Money Markets

Structure, Role & Preconditions for Market Development

Sonja Juko – Deutsche Bundesbank, Center for International Central Bank Dialogue

Disclaimer: Views expressed are those of the author and do not necessarily represent the view of Deutsche Bundesbank.
Money markets play a special role with a view to the functioning and the development of financial markets and the financial system at large.

The presentation

- provides an overview of key conceptual issues and offers a structured overview of constituting features of money markets and money market functioning
- reviews the role of money markets providing key arguments why money markets are important (and should be developed)
- Discusses preconditions for the development of money markets shedding light on relevant areas for action
What constitutes a money market?

Which subsegments can be distinguished?
Financial market segment where **short-term financial instruments** with maturities of up to one year are issued and traded between various market participants.
**Major money market participants**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks</td>
<td>Important financial intermediary in the money market</td>
</tr>
<tr>
<td></td>
<td>Need liquidity to satisfy statutory regulations as well as to be able to cover obligations at any time</td>
</tr>
<tr>
<td>Central Bank (CB)</td>
<td>Control of central bank reserves; setting policy rates; provide a platform for clearing and settlement</td>
</tr>
<tr>
<td>Government</td>
<td>Issuer of short-term securities which serve as benchmark and are used as collateral</td>
</tr>
<tr>
<td>Non-financial corporations (NFCs)</td>
<td>One of the largest contributors to volatility in liquidity</td>
</tr>
</tbody>
</table>

**What role do the different market participants play?**
Conceptual issues & money market structure

Money market participants & related subsegments

Money Market in its broadest sense

Redistribution of reserves

Interbank Money Market

“Primary Market of reserves”

Central Bank

Banks

Trading of short-term securities & derivatives

Non-Banks

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The interbank market is a sub-segment and the core of money markets

- Banks participate in the (interbank) money market ...
  - to optimize costs of short-term funding,
  - to minimize opportunity costs of holding liquidity,
  - to adjust their liquidity structure in consideration of economic and regulatory requirements
  - to hedge interest rate risks

When transactions are settled in CB money, banks effectively exchange CB reserve balances leading to a reallocation of existing CB reserves

Demand and supply determine money market rates
Conceptual issues & money market structure

Primary market of reserves

- Banks engage in transactions with CB to manage their liquidity
  - to satisfy their need of CB reserves by borrowing from the CB - paying the prevailing CB (policy) rate
  - to deposit excess reserves at the CB – which may or may not be remunerated

- Transactions between banks and the CB affect the overall level of aggregate reserves (liquidity) in the banking system

- Interest rates are determined by the policy rates and the operational procedures set by the CB
Conceptual issues & money market structure

Maturity of transactions: Call vs term money market

<table>
<thead>
<tr>
<th>Call money market</th>
<th>Term money market</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transactions during the day with <strong>O/N maturity</strong> by banks and non-banks</td>
<td>• Transactions with <strong>maturities of up to one year</strong> by banks and non-banks</td>
</tr>
</tbody>
</table>

**Example: US Treasuries**

<table>
<thead>
<tr>
<th>Date</th>
<th>1 Mo</th>
<th>2 Mo</th>
<th>3 Mo</th>
<th>6 Mo</th>
<th>1 Yr</th>
<th>2 Yr</th>
<th>3 Yr</th>
<th>5 Yr</th>
<th>7 Yr</th>
<th>10 Yr</th>
<th>20 Yr</th>
<th>30 Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/03/19</td>
<td>2.06</td>
<td>2.01</td>
<td>1.98</td>
<td>1.88</td>
<td>1.72</td>
<td>1.47</td>
<td>1.36</td>
<td>1.35</td>
<td>1.42</td>
<td>1.47</td>
<td>1.77</td>
<td>1.95</td>
</tr>
</tbody>
</table>

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Various classes of money market instruments can meet diverse needs of market participants.

