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Central Banking & Monetary Policy: An Introduction

Prof. Dr AP Faure



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1 Essence of central banking

1.1 Learning outcomes

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

1. Describe the main reason for the existence of central banks.
2. Elucidate the milieu of the central bank: the financial system.
3. Explain the context of monetary policy: financial stability.
4. Describe the components of the balance sheet of a central bank.
5. Explain the simplicity of money creation.
6. List the categories of central bank functions.

1.2 Introduction

To state that the central bank plays a significant role in the financial system and the real economy is a striking understatement. Because the public generally regards bank deposits (BD) as the *means of payments / medium of exchange* [notes and coins (N&C) are small in comparison and will soon disappear], BD is *money*. It follows that because BD is money, banks are able to create BD simply by making loans [marketable debt (MD) and non-marketable debt (NMD)]. This arrangement, while liberating (in terms of there not being a shortage) when compared with the days when money was made of precious metals (and therefore in short supply), is associated with a few problems:

- The supply of bank loans (which creates money, BD) is limited only by the demand for loans and the creditworthiness / project viability of the borrower (individuals, companies, government).
- Banks are in competition with one another for this business, and tend to be lax in terms of the latter, making them inherently unstable. They therefore require robust regulation and supervision.
- Because the supply of loans is (theoretically) unlimited, inflation and hyperinflation are risks which still exist.
- Because the supply of loans is (theoretically) unlimited (see Figure 1), price discovery in money does not exist. Therefore, intervention of an entity is required.

This entity is the central bank. Unsurprisingly, central banks were born in unstable times. The central bank is required in the main:

- To manage short-term interest rates, particularly the lending rates of banks, and therefore influence the demand for loans / money creation, called monetary policy.
- To regulate and supervise the unstable banking (and financial) system.

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These are the core functions of the central bank. There are many allied functions of the central bank. We present this extremely interesting entity in the following sections:

- Essence of central banking.
- Banker and advisor to government.
- Management of the money and banking system.
- Formulation and implementation of monetary policy.

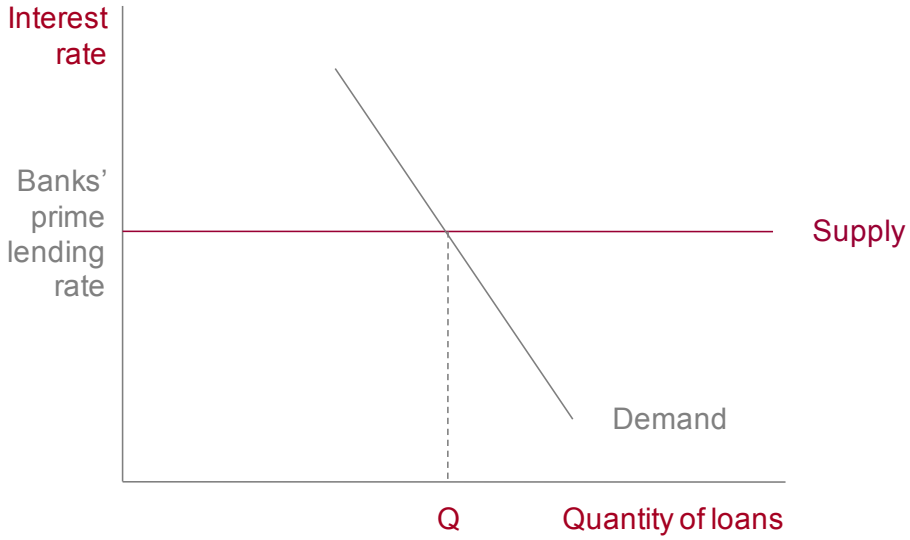


Figure 1: supply of & demand of bank loanrs

This section, on the essence of central banking, is arranged as follows:

- Milieu of the central bank: the financial system.
- Context of central banking: financial stability.
- Balance sheet of a central bank.
- Money creation
- Functions of central banks.

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1.3 Milieu of the central bank: the financial system

It may be useful to introduce the subject of central banking by briefly describing the financial system, thus contextualising banking. The financial system may be depicted simply as in Figure 2. It is essentially concerned with borrowing and lending and has six parts or elements (not all of which are visible in Figure 2):

- 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.

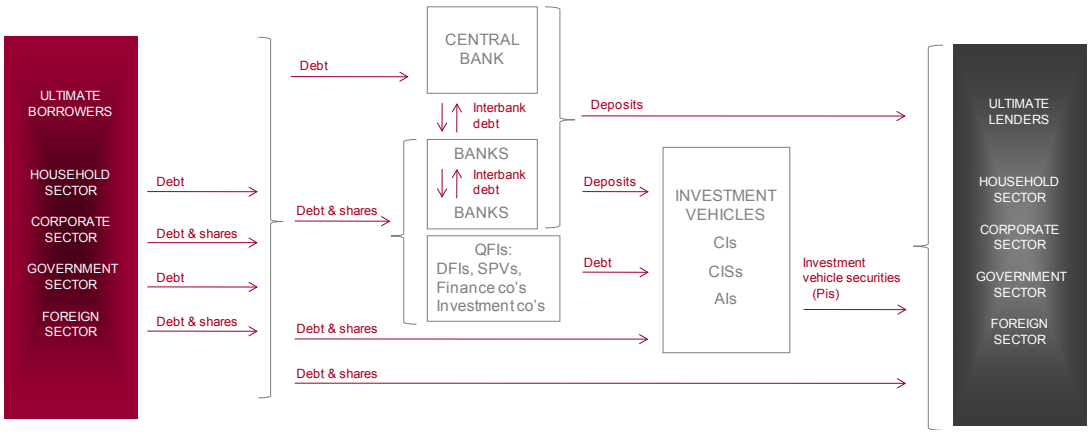


Figure 2: banks on the financial system

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There are a number of allied participants in the financial system, i.e. participants other than the *principals* (those which have financial liabilities or assets or both). The principals are: *lenders, borrowers* and *financial intermediaries*. The allied participants play a major role in terms of *facilitating* the lending and borrowing process (the primary market) and the secondary markets. So do the fund managers, who are actively involved in sophisticated financial analysis research and therefore play a major role in asset allocation and price discovery, the regulators of the financial markets and institutions, and the rating agencies. Thus, the allied *non-principal* participants in the financial system are:

- Financial exchanges and broker-dealers.
- Fund managers.
- Regulators.
- Rating agencies.

Figure 3 is an attempt to depict most of the elements of the financial system and the allied participants.

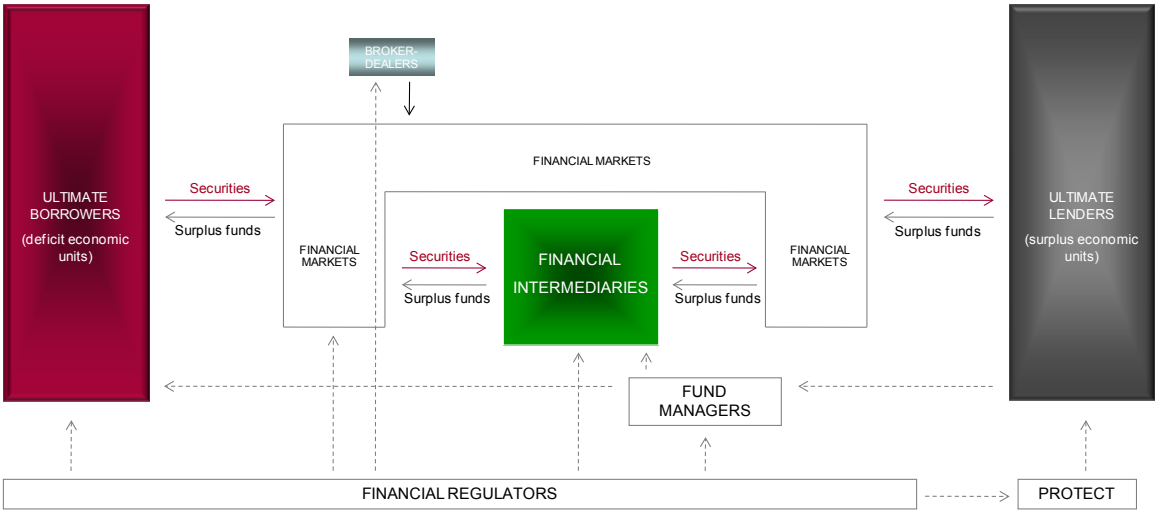


Figure 3: (most) elements of the financial system

In which elements is the central bank (from here on CB) involved? The answer is all, some directly and some indirectly. Figure 2 shows that the CB holds debt securities and issues deposits, and it is involved in the interbank market. What it cannot illustrate is the CB's activities in the financial markets as buyer and seller of certain securities (called open market operations – OMO), and its major role in price discovery and money creation. Neither does Figure 2 indicate its overall objectives. We will discuss all these critical issues; we begin with the overall objectives of the CB.

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1.4 Context of central banking: financial stability

1.4.1 Introduction

We present this discussion in the following sections:

- Objective of financial stability.
- Why financial stability?
- How is financial stability achieved domestically?
- Worldwide focus.

1.4.2 Objective of financial stability

Financial stability has two legs:

- Price stability.
- Stable conditions in the financial system.

Price stability is low and stable (non-volatile) changes in the general price level, generally referred to as the inflation rate. History has shown that when inflation is low, it tends to be non-volatile. What is low inflation? The majority of the world tends to subscribe to 2–3% pa. Why 2–3% pa and not 0% pa? The jury is out on this one, but present economic lore holds that 0% pa is too close to deflation (falling prices, which has a major negative impact on spending and investment), and that 2–3% pa is tolerable and keeps deflation at bay.

An obvious question is why is 2–3% *tolerable*? The answer is that at this level inflation has no material impact on the decision making process of economic units.

By this is meant that the attention of business is devoted to production and not diverted to endeavours to hedge the loss of purchasing power. The impact of high inflation on GDP growth is well known; in the last few years of the first decade of this century, an African country recorded the highest hyperinflation ever: approximately 7 000 000 000 000 000 000 000; gross domestic expenditure (GDP) shrunk by close on 50% and unemployment rose to 90%. What is the lesson? The rate of inflation should ideally be so low that it would not be an important factor in economic decision-making.

Stable conditions in the financial system are accomplished when there is a high degree of confidence that the financial intermediaries and markets are stable, i.e. are able to meet obligations without disruption. This does not mean that individual financial institutions cannot be allowed to fail. The financial system is unstable only when systemic failure is highly probable.

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These two elements of financial stability are interrelated. A central bank[1] elucidates:

> *"The two elements of financial stability, ie price stability and the stability of the financial sector, are closely related. Failure to maintain one of these elements provides an uncertain operating environment for the other, with causality running in both directions. For example, high inflation could lead to tighter monetary policy, higher interest rates, an increase in the non-performing loans of banks and a fall in asset and collateral values, which could precipitate bank and other failures in the financial sector. Conversely, disruptions in the financial system will make the transmission of monetary policy less effective and could materially affect changes in the general price level."*

1.4.3 Why financial stability?

Financial stability is regarded as essential to the achievement of sustainable high growth and employment. Financial stability is fundamental to the creation of an economic environment that is conducive to the conduct of business, i.e. to both sides of GDP (demand and supply respectively):

- Consumption (C) and investment (I) = gross domestic expenditure (GDE) + exports (X) less imports (M) = GDP (expenditure on). C + I = domestic demand; × – M = trade account balance (TAB) also called net external demand. Summary: C + I = GDE; GDE + TAB = GDP (expenditure on).
- Production of goods and services (GDP).



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Stable production, consumption and investment (internal and external) are fundamental to economic growth and the creation of employment. Central banks are at the centre of efforts to achieve and maintain financial stability.

1.4.4 How is financial stability achieved domestically?

As noted, there are two elements to price stability, i.e. *stable conditions in the financial sector* and *price stability*. The former is achieved by the CB putting in place measures and facilities that allows it to:

- Ensure the availability of notes and coin in circulation in convenient denominations to serve as a means to effect financial transactions.
- Create an efficient national payments and interbank settlement system.
- Support the development of efficient money, bond and foreign exchange markets.
- Supervise the financial risks of banks.
- Support the development of an efficient banking system.
- Provide accommodation (liquidity) to solvent banks in extraordinary circumstances in order to safeguard the financial system, known better as the *lender of last resort* function (not to be confused with bank liquidity manipulation as an ingredient of monetary policy).

The other leg of financial stability, *price stability*, is achieved through the implementation of sound monetary policies in order to protect the value of the currency. This is a primary objective of the central bank.

It may be useful to present the view of a central bank[2] on its contribution to financial stability and its integration with price stability:

> *"The Federal Reserve's roles in conducting monetary policy, supervising banks, and providing payment services to depository institutions help it maintain the stability of the financial system.*
>
> *"Using the monetary policy tools at its disposal, the Federal Reserve can promote an environment of price stability and reasonably damped fluctuations in overall economic activity that helps foster the health and stability of financial institutions and markets. The Federal Reserve also helps foster financial stability through the supervision and regulation of several types of banking organizations to ensure their safety and soundness. In addition, the Federal Reserve operates certain key payment mechanisms and oversees the operation of the payment system more generally, with the goal of strengthening and stabilizing the payment system."*

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It will also be useful to present a view of the importance of the lender of last resort function in financial stability. The Bank of England articulates[3]:

> *"Where a threat to the stability of the financial system is perceived to be present, the Bank may intervene to stand between an intermediary and the market place in order to facilitate payments and settlements, which might otherwise not be completed. In extreme cases, emergency financial support by the Bank might be provided, the so-called 'lender of last resort' (LOLR) function, but this is only done where the failure of one institution could bring down other, otherwise viable, institutions. This function may involve the Bank lending money to the failing institution to prevent its failure and hence to stop repercussions of its collapse from spreading through the financial system. This safety net exists to protect the stability of the financial system as a whole and not to protect individual institutions or their managers and shareholders.*
>
> *"The use of the Bank's LOLR function must be carefully justified in terms of the damage that would result to the financial system and the wider economy if intervention did not take place. This is because the LOLR role requires the use of public money and can also encourage excessive risk-taking (and hence financial fragility) if institutions believe that they will be bailed out whenever they experience difficulties. These risks mean the Bank and the FSA need to co-operate closely when a problem emerges, and inform the Treasury."*

The last point made by the Bank of England is significant: the achievement of financial stability is not the sole responsibility of the central bank; this responsibility is shared between three agencies of government: Treasury, the central bank and the financial regulators [the central bank (bank supervision) and the financial services authority (non-banks)].

