banks to manage monetary policy: the 3-month London Interbank Offered Rate (LIBOR) for Swiss Francs (CHF) for the Swiss National Bank (SNB); the federal funds rate for the Federal Reserve Bank (Fed); the Euro OverNight Index Average (EONIA) for the European Central Bank (ECB), etc.
- There are **several types of interest rate indicators** on the market. These indicators are calculated from:
  - transactions, such as the Federal Funds Rate or EONIA;
  - quotes, such as the London Interbank Offered Rate (Libor) or the European Interbank Offered Rate (Euribor),
  - transactions and quotes, such as Swiss Average Rates (SAR).

These indicators can be calculated on the basis of loans:

- that are secured, like Swiss Average Rates;
- that are unsecured, such as Libor, Euribor, the Federal Funds Rate or EONIA.

#### 1. Libor (London InterBank Offered Rate)

- The indicator that estimates the average rate that a prime bank can obtain when borrowing a currency for a given period **without offering any collateral** to the lender.
- It was created by the British Bankers' Association (BBA) and has been administered since 1 February 2014 by the ICE Benchmark Administration.
- It is calculated daily at 11.00 hours (UTC) in London by Thomson Reuters based on the information of a wide sample of banks (panel banks) that are very active in the market for a particular currency.
- Libor is based on the ask rate (referred to as *offered rate*) and not on the bid rate. To determine the quotes on which the calculation of Libor will be based, contributing banks must answer the following question:

*'At what rate could you borrow funds, were you to do so by asking for and then accepting inter-bank offers in a reasonable market size just prior to 11 am?'*
- The contributors must enter their quotes in the Thomson Reuters system. On receiving the results, an algorithm sorts the quotes from the largest to the smallest. The algorithm then

eliminates all rates in the first and fourth quartile of the quotes received. Libor corresponds to the average of the remaining rates.

- Libor rates are not calculated based on transactions. Only contributors' **quotes** are taken into account in the calculation. The quantity likewise does not count. The contributors must however ensure that the rates quoted correspond to a quantity consistent with that usually traded in the market for the currency concerned.

## 2. Euribor (Euro Interbank Offered Rate)

- Euribor is an indicator that estimates the average rate that a prime bank can obtain by borrowing euros over a given period without **offering collateral** to the lending bank.
- It is calculated daily at 11.00 (UCT) in London by Thomson Reuters based on a wide sample of banks which are very active in the EUR market (much more numerous than those participating in the Libor EUR).
- At 11.00 hours (UCT), the Thomson Reuters algorithm sorts the quotes for each maturity into decreasing order, then eliminates 15 percent of the highest data and 15 percent of the lowest data. The Euribor rate for the maturity concerned is equal to the average of the remaining rates.
- As with Libor, Euribor is based on the ask rate (referred to as *offered rate*) and not on the bid rate. It is not calculated on the basis of actual transactions but on the basis of contributors' quotes.

## 3. Federal Funds Rate

- Funds held with the United States central bank - the Federal Reserve Bank (Fed) - are known in financial jargon as **federal funds**.
- In order to meet their payment obligations and to comply with the regulatory requirements for minimum reserves, banks with a liquidity shortage must borrow short-term funds from other banks. The federal funds market makes it easier for banks to adjust their level of reserves with the central bank.
- The loans are **unsecured**; in other words, the lenders do not receive collateral from the borrowers.
- Interest rates and the amount of **overnight loans** must be reported to the Fed by the most active brokers in the market. On the basis of these data, the Fed calculates the Federal Funds Rate. This corresponds to the **average** overnight negotiated rates, **weighted by the volume of loans** associated with each rate.
- The Federal Funds Rate is therefore an indicator based solely on the major transactions carried out on the federal funds market.

## 4. Swiss Average Rates (SAR)

- In order to reflect the growing importance of the repo market and demand among market players for reference interest rates in Swiss Francs (CHF) for **secured** loans, the Swiss National Bank, jointly with SIX Swiss Exchange, has devised a series of indicators known as *Swiss Average Rates*.
- Swiss Average Rates are **average interest rates weighted by volume**.
- They are calculated by SIX Swiss Exchange on the basis of **transactions and quotes** entered in the SIX Repo Ltd system for transactions involving fixed-income securities which are accepted by the Swiss National Bank as collateral in its own repo transactions.

- Swiss Average Rates are recalculated whenever a new transaction is concluded or a new quote is entered in the book. They are therefore calculated **in real time** and published every ten minutes by SIX Swiss Exchange.

#### 5. EONIA (Euro OverNight Index Average)

- Reference rate calculated by the European Central Bank for the euro (EUR).
- It corresponds to the volume-weighted average of all **overnight unsecured** loans granted by a **sample of banks active** in the euro interbank market.
- The banks involved in calculating EONIA are the same as those used to calculate Euribor.
- Each bank in the sample must report daily to the European Central Bank on the total amount of overnight unsecured loans instructed for settlement by 18.00 hours (CET), in addition to the **weighted average rate of those loans**.
- Based on the data received, the European Central Bank calculates EONIA. The rate is published between 18.45 and 19.00 hours (CET) that day.

#### Price quotation versus discount yield quotation

- Money market instruments are issued at a discount **relative** to their face value. The difference between the face value and the issue price represents the interest paid by the issuer.
- Depending on market practices, money market instruments may be quoted as a **discount yield** or as a **price** (percentage of the nominal amount). For example, money market debt register claims of the Swiss Confederation are quoted in prices, whereas US T-bills are quoted as a discount yield.
- At issue, the **discount yield** corresponds to the annual interest rate paid by the issuer (borrower) on the issue for the term of the loan.

Some financial instruments, such as US T-bills, are issued at a discount yield price.

Other financial instruments, such as money market debt register claims of the Swiss Confederation, are issued with a price expressed as a percentage of the face value. For currencies using the convention Act/360, the discount yield over  $\tau$  days,  $Y_{\tau}^D$ , is calculated as:

$$Y_{\tau}^D = \frac{[FV - PP]}{FV} \times \frac{360}{\tau},$$

where:

- FV is the face value of the financial instrument;
- PP is the purchase price of the issue.

#### Example

Issue price: 99.970 percent

Face value: CHF 50,000

Term: 91 days

The annual interest rate paid by the issuer, or discount yield, is equal to:

$$[(100 - 99.970)/100] \times (360/91) = 0.00118681 = 0.12 \text{ percent}$$

The amount of interest paid by the issuer on a face value of CHF 50,000 for a period of 91 days is CHF 15.