3 Financial system and money market

3.1 Learning outcomes

After studying this text the learner should / should be able to:

1. Describe the financial system.
2. Elucidate the market in which money is created: the money market.
3. Discuss the significance of the interbank markets in money creation.

3.2 Introduction

You now know what money is: bank notes, coins and bank deposits. We now need to refine this definition. Bank notes are the notes of the central bank, and we know that because they are *issued* by the central bank they are part of its liabilities. Coins in many countries are also issued by the central bank; where this is not the case they are issued by a government department (usually Treasury or the Department of Finance). We will assume they are issued by the central bank for the sake of simplicity. We will call them *bank notes and coins* or just N&C, with the background knowledge that N&C are liabilities of the central bank. N&C are held by the domestic non-bank private sector (NBPS) and by the banks in their vaults, teller drawers and ATMs. Only the former (N&C held by the NBPS) is regarded as being part of the money stock.

Bank deposit (BD) money is a wide term. The foreign sector, government and banks also bank with banks (the latter is called the interbank deposit or loan market). Generally the deposit part of the money stock is taken to include only the deposits the NBPS. Thus we have:

M = BD + N&C (both in the "hands" of the NBPS).

Money exists and is created in the money market. The money market is a financial market and it is one of the financial markets. The financial markets make up the financial system. Therefore, if you are to understand money and money creation clearly, you need to see it as part of the financial system. Next we present a brief elucidation of the financial system, its instruments, its markets, and so on. This is followed by a definition of the money market, an exposition on money market interest rates (because they are the operational variable of monetary policy) and the interbank market/s.

3.3 The financial system

3.3.1 Introduction

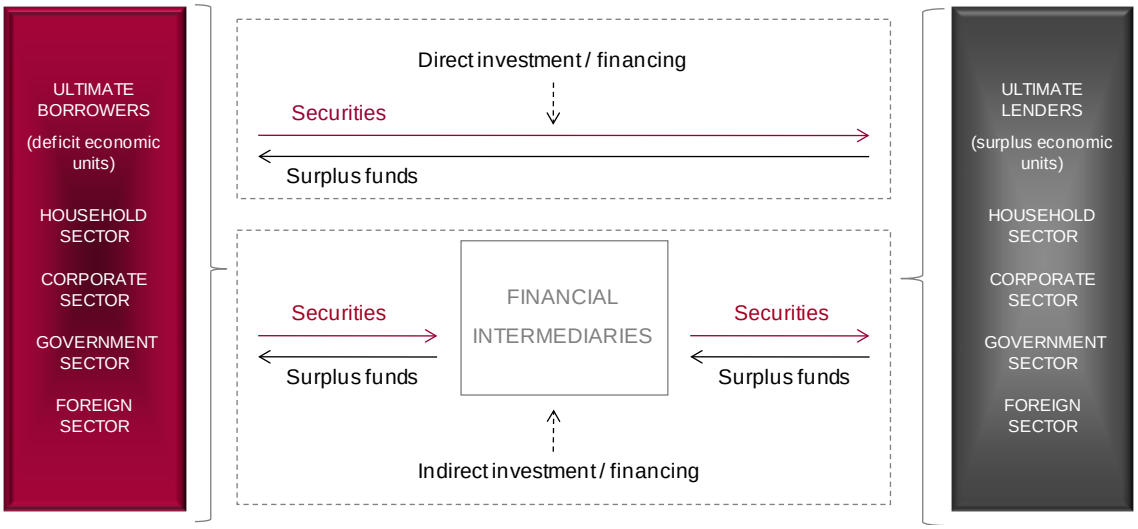


Figure 1: simplified financial system

The financial system may be depicted simply as in Figure 1. It is essentially concerned with borrowing and lending and has six parts or elements (not all of which are visible in Figure 1):

- First: *lenders* (surplus economic units) and *borrowers* (deficit economic units), i.e. the non-financial-intermediary economic units that undertake lending and borrowing. They may also be called the *ultimate* lenders and borrowers (to differentiate them from the financial intermediaries who do both). Lenders try and earn the maximum on their surplus money and borrowers try and pay the minimum for money borrowed.
- Second: *financial intermediaries*, which intermediate the lending and borrowing process; they interpose themselves between the ultimate lenders and borrowers and endeavour to maximise profits from the differential between what they pay for liabilities (borrowings) and earn on assets (overwhelmingly loans). In the case of the banks this is called the *bank margin*. Obviously, they endeavour to pay the least on deposits and earn the most on loans. (This is why you must be on your guard when they make you an offer for your money or when they want to lend to you.)

- Third: *financial instruments*, which are created to satisfy the financial requirements of the various participants. These instruments may be marketable (e.g. treasury bills) or non-marketable (e.g. a utilised bank overdraft facility).
- Fourth: the *creation of money* when demanded. As you know banks (collectively) have the unique ability to create their own deposits (= money) because we the public generally accept their deposits as a means of payment.
- Fifth: *financial markets*, i.e. the institutional arrangements and conventions that exist for the issue and trading (dealing) of the financial instruments.
- Sixth: *price discovery*, i.e. the price of shares and the price of debt (the *rate of interest*) are "discovered", i.e. made and determined, in the financial markets. Prices have an allocation of funds function.

We need to present you with a little more information on these six elements.

3.3.2 Lenders and borrowers

The first element is lenders and borrowers. As seen in Figure 1, they can be categorised into the four groups or "sectors" of the economy:

- *Household* sector (= individuals).
- *Corporate* sector (= companies – private and government owned).
- *Government* sector (= all levels of government – local, provincial, central).
- *Foreign* sector (= any foreign entity – corporate sector, financial intermediaries such as retirement funds).

The members of these sectors may be either lenders or borrowers or both at the same time. For example, a member of the household sector may have a mortgage bond (= borrower by the issue of a non-marketable debt instrument) and at the same time hold a balance on your accounts at the bank (= a lender; a holder of money).

3.3.3 Financial intermediaries

The second element is financial intermediaries. As seen in Figure 1, lending and borrowing takes place either *directly* between ultimate lenders and borrowers [e.g. when an individual buys a share (also called equity or stock) issued by a company], or *indirectly* via financial intermediaries. Financial intermediaries essentially solve the differences (or conflicts) that exist between ultimate lenders and borrowers in terms of their requirements: size, risk, return, term of loan, etc.

An example: your friend Johnny (a member of household sector) has LCC 10 000 he would like to lend out (= invest) for 30 days at low risk. You (a member of household sector) would like to borrow LCC 20 000 for 365 days to buy a car. You don't mind who you borrow from, because you represent the risk, not the lender. Your and Johnny's requirements don't match at all; direct financing won't work. He places his LCC 10 000 on deposit with a prime bank for 30 days and you borrow LCC 20 000 from the bank for 365 days. You and Johnny are both in high spirits; the bank satisfied your different requirements.

Financial intermediaries exist not only because of the divergence of requirements of lenders and borrowers, but for the specialised services they provide, such as insurance policies (insurance companies), retirement fund products (retirement funds), investment products (securities unit trusts, exchange traded funds), overdraft and deposit facilities (banks), and so on. The banks also provide a payments system, the system we don't see but rely much on. The central bank provides an interbank settlement system (as we will see later).