1.4.5 Worldwide focus

Financial stability has a worldwide focus, the backdrop being the interrelatedness of the world's financial systems: the problem of cross-border contagion. More recently this focus has been spurred on by a number of developments, such as:

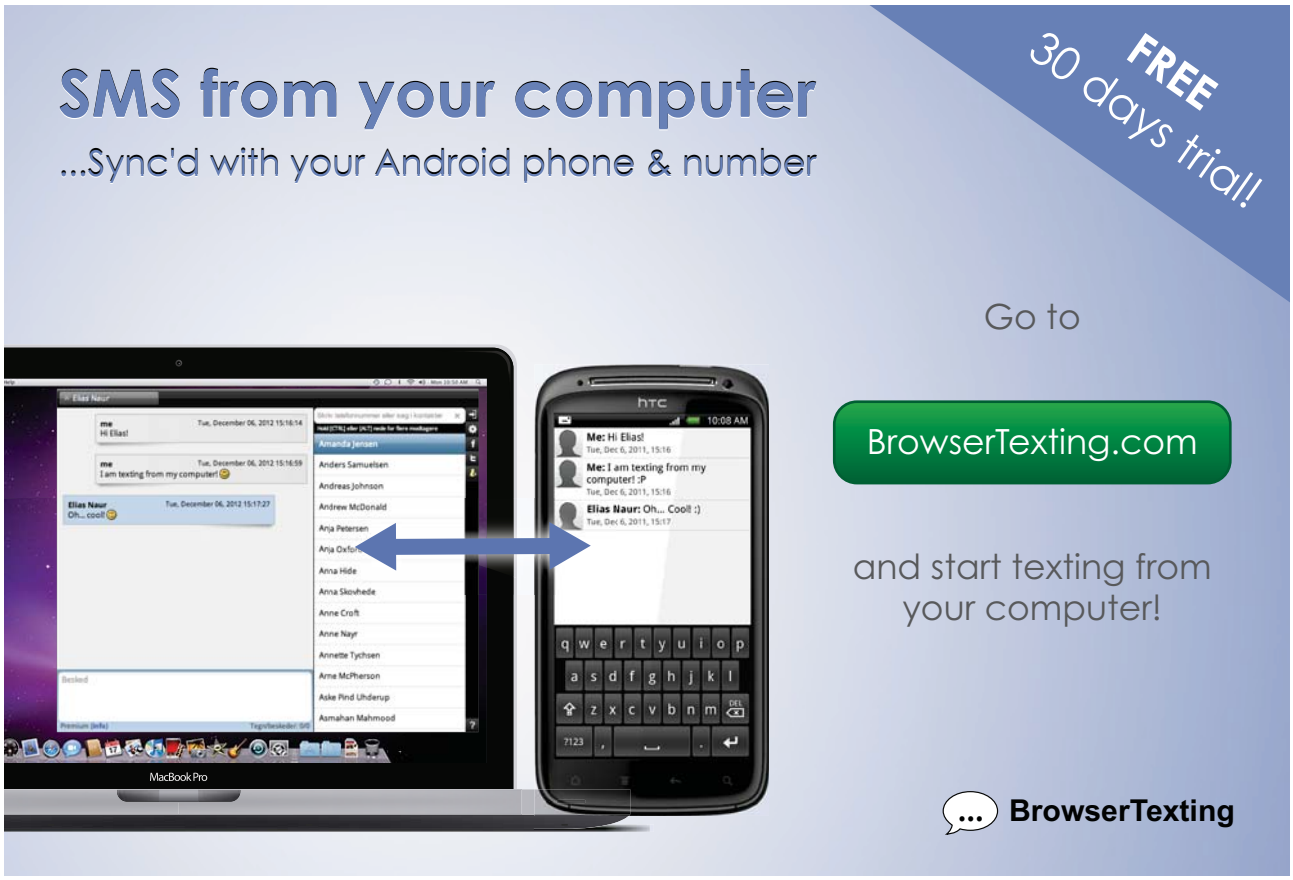
- A number of monetary crises toward the end of the 20th century and the early part of the 21st century.
- Financial innovations, driven by increasing competition.
- Technological advancement.
- Growing interdependence of the world's economies.

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These developments have led to a number of international financial-stability proposals. One example is the initiative to adopt key standards for sound financial systems [by the IMF, the World Bank, the G20 countries and the Basel Committee (comprised mainly of the G20)]; the areas covered are:

- Monetary and financial policy transparency.
- Fiscal policy transparency.
- Data dissemination.
- Insolvency issues.
- Corporate governance.
- Accounting and auditing.
- Payment and settlement.
- Market integrity.
- Banking supervision.
- Securities regulation.
- Insurance supervision.
- Public debt management.

In conclusion, it is useful to quote from the keynote speech of a President and CEO of the Federal Reserve Bank of New York (delivered at an International Conference of Banking Supervisors, Basel, Switzerland). He said:



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"In a world of instantaneous communication, interconnected markets, and more complex instruments and risks, effective supervision is more important than ever to maintaining financial stability, both locally and globally. To remain effective and relevant, supervisors must understand how and to what extent the 'wired' economy and other technologies are changing banking and finance…we must take care that our efforts to ensure the safe and sound operation of the financial markets do not stifle the innovation and creative energy that is changing banking and finance – indeed the world – for the better."

1.5 Balance sheet of a central bank

1.5.1 Introduction

The balance sheet of a CB is comprised of, on the one side, equity and liabilities, and on the other, assets, such that:

Equity + liabilities = assets.

We present the balance sheet items of the generic CB, ignoring equity (capital and reserves) and "other" liabilities (other creditors, revaluation adjustments, certain other reserves, etc.) and assets (accounts receivable in transit, etc) because these are unimportant in the broad canvas of central banking (see Balance Sheet 1). We also present the generic collective balance sheet of the private banking sector to indicate the central bank's close relationship with the banks (see Balance Sheet 2).

BALANCE SHEET 1: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
E. Foreign assets	1 000	A. Notes and coins	1 000
F. Loans to government	1 100	B. Deposits	
G. Loans to banks (BR) @ KIR	400	1. Government	900
		2. Banks' reserves (TR)	500
		Required reserves (RR) (500)	
		Excess reserves (ER) (0)	
		C. Foreign loans	50
		D. Central bank securities	50
Total	2 500	Total	2 500

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

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Note that the counterparts in the two balances sheets have been highlighted. Note also that the monetary unit is the "corona" and the country is fictitious Local Country (LC). The currency code is LCC (like USD, GBP, EUR, JPY, ZAR, etc.).

1.5.2 Liabilities

1.5.2.1 Notes and coins

Most countries have a bank note manufacturing company and a mint (coin manufacturing company), and usually they are subsidiaries of the CB. The amount against this item reflects the total of all notes and coins (N&C) issued by the CB, in this example LCC 1 000 billion. This is not the amount printed / minted, but the total amount that has been issued to the banks and public via the banks. When banks buy N&C they are paid for and settled via the interbank settlements system (by a debit to the banks' reserves as we shall see later).

In the vast majority of countries the CB is the sole issuer of N&C, a role taken over from the banks in distant history (in the case of the Bank of England[4] in 1694). As is generally known, in distant history coins were money, followed by N&C, and then bank deposits (BD) joined the fraternity of assets that became the *generally accepted means of payments / medium of exchange* (= the definition of money[5]).

Thus, the stock of money (which we call M3, i.e. including all BD) is the N&C + BD held by the domestic non-bank private sector (NBPS). In terms of Balance Sheets 1–2, the N&C held by the NBPS = LCC 1 000 [issued by the CB (item A)] *less* LCC 100 [held by the banks in tills and ATMs (item C)] = LCC 900. From Balance Sheet 2 we know that BD held by the NBPS = LCC 5 000 (item A). Thus:

M3 = N&C + BD held by the NBPS
= LCC 900 + LCC 5 000
= LCC 5 900.

The principle is illustrated in Figure 4.

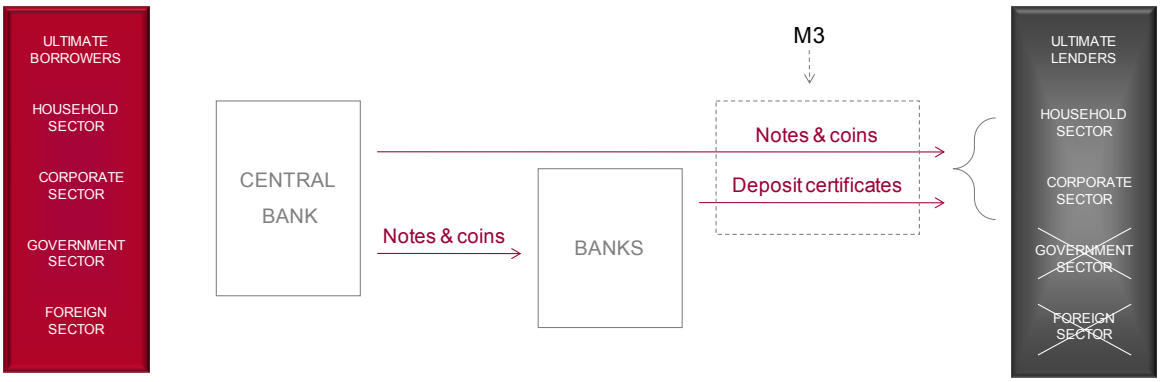


Figure 4: what is money?

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1.5.2.2 Deposits: government

Being the banker to government is one of the enduring functions of the CB and reflects the need for a custodian of the funds of central government. The government usually has two CB accounts: called the Exchequer account and the Paymaster General account in many countries.

In some countries, the central government also banks with the large private sector banks in accounts called Tax and Loan Accounts (TLAs). The main motivation for this is to avoid the disruptive effect on the money market of large shifts of tax payments to government / expenditures of government at certain times (and the consequent need of the CB to accommodate the banks).

In some countries where TLAs exist, the shifting of government deposits between the banks and the CB is used as a powerful tool to influence bank liquidity – for monetary policy proposes.

1.5.2.3 Deposits: banks

Banks have two accounts with the central bank: a reserve account and a settlement account over which interbank settlement takes place. In some countries the banks only have one account in which reserves are held and over which settlement takes place. We assume the latter.

What are reserves? In most countries banks have a reserve requirement, i.e. are obliged to hold required reserves (RR) equal to the total of deposits[6] times the reserve requirement ratio (r):

$$RR = BD \times r.$$

A glance at Balance Sheets 1–2 will show that the banks are holding deposits of LCC 5 000 billion. If we assume that the r = 10%, we have:

$$RR = LCC\ 5\ 000 \times 0.1$$
$$= LCC\ 500.$$

The balance sheets also show that the banks comply exactly with the reserve requirement: the amount in the reserve account of the banks (collectively) (TR) = LCC 500. This makes economic sense because the CB does not pay interest on bank balances with itself. So banks keep this balance to a minimum). However, banks are in the business of loans provision and this creates deposits; therefore, their RR increase continually. Thus, as bank deposits increase, their RR *increase* is given by:

$$\Delta RR = \Delta BD \times r$$

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For example, if bank deposits increase from LCC 5 000 to LCC 6 000, the banks collectively are obliged to increase their RR balance by LCC 100:

$$\begin{aligned}\Delta RR &= \Delta BD \times r \\ &= LCC\ 1\ 000 \times 0.1 \\ &= LCC\ 100.\end{aligned}$$

How do they do this? *They cannot do so on their own*. This is *at the heart of monetary policy* in most countries. *Banks cannot create central bank money (CBM)*; only the CB can manipulate its own balance sheet.

In Balance Sheets 1–2 we know that TR = RR. Do banks hold excess reserves (ER), given by TR – RR = ER? The answer is not if they can help it – because they earn no interest on any part of TR. However, there are exceptional circumstances when they do (such as during the quantitative easing (QE) phases in the USA in 2010 (and later this applied also in the UK and elsewhere). In these circumstances, interest rates are low – as part of expansionary monetary policy (see more later on).



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As said, interbank settlement / clearing takes place over the banks' accounts at the CB. How does this work? Bank clients move deposits around the system every day. At the end of the day (banks close off their books every day), the amounts are settled via the reserve accounts. However, if Bank A loses a net LCC 100 million and Bank B gains a net LCC 100 million, their balance sheets change as indicated on Balance Sheets 3–5.

BALANCE SHEET 3: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
		Reserve accounts: Bank A Bank B	 -100 +100
Total	0	Total	0

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

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

Assuming banks have no ER or borrowed reserves (BR), the final IBM takes place: Bank A will borrow LCC 100 million from Bank B at the interbank rate, and Bank B will instruct the CB to make the transfer, as indicated in Balance Sheets 6–8.

BALANCE SHEET 6: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
		Reserve accounts: Bank A (before interbank) Bank A (after interbank) Bank B (before interbank) Bank B (after interbank)	 -100 +100 +100 -100
Total	0	Total	0

BALANCE SHEET 7: BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
Reserve account at CB Reserve account at CB	-100 +100	Deposits (Company A) Loan from Bank B	-100 +100
Total	0	Total	0

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BALANCE SHEET 8: BANK B (LCC MILLIONS)			
Assets		Liabilities	
Reserve account at CB Reserve account at CB Loan to Bank A	+100 -100 +100	Deposits (Company A)	+100
Total	+100	Total	+100

As we will see later, when banks transact amongst one another, bank reserves do not change (except when money is created = BD+). However, when the CB does a transaction, reserves do change, and BR is affected.

