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## Market Interest Rates and Quotes

### 3.1 The Complexity of Interest Rates

In many, if not in all discussion about valuing financial instruments, especially interest rate derivatives, the risk-free interest rate is an important topic. The risk-free interest rate are used to discount projected or expected cash-flows to a present value. But, what rate should be used? A short answer should be that this depends on what instrument to value, the counterparty and the agreements made. A better answer might be that the rate should be chosen to reflect the funding cost of buying the instrument. In this section we will discuss how the market situations in the near future have changed the view about the risk-free interest rate.

Before 2007, the London Inter-Bank Offered Rate (LIBOR) rate was frequently used as the risk-free interest rate. Today, we know that this is not correct. To understand why, we have to go back to the definition.

#### 3.1.1 The LIBOR Rates

On 1 February 2014 the administration of LIBOR was transferred from the British Banker's Association (BBA) to the Intercontinental Exchange (ICE), and BBA LIBOR is now known by the name ICE LIBOR. The need for a new administrator of LIBOR was highlighted in the Wheatley Review<sup>1</sup> due to the findings by various authorities in regard to the attempted manipulation of LIBOR.

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<sup>1</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/191762/wheatley\\_review\\_libor\\_finalreport\\_280912.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191762/wheatley_review_libor_finalreport_280912.pdf)

LIBOR reflects the average rate at which banks can obtain unsecured funding in the London inter-bank market for a particular currency and a particular time period. It is used globally as a benchmark to calculate payments made under all manner of finance documents – for example, derivatives, syndicated and bilateral loan agreements and floating rate notes.

The appointment of ICE as the new administrator will need to be reflected in the LIBOR definition in finance documents entered into after 1 February 2014. With regard to pre 1 February 2014 finance documents, they will typically define LIBOR by reference to BBA LIBOR. On the basis that ICE LIBOR retains substantially the same attributes as BBA LIBOR and the transfer of the administration function does not involve a fundamental change in the way in which the relevant data is collected and the calculation made, the widely held view in the market is that a reference to BBA LIBOR will operate to reference ICE LIBOR.

In 2015, the ICE Benchmark Administration (IBA) has a reference panel of 11–17 banks, see [Table 3.1](#) for five different currencies,<sup>2</sup> which includes CHF (Swiss Franc), EUR (Euro), GBP (Pound Sterling),

**Table 3.1** ICE Benchmark Administration panel banks

BANK/CCY	USD	GBP	EUR	CHF	JPY
Lloyds TSB Bank plc	○	○	○	○	○
Bank of Tokyo-Mitsubishi UFJ Ltd	○	○	○	○	○
Barclays Bank plc	○	○	○	○	○
Mizuho Bank, Ltd.		○	○		○
Citibank N.A. (London Branch)	○	○	○	○	
Cooperative Rabobank U.A.	○	○	○		
Credit Suisse AG (London Branch)	○		○	○	
Royal Bank of Canada	○	○	○		
HSBC Bank plc	○	○	○	○	○
Santander UK Plc		○	○		
Bank of America N.A (London Branch)	○				
BNP Paribas SA, London Branch		○			
Credit Agricole Corporate & Investment Bank	○	○			○
Deutsche Bank AG (London Branch)	○	○	○	○	○
JPMorganChase Bank, N.A. (London Branch)	○	○	○	○	○
Societe Generale (London Branch)	○	○	○	○	○
Sumitomo Mitsui Banking Corporation Europe limited	○				○
The Norinchukin_Bank	○				○
The Royal Bank of Scotland plc	○	○	○	○	○
UBS AG	○	○	○	○	○

<sup>2</sup> Before May 2013 there were 11 currencies. The following currencies have been removed; NZD, DKK, SEK, AUD and CAD. At the same time the tenors 2W, 4M, 5M, 7M, 8M, 9M, 10M and 11 M were removed for CHF, EUR, GBP, JPY and USD.

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the JPY (Japanese Yen), and USD (US Dollar). It is a polled rate from the panel of banks.