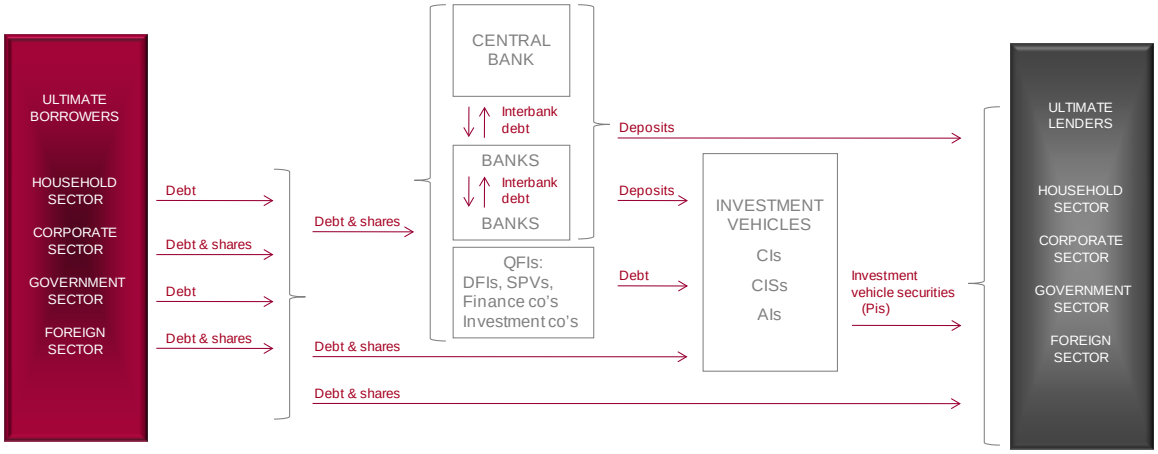


Figure 2: financial intermediaries

Box 1: financial intermediaries

MAINSTREAM FINANCIAL INTERMEDIARIES

DEPOSIT INTERMEDIARIES

Central bank (CB)
Private sector banks

NON-DEPOSIT INTERMEDIARIES (INVESTMENT VEHICLES)

Contractual intermediaries (CIs)

Insurers
Retirement funds (pension funds, provident funds, retirement annuities)

Collective investment schemes (CISs)

Securities unit trusts (SUTs)
Property unit trusts (PUTs)
Exchange traded funds (ETFs)

Alternative investments (AIs)

Hedge funds (HFs)
Private equity funds (PEF's)

QUASI-FINANCIAL INTERMEDIARIES (QFIs)

Development finance institutions (DFIs)
Special purpose vehicles (SPVs)
Finance companies
Investment trusts / companies
Micro lenders

The main financial intermediaries that exist in most countries and their relationships with one another are presented in Figure 2. A useful classification of them is presented in Box 1. Note that the non-deposit intermediaries may also be seen as *investment vehicles*. Their products (= their liabilities), which can be called participation interests (PIs), are designed as investments for the household sector (and in some cases other financial intermediaries).

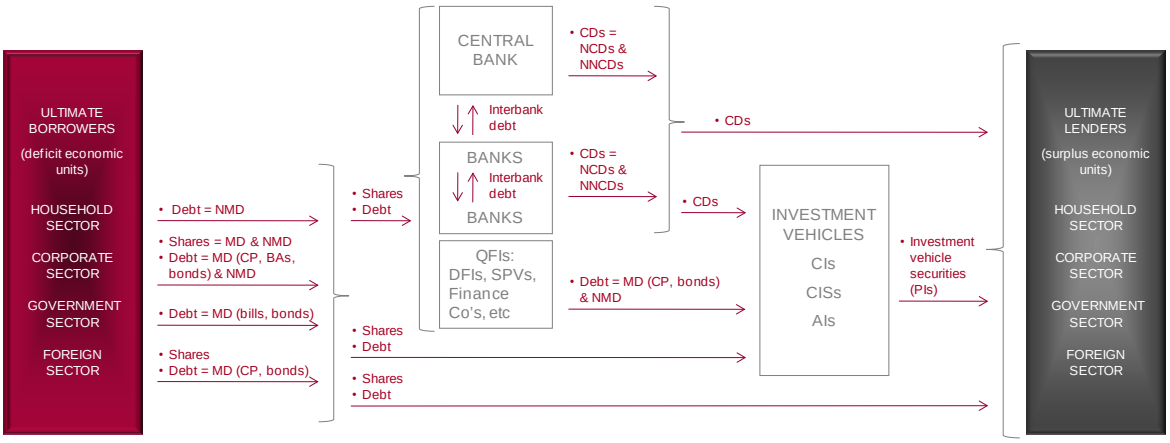
3.3.4 Financial instruments

The third element is financial instruments. They are also called *securities*; borrowers issue securities. They are therefore *evidences of debt or shares*. They also represent *claims on* the issuers / borrowers.

Ultimate lenders exchange money (deposits) for securities and ultimate borrowers exchange (issue new) securities for money. Financial intermediaries issue their own securities (e.g. deposits) and hold the securities of the ultimate borrowers (e.g. treasury bills). As you know, the banks have a special and unique role in this market for money in that they are able to create money (bank deposits) by making new loans (buying new securities).

Securities offer a return that is fixed (fixed-interest debt) or variable (variable-rate debt and share dividends). The capital amount of shares and debt is paid back after a period (bonds and preference shares) or not ever (perpetual bonds and shares). Securities are also either marketable of non-marketable. This is discussed in more detail in the next section.

The instruments of the financial system are shown in Figure 3 and outlined below.



MD = marketable debt; NMD = non-marketable debt; CP = commercial paper; BAs= bankers' acceptances; CDs = certificates of deposit (= deposits); NCDs = negotiable certificates of deposit; NNCDs = non-negotiable certificates of deposit; foreign sector issues foreign shares and foreign MD (foreign CP & foreign bonds); PI = participation interest (units)

Figure 3: financial intermediaries & instruments / securities

There are two categories of financial instruments:

- Debt (and deposits).
- Shares.

The instruments of debt and shares and their issuers are as follows:

The *household sector* issues:

- Non-marketable debt (NMD) securities
  - Examples: overdraft loan from a bank; mortgage loan from a bank.

The *corporate sector* issues:

- Share securities (marketable = listed & non-marketable = non-listed)
  - Ordinary shares (aka common shares).
  - Preference shares (aka preferred shares).

- Debt securities
  - Non-marketable debt (NMD).
  - Marketable debt (MD)
    - Examples: corporate bonds, commercial paper (CP), bankers' acceptances (BAs), promissory notes (PNs).

The *government sector* issues:

- Marketable debt (MD) securities
  - Treasury bills (aka TBs and T-bills).
  - Bonds (aka T-bonds).

The *foreign sector* issues (into the local markets):

- Foreign share securities (inward listings).
- Foreign debt securities (inward listings).

The *deposit financial intermediaries (central and private sector banks)* issue:

- Deposit securities
  - Central bank
    - Non-negotiable certificates of deposit (NNCDs).
    - Notes and coins.
    - Central bank securities[110].
  - Private sector banks
    - Non-negotiable certificates of deposit (NNCDs).
    - Negotiable certificates of deposit (NCDs).

The *quasi-financial intermediaries* issue:

- Debt securities
  - Non-marketable debt (NMD)
    - Example: utilised overdraft facility.
  - Marketable debt (MD)
    - Examples: bonds, commercial paper (CP)

The above may be summarized as in Table 1.

As we have indicated, it is rare that the individual invests in these financial instruments (the exceptions are bank deposits in the form of NNCDs and shares). Rather, they invest in these ultimate financial instruments via the *investment vehicles*, by buying their PIs.

	Debt & deposits		Shares		
	Non-marketable debt & deposits	Marketable debt & deposits	Non-marketable	Marketable	
			Non-listed ordinary shares*	Listed ordinary shares	Listed preference shares
ULTIMATE BORROWERS					
Household sector	OD & mortgage loans from banks	-	-	-	-
Corporate sector	OD & mortgage loans from banks	Corp bonds, CP, BAs, PNs	YES	YES	YES
Government sector	OD loans from banks	Govt bonds, TBs	-	-	-
Foreign sector	-	Foreign bonds	-	YES (inward listing)	YES (inward listing)
FINANCIAL INTERMEDIARIES					
Central bank	NNCDs	NCDs**, notes & coins	-	-	-
Private sector banks	NNCDs	NCDs	-	-	-
Quasi-financial intermediaries	OD loans from banks	Corp bonds, CP	-	-	-
Investment vehicles	Participation interests (PIs)	-	-	-	-

OD = overdraft); CP = commercial paper; BAs = bankers' acceptances; PNs = promissory notes; Corp = corporate; NNCDs = non-negotiable certificates of deposit; NCDs = negotiable certificates of deposit.
* Non-listed preference shares do exist but are rare. ** Central bank (CB) securities, which are akin to NCDs.

Table 1: financial instruments / securities

3.3.5 Financial markets

The fourth element of the financial system is financial markets. Financial markets are categorised according to the securities issued by ultimate borrowers and financial intermediaries. It was noted above that financial securities are either marketable of non-marketable. Examples are non-negotiable certificates of deposit (NNCDs) (= an ordinary deposit receipt) and negotiable certificates of deposit (NCDs) issued by the private sector banks.