1.5.2.4 Foreign loans

In exceptional circumstances, central banks do undertake foreign loans – usually when they experience balance of payments problems.

1.5.2.5 Central bank securities

Central bank securities are called by many names in different countries: debentures in South Africa, certificates in Botswana, bills in Malawi, and so on. They are short-term securities (have a maturity of less than a year) and are issued solely for monetary policy purposes. An issue drains liquidity.

1.5.3 Assets

1.5.3.1 Foreign assets

BALANCE SHEET 9: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
E. Foreign assets	1 000	A. Notes and coins B. Deposits 1. Government	1 000
F. Loans to government	1 100	2. Banks' reserves (TR)	900
G. Loans to banks (BR) @ KIR	400	Required reserves (RR) (500) Excess reserves (ER) (0)	500
		C. Foreign loans	50
		D. Central bank securities	50
Total	2 500	Total	2 500

As seen in Balance Sheet 1 (repeated in Balance Sheet 9 for the sake of convenience), the central bank usually has three asset items. Foreign assets (item E) are usually comprised of gold bullion holdings and foreign investments in foreign investments, e.g. USD bank deposits, GBP treasury bills, EUR (German) bonds. These are the foreign exchange (forex) reserves of countries and this item E reflects the role of custodian of the forex reserves of the country. Some countries place these investments in a separate fund and call it *sovereign fund*.

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Many central banks make use of forex swaps to influence bank liquidity. These are similar to repurchase agreements (repos).

1.5.3.2 Loans to government

Item F, *loans to government*, is usually comprised of treasury bills and government bonds, which are MD. They are used in OMO transactions, i.e. in bank liquidity management.

1.5.3.3 Loans to banks

Item G, *loans to banks*, is at the heart of monetary policy. In normal times, most central banks compel the banks to borrow reserves from them (BR) at their key interest rate (KIR) at all times. KIR has many names, such as discount rate, repo rate, bank rate, base rate. In our example the amount borrowed at KIR is LCC 400 billion, meaning, essentially, that the banks are complying with the RR largely as a result of their BR.

BALANCE SHEET 10: BANKS (LCC BILLIONS)			
Assets		**Liabilities**	
C. Notes and coins	100		
D. Reserves with CB (TR)	500	A. Deposits of NBPS	5 000
Required reserves (RR) (500)			
Excess reserves (ER) (0)		B. Loans from CB (BR)	400
F. Loans to government	1 000		
G. Loans to NBPS	3 800		
Total	5 400	Total	5 400

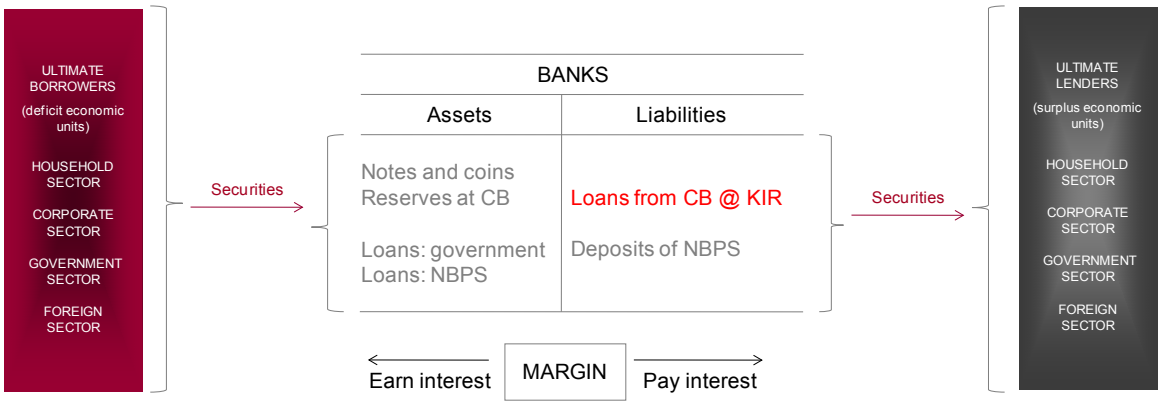


Figure 5: bank margin

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The policy becomes clear when one views the banks' collective balance sheet (repeated here in Balance Sheet 10) and Figure 5. A summary follows (because the detail follows later):

- The CB compels the banks to borrow from it (BR) at the KIR.
- Although the BR makes up a small proportion of liabilities, the KIR exerts a powerful influence on bank deposit rates. Because the banks compete aggressively amongst one another for deposits in order to repay the CB, their wholesale deposit rates rise to just below the KIR. The wholesale rates affect the retail rates.
- Banks are profit-maximising entities. They endeavour to earn a steady margin between what they pay for deposits and earn on assets.
- Therefore, when the cost of liabilities changes, so do the rates they charge for loans (their largest asset). The benchmark rate for loans is prime rate (PR), and all loan rates are linked to PR.
- The level of PR (especially in real terms) has a major impact on the demand for loans.
- The demand for loans is the counterpart of money creation.
- New loan / money creation (underlying which is new C + I = GDE = domestic *demand*) at too high a level in relation to the economy's ability to *supply* the goods demanded, leads to inflation.
- A high level of inflation affects economic decision making and therefore GDP growth.



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The above was presented to introduce the reader to the functions of the central bank. As seen, the main function is monetary policy. But there are many others. Before we get to them, we need to cement that fact that money creation is a surprisingly simple affair.

1.6 Money creation

Bank assets and liabilities are not static. They increase mainly as a result of new bank loans / money creation. Thus will be discussed in detail later; here we present a simple example. A reminder: broad money, M3, is made up of bank notes and coins (N&C) + bank deposits (BD) (held by the domestic non-bank private sector – NBPS):

$$M3 = N\&C + BD.$$

Of these BD is the largest (+/- 95%). BD increase when banks make new loans = buy NMD and MD.

BALANCE SHEET 11: COMPANY A (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Goods Bank deposits	-10 +10		
Total	**0**	**Total**	**0**

BALANCE SHEET 12: COMPANY B (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Goods	+10	Bank loan (overdraft)	+10
Total	+10	Total	+10

BALANCE SHEET 13: BANK A (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Loan to Company B	+10	Deposit of Company A	+10
Total	+10	Total	+10

Company A is a producer of goods required by Company B. Company B requires finance of LCC 10 million in order to purchase the goods, and approaches Bank A for a loan. After a credit check, the bank grants Company B an overdraft facility.

Company B draws a cheque for LCC 10 million on its overdraft facility and presents the cheque to Company A and takes delivery of the goods. Company A is thrilled to the back teeth with the sale and deposits the cheque with bank A. The cheque is put through the interbank clearing system, and the balance sheets of the respective parties end up as shown in Balance Sheets 11–13. This transaction has implications for the RR and therefore BR, which will be introduced later on.

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It will be evident that the deposit of Company A amounts to an increase in M3 (BD held by the NBPS), and that its source was the increase in the overdraft granted to Company B and utilised by it (the *real source* of course was the *demand for loans* (Δ = change):

$$\Delta M3 = \Delta BD = \Delta \text{bank loans}.$$

Questions immediately arise: can banks really do this in the real world? Surely there must be a brake on the system? The answer is yes, the banks do this every day; in fact the system is designed to allow this to happen. The *brake on the system*, i.e. the mechanism that prevents the increase in money creation escalating out of hand, as we have seen, is *monetary policy*, and it operates via changes in interest rates, assuming the KIR is made effective by the banks borrowing from the CB (i.e. having BR).

1.7 Functions of central banks

The functions of central banks are usually outlined as follows:

- Issuer of bank notes and coins.
- Banker to government.
- Advisor to government.
- Custodian of banks' cash reserves.
- Central clearance and settlement of interbank claims.
- Custodian of the gold and other foreign reserves of the country.
- Management of the money and banking system.
- Lender of last resort.
- Public debt management.
- Formulation and execution of monetary policy.
- Open market operations.
- Collection and interpretation of economic statistics.
- Supervisor of banks.
- Administration of exchange controls (where applicable).

This, however, is a scatter approach, and not especially useful. Many of the functions of the central bank can be grouped into a more logical framework. For example, the functions *banker to government*, *advisor to government* and *public debt management*, belong together. Similarly, *lender of last resort*, *custodian of banks' cash reserves* and *management of the money and banking system* belong together.

A more logical framework of the functions of central banks is shown in Table 1.[7]

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Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability)
Formulation of monetary policy framework
Influence on level of interest rates (through bank liquidity management)
Open market operations
Banker and advisor to government
Banker to government
Public debt management
Administration of exchange controls
Management of the money and banking system
Lender of last resort (note: not a monetary policy function)
Currency management (notes and coins)
Banker to private sector banks
Settlement of interbank claims
Bank supervision
Supervision of payments system
Management of gold and foreign exchange reserves
Development of debt market
Provision of economic and statistical services
Provision of internal corporate support services and systems

Table 1: Functions of central banks

It should be evident that many of these functions are all interrelated. The latter two functions do not require much elaboration; thus we will cover them first. The function *provision of internal corporate support services and systems* is an obvious one: any organisation requires an infrastructure in order to carry out its functions / business.

The function *provision of economic and statistical services*, while significant, is also an obvious one. Suffice it to say here that all central banks have Economics Departments that provide detailed statistics to the CB, government and the public through the publication of its:

- Quarterly Bulletins and Annual Reports.
- Monthly Statements of Assets and Liabilities and Releases of Selected Data.
- Statements and Reports of the Monetary Policy Committee (MPC).

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Of these publications its Quarterly Bulletin is the most detailed. Apart from a comprehensive Quarterly Economic Review, and articles of interest, the Bank provides detailed statistics on:

- Money and banking.
- Capital market.
- National financial account.
- Public finance.
- International economic relations.
- National accounts.
- General economic indicators.
- Key information (mainly key selected data).

These data are an essential source of information for policy-makers (the CB itself), government, analysts, and academics.

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With these two functions covered, we are left with three; we discuss them in the following order:

- Banker and advisor to government.
- Management of the money and banking system.
- Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability).

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2 Banker & advisor to government

2.1 Learning outcomes

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

1. List the categories of central bank functions.
2. Elucidate the interbank markets.
3. Explain the central bank's role in bank liquidity management.
4. Describe the central bank function "banker to government".
5. Explain the context of "Tax and Loan Accounts".
6. Expound on the significance of the central bank's role in public debt management.
7. Explicate the central bank's role in the administration of exchange controls.

2.2 Introduction

Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability)
Formulation of monetary policy framework
Influence on level of interest rates (through bank liquidity management)
Open market operations
Banker and advisor to government
Banker to government
Public debt management
Administration of exchange controls
Management of the money and banking system
Lender of last resort (note: not a monetary policy function)
Currency management (notes and coins)
Banker to private sector banks
Settlement of interbank claims
Bank supervision
Supervision of payments system
Management of gold and foreign exchange reserves
Development of debt market
Provision of economic and statistical services
Provision of internal corporate support services and systems

Table 1: Functions of central banks

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In the previous section we presented Table 1 which listed the functions of central banks. As can be seen, in its role of as *banker and advisor to government* the CB has three responsibilities. In order to fully appreciate them and the sections which follow, we need to introduce the interbank markets more fully here, as well as the role of the CB in bank liquidity management. In this section we present the following subsections:

- The interbank markets.
- Bank liquidity management.
- Banker to government.
- Tax and Loan Accounts.
- Public debt management.
- Administration of exchange controls.

2.3 The interbank markets

2.3.1 Introduction

There are three interbank markets:

- Bank-to-central bank interbank market.
- Central bank-to-bank interbank market.
- Bank-to-bank interbank market.

We again present the balance sheets of the CB and the banks. The highlighted items are the accounts through which the interbank markets (IBMs) function.

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

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

The IBMs are where the settlement of interbank claims take place and where monetary policy begins. In some countries banks have two accounts with the central bank: a *reserve account* in which required reserves (RR) are held and a *settlement account* (SA) over which the settlement of interbank claims takes place. In some other countries banks have one account with the central bank 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:

$$TR = RR + ER.$$



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As we shall see in detail later, only one of the three IBMs is a true market: the bank-to-bank IBM. The IBM rate is shown with the KIR in Figure 2[8]. The KIR, as we know, is determined administratively by the MPC. It exerts a powerful impact on the IBM rate; note that it is below the KIR.