The LIBOR rate is determined by every contributor bank, which are determined yearly by the IBA and regulated by the Financial Conduct Authority. Only banks that have a significant presence in the London market are considered to be placed on the ICE LIBOR panel. All of the panel banks are asked 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 a.m.?” The banks are obligated to submit a rate at which they would borrow cash from another bank.

Once the banks submit their rates in response to the question, ICE calculates the LIBOR rate using a trimmed mean excluding both the highest and lowest quartiles of the submissions to exclude outliers, while the rest are averaged. The average rate is published to the market daily at approximately 11:45 a.m. Greenwich Mean Time.

ICE are using an ICE LIBOR HOLIDAY CALENDAR that can be found at [https://www.theice.com/publicdocs/Fixing\\_Calendar\\_2016.pdf](https://www.theice.com/publicdocs/Fixing_Calendar_2016.pdf)

Quoted LIBOR rates are given as in [Table 3.2](#) and [Table 3.3](#).

#### 3.1.1.1 Calculation

All ICE LIBOR rates are quoted as an annualized interest rate. This is a market convention. For example, if an overnight Pound Sterling rate from a contributor bank is given as 2.000000%, this does not indicate that a contributing bank would expect to pay 2% interest on the value of an overnight loan. Instead, it means that it would expect to pay 2% divided by 365.

Every ICE LIBOR rate is calculated using a trimmed arithmetic mean. Once each submission is received, they are ranked in descending order and then the highest and lowest 25% of submissions are excluded. This trimming of the top and bottom quartiles allows for the exclusion of outliers from the final calculation. The number of rates for different numbers of contributors are shown in [Table 3.4](#)

#### 3.1.2 The EURIBOR Rates

The Euro Interbank Offered Rate (EURIBOR) is a daily reference rate, published by the European Money Markets Institute (EMMI), based on

Table 3.2 Euro LIBOR quotes

EUR	08-15-2016	08-12-2016	08-11-2016	08-10-2016	08-9-2016
Euro LIBOR – overnight	-0.40000%	-0.39929%	-0.40000%	-0.40000%	-0.40000%
Euro LIBOR – 1 week	-0.38714%	-0.38714%	-0.38714%	-0.38714%	-0.38714%
Euro LIBOR – 2 weeks	-0.34129%	-	-	-	-
Euro LIBOR – 1 month	-0.37143%	-0.37071%	-0.37214%	-0.37214%	-0.37143%
Euro LIBOR – 2 months	-0.32143%	-0.33971%	-0.33971%	-0.33900%	-0.33829%
Euro LIBOR – 3 months	-	-0.31929%	-0.31929%	-0.31857%	-0.31857%
Euro LIBOR – 4 months	-	-	-	-	-
Euro LIBOR – 5 months	-	-	-	-	-
Euro LIBOR – 6 months	-0.20214%	-0.20219%	-0.19843%	-0.19829%	-0.19729%
Euro LIBOR – 7 months	-	-	-	-	-
Euro LIBOR – 8 months	-	-	-	-	-
Euro LIBOR – 9 months	-	-	-	-	-
Euro LIBOR – 10 months	-	-	-	-	-
Euro LIBOR – 11 months	-	-	-	-	-
Euro LIBOR – 12 months	-	-	-	-	-

the averaged interest rates at which Eurozone banks offer to lend and borrow *unsecured* funds from each in the euro interbank market. EUR-IBOR was first published on December 30, 1998. Prior to 2015, the rate was published by the European Banking Federation and calculated by Tomson Reuters.

At present there are eight EURIBOR maturities – 1 week, 2 weeks, 1 month, 2 months, 3 months, 6 months, 9 months and 12 months (until October 2013 there were 15 maturities). The rates are used as a reference rate for euro-denominated forward rate agreements, short-term interest rate futures contracts and interest rate swaps. EURIBOR are used in the same way as LIBOR rates are commonly used for Sterling and US dollar-denominated instruments.