There are two market types or forms (see Figure 4): primary market and secondary market. All securities are issued in their primary markets and the marketable ones are traded in the secondary markets. In the primary market the *issuer* receives the money paid by the *lender / buyer*. In the secondary market the *seller* receives the money paid by the *buyer*.

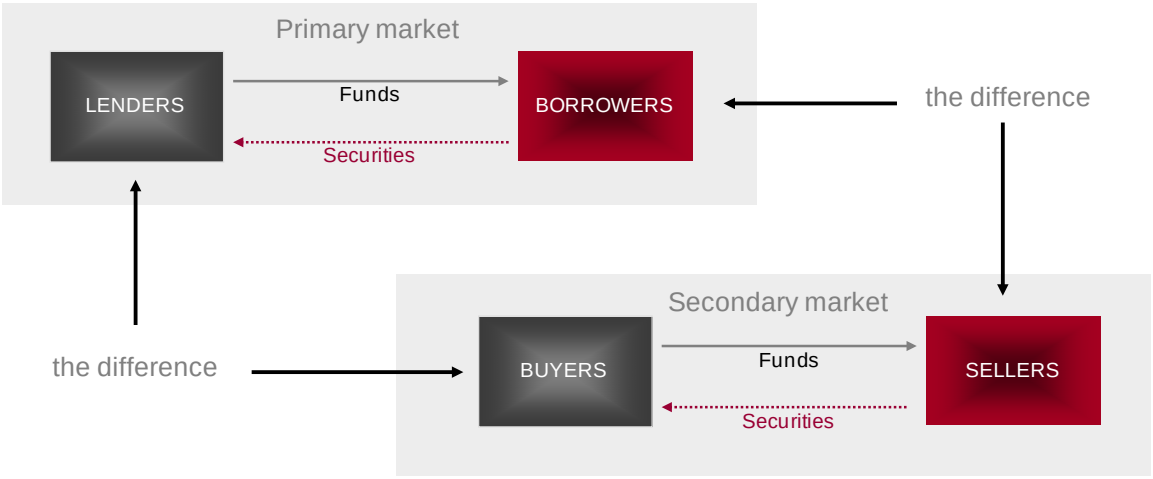


Figure 4: primary & secondary markets

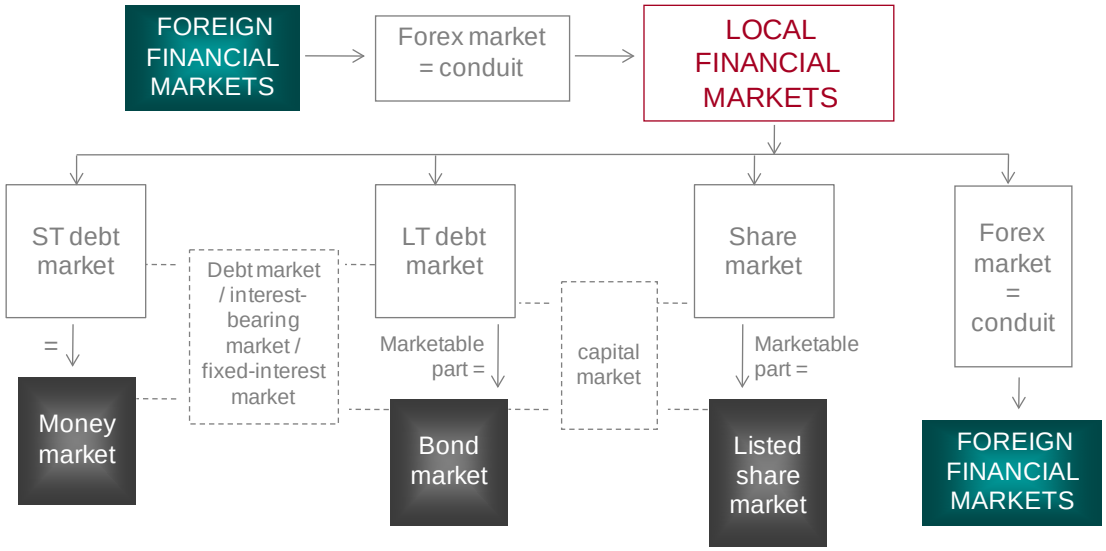


Figure 5: financial markets

There are a number of markets for financial instruments: the market for life policies (a primary market only), the market for PIs (also called units) of securities unit trusts (a primary market and a partial secondary market: the units are saleable to the issuer), the market for PIs in retirement funds (strictly a primary market), the deposit market (primary market for NNCDs and a secondary market for NCDs), the bond market (secondary market), and so on.

The financial markets are depicted in Figure 5. As we will show later, the money market should be defined as the short-term debt market (STDM = marketable and non-marketable debt), while the bond market is the marketable arm of the long-term debt market (LTDM).

The money market (STDM) and the LTDM together make up the debt market (also known as the interest-bearing market and the fixed-interest market). The terms *interest-bearing* and *fixed-interest* oppose the debt market from the share market because the returns on shares are dividends and dividends are not fixed – they depend on the performance of companies. The LTDM and the share market is called the capital market.

The foreign exchange market is not a financial market, because lending and borrowing do not take place in this market. Rather, it is a conduit for foreign investors into local financial markets and for local investors into foreign financial markets.

In addition to these *cash* or *spot* markets [where the settlement of deals takes place a few days after transaction date (T+0)] we have the so-called derivative markets. They are comprised of instruments (forwards, futures, swaps, options and "others" such as weather derivatives) that are *derived* from and get their value from the spot financial markets. Whereas cash markets settle as soon as possible, derivative markets settle at some stage in the future.

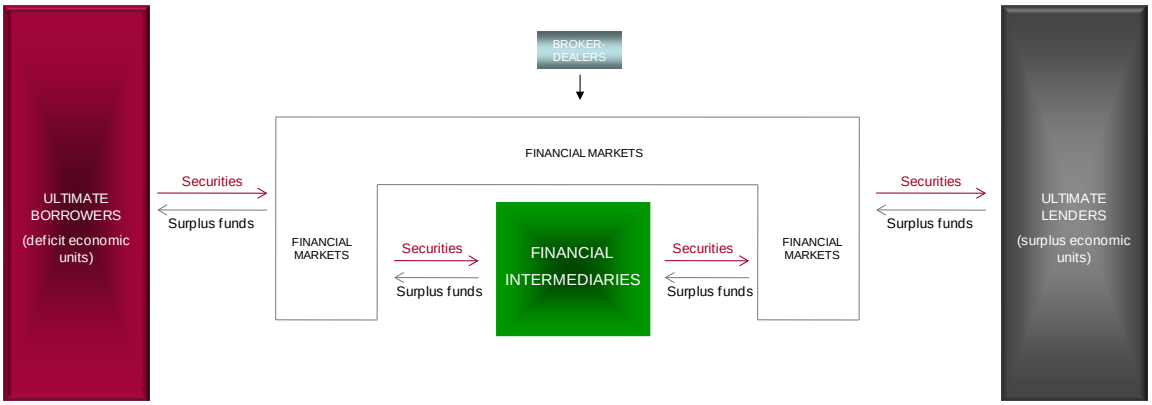


Figure 6: financial markets

Secondary markets are either over-the-counter (OTC), also called "informal markets" (such as the foreign exchange and the money markets) because there is no exchange involved, and exchange (or formal) markets, such as the share (or stock) exchange. The place of the financial markets in the financial system may be depicted as in Figure 6.

The financial markets do not intermediate the financial lending and borrowing process as do financial intermediaries such as banks; they merely facilitate the primary and secondary markets.

3.3.6 Money creation

The fifth element is creation of money. As this entire text is on money creation, we will not give it much attention here. Here follows a brief summary. When banks make new loans / provide new credit (= buy NMD, MD and shares), they create NBPS deposits (= money).

The referee in this game is the central bank which *controls* the growth rate in money creation (= new bank deposits resulting from new bank loans) by means that differ from country to country (which are elucidated later). The principal method is the interest rate on banks' loans (= bank assets) via the central bank's KIR interest rate, which influences the cost of bank liabilities (i.e. via the bank margin).