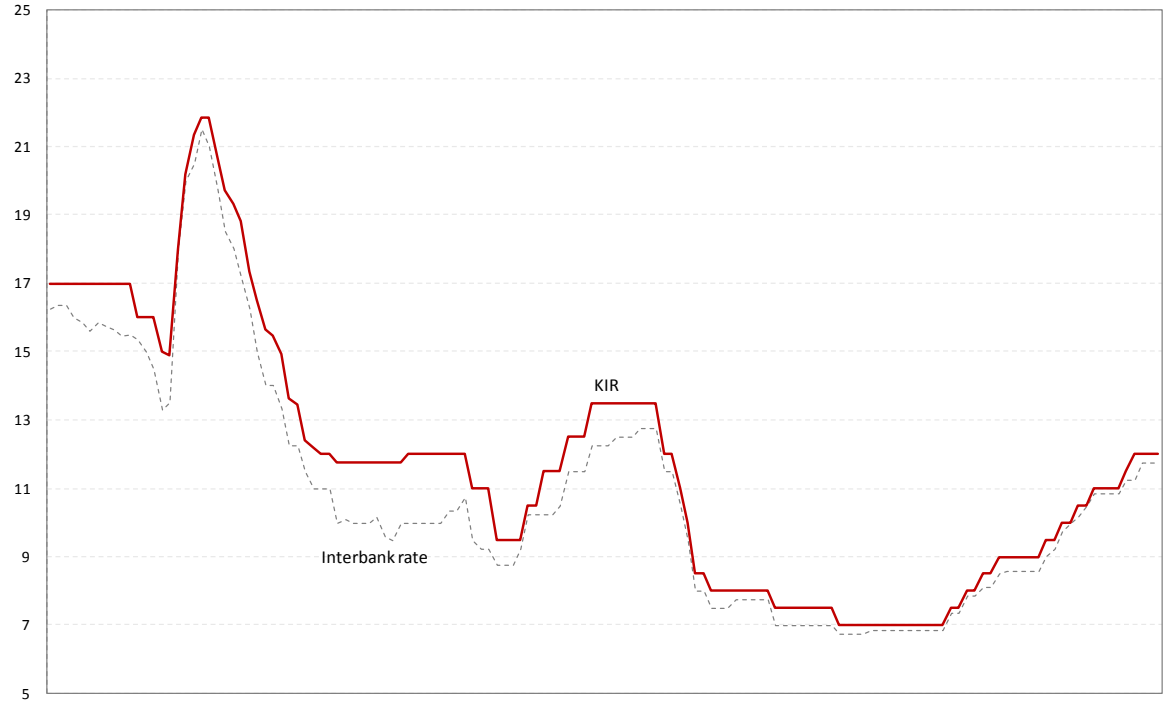


Figure 1: interbank rate & KIR

1.3.2 The bank-to-central bank interbank market

The first IBM to be discussed 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.

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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 (r) 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[9] on reserves. Note also in this example that the banks are borrowing LCC 400 billion from the central bank, so they will not have ER. In summary, as regards the b2cb IBM:

$BD \times r = RR = TR.$
LCC 5 000 billion × 0.10 = LCC 500 billion = TR.
$ER = 0.$

1.3.3 The central bank-to-bank interbank market

The second IBM we discuss 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 that 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[10]. This, as we will show later in some detail, is an extremely successful policy protocol.

1.3.4 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.

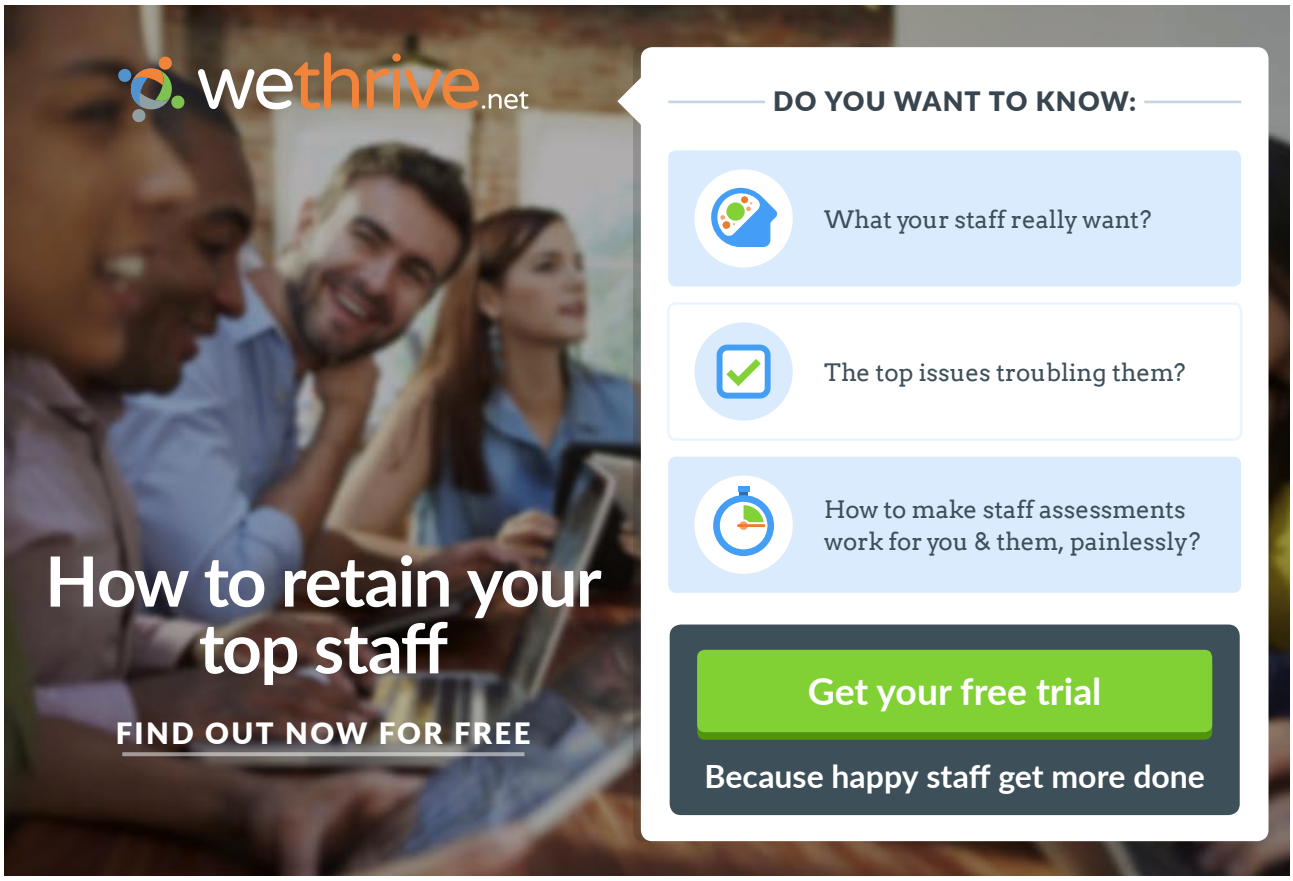
How does the settlement of these transactions take place between the two banks? It takes place over the banks' reserve accounts: item B2 in Balance Sheet 1, and item D in the Balance Sheet 2. Balance Sheets 3–6 elucidate the story.

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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



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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.

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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 1) 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.

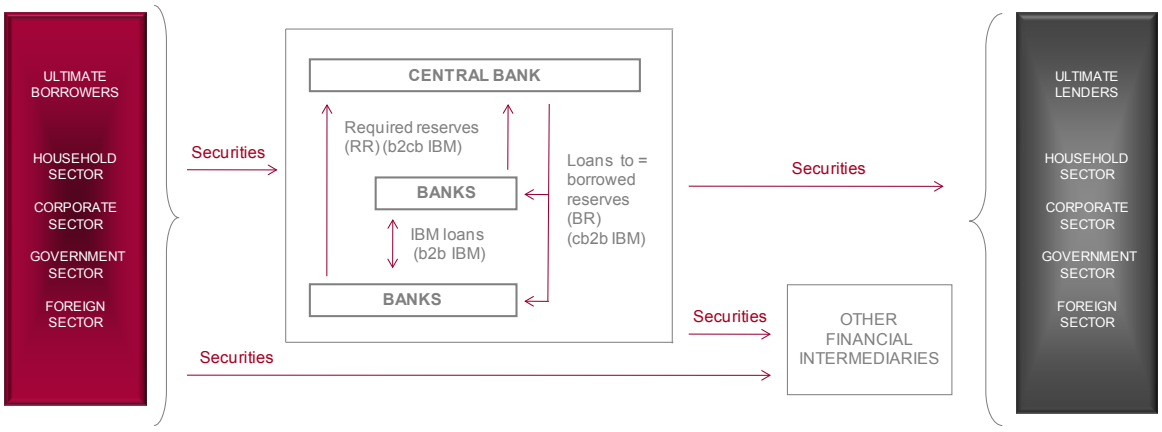


Figure 2: interbank markets

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[11]. This they are able to do without restraint[12] 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 later.

We portray the interbank markets in Figure 2.

2.4 Bank liquidity management

Balance Sheet 9 presents the balance sheet of the central bank in simplified form (we have left out unimportant items such as *other assets*, *other liabilities* and *capital and reserves*). From this balance sheet we can create what can be called a *money market identity* as follows.

On the left of the identity we have the net excess reserves (NER) of the banking sector, an indicator of bank liquidity. It is made up of the ER of the banks (item B2b)[13] less the extent of CB loans to the banking sector (at the KIR), i.e. the LS (item G):

$$NER = B2b - G.$$

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BALANCE SHEET 9: CENTRAL BANK (LCC MILLIONS)	
Assets	**Liabilities**
E. Foreign assets F. Loans to government (government securities) G. Loans to banks (borrowed reserves – BR)	A. Notes and coins B. Deposits 1. Government 2. Banks (TR) a. RR b. ER C. Foreign loans D. Central bank securities

On the right hand side of the identity we have all the remaining liability and asset items; thus:

$$NER = B2b - G = (E + F) - (A + B1 + B2a + C + D).$$

If we group the related liability and asset items we have:

$$NER = B2b - G = (E - C) + (F - B1) - A - B2a - D.$$

It will also be evident that (Δ = change):

$$\Delta NER = \Delta(E - C) + \Delta(F - B1) - \Delta A - \Delta B2a - \Delta D.$$



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Thus, a change in the NER (and the LS which is its main component) of the banking system is *caused* by changes in the other appropriately grouped balance sheet items (which can be called *balance sheet sources of change* – BSSoC):

$\Delta NER =$

$\Delta(E - C)$	= net foreign assets (NFA)
$+ \Delta(F - B1)$	= net loans to government (NLG)
$- \Delta A$	= notes and coins in circulation
$- \Delta B2a$	= RR
$- \Delta D$	= central bank securities (CBS).

The actual causes of change are the transactions that underlie the BSSoC. It will be apparent that the instruments of OMO are NFA (usually forex swaps), NLG (purchases / sales of government securities and changes in government deposits) and CBS (issues), and that RR can also be used (and is at infrequent times) to manipulate bank liquidity (NER). For example, the sale of forex to a bank (a forex swap) will decrease NER (increase the LS); the BSSoC is a decrease in NFA. Similarly the sale of TBs to the banks will decrease NER (increase the LS). The BSSoC is a decrease in NLG. Thus, the CB has total control over bank liquidity (assuming efficient markets).

With the above as the backdrop, we are now able to proceed with the CB function of banker to government.

2.5 Banker to government

When central banks emerged in the first part of the 20th century they all took on the role of sole banker to government. In most countries the CB remains the sole banker to government. The two accounts maintained for government in most countries are the *Exchequer Account* and the *Paymaster General Account*. The former is the general account into which all receipts are placed, and the latter the account into which department allocations are placed prior to disbursement. Generally, the CB does not provide banking services to provincial governments, local authorities or state enterprises.

In some countries, government maintains accounts, styled *Tax and Loan Accounts* (TLAs), with banks that qualify to hold these accounts (the large commercial banks). This structure is usually put in place to assist in the management of banking liquidity.

The payment of taxes and loan receipts into the Exchequer Account amounts to a loss of funds (reserves) to the private banking sector, which necessitates the assistance (provision of BR) by the CB to the same extent.

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With the TLAs in place, the movement of tax and loan funds from the private sector to the government sector does not disrupt the smooth functioning of the money market. It will be evident that this structure also represents a powerful monetary policy tool. The CB, with the concurrence of the government, is able to shift funds between the Exchequer account and the TLAs in order to influence money market conditions, i.e. the extent of BR. This important aspect of *banker to government* is given more attention in the next section.

2.6 Tax and loan accounts

2.6.1 Introduction

It will be apparent that, when government banks with the CB only, funds received by the government represent funds lost to the private banking sector, and government disbursements represent funds gained by the private banking sector. There are many sources of government receipts and many destinations of government disbursements. Examples of the former are individual income tax, company tax, value added tax, customs and excise duties, and sales of government securities. The latter includes maturities of and interest on government securities, payment of salaries to employees, and procurement of goods.



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It will also be evident that there are timing differences between government receipts and disbursements and that the amounts involved are large. The effect of these flows on changes in government's balance at the CB over a ten-year period (month-end data) is shown in Figure 3 for a particular country before it introduced a TLA system (monetary unit changed to LCC).

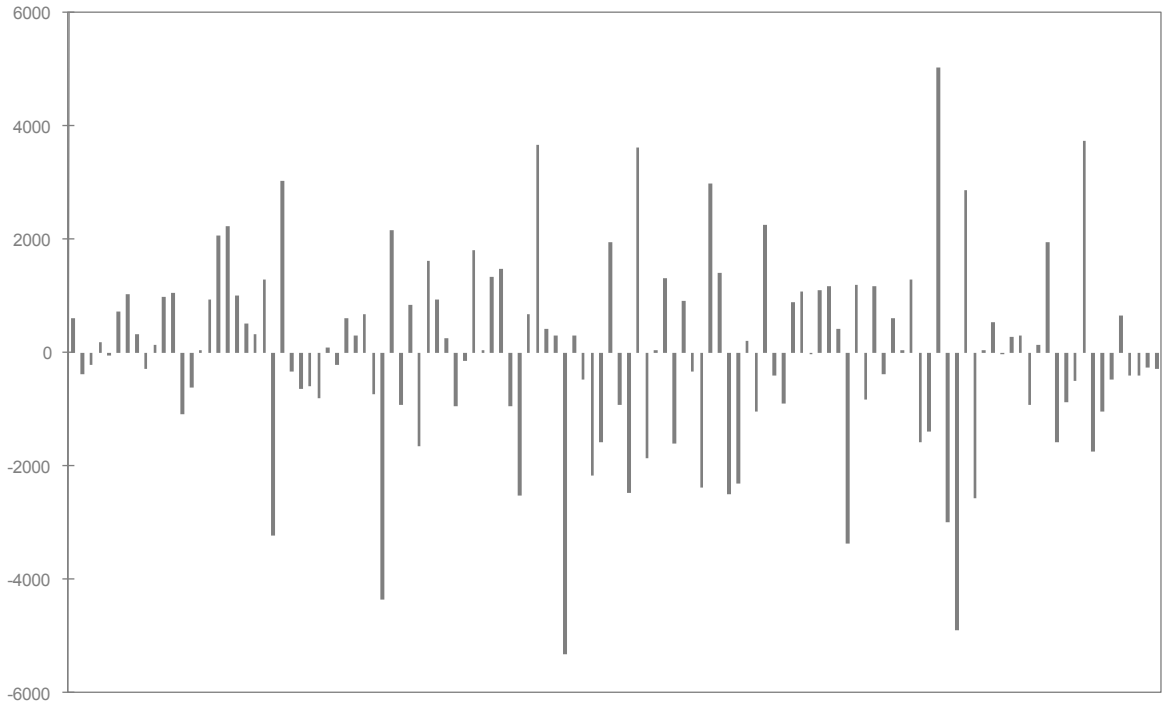


Figure 3: change in government deposits with central bank (LLC millions)

These flows have an equivalent bearing on bank liquidity. In this section we present a few examples, and discuss the problem from the point of view of the CB, government and the banks. We then present the solution (the TLA system), and give attention to the employment of the TLA system in monetary policy. The following are the sections:

- Tax payments.
- Receipts of loan issues.
- Problem from perspective of central bank.
- Problem from perspective of government.
- Problem from perspective of banks.
- Monetary policy tool.