**Table 3.3** USD LIBOR quotes

USD	08-15-2016	08-12-2016	08-11-2016	08-10-2016	08-09-2016
USD LIBOR – overnight	0.41889%	0.41910%	0.42020%	0.41970%	0.41880%
USD LIBOR – 1 week	0.44078%	0.44270%	0.44345%	0.44370%	0.44245%
USD LIBOR – 2 weeks	–	–	–	–	–
USD LIBOR – 1 month	0.50744%	0.50665%	0.50765%	0.51765%	0.51315%
USD LIBOR – 2 months	0.63206%	0.63255%	0.62880%	0.63280%	0.62955%
USD LIBOR – 3 months	0.80411%	0.81825%	0.81700%	0.81760%	0.81600%
USD LIBOR – 4 months	–	–	–	–	–
USD LIBOR – 5 months	–	–	–	–	–
USD LIBOR – 6 months	1.19744%	1.20670%	1.20395%	1.20370%	1.19620%
USD LIBOR – 7 months	–	–	–	–	–
USD LIBOR – 8 months	–	–	–	–	–
USD LIBOR – 9 months	–	–	–	–	–
USD LIBOR – 10 months	–	–	–	–	–
USD LIBOR – 11 months	–	–	–	–	–
USD LIBOR – 12 months	1.50661%	1.52570%	1.51950%	1.52450%	1.52250%

**Table 3.4** Number of used rates for given numbers of contributors

#CONTRIBUTORS	METHODOLOGY	#OF RATES
18 Contributors	Top 4 highest rates, tail 4 lowest rates	10
17 Contributors	Top 4 highest rates, tail 4 lowest rates	9
16 Contributors	Top 4 highest rates, tail 4 lowest rates	8
15 Contributors	Top 4 highest rates, tail 4 lowest rates	7
14 Contributors	Top 3 highest rates, tail 3 lowest rates	8
13 Contributors	Top 3 highest rates, tail 3 lowest rates	7
12 Contributors	Top 3 highest rates, tail 3 lowest rates	6
11 Contributors	Top 3 highest rates, tail 3 lowest rates	5

As at February 2016 the panel of banks contributing to EURIBOR consists of 24 banks: Whereas in September 2012, the panel of banks contributing to EURIBOR consisted of 44 banks, see [Table 3.5](#).

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**Table 3.5** The LIBOR panel banks at 2012-09-01 and 2014-09-01

Country	Banks 2012-09-01	Banks 2014-09-01
Austria	Erste Group Bank AG RZB Raiffeisen Zentralbank Österreich AG	
Belgium	Belfius KBC	Belfius
Finland	Nordea Pohjola	Nordea Pohjola
France	Banque Postale BNP-Paribas HSBCFrance Société Général Natixis Credit Agricole s.a. Credit Industriel et Commercial CIC	BNP-Paribas HSBC France Société Général Natixis Credit Agricole s.a.
Germany	Landesbank Berlin Bayerische Landesbank Girozentrale Deutsche Bank Commerzbank DZ Bank Deutsche Genossenschaftsbank Norddeutsche Landesbank Girozentrale Landesbank Baden-Wurttemberg Girozentrale Landesbank Hessen-Thuringen Girozentrale	Deutsche Bank Commerzbank DZ Bank Deutsche
Greece	National Bank of Greece	National Bank of Greece
Italy	Intesa Sanpaolo Banca Monte dei Paschi di Siena UniCredit UBI Banca	Intesa Sanpaolo Banca Monte dei Paschi di Siena UniCredit
Ireland	Bank of Ireland AIB	
Luxembourg	Banque et Caisse d'Epargne de l'Etat	Banque et Caisse d'Epargne de l'Etat
Netherlands	ING Bank Rabobank	INGBank
Portugal	Caixa Geral de Depósitos (CGD)	Caixa Geral de Depósitos (CGD)
Spain	Banco Bilbao Vizcaya Argentaria Banco Santander Central Hispano Confederacion Española de Cajas de Ahorros CaixaBank S.A.	Banco Bilbao Vizcaya Argentaria Banco Santander CECABANK CaixaBank S.A.
Great Britain	Barclays	Barclays
Denmark	Den Danske Bank	Den Danske Bank
Sweden	Svenska Handelsbanken	
Non-EU banks	UBS (Luxembourg) S.A. Citibank J.P.Morgan Chase & Co	London Branch of JP Morgan Chase
	The Bank of Tokyo-Mitsubishi UFJ	The Bank of Tokyo-Mitsubishi

### 3.1 The Complexity of Interest Rates

The panel of banks provide daily quotes of the rate, rounded to two decimal places, that each panel bank believes one prime bank is quoting to another prime bank for interbank term deposits within the Euro zone. The maturities are ranging from 1 week to 1 year.