**Cash segment**
- Interbank loans and deposits
- (Tradable) Short-term securities, e.g. certificates of deposit (CDs), bills of exchange, commercial papers (CPs)

**Secured market**
- Repurchase agreements (repos)
- Swaps against FX

**Derivatives segment**
- Interest rate swaps
- Forward rate agreements
- Futures
- Options

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Main goal of market participants using the cash segment is to **maintain liquidity**

- If the money market is liquid, market participants assume that their demand of short-term liquidity can be satisfied easily and immediately at any time. This **lowers need of market participants to hold precautionary liquidity buffers** which in turn increases aggregate earnings.

- Cash products enable market participants with a surplus of short-term deposits to **earn an interest**

**Derivatives segment**

- **Hedging**: reduce the risk of adverse price movements in an asset. Primarily, hedging against interest rate risks.

- **Trading**: speculating on interest rate changes.

- **Arbitrage**: taking advantage of price differences.
## Key characteristics & conventions of money market instruments

<table>
<thead>
<tr>
<th></th>
<th>Interbank loans/deposits</th>
<th>CDs</th>
<th>Bills of exchange</th>
<th>CPs</th>
<th>T-Bills</th>
<th>Repos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(Main) issuer</strong></td>
<td>Banks</td>
<td>Banks</td>
<td>NFCs</td>
<td>NFCs, banks</td>
<td>Government</td>
<td>Banks, CB</td>
</tr>
<tr>
<td><strong>Credit risk</strong></td>
<td>Issuer</td>
<td>Issuer</td>
<td>Mitigated by real goods</td>
<td>Issuer</td>
<td>Issuer</td>
<td>Mitigated by security (collateral)</td>
</tr>
<tr>
<td><strong>Interest</strong></td>
<td>Coupon instrument</td>
<td>Coupon instrument</td>
<td>Discount instrument</td>
<td>Discount instrument</td>
<td>Discount instrument</td>
<td>Coupon instrument</td>
</tr>
<tr>
<td><strong>Quotation</strong></td>
<td>Yield basis</td>
<td>Yield basis</td>
<td>Discount rate</td>
<td>Yield basis/discount rate</td>
<td>Yield basis/discount rate</td>
<td>Yield basis</td>
</tr>
<tr>
<td>** Tradable/Secondary market**</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
The more instruments are issued and actively traded among diverse market participants the more developed the market is.

<table>
<thead>
<tr>
<th>Money market subsegment</th>
<th>Issuer</th>
<th>Counterparties</th>
<th>Financial instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broader money market</td>
<td>Banks/Non-banks</td>
<td>Banks/Non-banks</td>
<td>(Un)Secured securities &amp; derivatives (up to 1Y)</td>
</tr>
<tr>
<td>Broader interbank money market</td>
<td>Banks</td>
<td>Banks</td>
<td>(Un)Secured securities &amp; derivatives (up to 1Y)</td>
</tr>
<tr>
<td>Secondary market of CB reserves</td>
<td>Banks</td>
<td>Banks</td>
<td>CB reserves</td>
</tr>
<tr>
<td>Primary market of CB reserves</td>
<td>CB</td>
<td>Banks</td>
<td>CB reserves</td>
</tr>
</tbody>
</table>
What is the basic structure of the money market in your country?

NOTE: Chose from the given options and select all that apply.
Short maturities make up the bulk of the market

Maturity breakdown for various money market segments (percentages of total)

Note: The secured segment consists of daily repurchase agreement transactions only (borrowing and lending) denominated in euro with a maturity of up to and including one year.

Source: Euro money market survey (2015)
What characterises an efficient money market?

What are measures of market efficiency?
Money market efficiency is typically measured by indicators that are a reflection of the liquidity situation in the money market:

- bid-ask spreads
- volatility of interest rates
- daily turnover

Generally speaking, a high daily turnover, narrow bid-ask spread and low volatility implies ceteris paribus a more efficient market.