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2.6.2 Tax payments

The first example: flow of funds to government resulting from tax payments of LCC 100 million. The following steps may be identified:

Step 1:

- Taxpayers (NBPS) draw cheques on their bankers and deliver them to the revenue authority (RA).
- The RA deposits the cheques at the CB.
- The cheques are cleared and the taxpayers' accounts at their banks are debited; the banks' accounts at the CB are debited (see Balance Sheets 10–11).
- The CB credits the Exchequer account and debits the banks on which the cheques were drawn (see Balance Sheet 12) (note: the CB is the only bank which does not maintain bank accounts elsewhere; the receipt of a bank cheque will thus result in that bank being *debited* in the books of the CB).
- Note: we ignore the effect of a change in deposits on the RR for the sake of simplicity.

BALANCE SHEET 10: NBPS (LCC MILLIONS)			
Assets		**Liabilities**	
Bank deposits	-100	Tax liability	-100
Total	-100	Total	-100

BALANCE SHEET 11: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Reserves at CB (TR) (RR = -100)	-100	NBPS deposits	-100
Total	-100	Total	-100

BALANCE SHEET 12: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
		Government deposits Bank reserves (TR) (RR = -100)	+100 -100
Total	0	Total	0

Step 2:

- The bank concerned, which does not hold ER with the CB, is now in contravention of the reserve requirement
- The bank requests an overnight loan from the CB, which is granted automatically (see balance Sheets 13–14).

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BALANCE SHEET 13: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loan to banks (BR) @ KIR	+100	Bank reserves (TR) (RR = +100)	+100
Total	+100	Total	+100

BALANCE SHEET 14: BANKS (LCC MILLIONS)			
Assets		Liabilities	
Reserves at CB (TR) (RR = +100)	+100	Loans from CB (BR) @ KIR	+100
Total	+100	Total	+100

Net effect:

- NBPS: decrease in tax liability and bank deposits (see Balance Sheet 15).
- Banks: decrease in NBPS deposits and increase in loans from CB (see Balance Sheet 16).
- CB: increase in government deposits and in loans to banks, i.e. decrease in bank liquidity = NER = increase in BR; BSSoC = decrease in NLG (see Balance Sheet 17).



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BALANCE SHEET 15: NBPS (LCC MILLIONS)			
Assets		Liabilities	
Bank deposits	-100	Tax liability	-100
Total	-100	Total	-100

BALANCE SHEET 16: BANKS (LCC MILLIONS)			
Assets		Liabilities	
		NBPS deposits Loans from CB (BR) @ KIR	-100 +100
Total	0	Total	0

BALANCE SHEET 17: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loans to banks (BR) @ KIR	+100	Government deposits	+100
Total	+100	Total	+100

2.6.3 Receipts of loan issues

The second example: flow of funds to government resulting from the issue of LCC 100 million bonds which are bought by the banks. Here we cut out the steps and fast-forward to the net effect. From Balance Sheets 18–20 we see that:

- Government: increases deposits and bonds in issue.
- Banks: increase in bond holdings and loans from CB.
- CB: increase in government deposits and in loans to banks, i.e. decrease in bank liquidity = NER = increase in BR; BSSoC = decrease in NLG.

BALANCE SHEET 18: GOVERNMENT (LCC MILLIONS)			
Assets		Liabilities	
Deposits at CB	+100	Bonds	+100
Total	+100	Total	+100

BALANCE SHEET 19: BANKS (LCC MILLIONS)			
Assets		Liabilities	
Bonds	+100	Loans from CB (BR) @ KIR	+100
Total	+100	Total	+100

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BALANCE SHEET 20: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loans to banks (BR) @ KIR	+100	Government deposits	+100
Total	+100	Total	+100

Clearly, when government spends the funds the money market situation will return to normal, except that there is an influence on RR.

2.6.4 Problem from perspective of central bank

Ideally, central banks would like to use bank liquidity (NER and the liquidity shortage – LS) as a strong signal to the market in respect of monetary policy. Some central banks use the LS as the cutting edge of monetary / interest rate policy. It will be evident that, given the large and frequent changes in government deposits at central banks, this is not possible.

It is notable that the solution to the problem, as outlined below, not only makes the central bank's task in terms of using the LS as a signal easier, but it also represents an additional tool of monetary policy. This will become clear later.

2.6.5 Problem from perspective of government

The disruptive effect on the money market and short-term interest rates of the flow of funds to and from the government sector are also of concern to Treasury. Firstly, volatile interest rates have a bearing on the timing and success of government securities issues and the rates it is able to negotiate.

Secondly, Treasury is closely involved in monetary policy and would like to see such policy implemented smoothly. Thirdly, a banking system without TLAs makes efficient cash flow management difficult, for example the Paymaster General account is funded in advance of payments. This often requires Treasury to make securities issues earlier, with cost consequences.

2.6.6 Problem from perspective of banks

We know that the flows of funds to and from the government sector lead to commensurate, but opposite, effects on the private banking system. This produces a number of disorders:

- Banks are obligated to hold larger amounts of eligible (for accommodation) government paper, which could be said to "crowd out" the private sector.
- Interest rates are influenced which reflect seasonal flows; such changes could give the wrong signal to lenders and borrowers.
- There are unnecessary administrative problems created (associated with acquiring frequent accommodation and the repayment thereof).
- The flows generally disrupt the intermediation process.

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26.7 The solution

The problem of the flows of funds to and from the government sector arises from the fact that the CB has the function of "banker to the government." The solution is therefore straightforward: the implementation of a system whereby government also "banks" with the private banking system. A broad outline of the system follows:

- The government opens TLAs at the head offices of the participating banks (there are criteria).
- Revenue authorities deposit receipts of funds on a same-day-basis in the TLAs.
- The proceeds of securities issues are also deposited in the TLAs.
- The PMG account remains at the CB and all government disbursements are made from this account. As payments are made, the PMG account is funded from the TLAs.

In order to ensure that no balance remains on the PMG account, this account is operated on an "imprest" or debit basis. This means that the PMG account is not funded in advance, and that when government warrant vouchers / cheques are presented, they are debited to the PMG account.

Thus, after the interbank clearing, the PMG account is in debit, and the exact amount of the debit is known. At this time (under the same date) funds are transferred from the TLAs at the banks to the Exchequer account and from the Exchequer account to the PMG account. It will be clear that the balance on the PMG account is thus always zero.



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The process described above means that the government's balances effectively never leave the private banking system. Thus, there is no money market effect, i.e. no effect on the reserves of the banks and therefore on BR. Relevant examples follow:

Tax payments by individuals

The NBPS pays LCC 100 million in taxes (see Balance Sheets 21–22).

BALANCE SHEET 21: NBPS (LCC MILLIONS)			
Assets		**Liabilities**	
Bank deposits	-100	Tax liability	-100
Total	-100	Total	-100

BALANCE SHEET 22: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
		NBPS deposits TLAs	-100 +100
Total	0	Total	0

Issues of government securities

We assume LCC 100 million bonds are purchased by the NBPS (see Balance Sheets 23–25).

BALANCE SHEET 23: GOVERNMENT (LCC MILLIONS)			
Assets		**Liabilities**	
Bank deposits (TLAs)	+100	Bonds	+100
Total	+100	Total	+100

BALANCE SHEET 24: NBPS (LCC MILLIONS)			
Assets		**Liabilities**	
Bank deposits Bonds	-100 +100		
Total	0	Total	0

BALANCE SHEET 25: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
		NBPS deposits TLAs	-100 +100
Total	0	Total	0

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Disbursement of funds (for procurement of goods from NBPS)

Government purchases LCC 100 million goods from the NBPS (see Balance Sheets 26–28).

BALANCE SHEET 26: GOVERNMENT (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Bank deposits (TLAs)	+100 -100		
Total	0	Total	0

BALANCE SHEET 27: NBPS (LCC MILLIONS)			
Assets		**Liabilities**	
Bank deposits Goods	+100 -100		
Total	0	Total	0

BALANCE SHEET 28: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
		NBPS deposits TLAs	+100 -100
Total	0	Total	0

2.6.8 Monetary policy tool

It should be clear that the TLAs represent a powerful tool of monetary policy. An example: the CB decides to increase the LS by LCC 100 million (= decrease NER by same). It simply shifts LCC 100 million from the TLAs to the Exchequer account. This is shown in Balance Sheets 29–31. Note that this time we have not ignored the effect on RR of the change in bank deposits; assumption: r = 10% of deposits.

BALANCE SHEET 29: GOVERNMENT (LCC MILLIONS)			
Assets		**Liabilities**	
Deposits at CB (Exchequer account) TLAs	+100 -100		
Total	0	Total	0

BALANCE SHEET 30: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Reserves at CB (TR) (RR = -10)	-10	TLAs Loans from CB (BR) @ KIR	-100 +90
Total	-10	Total	-10

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BALANCE SHEET 31: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to banks (BR) @ KIR	+90	Government deposits Bank reserves (TR) (RR = -10)	+100 -10
Total	+90	Total	+90

2.7 Public debt management

2.7.1 Introduction

Some central banks manage the public debt on behalf of government, and some participate in a small but meaningful way. Before discussing the central bank's involvement in public debt management, it may be useful to be reminded of the issues surrounding the public debt. The following are the sections to be covered:

- The public debt.
- The central bank public debt management.



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2.7.2 The public debt[14]

2.7.2.1 Introduction

Most central governments run an annual budget deficit, which means they need to borrow in the domestic and foreign debt markets. This they do in terms of a statute, usually called Public Finance Act or Public Finance Management Act. The statute spells out the details and the constraints (deference to Parliament), but it generally permits central government to:

- Finance the budget deficit (i.e. the difference when revenue < expenditure) by incurring debt.
- Borrow by issuing debt instruments: bonds and treasury bills, locally and internationally.
- Refinance maturing debt or a debt redeemed before maturity date (for example it can buy up existing debt and cancel it).
- Issue debt instruments in order to assist the CB in controlling the domestic monetary situation (this is rarely implemented).

Clearly, the total public debt outstanding reflects accumulation of the budget deficits of the past. Issues involved in public debt management include:

- Domestic versus foreign debt.
- Term structure of debt.
- Relationship with monetary policy.
- In-progress debt management.
- Debt to GDP ratio.

2.7.2.2 Domestic versus foreign debt

Assuming government debt has an investment-grade credit rating, it is able to issue debt domestically and in international markets. Local debt is treasury bills and bonds of various types [plain vanilla (fixed-coupon and fixed-term), inflation-linked, zero-coupon, floating rate and so on]. They are denominated in LCC.

Foreign debt issues are made only in bonds, and they are usually of the plain vanilla type. These bonds are either:

- *Foreign bonds* (issued in the currency of the investors – e.g. USD).
- *Eurobonds* (issued in countries other than the country of the currency in which they are denominated). For example, the Kenyan government could issue a USD-denominated bond in the UK. Another example is a *Euro-LCC bond*, i.e. a bond that is denominated in LCC and is issued in another country.

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- *Global bonds* (issued in two or more markets but are denominated in the currency of one of the markets. An example: Local Country issues a global bond denominated in USD in both the US bond market (in which case it is a foreign bond and called a *Yankee bond*), as well as in the Eurobond market (in which case it is called a *Eurodollar bond*).

The constraint on domestic issues lies in "crowding out" the private sector, resulting in higher interest rates. The constraint on foreign issues is a balance of payments-related one: foreign exchange reserves must be available to repay the debt on maturity. Failure to do so will result in a default-status credit rating, and the non-availability of foreign investors and foreign exchange from this source.

2.7.2.3 Term structure of debt

As seen, locally-registered government debt is made up of bonds (maturity > one year) and treasury bills (maturity < one year). In this discussion we assume the plain vanilla bond is the bond of choice (which it is in real life).

The choice of term of an issue is largely a function of the interest rate view of government. If rates are expected to rise and remain high for an extended period, the appropriated term of financing is long-term. The converse also applies. The objective is to minimise the interest burden.

Another consideration is the maturity profile of debt: it is essential to avoid the bunching of debt redemptions for certain periods, i.e. to create "smooth" maturity structure. This ensures the ease of refinancing, with positive implications for the interest burden.

2.7.2.4 Relationship with monetary policy

At the core of monetary policy is the creation by the CB of a LS and its accommodation at the KIR. The method of CB accommodation is usually either overnight loans or repos. In both cases treasury bills and short-term government bonds (usually < three years) are utilised by the banks. This means that central government is required to ensure that sufficiency of supply of treasury bills and short-term government bonds is taken into account in decisions on the term to maturity of new issues.