Every Panel Bank is required to directly input its data no later than 11:00 a.m. (CET) on each day that the Trans-European Automated Real-Time Gross-Settlement Express Transfer system (TARGET) is open. At 11:02 a.m. (CET), GRSS (Global Rate Set Systems) will instantaneously publish the reference rate on Reuters, Bloomberg and a number of other information providers which will then be made available to all their subscribers. The published rate is a rounded, truncated mean of the quoted rates. The highest and lowest 15% of quotes are eliminated and the remainder are averaged and the result is rounded to three decimal places. EURIBOR rates are spot rates, that is, for a start two working days after measurement day. Like US money-market rates, they are Actual/360, that is, calculated with an exact day count over a 360-day year. (Fig. 3.1)

#### 3.1.2.1 EURIBOR+

At a SIFMA<sup>3</sup> Roundtable on December 2, 2015, representatives of the European Money Market Institute (EMMI) explained their plan to change the EURIBOR rate from the current quotation-based system to a rate based on actual transactions. The new rate will be called EURIBOR+. According to EMMI, one of the goals is to achieve a “seamless transition” in which no current EURIBOR-based contracts would be disrupted. At the end of the transition, EURIBOR+ will continue to be published on the same data vendor pages, such as Reuters page EURIBOR01. EMMI administers the EURIBOR and Euro Overnight Index Average (EONIA) rates.

Currently, EURIBOR is defined as “the rate at which euro interbank term deposits are being offered within the EU and EFTA countries by one Prime Bank to another at 11:00 a.m. Brussels time.” The definition of EURIBOR+ would be “the rate at which banks of sound financial standing could borrow funds in the EU and EFTA countries in the wholesale, unsecured money markets in euro.”

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<sup>3</sup> Securities Industry and Financial Markets Association

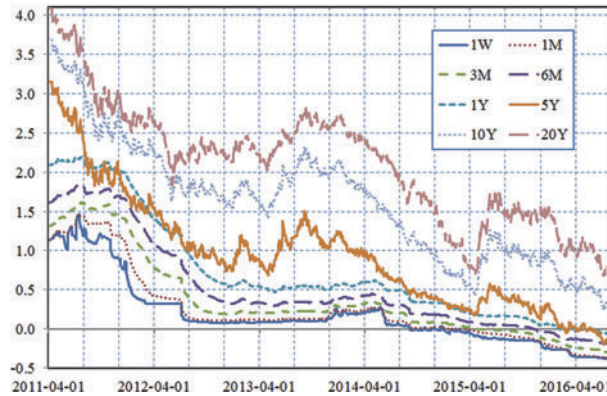


Fig. 3.1

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The key difference between current EURIBOR and EURIBOR+ is that EURIBOR relies on quotes and member bank estimates of prime bank activity, while EURIBOR+ will rely on actual wholesale borrowing transactions executed by the member bank. EURIBOR's current estimate of bank funding rates as a point-in-time average will be replaced by the EURIBOR+ backward-looking period average.

The transition to EURIBOR+ is targeted to take effect on July 4, 2016.

The first element to consider is that the number of entities that provide data is increased, in addition to changing the methodology, since it will take into account not only the deposits that banks make to each other (interbank lending) but also those of big companies and financial institutions, non-financial small and medium entrepreneurs, insurance companies, pension funds, etc. The current EURIBOR measures the average interest rate at which banks lend money in Europe and currently only 24 institutions are providing information. The problem is that banks do not provide accurate information on operations with real interest but on estimates of the interest that would be charged between them.

The various manipulations of EURIBOR (also from other indices such as Libor or Tibor) between 2005 and 2009 made the European Commission in 2013 to fine several entities. The new EURIBOR Plus

<sup>4</sup> Source Swedbank AB (publ)



### 3.1 The Complexity of Interest Rates

calculation would be based on a more realistic rate which would mean that an application of a rate more realistic, although not until the test period to see if this is so.