3.3.7 Price discovery

The sixth element is price discovery. Primary and secondary markets are important for a number of reasons, the most important of which is *price discovery*, i.e. the establishment of interest rates for various terms and the prices of shares. Interest rates, as we will see, have an important role to play in the pricing of all assets. The central bank plays a significant role in the establishment of interest rates. These significant issues are addressed later.

3.3.8 Allied participants on the financial system

From the above discussion it will be evident that there are a number of allied participants on the financial system. By this we mean participants other than the *principals* (those who have financial liabilities or assets or both). As we now know, the principals are:

- Lenders.
- Borrowers.
- Financial intermediaries.

The allied participants, who play a major role in terms of facilitating the lending and borrowing process (the primary market) and the secondary markets are the financial exchanges and their members. Also we need to mention the fund managers, who are actively involved in sophisticated financial market research and therefore play a major role price discovery, and the regulators of the financial markets. Thus the allied non-principal participants in the financial markets are:

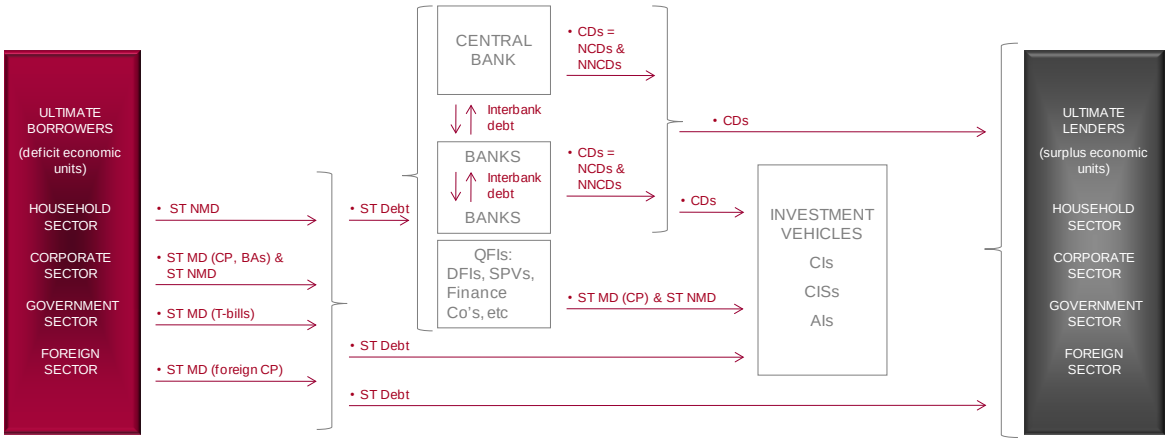
- Financial exchanges.
- Broker-dealers.
- Fund managers.
- Regulators.

3.4 The money market

We have described the financial system, and we know that the money market is an essential part of it and the foundation of the other financial markets. We defined the money market as the STDM. As far as debt instruments are concerned, the money market encompasses:

- Primary market: the issue of all forms of short-term instruments of borrowing, that is, the short-term debt of ultimate borrowers and certain QFIs, and short-term deposit instruments. Deposit instruments are the NNCDs and NCDs of banks and certain instruments of the central bank, the important ones of which are notes and coins (= part of money) and central bank securities (= a form of deposit, and an instrument of monetary policy).
- Secondary market: the exchange of existing marketable short-term debt instruments.

Hidden from the public's view, however, is an integral part of the money market: the interbank market (and there are three parts to it). These markets play a significant role in money creation and monetary policy. We discuss them in some detail later. In Figure 7 we present a summary of the money market.



MD = marketable debt; NMD = non-marketable debt; CP = commercial paper; BAs= bankers' acceptances; CDs = certificates of deposit (= deposits); NCDs = negotiable certificates of deposit; NNCDs = non-negotiable certificates of deposit;

Figure 7: money markets

3.5 Money market interest rates

We now need to address money market (or short-term) interest rates. Short-term interest rates, such as the banks' prime lending rate, deposit rates, and so on, are *made* (or *discovered*) in the money market and longer-term interest rates are *made* in the bond market. How are interest rates *made*? Interest rates are the price of money: the rate of interest paid on debt, to compensate the lender (buyer of the debt) for foregoing liquidity (= not spending now). Usually[111], the longer the debt is the higher the rate is because the lender is foregoing liquidity for longer. Interest rates are *made* in the primary and secondary debt (and deposit) markets. The players in the market are the lenders and borrowers and the financial intermediaries. Of the latter the central bank is the most important – it is a player and the referee.

It is necessary now to present the concepts *time value of money* (TVM) and *yield curve* (YC). TVM is best elucidated with a question: if you were offered the choice of receiving LCC 100 today or LCC 100 in one year's time, which will you choose? Unless you have a major brain problem you will choose the latter. Why? Because it's worth more to you: you can invest the money and have more than LCC 100 in a year's time.

Therefore money has a present value (PV) and a future value (FV). PV is the LCC 100 now and FV is the value the LCC 100 escalated to a number in the future, the difference between the two being the rate of interest for the one-year term to maturity applied to the PV. You will now immediately understand that [ir = interest rate % pa expressed as a unit of 1 (let's assume 10% pa or 0.1); t = term to maturity in days divided by 365]:

$$FV = PV + (PV \times ir \times t).$$

This equation translates to:

$$FV = PV \times [1 + (ir \times t)].$$

Using the above numbers we have:

$$\begin{aligned} FV &= PV \times [1 + (ir \times t)] \\ &= LCC\ 100 \times [1 + (0.1 \times 365 / 365)] \\ &= LCC\ 100 \times 1.01 \\ &= LCC\ 110. \end{aligned}$$

The converse is to derive the PV from a known FV:

$$PV = FV / [1 + (ir \times t)].$$

Thus if we have a given number of LCC 110 in 365 days' time (= FV) we are able to calculate the PV at the ruling interest rate for the period (again assume 10% pa):

$$\begin{aligned} PV &= FV / [1 + (ir \times t)] \\ &= LCC\ 110 / [1 + (0.1 \times 365 / 365)] \\ &= LCC\ 110 / 1.01 \\ &= LCC\ 100. \end{aligned}$$

This PV-FV concept (i.e. time value of money) is the principle underlying the valuation of *all assets* that have a monetary value / cash flow/s in the future[112]: money market assets, shares, bonds and income-producing property. This principle is significant in comprehending monetary policy: when interest rates increase the value of assets falls, and vice versa. This has a major impact on aggregate demand and on the demand for bank loans. As we will see, central banks focus on and have control over interest rates.

Figure 8 shows the effect on PV (= the value of the asset) of different rates of interest: the higher the rate, the lower the PV.

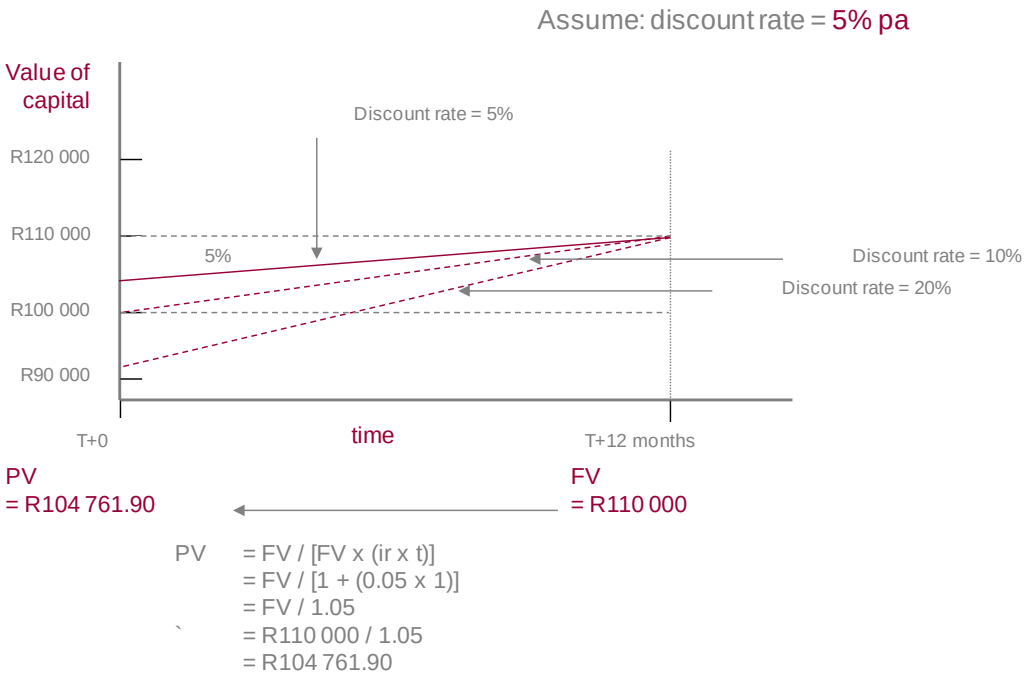


Figure 8: from FV to PV (the principle)

Now, on to the YC. In the example above the "security" had a term to maturity (ttm) of one year and an interest rate of 10% pa. The 10% pa rate is the rate determined in the secondary market for this security. Now imagine tens or hundreds of government securities (bonds and treasury bills) all with different terms to maturity trading in the secondary market[113]. Each of them has a market rate that largely depends on the ttm.