2.7.2.5 In-progress debt management

Once a debt is issued it does not mean that it cannot be repurchased by government. The considerations in this respect are:

- Cash flow management (e.g. repurchase debt when cash flush).
- Term structure management (e.g. if government would like to smooth the debt maturity structure: repurchase relevant debt and finance this with relevant new debt).
- Minimise interest burden (e.g. repurchase long-term debt if rates are expected to fall for an extended period).

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2.7.2.6 Ratio to gross domestic product

The ratio *government debt (GD) / GDP* is used internationally as a measure of fiscal discipline. In most countries a ratio in excess of 60 per cent is deemed to be excessive. The ratio has a bearing on the credit rating of the country and therefore on the availability of foreign funds and the level of interest rate.

2.7.3 The central bank and public debt management

Public debt management is part of fiscal policy. Fiscal policy and monetary policy co-ordination is an essential part of economic policy. Apart from this obvious macro relationship, the CB plays a role in micro public debt management, as follows:

The CB acts as an agent for Treasury in the placing of treasury bills and government bonds in the debt market. It conducts regular (usually weekly) treasury bill tenders as well as other special tenders of bills when required. It conducts tenders for government bonds when required. Where a primary dealership system is in place, the CB organises it, appoints the dealers and conducts the tenders as well. Usually the primary dealers are obliged to tender for a certain minimum amount. The bonds on offer are allocated in ascending order of yields bid.



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The CB participates in Treasury's debt management meetings, and acts an advisor in decisions on the timing, size, type of security, and the maturity structure of bond issues. It also advises Treasury in respect of foreign issues of bonds.

2.8 Administration of exchange controls

Exchange controls, detailed in the Exchange Control Regulations, are instituted under the relevant statute, and are the responsibility of the Ministry of Finance / Treasury. The Minister of Finance / Treasury delegates the administration and execution of exchange controls to the governor of the CB in terms of the Exchange Control Regulations. The governor creates an Exchange Control Department, which is responsible for the day-to-day administration of exchange controls.

The Minister of Finance / Treasury, also under the Exchange Control Regulations, appoints certain banks as Authorised Dealers in foreign exchange (forex). The appointment affords the banks the right to buy and sell forex, subject to certain conditions and within limits prescribed by the Exchange Control Regulations. Authorised Dealers are not agents for the Exchange Control Department but act on behalf of their customers within the Regulations.

The Exchange Control Regulations are designed to restrict the free movement of forex in order to protect the domestic economy from large and disruptive fluctuations in capital movements and other economic shocks, such as spikes in commodity prices. It is also designed to preserve scarce forex reserves for crucial purposes.

There are few advantages to exchange control; some would say there are none, only disadvantages such as:

- They negatively affect the image of the country.
- They impede price discovery. The "official" forex market price is fixed under some regimes. This creates a "black market" in forex (which discovers the true price = exchange rate).
- They "make" criminals of certain members of the public (usually the wealthy and the businessmen / women). It is normal to endeavour to hedge wealth.
- They encourage businesses to move to a country which does not have exchange controls.
- They encourage the best human capital to make a home elsewhere.
- They enable incompetent governments to remain in power for longer than otherwise.
- By restricting their expansion to other countries, they hinder the development of local companies.
- They discourage inward foreign investment.
- They are expensive and time consuming to the CB, the authorised dealers in forex, business and the public.
- They cause major frustrations for the authorised dealers, business and the public, which contributes to many of the abovementioned disadvantages, such as encouraging the best human capital to make a home elsewhere.

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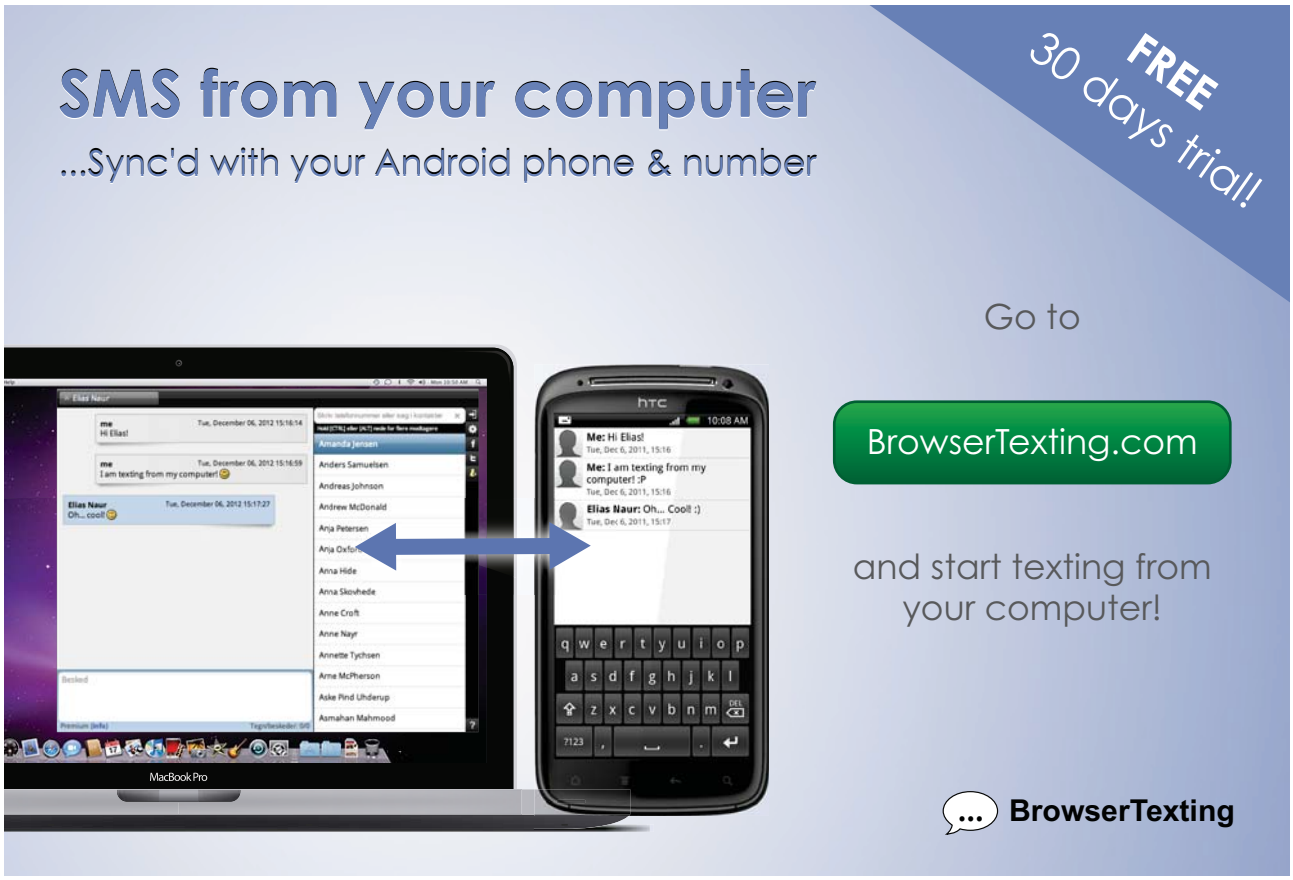
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3 Management of money & banking system

3.1 Learning outcomes

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

1. Elucidate the central banking function "lender of last resort".
2. Explain the central bank's role in currency (notes and coins) management.
3. Describe the central bank function "banker to private sector banks".
4. Detail the central bank function "settlement of interbank claims".
5. Expound on the significance of the central bank's role in bank supervision.
6. Explicate the central bank's role in the supervision of the payments system.
7. Elucidate the central banking function "management of gold and foreign exchange reserves".



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3.2 Introduction

Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability)
Formulation of monetary policy framework
Influence on level of interest rates (through bank liquidity management)
Open market operations
Banker and advisor to government
Banker to government
Public debt management
Administration of exchange controls
Management of the money and banking system
Lender of last resort (note: not a monetary policy function)
Currency management (notes and coins)
Banker to private sector banks
Settlement of interbank claims
Bank supervision
Supervision of payments system
Management of gold and foreign exchange reserves
Development of debt market
Provision of economic and statistical services
Provision of internal corporate support services and systems

Table 1: Functions of central banks

A significant component of financial stability is proficient management of the money and banking system. As can be seen in Table 1 the central bank's function *management of the money and banking system* carries a number of responsibilities. These are critical responsibilities and, as will be seen, many of them overlap with the monetary policy function.

In order to fully appreciate (some of) them, we need to discuss the function "settlement of interbank claims" first. The following is the order of the sections:

- Banker to private sector banks.
- Settlement of interbank claims.
- Supervision of payments system.
- Lender of last resort.
- Currency (notes and coins) management.
- Bank supervision.
- Management of foreign assets.
- Development of debt market.

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3.3 Banker to private sector banks

As we have seen, a CB acts as the custodian of the reserves that banks are legally required to hold with the CB (the RR). It is called the reserve requirement, and it is a ratio (*r*) of bank deposits (or bank liabilities in some cases). The CB also has the authority to change the reserve requirement ratio in order to influence bank liquidity, although this is rarely used as a tool – because it is able to undertake OMO. It tends to be utilised only in countries with fledgling financial markets.

A CB[15] elucidates in this regard:

> *"The…Bank acts as custodian of the cash reserves that banks are legally required to hold or prefer to hold voluntarily with the Bank. The Bank has the authority to change the minimum cash reserves that banks are required to hold and can use such adjustments to influence bank liquidity and the amount of money in circulation."*

As we have seen, in some countries the banks are required to maintain two accounts with the Reserve Bank, *reserve accounts* and *current accounts* (the latter are also known as *free balance accounts* or *settlement accounts*). The former are the accounts in which the legally required amount of reserves must be held at all times, and the latter the accounts in which the clearing / settlement of interbank claims takes place. In some countries the banks are required to have just one account for the RR and settlement of interbank claims. We assume one account called the *reserve account*.



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The banks' balances on their reserve accounts are usually kept to the minimum required (the RR), for a simple reason: the CB does not pay interest on the RR or the ER of the banks (in most cases). Thus, banks place free balances they may have with deficit banks during the interbank clearing process.

A caveat is required: this is the norm; in exceptional circumstances, central banks have been known to bring about a situation in which the banks hold ER for extended periods – in order to ensure that interest rates are at a minimum, the motivation being stimulation of the economy. In essence this means that the banks are encouraged to make loans and create new money (deposits). As we have seen, banks only make loans if there is a demand for loans, and underlying the demand for loans is economic activity (C + I = GDE).

It may be useful to take the reader back to the origin of this CB function. It began in the days of the London silver- and goldsmiths in the 17th century. For many reasons (such as plundering by the king when coins were kept at the Mint in the Tower of London), the London wealthy began making use of the secure facilities of the goldsmiths for their wealth, which was then comprised of precious metal coins. They *deposited* their coins with the goldsmiths and the latter issued a *receipt* for the gold.

It was later found that these receipts were a convenient *means of payments* for goods and services, and it came to pass that the goldsmiths were requested to split *receipts* into smaller denominations and to issue them without being payable to a person (i.e. to *bearer*). For example, if Mr A deposited 100 one pound gold coins the goldsmith-banker would be asked for 100 receipts, each with a face value of one pound. These receipts became the principal means of payment, i.e. money. Thus at this stage the amount of money in circulation was the sum total *of gold coins in circulation plus goldsmith-banker receipts in the possession of the public*.

The receipts became money because they were *convertible into gold*, i.e. any holder of a receipt could present it to the relevant goldsmith and demand gold. At that time loans were made by the goldsmiths in the form of the gold in their possession. The goldsmiths over time became more involved in banking business which led to the name: goldsmiths-bankers, and later just bankers.

It did not take long for a goldsmith-banker to realise that if their receipts were being used as the means of payment, then loan demand could be satisfied not by gold coins, but by the issue of new goldsmith-banker receipts. This was an historical event of momentous proportions and changed the economics of the world forever. The most significant event in banking – money creation by the new banks – was born, which endures to this day. It liberated economies from the often stifling shortage of precious metals from which money was struck. It is appropriate from here on to refer to goldsmith-banker receipts as *bank notes* and to the goldsmith-banker as *bank*.

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BALANCE SHEET 1: BANK (POUNDS)			
Assets		**Liabilities**	
Gold coins (1 000 000 of one pound each) (1)	1 000 000	Bank notes / receipts (1)	1 000 000
Total	1 000 000	Total	1 000 000

An example is appropriate: Balance Sheet 1 indicates a bank's stock balance sheet before the making of loans by the issue of new notes. We assume that gold coins had a face value of one pound (which was not the case then). All bank notes were covered in full by gold. Balance Sheet 2 (step 2) shows the balance sheet after loans are made with the issue of new bank notes to the value of 500 000 pounds. Now, bank notes are covered by gold to the extent of 0.67% (1 000 000 / 1 500 000).

BALANCE SHEET 2: BANK (POUNDS)			
Assets		**Liabilities**	
Gold coins (1 000 000 of one pound each) (1) Loans (2)	1 000 000 500 000	Bank notes / receipts (1) Bank notes / receipts (2)	1 000 000 500 000
Total	1 500 000	Total	1 500 000

The next step, bank deposit money, was a logical inevitability: the opening of current accounts (then called "running caches") from which payments are made to other accounts by means of an instrument of transfer: the cheque. Thus money (the *means of payments*) became bank notes and gold coins (N&C), and bank deposits (BD):

M = N&C + BD (in the possession of the NBPS[16]).

It did not take long for the banks to realise that loans could be made by simple bookkeeping entry: credit the current account: see Balance Sheet 3 (step 3: the initial credit to, and after spending by, the borrower).