Analysing volatility offers insights into the microstructure of money markets:

- For instance, comparing the volatility of interest rates at specific maturities with the average level of volatility across the whole maturity spectrum may allow the CB to detect atypical movements in some segments of the money market, which, in turn, could be related to imperfections in the market’s structure and might impinge on the effective transmission of the monetary policy impulse.
## Conceptual issues & money market structure

### Money market efficiency: Euro money market - Turnover

- **Turnover in specific instruments has evolved over time**
  - ... shedding light on the relative importance of the various money market segments

- **What explains the development of individual money market instruments over time?**

### Cumulative quarterly turnover in the euro money market (EUR trillion)

<table>
<thead>
<tr>
<th>Year</th>
<th>unsecured secured</th>
<th>OISs</th>
<th>FX swaps</th>
<th>other IRSs</th>
<th>Xccy swaps</th>
<th>FRAs</th>
<th>ST securities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>2008</td>
<td></td>
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<tr>
<td>2009</td>
<td></td>
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<tr>
<td>2010</td>
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<tr>
<td>2011</td>
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<tr>
<td>2012</td>
<td></td>
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<tr>
<td>2013</td>
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<tr>
<td>2014</td>
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<tr>
<td>2015</td>
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</tr>
</tbody>
</table>

Note: The secured segment consists of daily repurchase agreement transactions only (borrowing and lending) denominated in euro with a maturity of up to and including one year.
Agenda

- Conceptual issues & money market structure
  - Definition and market participants
  - Money market instruments

- Role of money markets: Why money markets are important

- Preconditions for an efficient money market
Who needs money markets and why?
Role of money markets: Why money markets are important

Overview

- Financial intermediation
- Monetary policy transmission
- Importance of money markets
- Liquidity (risk) management
- Pricing and financing conditions
Role of money markets: Why money markets are important
Financial intermediation

- A deep and liquid (interbank) money market supports financial intermediation function of commercial banks, in particular, the maturity transformation
  - Money markets improve the funding base which is a crucial prerequisite for maturity transformation
  - In emerging and developing economies the importance of money markets is more pronounced by the fact that most of the financial sector functions are served by commercial banks

- In the absence of well-functioning money markets, banks may prefer to minimise the interest rate risk to which they expose themselves when performing maturity transformation by extending variable rate loans to borrowers only
  - As a result, banks pass on the interest rate risk to borrowers thus creating potential risks for financial stability as interest rate increases can trigger large increase in NPLs as borrowers may become unable to service their debt at higher rates

- In the absence of money markets, banks lack possibility to manage liquidity risk which can reduce their willingness to hold assets with longer maturities
  - As a result bond market activity and bank lending can be impaired
Role of money markets: Why money markets are important

Liquidity (risk) management

- **Banks** use the money market to manage liquidity and to smooth out individual liquidity imbalances which may occur at any time as a result of various liquidity factors

- **Absence of a functioning money market,**
  - Renders liquidity management more difficult for banks
  - May encourage hoarding of liquidity (→ example of Euro area money market)
  - Could force banks to process client transactions with multiday delays so as to find matching transactions within their own client base
  - Can hamper economic activity as bank intermediation is impaired

- **Money markets serve as medium for cash management for governments**

- **Money markets allow financial intermediaries to manage liquidity risk attached to bonds and other term instruments**
  - By lowering liquidity risk premiums they enable investors to hold larger portfolios of longer-term instruments and are therefore crucial to stimulate active bond markets.
Role of money markets: Why money markets are important

Pricing and financing conditions

- (Interbank) money market rates represent the marginal costs of funding for banks and provide benchmarks for the financing conditions throughout the economy
  - Developments in money markets affect the financing conditions faced by NFCs and households

- Banks rely on money market rates in order to price longer term debt as long term interest rates are determined by
  - the current level of short-term interest rates
  - expectations of future short-term interest rates
  - and risk perceptions (liquidity, credit risk and inflation)

- In the absence of a functioning money market, banks have difficulty pricing longer term debt and may be reluctant to lend at longer maturities
Role of money markets: Why money markets are important

Pricing and financing conditions: Yield curve

Money market rates
- form the short end of the yield curve
- serve as a reference point (anchor) for longer term yields

Expectations of future money market rates guide longer term yields
Money markets are relevant for CBs as they form the starting point of monetary policy transmission: Changes in monetary policy affect the money market first.

Money markets are of particular importance for CBs which implement monetary policy via an interest rate steering approach.