#### 3.1.3 The EONIA Rates

The other widely used reference rate in the euro-zone is EONIA, also published by the European Banking Federation, which is the daily weighted average of overnight rates for unsecured interbank lending in the euro-zone, that is, like the federal funds rate in the US. The banks contributing to EONIA were the same as the Panel Banks contributing to EURIBOR. However, “On 1st June 2013 the Eonia® and Euribor® respective panels of contributing banks have been differentiated.”(EMMI website)

The reference rate referred to as EONIA is computed as a weighted average of **all overnight unsecured lending transactions** in the interbank market, initiated within the euro area by the Panel Banks. Note that this is an average of **actual** transactions that has taken place between banks - not any indicative quote as used in the calculations of LIBOR or EURIBOR rates. It is reported on an act/360 day count convention with three decimal places.

“Overnight” means from 1 day to the next business day, until the interbank payment system TARGET, The Trans-European Automated Real-time Gross settlement Express Transfer system closes. The panel of reporting banks is the same as for EURIBOR, so that only the most active banks located in the euro area are represented on the panel and the geographical diversity of banks in the panel is maintained.

All specified transactions initiated during the business day shall be reported by the Panel Banks in aggregate, that is, the sum of all lending transactions carried out before the closing of real-time gross settlement (RTGS) systems at 6:00 p.m. (London time). Each Panel Bank shall, on each day that the TARGET system is open and no later than 6:30 p.m., report to the ECB the total volume of unsecured lending transactions that day and the weighted average lending rate for these transactions. Thus, the calculation of the weighted average for the overnight transactions for each bank is made by the respective Panel bank itself.

The amount of lending transactions shall be reported by Panel Banks in millions of euro, and the individual average rates shall be reported

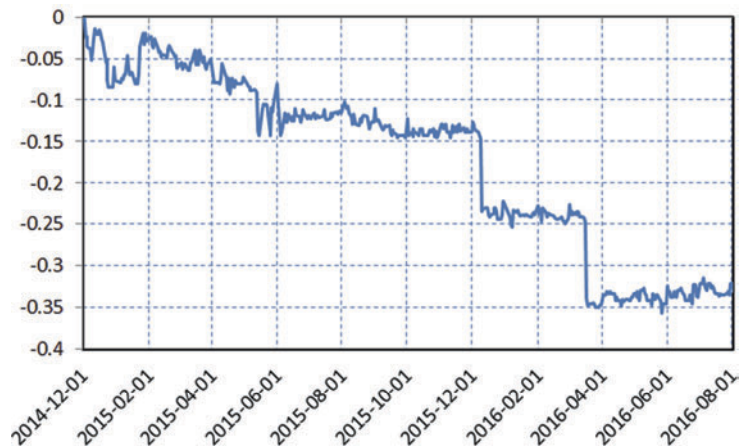


Fig. 3.2

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with three decimals. Rounding shall be carried out following established rounding rules in the market. In Fig. 3.2, the evolution of the EORNIA rate between 2014-12-01 and 2016-08-01 are shown.

### 3.1.3.1 Calculation and Publication of EONIA

Based on the reported volumes and average rates from each Panel Bank the European Central Bank (ECB) calculates EONIA, the weighted average for all the Panel banks. ECB shall aim to make the computed rate available for publication as soon as possible so that EONIA can be published between 6:45 p.m. and 7:00 p.m. on the same evening.

The ECB will undertake control measures to assess the quality of EONIA and may report to the Steering Committee on the performance of individual Panel Banks.

### 3.1.4 The Euro Repurchase Agreement Rate – Eurepo

For the reference rate Eurepo,<sup>6</sup> a representative panel of prime banks provide daily quotes of the rate, rounded to three decimal places. Each Panel Bank reports its believes on what one prime bank is bidding another prime bank (and offering money) for term repo with

<sup>5</sup> Source, Swedbank AB (publ)

<sup>6</sup> [http://www.emmi-benchmarks.eu/assets/files/Eurepo\\_tech\\_features.pdf](http://www.emmi-benchmarks.eu/assets/files/Eurepo_tech_features.pdf)

generalized collateral (Eurepo GC). Eurepo is quoted for spot delivery (T +2) using the act/360 day-count convention. Eurepo is quoted for the following maturities: T/N, 1, 2 and 3 weeks and 1, 2, 3, 6, 9 and 12 months.