Imagine taking a snapshot of the government securities (remember: government bonds and treasury bills) market at a specific time on a specific day, i.e. you write down the rates at which all the government securities are trading. You have two parameters: *ttm* and *market rate* (called yield to maturity – ytm – in the bond market) for each security. You plot this on a chart (in a spreadsheet); you will now have a series of crosses / dots on the screen as indicated in Figure 9. You then use sophisticated stats-maths to draw a best-fit curve as indicated by the solid line in Figure 9. This is the *yield curve* for government securities. Formally, it is *a representation of the relationship between term to maturity and interest rate (ytm)* for the government securities market.

We know that the money market is the STDM and the bond market is part of the LTDM. The cut-off point between the two is arbitrarily set at one year. Thus, in the YC the rates on government securities from 1 day to a year are money market rates, and after a year the rates are bond market rates. More essential knowledge: the rates on government securities are also called risk-free rates (rfr), and this is so because if you buy a government security you will definitely[114] get your money back plus the fixed rate that applied to it.

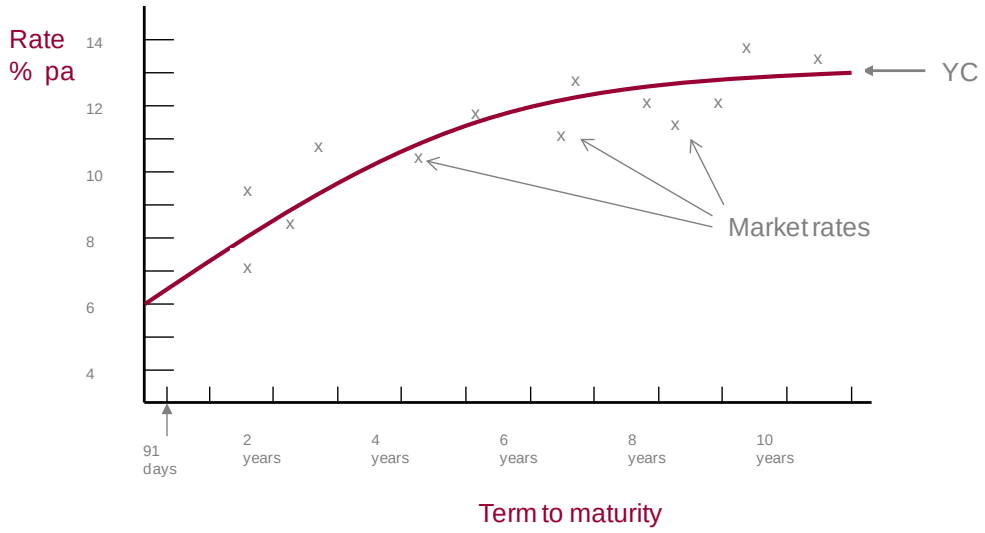


Figure 9: normal yield curve

What is the relevance of this to money creation? It is that money creation takes place in the financial markets and it is closely related to interest rates. The government securities YC can be regarded as the "norm" or reference, and all other (non-government) rates revolve around the norm. More importantly, the central bank has the tools to influence the bottom end of the YC to a desired level. Thus, the central bank determines the bottom end of the YC, and all other interest rates react to any changes to the YC the central bank brings about.

Also, these rates represent the lowest rates of return that can be expected on investments. Thus, if rates are pushed higher, borrowers will borrow less (= a lower rate of growth in money creation = lower inflation). Individuals will have to pay more on debt, and companies will discover that new projects for which borrowing is required may not be as feasible as before (remember companies offer a *return* in the form of dividends) (= a lower rate of growth in money creation). Long-term investors such as retirement funds will tend to buy more bonds and fewer shares.

Conclusion: interest rates play a vital role in money creation. But before this section ends there is a need to elucidate the composition of interest rates (see Figure 10). It will be noted that inflation is a component. What influences inflation? Money growth does.

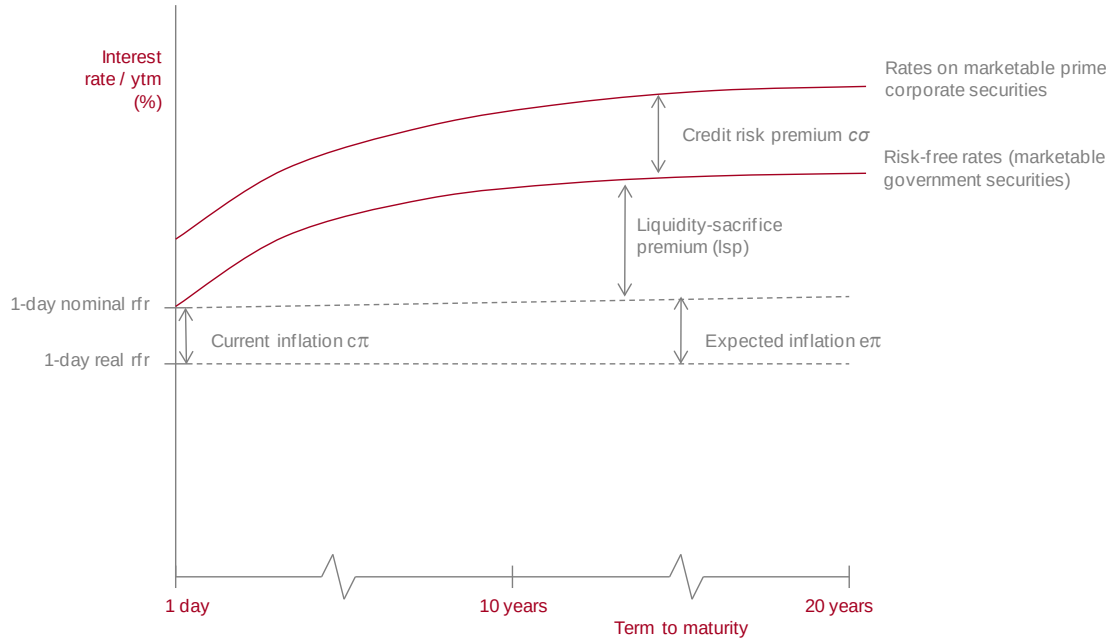


Figure 10: composition of nominal interest rates

Our starting point is the one-day rate on government securities, called the *nominal* (it means *actual*) rfr for one day. This is a rate that is available in the real world. The current inflation rate (cπ) is known (at worst it is a few weeks old, but if inflation is steady it does not matter if the next one published is a few points out from the previous one); therefore you can determine the *real* rfr for one day (nominal rfr – cπ = real rfr).

From this point on the nominal rates on all longer-term government securities are composed of the one-day real rfr, cπ [or *expected* inflation (eπ) as you go longer], and the liquidity-sacrifice premium (lsp). The investor demands an lsp because s/he is sacrificing the ability to use the money now.[115] The lsp increases as the ttm increases because investors demand more return for the longer sacrifice of liquidity.

You will recall that we said that the government security yield curve is the norm for rates. This statement will now become clear. Companies which borrow through the issue of bonds set the rates on their bonds with reference to the rates on government securities, that is, government securities rates are the benchmark rates for corporate bond rates. As indicated in Figure 10, they show a positive relationship with ttm.