Chart: The transmission mechanism from interest rates to prices
Money market segments are linked with other financial market segments in various ways

- **Primary Market**: Initial sale of T-bills by the Government's agent, usually the central bank. Sold by auction or tap issue.
- **Term Money Market**: Market for funds with maturities greater than a day and less than 1 year. Includes secondary market in T-bills and other paper. Banks and large financial organizations participate.
- **Primary Government Bond Market**: Initial sale of government bonds by the Government's agent, usually the central bank. Sold by auction or tap issue.
- **Bond Market**: Market for paper of over 1 year remaining to maturity. Banks and other financial and institutional investors participate.
- **Call Money Market**: Market for funds with overnight maturity. Transactions take place during the day. Banks and large organizations participate.
- **Interbank Market**: Funds held immediately prior to final settlement to enable banks to meet obligations to each other and to the central bank. Only institutions with accounts at the central bank and the central bank participate. Also called the clearing or settlement market.
Role of money markets: Why money markets are important

Monetary policy transmission (cont.)

- Smooth functioning of money markets ensures that the impulse of monetary policy is transmitted along the yield curve, as long-term rates matter most for economic activity.

- A CB can exert a dominant influence on money market conditions and money market interest rates: Given its monopoly over the creation of CB reserves, a CB can manage the level of CB reserves which serves as ultimate liquidity in the banking system, thus affecting the funding costs for banks.

Coevolution between CB actions and money market development

Central Bank (Money Market as arena for action)
- Steers money market interest rates (as operational target) close to policy rates
- Is monopoly supplier of CB reserves

Money Markets (Money Market as source of information)
- Transmits policy signal
- Provides crucial information for monetary policy strategy and monetary policy implementation

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Role of money markets: Why money markets are important

Excursus: Liquidity analysis, liquidity management & interest rate steering

Money markets take center stage in liquidity analysis, liquidity management and the steering of interest rates by the CB

- Poor liquidity analysis and liquidity management by the CB undermines money market functioning
- Sizeable system-wide liquidity surplus removes incentives to transact and need to manage liquidity

[Diagram showing liquidity flow, conditions, analysis & projection, management]

See Annex for basic interest rate steering approaches
What is the role of the money market in different monetary policy frameworks? What is the role of the money market in the monetary policy framework of your CB?

Table 1: Monetary policy frameworks

<table>
<thead>
<tr>
<th>Monetary policy framework</th>
<th>Intermediate target</th>
<th>Operational Target</th>
<th>Tool-kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange rate targeting</td>
<td>exchange rate</td>
<td>interest rate/exchange rate</td>
<td>FX-transactions; O/N standing facilities; MRR (averaging)</td>
</tr>
<tr>
<td>Monetary targeting</td>
<td>monetary aggregate</td>
<td>reserve money</td>
<td>MRR (rate and averaging); fine-tuning operations</td>
</tr>
<tr>
<td>Enhanced monetary targeting</td>
<td>monetary aggregate</td>
<td>short term interest rates</td>
<td>MRR (rate and averaging); O/N standing facilities; fine-tuning operations</td>
</tr>
<tr>
<td>Inflation targeting</td>
<td>inflation forecast</td>
<td>short term interest rates</td>
<td>MRR (averaging); O/N standing facilities; fine-tuning operations</td>
</tr>
<tr>
<td>Full-fledged inflation targeting</td>
<td>inflation forecast</td>
<td>short term interest rates</td>
<td>MRR (averaging); O/N standing facilities; fine-tuning operations</td>
</tr>
</tbody>
</table>

Increasing role of money markets for monetary policy transmission
Money markets matter also for financial stability