Contribution of data

- Every Panel Bank will be required to directly input their data to the Calculation Agent platform no later than 10:45 a.m. (CET) on each day that the Trans-European Automated Real-Time Gross-Settlement Express Transfer system (TARGET) is open.
- Each Panel Bank will be allocated a private page by the Calculation Agent on which to contribute its data. Each contribution can only be viewed by the contributing Panel Bank and by the Calculation Agent staff involved in the calculation process.
- From 10:45 to 11:00 a.m. at the latest, the Panel Banks can correct, if necessary, their quotations.

#### 3.1.4.1 Calculation

At 11:00 a.m. (CET), the Calculation Agent will process the Eurepo calculation. The Calculation Agent shall, for each maturity, eliminate the highest and lowest 15% of all the quotes collected. The remaining rates will be averaged and the result will be rounded to three decimal places.

#### 3.1.4.2 Fall-Back Rules

Before calculating at 11:00 a.m. (CET) on each Target Day the Eurepo for that day, the Calculation Agent shall verify if all the Panel Banks have made their data available for that day in accordance with the established procedures.

If one or more Panel Banks have failed to do so, the Calculation Agent shall use reasonable efforts to remind such Panel Banks by telephone or any other means of communication of their obligation to provide the data and shall invite them to submit the data immediately.

Should any Panel Bank after such a reminder still not provide its data until 11:00 a.m. (CET), the Calculation Agent shall calculate the Eurepo for that day without the missing data and promptly notify EMMI in writing.

At 11.00 am:

- if eight or more Panel Banks from three or more countries have provided data, calculate and display the Eurepo based on this data; or
- if fewer than eight Panel Banks have provided data or if the Panel Banks which have provided data are from fewer than three countries, the Calculation Agent shall delay the calculation of the Eurepo for that day until eight or more Panel Banks from three or more countries have provided data. The Calculation Agent shall, at 11:15 a.m. (CET), indicate the delay to all Authorized Vendors and promptly notify EMMI.
- If fewer than eight Panel Banks have provided data by 12:30 p.m. (CET), Eurepo rates of the previous business day will be republished at 12:30 p.m. (CET) and will be used as the Eurepo rates for that day. Any republished rates from the previous business day will be identified as such by the Calculation Agent.

In this event, the Eurepo Steering Committee shall be convened in special session as soon as practicable on notification of a contingency event, in order to devise a resolution strategy preserving the continuity of Eurepo. This strategy should be implemented within a period no longer than three fixing days of the prior fixing established under the regular process. The prior fixing may be re-published as the fixing for the days in this period.

### **3.1.4.3 Publication of Eurepo**

After the calculation has been processed at 11:00 a.m. (CET), the calculation agent will publish the Eurepo reference rate which will be made available simultaneously to all Authorised Vendors.

At the same time, the underlying Panel Bank rates will be published on a series of composite pages which will display all the rates by maturity.

Historical data and individual submissions for Eurepo are also published on a delayed basis on the EMMI official website.

### 3.1.5 Sterling Overnight Index Average (SONIA)

Sterling Overnight Index Average (SONIA) was introduced by the Wholesale Markets Brokers' Association (WMBA) in March 1997 as a benchmark for the cost of overnight funds in sterling. It was London's first Overnight Index and it stimulated the development of Overnight Index Swaps (OIS) in the Sterling Money Market. SONIA provides a methodology for the fixing of Overnight Indexed Swap rates. Although some central banks calculate and publish daily fixing rates for overnight funds in their respective currency, the Bank of England did not. So if no appropriate rate existed in Sterling, the WMBA, with the BBA's backing, decided to create the SONIA calculations. Historical data are available on the WMBA website.