In summary the rfr for each ttm is composed as follows:

Each rfr = one-day real rfr + π (current / expected) + lsp.

Corporate bond rates (cbr) are composes as follows (crp = credit risk premium):

Each cbr = one-day real rfr + π (current / expected) + lsp + crp.

Now we know how interest rates are composed. As a quick aside: instinctively you will derive from this analysis that it is rational to benchmark any potential investment on the risk-free rates. In other words when any investment is assessed its return must be higher than the rfr as follows:

Required rate of return (rrr) = nominal rfr + a premium for credit risk.

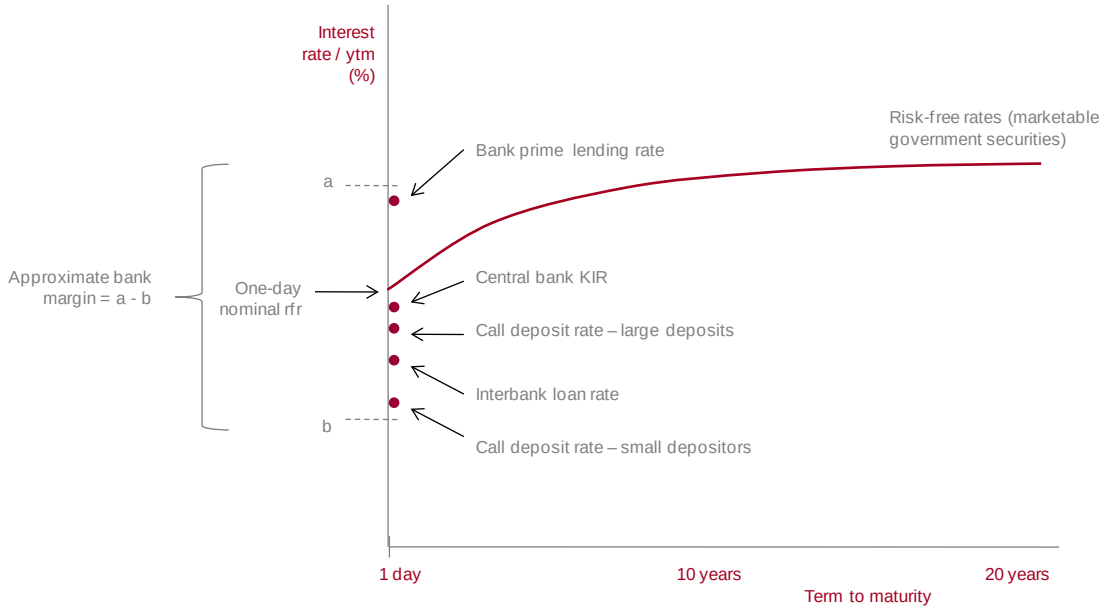


Figure 11: money market rates & bank margin

Back to the money market and specifically to short-term interest rates (see Figure 11).[116] We know where the reference one-day nominal rfr is. One day debt / deposit rates are known as "call" rates; for example if you place a large amount of money with a bank and you have the right to withdraw it when it suits you, it is a call money deposit. The call rate can vary daily, depending on money market conditions (explained later in detail). Call rates are critical rates in the money market because this is where all interest rates have their genesis, and, critically, this is where the central bank intervenes to "set" short-term interest rates. As we will see, in some countries this "setting" of rates is virtually *exact*, and in others less so.

We now need to focus on the bottom end (money market part) of the YC and, even more tightly, to the one-day rates. Note that "one-day rates" refers not only to one-day deposits / loans but to deposits / loans where the rate is changeable daily (in theory, and this includes overdrafts). As explicated earlier, banks endeavour to earn a healthy margin. A large proportion of banks' deposits are for one day, i.e. on call. In the case of the household sector consider cheque deposit accounts, savings accounts, transmission accounts and small call deposit accounts. The rate paid on these deposits is represented in Figure 11 by the dot denoted "call deposit rate – small depositors". For the large deposits at call, which is a major component of banks' deposits, a higher call rate is paid – the dot denoted "call deposit rate – large depositors". The latter plays a mammoth role in the money market – which will become clearer later – in that they are savvy as far as what bank call rates should be, and demand the highest rates. If a bank slips on its quote the call deposit money will move to another bank. So, the market for large call deposits is efficient indeed.

All other deposit rates are related to the banks' call rates for large deposits. As we move further into the longer-term the rates are usually higher, but they are still related to the call rates.

Now consider the *bank margin* we spoke about earlier. As profit-maximising entities banks endeavour to maximise the margin, by paying the least for deposits and earning the most on loans extended. Their benchmark rate for credit extended is called the *prime lending rate*, which we will call *prime rate*. This is called a benchmark rate because it is a high profile rate, i.e. published at all times. It is the rate for low risk customers; all other bank credit rates are benchmarked on prime rate. Thus, you may be paying prime + 1% pa for your overdraft facility utilised while your wealthy pal may be paying prime. A large company may pay prime minus 1.5% pa, while a smaller one may be paying prime and so on and so forth. In figure 11 the bank margin is approximately denoted.

Two other one-day rates are indicated in Figure 11 that we have not spoken of before: the interbank rate and the central bank's lending rate to banks, the KIR. Both these are interbank rates, and we now turn to these and related issues.

3.6 The interbank markets

3.6.1 Introduction

Part of the money market is 1-day loans of banks to other banks, called the interbank loan market or just the interbank market (IBM). Here we need to differentiate the private sector banks and the central bank. We also need to reintroduce the balance sheets of these two very different types of banks: see Balance Sheets 1 and 2. Note that in order to simplify the analysis, we make the following assumptions (which do not affect the principles discussed):

- Private sector banks are denoted banks.
- Capital and reserves, other assets and other liabilities are ignored.
- Government only banks with the central bank (which is the case in most countries).
- Loans to government sector means holdings of government bonds and treasury bills.
- We regard all deposits as short-term (= money).
- The banks hold no foreign deposits / assets.
- Bank notes do not rank as reserves, which does apply in a number of countries. We assume this because when bank notes rank as reserves the story becomes complicated and detracts from the principles we are attempting to bring across clearly.

From the balance sheets of the central bank we can gauge its main functions, which we will discuss in more detail later. Banks are uncomplicated intermediaries; they take deposits from the public and provide loans to government and the NBPS – or do they? In a static balance sheet it seems so, but when their balance sheets expand the story is different – as you now know, new loans creates new money. Apart from this main function they have transactions with the central bank as you can see from the other balance sheet items. Note the highlighted items: it is through these accounts that the IBM functions.

BALANCE SHEET 1: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 000	A. Notes and coins	1 000
		B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		a. Required reserves (RR = 500)	
F. Loans to banks (borrowed reserves – BR)	400	b. Excess reserves (ER = 0)	
		C. Foreign loans	100
Total	**2 500**	**Total**	**2 500**

BALANCE SHEET 2: BANKS (LCC BILLIONS)			
Assets		**Liabilities**	
C. Notes and coins	100		
D. Reserves with central bank (TR)	500		
1. Required reserves (RR = 500)		A. Deposits of NBPS (BD)	5 000
2. Excess reserves (ER = 0)			
F. Loans to government	1 000	B. Loans from central bank (BR)	400
G. Loans to private sector	3 800		
Total	**5 400**	**Total**	**5 400**

The IBM is where the settlement of interbank claims takes place and where monetary policy begins. In some countries banks have two accounts with the central bank: a *reserve account* on which required reserves (RR) are held and a *settlement account* (SA) over which the settlement of interbank claims takes place. In other countries banks have one account with the central bank, and it has many names: reserve account, settlement account, cash reserve account, and so on. Here we refer to it as *reserve account*. On these accounts the banks hold their required RR and (if any) their excess reserves (ER). The total of the two amounts we call total reserves (TR). Thus:

$$TR = RR + ER.$$

There are three interbank "markets" of which only one is a true market, i.e. where a market rate is determined (the IBM rate – see Figure 12[117], note that it is below the KIR).