<table>
<thead>
<tr>
<th>Function of money markets</th>
<th>... from a CB perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help in managing liquidity of commercial banks e.g. caused by cash flow mismatches</td>
<td>➔ crucial for monetary policy and financial stability</td>
</tr>
<tr>
<td>Help in reducing liquidity and interest rate risk of commercial banks e.g. by offering</td>
<td>➔ crucial for financial stability</td>
</tr>
<tr>
<td>instruments to hedge against and speculate on short-term interest rate and FX risks</td>
<td></td>
</tr>
<tr>
<td>Provide a source of funding for banks, and other economic agents and investment</td>
<td>➔ crucial for monetary policy</td>
</tr>
<tr>
<td>opportunities e.g. to meet payment and short-term financing needs or to profitably</td>
<td></td>
</tr>
<tr>
<td>invest short-term</td>
<td></td>
</tr>
<tr>
<td>Facilitate pricing signals by setting the marginal cost of funding Developments in</td>
<td>➔ crucial for monetary policy</td>
</tr>
<tr>
<td>money markets affect the financing conditions faced by NFCs and households. Money</td>
<td></td>
</tr>
<tr>
<td>market rates provide benchmark rates for the pricing of other financial contracts</td>
<td></td>
</tr>
<tr>
<td>Serve as starting point in the monetary policy transmission mechanism</td>
<td>➔ crucial for monetary policy</td>
</tr>
</tbody>
</table>
Agenda

- Conceptual issues & money market structure
  - Definition and market participants
  - Money market instruments

- Role of money markets: Why money markets are important
  - Financial intermediation
  - Managing liquidity
  - Pricing and financing conditions
  - Monetary policy transmission

- Preconditions for an efficient money market
What are essential preconditions for efficient money market?
Preconditions for an efficient money market

Overview

- Efficient use of local currency
- Efficient payment and settlement systems
- Sufficient legislation
- Structure & functioning of the banking system
- Commitment of the central bank

Source: Vavra et al. (2016)
In principal, money markets can function well using both foreign and local currency

However, it is beneficial to promote and develop money markets in local currency

- CB can only reliably perform its function as a monopoly supplier of CB reserves and lender of last resort in local currency, since its stock of foreign exchange reserves is limited
- Monetary policy can be implemented in a more straight forward ways avoiding instruments which may undermine market development further, such as reserve requirements differentiated across currencies, and a set of controls on foreign capital flows

Local currency deposits serve as a reliable source of funding safeguarding the liquidity of commercial banks

- Helps commercial banks in overcoming maturity mismatches
- Contributes to build trust among banks
### Preconditions for an efficient money market

**Structure and functioning of the banking system**

#### Money market development depends on the structure and functioning of the banking system

<table>
<thead>
<tr>
<th>Competition within the banking sector</th>
<th>Ownership of banks</th>
<th>Diversity of banks business models</th>
</tr>
</thead>
</table>
| • normally leads to lower bid-ask spreads in money markets, improvements in quality of services through better and faster execution of orders, and a wider range of financial services | • **State ownership** often dampens commercial orientation  
• **Foreign ownership** of banks can be accompanied by increased efficiency in the money markets as foreign banks bring expertise, corporate governance practices and new and innovative technology. Because of their recourse to their parent banks foreign owned local banks can tap external liquidity and funding sources | • Matters as retail banks tend to have liquidity surplus while wholesale banks fund themselves from the money market more often;  
• If banks have similar liquidity needs and funding sources this reduces activity in the money market, because all participants are on one side of the trade  
• If a liquidity is distributed evenly among banks with similar client profile, the only natural counterparty to their liquidity operations is the CB |

### Banking supervision facilitates the well-functioning of money markets by monitoring banks’ business activity and maintaining trust among market participants
Preconditions for an efficient money market
Commitment of central bank

I. CBs can create incentives for banks to interact with each other by managing liquidity conditions that encourage interbank transactions and revising its monetary policy operational framework

- Lowering the frequency of monetary policy operations
- Allowing reserve averaging (which supports the stabilization of money market interest rates)

II. Further measures supporting commitment to develop money market

- Taking part in developing a secondary market for government securities (e.g. market making) that can provide collateral for money market transactions
- Promoting standards, practices, codes of conduct and contractual frameworks such as the Global Master Repurchase Agreement
- Establishing market infrastructures such as trading platforms
- Assisting the establishment of money market reference rates serving as benchmarks
By steering short-term rates and giving guidance for (expected) future short term rates CBs can promote stable money market rates - and thus stable funding conditions

- Pass through of money market rates to long-term rates can be strengthened further by promoting price stability,
- CBs effectively reduce inflation risk and thus volatility in funding conditions as long term interest rates not only reflect investors’ assumptions about future (short term) interest rates but also include a risk premia (rp) associated with long-term investment, in particular inflation risk as well as credit risk (→ Liquidity premium theory)

[...] the development of resilient and well-functioning money markets is deeply intertwined with the development of a monetary policy framework based on a flexible exchange rate and a pursuit of low and stable inflation

[...] reforms focused solely on the money market mechanics will have only limited chances of success, if not accompanied by sustained efforts to achieve low and stable inflation using a predictable interest rate policy and a relatively flexible exchange rate.