The Bank of England and the WMBA announced in April 13 2016 that the Bank of England will become the administrator of the SONIA interest rate benchmark on 25 April 2016.<sup>7</sup>

SONIA tracks actual Sterling overnight funding rates experienced by market participants during the day. SONIA is the weighted average rate to four decimal places of all **unsecured sterling overnight** cash transactions brokered in London by WMBA member firms between midnight and 4:15 p.m. with all counterparties in a minimum deal size of £25 million.

The creation of SONIA led to new derivative products, which have been used to reduce the risk and increase the transparency for overnight funding? The foremost example of this is the OIS. In such a swap a fixed rate interest rate is swapped against a floating rate index, for example, SONIA or EONIA. OIS contracts replicate a mismatched interbank deposit position through either:

- a short-term loan funded by an overnight deposit; or
- an overnight loan funded by a short-term deposit.

OISs allow banks to manage their liquidity requirements more effectively although part of the overnight risk still remains.

A typical OIS contract looks like this: Two parties agree to exchange the difference between the interest accrued at a pre-specified fixed interest rate on a given notional amount for a fixed period – say 3 months – and the compounded interest obtained from rolling-over the

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<sup>7</sup> <http://www.bankofengland.co.uk/publications/Pages/news/2016/046.penalty\z.aspx>

daily SONIA rates over the term of the swap. At the end of the period settlement of the contract is made and payments are netted so the principal never changes hands.

### 3.1.6 Federal Funds

Federal funds, or fed funds, are unsecured loans of reserve balances at Federal Reserve Banks that depository institutions make to one another. The rate at which these transactions occur is called the fed funds rate.

The most common duration or term for fed funds transaction is overnight, though longer-term deals are arranged. The Federal Open Market Committee (FOMC) sets a target level for the fed funds rate, which is its primary tool for implementing monetary policy. Fed Funds Transactions Redistribute Bank Reserves

Fed funds are unsecured loans of reserve balances at Federal Reserve Banks between depository institutions. Banks keep reserve balances at the Federal Reserve Banks to meet their reserve requirements and to clear financial transactions. Transactions in the fed funds market enable depository institutions with reserve balances in excess of reserve requirements to lend them, or “sell” as it is called by market participants, to institutions with reserve deficiencies. Fed funds transactions neither increase nor decrease total bank reserves. Instead, they redistribute bank reserves and enable otherwise idle funds to yield a return.

### 3.1.7 Summary

In [Table 3.6](#), we show a summary of the most common interest rates.

Table 3.6 A summary of some interest rates

	Libor	Euribor	Eonia	Europe
<b>Definition</b>	London Interbank Offered Rate	Euro Interbank Offered Rate	Euro Overnight Index Average	Euro Repurchase Agreement rate
<b>Market Side</b>	London Interbank Offer	Euro Interbank Offer	Euro Interbank Offer	Euro Interbank Offer
<b>Rate Quotation Specs</b>	EURLibor=Euribor, Other currencies: minor differences(e.g. act/365, T+0, London calendar for GBP Libor).	TARGET calendar settlement T+2, act/360, three decimal places, modified following, end of month, tenor variable.	TARGET calendar settlement T+1, act/360, three decimal places, tenor 1d.	TARGET calendar settlement T+2, act/360, three decimal places, modified following, end of month, tenor variable.
<b>Maturities</b>	1d-12m	1w,2w,3w,1m . . . 12m	1d	T/N-12m
<b>Publication Time</b>	12:30 CET	11:00am CET	6:45-7:00pm CET	11:00am CET
<b>Panel Banks</b>	11-17 banks per currency	24 banks from 11 EU countries+2 international banks	24 banks from 11 EU countries+2 international banks	24 EU banks from plus some large international banks from Non-EU countries
<b>Calculation agent</b>	ICE	EMMI	ECB	EMMI
<b>Transaction based</b>	No	No	Yes	No
<b>Collateral</b>	No (unsecured)	No (unsecured)	No (unsecured)	Yes (secured)
<b>Counterparty risk</b>	Yes	Yes	Low	Negligible
<b>Liquidity Risk</b>	Yes	Yes	Low	Negligible
<b>Tenor based</b>	Yes	Yes	No	No