3.6.2 The bank-to-central bank interbank market

The first IBM is the bank-to-central bank interbank "market", or *b2cb IBM*. It is an "administrative" market in which the flow is one-way: from the banks to the central bank in the form of the cash reserve requirement. As mentioned earlier we will refer to the cash reserve requirement *amount* as required reserves (RR). The banks' RR are held on their reserve accounts with the central bank. In the vast majority of countries the RR balances earn no interest, which is an essential element in monetary policy (as we will elucidate later). Another important element of monetary policy in most countries is that banks are kept chronically short of reserves by the central bank (see later), such that ER for the banking system does not exist.

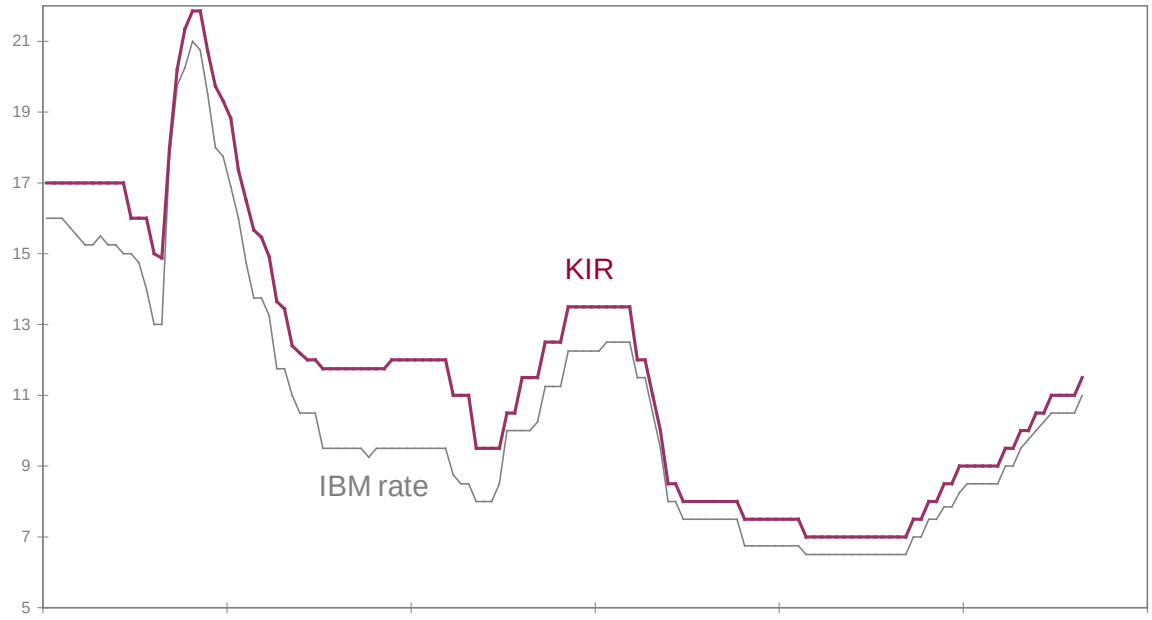


Figure 12: IBM rate & KIR

To elucidate the RR further: in most countries banks are required by statute to hold a certain ratio of their deposits in an account with the central bank. It has its origin in the gold coin reserves held by the goldsmith-bankers from the seventeenth century and later in voluntary note and deposit holdings with the Bank of England. In our accompanying balance sheets (1 and 2) the banks have deposits (BD) of LCC 5 000 billion, an assumed statutory RR ratio (rr) of 10% of deposits, and RR with the central bank of LCC 500 billion. They therefore are holding the minimum required (TR = RR), and they do so because, as noted, the central bank does not pay interest[118] on reserves. Note also in this example that the banks are borrowing LCC 400 billion from the central bank, so it will not have ER (this critical issue is illuminated in much detail below). In summary, as regards the b2cb IBM:

BD × rr = RR = TR.
LCC 5 000 billion × 0.10 = LCC 500 billion = TR.
ER = 0.

3.6.3 The central bank-to-bank interbank market

The second IBM is the central bank-to-bank interbank "market", or *cb2b IBM*. It is also an "administrative" market, and it is *at the centre of the vast majority of countries' monetary policy*. It represents loans from the central bank to the banks (also called borrowed reserves – BR). The central bank provides these reserves at its KIR. As seen in the balance sheets above:

BR = LCC 400 billion.

In most countries monetary policy is aimed at ensuring that the banks are indebted to the central bank *at all times* so that the KIR is applied and therefore is "made effective" on part of the liabilities of the banks (recall from Figure 2: bank liabilities = BD + BR). The KIR has a major influence on the banks' deposit rates and, via the more or less static bank margin, on the banks' prime rate[119]. This, as we will show later in some detail, is an extremely successful policy protocol.

3.6.4 The bank-to-bank interbank market

The third interbank market is a true market: the bank-to-bank interbank market, or *b2b IBM*. This market operates during the banking day but particularly at the close of business each day (banks "close off their books" every day). Allow us present an example: a large corporate customer (Company A) withdraws LCC 100 billion of its call money deposits from Bank A and deposits it with Bank B – because Bank B offered a higher call money rate.

How does the settlement of these transactions take place between the two banks? It takes place over the banks' reserve accounts: item B2 in Balance Sheet 1, and item D in the Balance Sheet 2. Balance Sheets 3 – 6 elucidate the story.

BALANCE SHEET 3: COMPANY A (LCC BILLIONS)			
Assets		**Liabilities**	
Deposit at Bank A Deposit at Bank B	-100 +100		
Total	**0**	**Total**	**0**

BALANCE SHEET 4: BANK A (LCC BILLIONS)			
Assets		**Liabilities**	
Reserve account at CB	-100	Deposits (Company A)	-100
Total	**-100**	**Total**	**-100**

BALANCE SHEET 5: BANK B (LCC BILLIONS)			
Assets		**Liabilities**	
Reserve account at CB	+100	Deposits (Company A)	+100
Total	**+100**	**Total**	**+100**

BALANCE SHEET 6: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Reserve accounts: Bank A Bank B	 -100 +100
Total	0	Total	0

Assuming that at the close of business yesterday the two banks were not borrowing from the central bank (BR = 0) and they did not have any surpluses with the central bank (TR = RR; ER = 0):

- Bank A is now short of RR by LCC 100 billion, and therefore does not comply with the RR (TR < RR).
- Bank B now has surplus reserves (TR > RR or TR – RR = ER = LCC 100 billion).

BALANCE SHEET 7: BANK A (LCC BILLIONS)			
Assets		Liabilities	
		Deposits (Company A) Loan (Bank B)	-100 +100
Total	0	Total	0

BALANCE SHEET 8: BANK B (LCC BILLIONS)			
Assets		Liabilities	
Loan to Bank A	+100	Deposits (Company A)	+100
Total	+100	Total	+100

We assume this is the only transaction that takes place during the day, and that bank B does not have outstanding borrowings from the central bank. We are now at the close of business. The electronic interbank settlement system presents the two banks with the above information that pertains to each of them. Bank A needs to borrow LCC 100 billion and Bank B would like to place its ER somewhere at a rate of interest. The *somewhere* at the end of the business day is only the other banks (in this case Bank A).

The final interbank clearing process at the end of the business day takes place over these same reserve accounts with the central bank. In this b2b IBM the surplus bank, Bank B, will place its ER of LCC 100 billion with Bank A, and this will take place at the IBM rate (after some haggling). Bank B will instruct the central bank to debit its reserve account and credit Bank A's reserve account. The central bank's balance sheet will be unchanged, and the banks' balance sheets appear as in Balance Sheets 7 and 8.

Thus, in the b2b IBM, banks place funds with or receive funds from other banks depending on the outcome of the clearing. Surpluses are placed at the IBM rate. A critical issue here is that this rate is closely related to the KIR (as shown in Figure 12) because banks endeavour to satisfy their liquidity needs in this market before last resort borrowing from the central bank at the KIR. In this example it was possible. Later we will show that when the central bank does a deal in the open market (= open market operations or OMO) it affects bank liquidity. And as you now know, when one speaks of bank liquidity one makes reference to the state of balances on the banks' reserve accounts: the status of TR, RR, ER and BR. As we will demonstrate later, the central bank has total control over bank liquidity, and therefore over interest rates.