Source: Vavra et al. (2016)
Preconditions for an efficient money market

Sufficient legislation

- Smooth money market functioning requires specific legislation in various areas which aim to reduce risks and uncertainty and to build trust among money market participants
  - Bankruptcy procedures
  - Finality of payment and settlement
  - Status and use of collateral
- Abolish legal constrains for deposits, interest rates and lending
- Tax law defining the treatment of money market activities, including capital gains, (interest) income, and inflation and exchange rate differentials
- Reporting requirements promoting greater transparency of money market activities and the compilation of indexes of money market activity and rates can spur the development of money markets
  - E.g. European Market Infrastructure Regulation (EMIR) aims to make OTC derivatives trading more transparent and secure by requesting standardized derivatives being settled through central counterparties and by reporting all derivative contracts/transactions to trade repositories thereby reducing settlement risks and easing market disruption in the event of counterparty default
An efficient payment system infrastructure is indispensable to the efficient functioning of money & capital markets

- A key function of the payment system is to insure the finality of settlements, so that transactions made over payment networks will be complete and not subject to reversal even if the parties to the transaction go bankrupt or fail after settlement

Real time gross settlement (RTGS) systems provide greater assurance of payment finality and uninterrupted financial market operation without netting debits with credits

- The price of lower settlement risk is a larger need for liquidity, which stimulates money market activity

Oversight of payment and settlement systems (typically done by the CB) promotes safety and efficiency monitoring existing and planned systems, assessing them against these objectives and, where necessary, inducing change
Are preconditions for an efficient money market met in your country?

- Is local currency mainly used?
- Is the banking system efficient (competition and diversity within the banking sector)?
- Does the CB create incentives for banks to interact?
- Does specific legislation ensure smooth money market functioning?
- Are there well-functioning payment and settlement systems (preferably RTGS)?
Which further aspects do you consider as relevant precondition for an efficient money market?
Key takeaways

- The money market is a financial market segment for short-term maturities

- Money markets are the cornerstone of an efficient system of market-based financial intermediation
  - Allow to cover short-term liquidity needs
  - Promote the development of government and private sector bond markets
  - Contribute to a smooth transmission of monetary policy

- A growing number of different issuers, counterparties and types of instruments traded are an indicator of the development of the money market

- Development of money markets depends on various preconditions and requires a range of policies that create incentives for market activity
  - ...in particular for banks as key financial intermediary, to actively manage their liquidity risk
  - CB operating procedures greatly influence banks’ incentives to use the money market
The money and interbank market

References

- BIS (2017): Repo market functioning, CGFS Paper No 59
- Freixas, Hartmann, Mayer (2008): „Handbook of European financial markets and institutions“
- Vavra et al. (2016) : „Framework for developing money markets in Frontier and Emerging Market Economies“
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Money market structure

Money market instruments: Coupon vs discount instruments

**Coupon instruments**
- Issued with an interest rate (coupon) at face value
- At maturity, notional amount and interest are paid back

**Examples: Interbank deposits, CDs, Repos**

**Discount instruments**
- Issued with a discount from the notional value
- At maturity, holder receives notional amount
- Difference between issuing price and repayment constitutes interest

**Examples: Commercial papers (CPs), T-Bills, Bill of exchange**
Money market structure

Money market instruments: Repurchase agreement (Repo)

- Agreement in which the seller sells securities (referred to as “collateral”) at a given price, coupled with an agreement to repurchase the securities at a pre-specified price at a later point in time
  - Buyer becomes owner of the collateral and can reuse the collateral, i.e. the collateral is not pledged

- Distinction: Cash-driven vs. collateral-driven repo (general and special collateral)

- Further defining features of repos
  - Repurchase of equivalent securities.
  - Overcollateralization (haircut).
  - Variation margin is required and adds operational burden.