BALANCE SHEET 3: BANK (POUNDS)			
Assets		**Liabilities**	
Gold coins (1 000 000 of one pound each) (1) Loans (2) Loans (3)	1 000 000 500 000 500 000	Bank notes / receipts (1) Bank notes / receipts (2) Current account deposits (3)	1 000 000 500 000 500 000
Total	2 000 000	Total	2 000 000

It will be evident that current account balances are convertible into bank notes and that the *gold coverage ratio* now becomes 0.5 or 50% (1 000 000 / 2 000 000). This ratio became important because the banks realised that there is a limit to their extension of loans / deposits: they must hold sufficient gold reserves to meet demand for gold coins. This is the origin of the reserve requirement (RR): a self-imposed limit to new bank loans / creation of new deposits (note: they are counterparts).

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Thus, it came to pass that new loans could only be made when new deposits of gold coins were made. If the acceptable gold reserve ratio requirement (the *r*) is 10%, and a deposit of gold coins of 100 000 pounds were made, then the banks could extend new loans to the extent of:

$$\begin{aligned} \text{New loans} &= \text{new reserves} \times (1 / r) - \text{new reserves} \\ &= 100\,000 \text{ pounds} \times 0.10 - 100\,000 \\ &= 1\,000\,000 - 100\,000 \\ &= 900\,000 \text{ pounds.} \end{aligned}$$

BALANCE SHEET 4: BANK (POUNDS)			
Assets		**Liabilities**	
Gold coins (1)	+100 000	Deposits (1)	100 000
Loans (2)	+900 000	Deposits (2)	900 000
Total	1 000 000	Total	1 000 000

Thus, a fresh 100 000 pounds of gold was "backing" 1 000 000 in new deposits (liabilities) = 0.10 or 10%.



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In 1875, a scholar[17] on money matters wrote (based on studies that indicated that an *r* of 5% is the norm):

> *"Thus, the whole fabric of our vast commerce is found to depend upon the improbability that the merchants and other customers of the banks will ever want, simultaneously and suddenly, so much as one-twentieth part of the gold money which they have a right to receive on demand at any moment during banking hours."*

If he was exasperated in 1875, he would have been more so when the gold standard was abolished in the 20th century. This event has a long and intricate history; suffice it to say that there were periods of uncertainly when convertibility of bank liabilities into gold was suspended. Once abolished in the 20th century, there was nothing "backing" bank liabilities. The acceptable reserves (RR) then became bank notes of and deposits at the CB, and now some countries have abolished CB notes as ranking as reserves (for many reasons).

This paved the way for "fractional reserve banking", where central banks are able to control bank lending / deposit creation by restricting the amount of reserves created (which is CB money – CBM – over which central banks have a monopoly, i.e. no bank except the CB can create CBM.

This paved the way for excessive money creation and hyperinflation, when central banks were pressured by governments to create reserves on demand. The term *hyperinflation* was coined during the first half of the 20th century.

Today, most central banks do not rely on bank reserves to curb bank lending / deposit creation, but on interest rates. The RR is but one of many factors that influence bank liquidity, as we have seen. In normal times central banks create a permanent liquidity shortage and charge the banks the KIR in order to influence bank lending rates.

In conclusion, we present a brief history of the first deposit by a bank at a central bank. The Bank of England, which only later morphed into a CB, was formed in 1694, in competition with the goldsmith-bankers / banks. It was afforded the sole right to issue banks notes (there were a few exceptions for a while), much to the chagrin of the banks. It came to pass that the banks made deposits with the Bank of England, and they regarded deposits as reserves, in addition to gold coins.

The first goldsmith-bankers / banks to open accounts with the Bank of England were the firms of Richard Hoare (later C Hoare & Co, which still exists as a London private banker today – see Box 1) and Freame & Gould (the forerunner of Barclays Bank). They opened their accounts with the Bank of England in March 1695[18], and in the course of time the other banks followed suit. This was a presaging of the Bank of England, in its later role of central bank, performing the function of *custodian of the reserves of banks*.

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BOX 1: C HOARE & CO, LONDON



Photo: AP Faure.
The bank started as a goldsmith in 1672 at the sign of the "Golden Bottle in Cheapside" (then the style of physical address).
It relocated to Fleet Street in 1690. A visit to their museum is most illuminating and educational. See www.hoarebankers.co.uk.
The bank is still owned and run by the Hoare family.

3.4 Settlement of interbank claims

A significant function of central banks is the provision of facilities for the central clearance and settlement of claims among banks, originating from cheque and other payments made. Settlement of claims among banks in the UK started with the goldsmith-bankers in the 17th century (i.e. in the absence of a CB).

An example may be helpful: there are three banks, all of which have a so-called "out-clearing book" indicating new deposits they have received in the form of cheques drawn on the other banks (see Tables 1–3). For example, Bank A has a new deposit of 2 000 pounds from Client A; the cheque is drawn on Bank B; thus, Bank B owes Bank A 2 000 pounds. Similarly, Bank C has a new deposit of 5 000 pounds from Client G; the cheque is drawn on Bank A; thus, Bank A owes Bank C 5 000 pounds.

	BANK B	BANK C	TOTAL
CLIENT A	2 000		2 000
CLIENT B		5 000	5 000
CLIENT C		1 000	1 000
TOTAL	2 000	6 000	8 000

Table 1: Out-clearing book: Bank A (pounds)

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	BANK A	BANK C	TOTAL
CLIENT D	3 000		3 000
CLIENT E	3 000		3 000
CLIENT F		4 000	4 000
TOTAL	6 000	4 000	10 000

Table 2: Out-clearing book: Bank B (pounds)

	BANK A	BANK B	TOTAL
CLIENT G	5 000		5 000
CLIENT H		1 000	1 000
CLIENT I	2 000		2 000
TOTAL	7 000	1 000	8 000

Table 3: Out-clearing book: Bank C (pounds)

The banks get together in a physical location, present their claims against the other banks, and receive the claims against themselves of the other banks (into *in-clearing books*). The outcome is presented in Table 4. Bank B has gained 7 000 pounds in deposits, while Bank A lost deposits of 5 000 pounds and Bank C lost deposits of 2 000 pounds. Initially, the individual banks settled the amounts between themselves:

- Bank A paid Bank B 4 000 pounds (6 000 – 2 000).
- Bank A paid Bank C 1 000 pounds (7 000 – 6 000).
- Bank C paid Bank B 3 000 pounds (4 000 – 1 000).

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		CLAIMS ON			
		BANK A	BANK B	BANK C	TOTAL
CLAIMS AGAINST	BANK A	X	6 000	7 000	13 000
	BANK B	2 000	X	1 000	3 000
	BANK C	6 000	4 000	X	10 000
	TOTAL	8 000	10 000	8 000	26 000

Table 4: Total claims on and against (pounds)

The amounts were settled in bank notes initially, and the balance sheets of the banks will have changed as indicated in Balance Sheets 5–7.

BALANCE SHEET 5: BANK A (POUNDS)			
Assets		**Liabilities**	
		Deposits Bank notes issued (Bank B) Bank notes issued (Bank C)	-5 000 +4 000 +1 000
Total	0	Total	0

BALANCE SHEET 6: BANK B (POUNDS)			
Assets		**Liabilities**	
Bank notes (Bank A) Bank notes (Bank C)	+4 000 +3 000	Deposits	+7 000
Total	+7 000	Total	+7 000

BALANCE SHEET 7: BANK C (POUNDS)			
Assets		**Liabilities**	
Bank notes (Bank A)	+1 000	Deposits Bank notes issued (Bank B)	-2 000 +3 000
Total	+1 000	Total	+1 000

Later when current accounts evolved that banks made loans to one another (called interbank loans). Their balance sheets would have indicated the changes shown in Balance Sheets 8–10.

BALANCE SHEET 8: BANK A (POUNDS)			
Assets		**Liabilities**	
		Deposits Interbank loan (Bank B) Interbank loan (Bank C)	-5 000 +4 000 +1 000
Total	0	Total	0

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BALANCE SHEET 9: BANK B (POUNDS)			
Assets		Liabilities	
Interbank loan (Bank A) Interbank loan (Bank C)	+4 000 +3 000	Deposits	+7 000
Total	+7 000	Total	+7 000

BALANCE SHEET 10: BANK C (POUNDS)			
Assets		**Liabilities**	
Interbank loan (Bank A)	+1 000	Deposits Interbank loan (Bank B)	-2 000 +3 000
Total	+1 000	Total	+1 000

Jevons[19] tells us that a formal Clearing House (CH) first emerged in London in about 1775. A Clearing House's main function is to net-off reciprocal claims and to ensure secure settlement. Table 5 presents an example of the net outcome of the CH numbers. Instead of the banks settling debts as indicated above, under a CH system the number of deals is significantly reduced. In our example, settlement takes place in that Bank A and Bank C settle not with one another, but only with Bank B (see Balance Sheets 11–13).

	BANK A	BANK B	BANK C	TOTAL
CLAIMS ON	8 000	10 000	8 000	26 000
CLAIMS AGAINST	-13 000	-3 000	-10 000	-26 000
TOTAL	-5 000	7 000	-2 000	0

Table 5: Net claims and settlement (pounds)

BALANCE SHEET 11 BANK A (POUNDS)			
Assets		**Liabilities**	
		Deposits Interbank loan (Bank B)	-5 000 +5 000
Total	0	Total	0

BALANCE SHEET 12: BANK B (POUNDS)			
Assets		**Liabilities**	
Interbank loan (Bank A) Interbank loan (Bank C)	+5 000 +2 000	Deposits	+7 000
Total	+7 000	Total	+7 000

BALANCE SHEET 13: BANK C (POUNDS)			
Assets		**Liabilities**	
		Deposits Interbank loan (Bank B)	-2 000 +2 000
Total	0	Total	0

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Jevons[20] informs that (as the book was published in 1875 the "more recently" referred to could be between 1860 and 1870):

> *"More recently a suggestion…was carried into effect, and the balances were paid by drafts upon the bank of England, in which bank each city banker deposits a large part of his spare cash."*

This heralded to CB function of central clearing and settlement, the central point being the banks' accounts at the Bank of England. Using the above example, the changes in the banks' balance sheets would be as indicated in Balance Sheets 14–17.

BALANCE SHEET 14: CENTRAL BANK A (POUNDS)			
Assets		**Liabilities**	
		Banks' reserve accounts	
		Bank A	-5 000
		Bank B	+7 000
		Bank C	-2 000
Total	0	Total	0

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BALANCE SHEET 15: BANK A (POUNDS)			
Assets		**Liabilities**	
Reserve account at CB	-5 000	Deposits	-5 000
Total	-5 000	Total	-5 000

BALANCE SHEET 16: BANK B (POUNDS)			
Assets		**Liabilities**	
Reserve account at CB	+7 000	Deposits	+7 000
Total	+7 000	Total	+7 000

BALANCE SHEET 17: BANK C (POUNDS)			
Assets		**Liabilities**	
Reserve account at CB	-2 000	Deposits	-2 000
Total	-2 000	Total	-2 000

All countries have an interbank clearing and settlement system, and most have an automated system, usually called an Automated Clearing Bureau (ACB). The netted amounts payable / received are delivered on the banks' CB accounts. Most countries also have a system for large payments, and these are not netted and settled in real time over banks' CB accounts. It is called the *real time gross settlement* (RTGS) system (note the absence the word *clearing*, which refers to netting). Where RTGS systems exist, the ACB systems remain but for small payments.

3.5 Supervision of payments system

In most countries there are three payments systems:

- RTGS system, for large payments.
- ACB system, for retail payments (cheques and ETFs).
- The payments system for the exchange of automatic teller machine (ATM) transactions between banks.

The three systems, and others that may exist, collectively, can be called the National Payment System (NPS). The systems all make use of the settlement facility at the CB, and because of this, the system is secure. When payments are made by banks they are made from their existing reserves. If these payments leave individual banks short of RR at the end of the business day, they are required to find the funds in the interbank market, or from the CB in the form of loans against collateral.

The CB is ultimately responsible for the NPS, and regards it as part of the foundations of financial stability.

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3.6 Lender of last resort

3.6.1 Introduction

It was seen above that with interbank settlements the amounts, colloquially-speaking, equal out; it is a zero-sum game. No new funds are created in, and no funds are lost to, the banking system: what one bank loses in deposits others gain. However, there are circumstances when this does not happen:

- When the CB does a local deal.
- When larger banks do not lend to smaller banks.
- When confidence in a particular bank wanes as a result of rumours or a *bank run*.

This section is about the last bullet point. However, we need to briefly elucidate the former two.

3.6.2 Central bank transactions

The first bullet point is a monetary policy issue. In the previous section the bank liquidity chronicle was outlined which, in essence, means that whenever the central bank dopes a deal in the financial markets, the deal has consequences for the liquidity of banks. A reminder is required (see Balance Sheet 18).

BALANCE SHEET 18: CENTRAL BANK (LCC MILLIONS)	
Assets	**Liabilities**
E. Foreign assets F. Government securities (claims on govt) G. Loans to banks (borrowed reserves – BR)	A. Notes and coins B. Deposits 1. Government 2. Banks (TR) a. RR b. ER C. Foreign loans D. Central bank securities

We presented the change identity:

$$\Delta NER = \Delta(E - C) + \Delta(F - B1) - \Delta A - \Delta B2a - \Delta D.$$

A change in the NER (B2b – G) of the banking system is *caused* by changes in the other appropriately grouped balance sheet items (which can be called balance sheet sources of change – BSSoC):

$$\Delta NER =$$

$\Delta(E - C)$ = net foreign assets (NFA)
$+ \Delta(F - B1)$ = net loans to government (NLG)
$- \Delta A$ = notes and coins in circulation
$- \Delta B2a$ = RR
$- \Delta D$ = central bank securities (CBS).