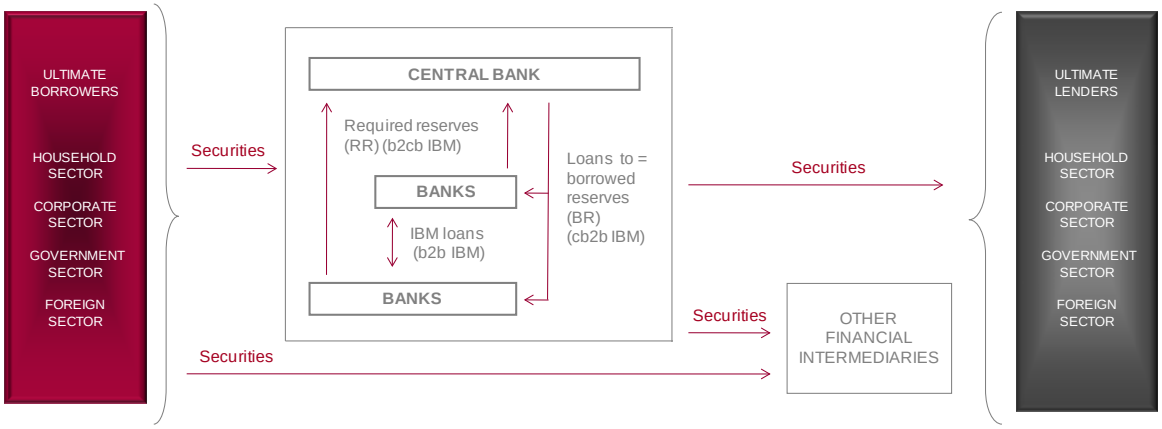


Figure 13: interbank markets

In the b2b IBM no new funds are created; existing funds are merely shifted around. New funds (reserves) are created in the cb2b IBM (in the long term). The latter is a function of the ability of banks to create money in the form of deposit money[120]. This they are able to do without restraint[121] and the central bank supports this by the creation of the additional RR (a function of deposit growth). Is it as simple as this? We will answer this essential question a little later.

We portray the interbank markets in Figure 13.

In order to concretise comprehension of the b2b IBM we present another example:

- Company A sells goods to Company B to the value of LCC 100 million; Company A's banker is Bank A.
- Company B borrows LCC 100 million to buy the goods; Company B's banker in Bank B.

It will be evident that this is a case of bank deposit money creation; the balance sheets appear as in Balance Sheets 9–13 just before the final interbank market clearing takes place. Note that we ignore the effect of the transactions on RR for now.

BALANCE SHEET 9: COMPANY A (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Deposits at Bank A	-100 +100		
Total	**0**	**Total**	**0**

BALANCE SHEET 10: BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
Reserve account at CB	+100	Deposits (Company A)	+100
Total	**+100**	**Total**	**+100**

BALANCE SHEET 11: COMPANY B (LCC MILLIONS)			
Assets		**Liabilities**	
Goods	+100	Loans from Bank B	+100
Total	**+100**	**Total**	**+100**

BALANCE SHEET 12: BANK B (LCC MILLIONS)			
Assets		Liabilities	
Loans to Company B Reserve account at CB	+100 -100		
Total	0	Total	0

BALANCE SHEET 13: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Reserve accounts: Bank A Bank B	 +100 -100
Total	0	Total	0

The final IBM takes place: Bank A makes an interbank loan to Bank B at the interbank rate, and instructs the central bank to debit its account and credit the account of Bank B. Company A's and Company B's balance sheets do not change; only the banks' do and end up as indicated in Balance Sheets 14–15.

BALANCE SHEET 14: BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
Loan to Bank B	+100	Deposits (Company A)	+100
Total	**+100**	**Total**	**+100**

BALANCE SHEET 15: BANK B (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to Company B	+100	Loan from Bank A	+100
Total	**+100**	**Total**	**+100**

It will be evident that the money stock has increased by LCC 100 million (= deposit of Company A) and the BSCoC is the bank credit increase of LCC 100 million; the real cause is the demand for credit by Company B which was satisfied by its banker, Bank B.

3.6.5 Money creation and the central bank-to-bank interbank market

The b2cb IBM represents the banks' RR (= a ratio of BD required by statute) on which interest is not paid. Thus as the BD increases, the amount of additional RR required is:

$$\Delta RR = \Delta BD \times rr.$$

In the aforementioned example this was ignored for the sake of simplicity. As we now know, when BD increases the reserves required to be held increases by $\Delta BD \times rr$, thus by LCC 10 million. This brings us to the cb2b IBM: in order to comply with the increased reserve requirement (+10) the banks have no option but to borrow the funds from the central bank at the KIR. The liquidity shortage (assuming there is one) increases by LCC 10 million (BR = +LCC 10 million). This is indicated in Balance Sheets 16–17 (we assume Bank B wrestled the lost deposit back).

BALANCE SHEET 16: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to banks (BR)	+10	Reserve accounts (TR) RR +10	+10
Total	**0**	**Total**	**0**

BALANCE SHEET 17: BANK B (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to Company B Reserves accounts (TR) RR +10	+100 +10	Deposits (Company A) Loans from CB @ KIR (BR)	+100 +10
Total	**+100**	**Total**	**+100**

So, now we know that when BD increases, the RR increases by ΔBD × rr. It is also important to know that whenever a central bank does a deal itself (OMO) it brings about a change in its balance sheet. This is a critical element in monetary policy, because it means that the central bank can influence its balance sheet at will, and specifically the amount that it lends to banks at its KIR. In other words, the central bank, depending on the deal, will be a part of the interbank clearing (apart from assisting banks to settle amongst themselves). Allow us present an OMO example:

- The central bank sells LCC 100 billion treasury bills (TBs) on tender.
- Bank A buys the TBs.

The balance sheets of the central bank (CB) and Bank A change as indicated in Balance Sheets 18–19.

BALANCE SHEET 18: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
TBs	-100	Reserve accounts: Bank A	 -100
Total	**-100**	**Total**	**-100**

BALANCE SHEET 19: BANK A (LCC BILLIONS)			
Assets		**Liabilities**	
TBs Reserve account at CB (TR)	+100 -100		
Total	**0**	**Total**	**0**

Bank A is now short of RR to the extent of LCC 100 billion. This is the only deal done in Local Country on the day, so there are no funds available in the b2b IBM. And here comes a critical point: Bank A cannot create central bank money; only the central bank itself can do so. Thus, critically, this deal ends up with the central bank making a loan to Bank A (BR) so that it again complies with the reserve requirement. Their balance sheets end up as indicated in Balance Sheets 20–21.

BALANCE SHEET 20: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
TBs Loan to Bank A @ KIR	-100 +100		
Total	**0**	**Total**	**0**

BALANCE SHEET 21: BANK A (LCC BILLIONS)			
Assets		**Liabilities**	
TBs	+100	Loan from CB @ KIR (BR)	+100
Total	**+100**	**Total**	**+100**

The liquidity of the banking sector [as measured by excess reserves (ER) less central bank loans to the banks (BR) = NER (net excess reserves)] has deteriorated by LCC 100 billion. This fairly intricate concept will be elucidated in some detail later.

What was the reason for the central bank doing this deal? It was to increase the bank's indebtedness to the central bank (i.e. reduce bank liquidity), in order to indicate a tougher stance on monetary policy. The banks are in a worse liquidity situation in that they are paying the KIR on a larger borrowing from the central bank. This interbank "market" is where monetary policy has its genesis.

The bottom end of the yield curve (specifically the one-day rate[122]) can be said to be heavily influenced (almost "set" as we shall see later) by the central bank through "manipulating" the *liquidity condition* of the banks. Through open market operations the central bank ensures (in most countries) that the banks at all times are in *liquidity shortage* (LS) condition (also called the *money market shortage* – MMS – in some countries). This means that they are kept (by the central bank) perennially short of liquidity and the central bank supplies the required liquidity (BR) at the KIR, thus making the KIR *effective*.[123]

As said before, the purpose is to influence the cost of bank liabilities, specifically bank deposits, and through the bank margin, the banks' lending rates. The level of bank lending rates affects the demand for loans, which creates BD (money). Before turning to the detail of this mechanism, and the application of this model in different countries, we need to introduce you to the measures of money, the causes of money creation, and the fallacies that exist.

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