Visualisation of cash flows
Global Master Repurchase Agreement as standardized contract

- jointly developed by the International Capital Markets Association (ICMA, Europe) and the Securities Industry and Financial Markets Association (SIFMA, USA).

Function of master agreement is two-fold

- “To facilitate trading by having counterparties agree as many general terms and conditions as possible, in advance of executing individual transactions.”
- “To set out clearly the rights and obligations of the counterparties during the life of the transaction [...] and in the event of a problem arising.”

Weblink

Providing a low-risk option for cash investment

- Reverse repos are used heavily by money market funds, asset managers, central counterparties and other institutional investors or corporates as a means of investing their cash.

Transformation of collateral

- Obtain specific securities or cash to be used in other transactions.

Supporting cash market efficiency and liquidity

- Arbitrageurs which are important for price formation extensively use repos to raise cash.

Facilitating hedging of risk

- Funding of hedging.

Enabling investors to monetize liquid assets

- Under stress repos provide a means to raise cash without liquidating assets.
Role of money markets: Why money markets are important

Excursus: The link between short term and long term rates

- Long-term interest rates are a geometric average of a given level of short-term interest rates today, expected future short-term interest rates (expectations theory) plus a premium which is always positive to cover for risks inherent in longer term investment
  
  Underlying assumptions: Return of single long term investment should be equal to a sequence of short term investments

\[
(1 + i_{LT})^n = rP_n + (1 + i_{ST}^{period\ 0})(1 + i_{ST}^{period\ 1}) \ldots (1 + i_{ST}^{period\ n})
\]

- Changes in the current level of short term interest rates and expectations of rising (falling) short-term interest rates imply an increase (decline) of long-term rates
  
  Future rates are unbiased estimates of forthcoming spot rates which reflect investors’ expectations of future short term interest rates
Preconditions for an efficient money market

Excursus: Basics of interest rate steering

1. Demand for CB reserves and money market rates are inversely related

2. Demand for CB reserves is determined by various factors
   - **Required reserves** set by central bank, i.e. banks are required to hold a certain amount of reserves
   - **Settlement requirements** for interbank transactions settled in central bank reserves
   - **Other liquidity needs**, e.g. as part of liquid asset pool and to meet cash demand
   - Note: Banks do not (cannot) lend out CB reserves to their customers. Technically, they do not need CB reserves to lend as they create a deposit liability on their balance sheet which funds the loan

3. A CB (usually) acts as monopoly supplier of CB reserves and provides whatever amount of reserves the banking system demands

4. CBs manage the level of liquidity by use of monetary policy instruments which include direct intervention in the money market via open market operations

Preconditions for an efficient money market

Excursus: Steering an operational target rate

Chart: Steering an operational target rate in a corridor system
Preconditions for an efficient money market

Excursus: Steering an operational target rate

Chart: Steering an operational target rate in a corridor system with a mechanism that assists the stabilisation of money market rates (e.g. reserve requirements with averaging)
Preconditions for an efficient money market

Excursus: Steering an operational target rate

Chart: Steering an operational target rate in a floor system

Money Markets: Structure, role and preconditions for Market development
Sonja Juko - Deutsche Bundesbank
Preconditions for an efficient money market

Excursus: Steering an operational target rate

Chart: Steering an operational target rate in a floor system – the relationship between short-term interest rates and excess liquidity, estimation of a logistic function according to Veyrune et al. (2018)

- Assumption: the relationship between excess liquidity and short-term interest rates in a symmetric interest rate corridor could be modeled as a bivariate logistic function, which is defined in such a way that short-term rates converge to the top of the interest rate corridor when excess liquidity is increasingly negative and vice versa.

- The estimations might help to identify conditions in which short-term rates become unanchored, that is, they move away from the policy rates and become more volatile within the interest rate corridor defined by the interest rates of the central bank’s standing facilities.

Note: Excess liquidity at the end of the maintenance period. The EONIA maintenance period average is normalized in a 0 to 1 corridor, representing the spread between the deposit facility rate (0) and the lending facility rate (1).