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The *actual causes* of change are the transactions that underlie the BSSoC. As said before, if deposits move from banks to banks, the liquidity of the banking sector (NER) does not change. As soon as the CB does a deal or when bank deposits or the demand for N&C changes, NER changes. Thus we have two sets of BSSoC:

- Passive BSSoC.
- Operational BSSoC.

The passive BSSoC are:

- Bank deposit (money) volume changes: has a RR consequence. While this factor is not operational, the CB does have an indirect influence on it.
- Notes and coins (N&C) in circulation. This item is influenced by the demand for N&C from the public and the banks.



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The operational BSSoC are:

- NFA (usually forex swaps). For example, the sale of forex to a bank (a forex swap) will decrease NER (increase the LS).
- NLG (purchases / sales of government securities and changes in government deposits).For example, the sale of TBs to the banks will decrease NER (increase the LS).
- CBS issues. A new issue will decrease NER (increase the LS).
- Reserve requirement ratio (r) can be changed by the CB. An increase in r will decrease NER (increase the LS).

2.6.3 Large / small bank problem

In certain countries where the banking sector is dominated by large banks, there may be reluctance by the large banks to deal in the interbank market with the small banks. This means that as deposits move from small banks to large banks, the latter may not recycle the funds, and the interbank market will not clear. This in turn will mean that the CB will have to accommodate the small banks at KIR. An example: LCC 100 million deposits shift from small banks to large banks (see Balance Sheets 19–21).

BALANCE SHEET 19: CENTRAL BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
		Banks' reserve accounts Small banks Large banks	 -100 +100
Total	0	Total	0

BALANCE SHEET 20: SMALL BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Reserve account at CB	-100	Deposits	-100
Total	-100	Total	-100

BALANCE SHEET 21: LARGE BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Reserve account at CB	+100	Deposits	+100
Total	+100	Total	+100

The obvious solution is an interbank transaction. However, if the large banks refuse to lend to the small banks there is little the CB can do, except perhaps encourage a collateral deal, or a repo deal. The transaction takes place, with collateral changing hands in the background.

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3.6.4 Confidence and the bank run

Confusion exists in respect of the expression *lender of last resort*. Lending to the banks for monetary policy purposes is deliberate and almost totally under the control of the CB. This is not *last resort* lending; it is *first resort* lending, in that it is engineered by the CB, because they desire to make the KIR effective.

The lender of last resort function of the CB is a *financial stability* issue. When a bank is "in trouble", as when confidence in the bank is lost leading to a bank run, that bank cannot meet all deposit demands (no bank is able to). The bank will fail if the lost deposits are not recycled back to it in the interbank market. The other banks will not entertain this (as in the above *large bank / small bank* example). Thus, it is left to the CB to decide to whether to rescue the bank.

This is an imperative issue, and it has systemic failure implications. It leads to the question: are certain banks too big to fail?

In this regard the Bank of England[21] asserts:

> *"Where a threat to the stability of the financial system is perceived to be present, the Bank may intervene to stand between an intermediary and the market place in order to facilitate payments and settlements, which might otherwise not be completed. In extreme cases, emergency financial support by the Bank might be provided, the so-called 'lender of last resort' (LOLR) function, but this is only done where the failure of one institution could bring down other, otherwise viable, institutions. This function may involve the Bank lending money to the failing institution to prevent its failure and hence to stop repercussions of its collapse from spreading through the financial system. This safety net exists to protect the stability of the financial system as a whole and not to protect individual institutions or their managers and shareholders.*
>
> *"The use of the Bank's LOLR function must be carefully justified in terms of the damage that would result to the financial system and the wider economy if intervention did not take place. This is because the LOLR role requires the use of public money and can also encourage excessive risk-taking (and hence financial fragility) if institutions believe that they will be bailed out whenever they experience difficulties. These risks mean the Bank and the FSA need to co-operate closely when a problem emerges, and inform the Treasury. The Bank also needs to satisfy its Court of Directors that any risks it accepts are manageable in relation to the Bank's own capital, when they are to be carried on the Bank's balance sheet."*

The opinion of the South African Reserve Bank:

> *"The Reserve Bank provides liquidity to banks during periods of temporary shortages of cash. This function is referred to as the Bank's 'lender-of-last-resort lending activities'.*

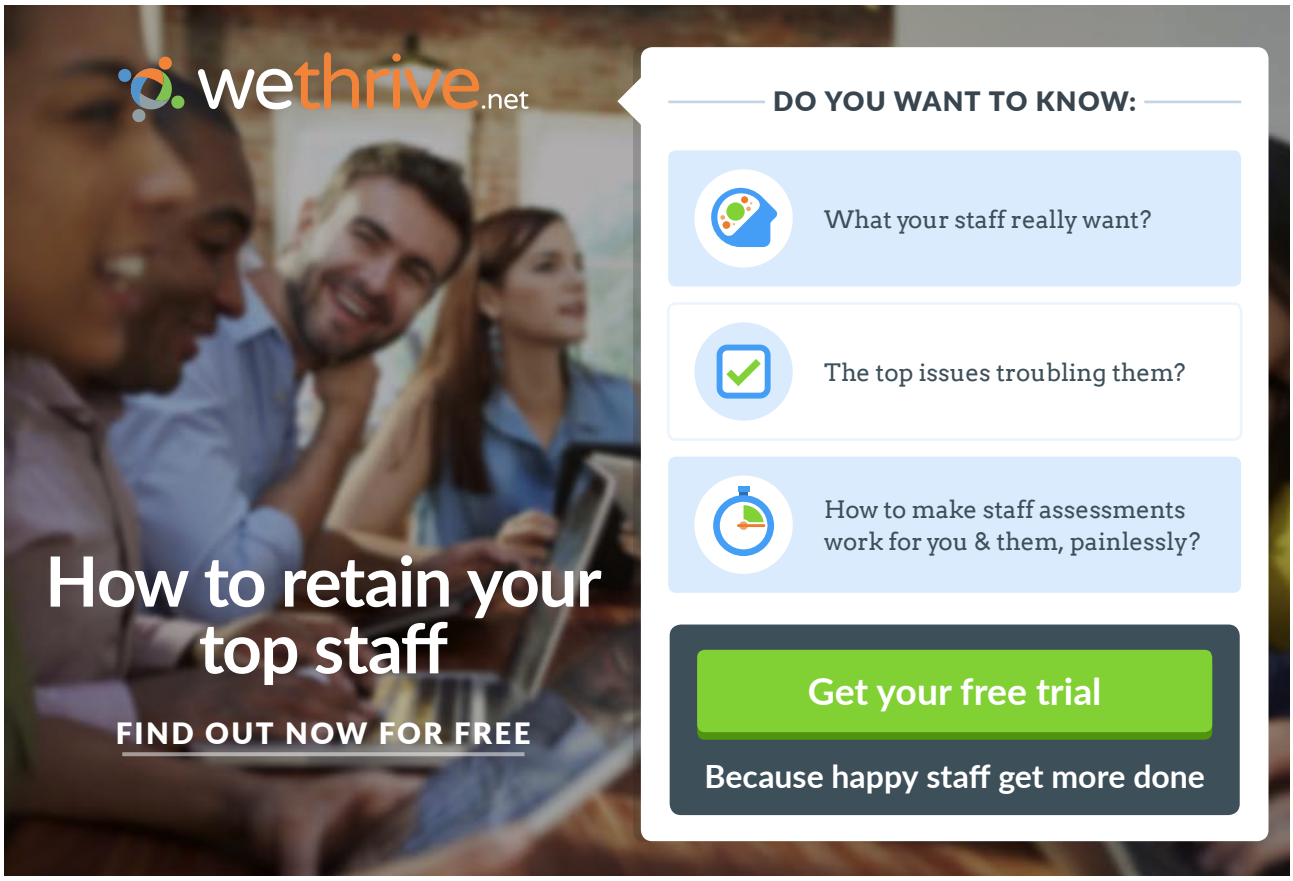
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"This function implies giving assistance to a bank facing liquidity problems. Such assistance is only given after a full analysis of the problems afflicting such a bank and the reasons they arose. The assistance will only be given on specific conditions, and its purpose is to prevent the bankruptcy of the bank receiving assistance, and/or avoid the danger of problems spreading to other banks through a 'run on such a bank'.

"A bankrupt bank will often not be able to repay its depositors, and the main purpose of special assistance is, therefore, to protect depositors. However, such assistance is never guaranteed or given automatically, and banks may accordingly go bankrupt, leading to severe hardships for depositors who lose their deposits at such a bank. The maintenance of stability in the banking system is, therefore, of the utmost importance to any country."

3.7 Currency (notes and coins) management

Because the CB (in most cases) has the sole right to manufacture, issue and destroy banknotes and coin in the country, it has the obligation to ensure that there are sufficient quantities of notes and coins of an acceptable quality in the public domain. This is to ensure that small transactions may continue unhindered.



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Most countries have a Mint (coins manufacturing company) and a bank notes manufacturing company. In Local Country, these companies are called the LC Mint Company (Pty) Limited and the LC Bank Note Company (Pty) Limited. They are subsidiaries of the CB. Some countries outsource this function to other countries.

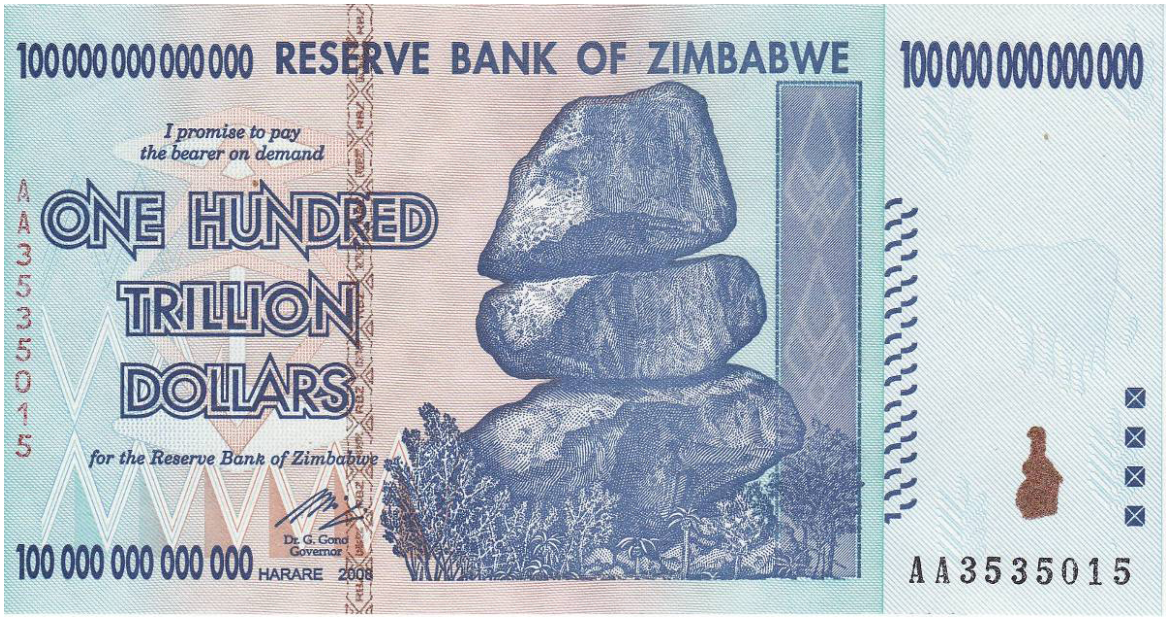
In this section we highlight the following:

- Legal tender.
- Sole right to issue.
- Denominations.
- Design.
- Issue of banknotes and coin.
- Managing quality of banknotes and coin in circulation.
- Managing public awareness for fraud prevention.
- Branch functions in respect of banknotes and coin.

All notes and coins issued by the CB are *legal tender*. This means they have to be accepted in payment (up to a certain amount). If not, the debt is extinguished.

As noted, the CB has the *sole right* to manufacture, issue and destroy banknotes and coins in Local Country. This right is bestowed on the CB by government and is contained in the statute regulating the CB.

BOX 2: LARGEST DENOMINATION BANK NOTE (WITH ZEROS)



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The *denominations* of bank notes and coins depend on many factors, but especially inflation and the exchange rate. For example, if Local Country experienced high inflation in the past and its exchange rate against the vehicle currency, the USD, is USD / LCC 205, it would most likely have had bank note denominations of LCC 1 000, LCC 500, LCC 100, LCC 50, LCC 20 and LCC 10. An example of a bank note in a past-hyperinflation country is shown in Box 2.

However, as Local Country's exchange rate against the USD is USD / 1.50, its bank note denominations are LCC 100, LCC 50, LCC 20, LCC 10, LCC 5 and LCC 1. One LCC made up of 100 cents and the denominations are: 50c, 20c, 10c, 5c, 2c and 1c. In past high inflation countries, the lower denominations will not exist.

As regards the *design* of bank notes and coins, all new designs must have the prior approval of government before they are placed into circulation. The same applies to denominations, although the CB makes recommendations.

As regards the *issue* of banknotes and coins the CB:

- calculates the country's new bank notes and coins requirements on an annual basis;
- places new bank notes and coins into circulation on an ongoing basis, according to demand; and
- ensures that sufficient new bank notes and coins are available to replace those that are removed from circulation due to "soil" and mutilation levels.

The quality of bank notes and coins in circulation is important for many reasons, including:

- To avoid fraudulent copying / printing (counterfeiting). Central banks follow the advances in technology and introduce security and technical features to keep ahead of the counterfeiter.
- To ensure that mechanical sorting and counting of notes and coins is possible.
- To ensure they are acceptable to members of the public and foreign visitors.
- To enhance the image of the country internationally.

The CB undertakes to reimburse soiled and mutilated bank notes and coins which are not wilfully damaged. Soiled and mutilated bank notes and coins are deposited at commercial banks who will in turn forward them to the CB for payment. The bank note covenant *I promise to pay the bearer on demand…for the Reserve Bank of…* (signed by the governor; see Box 2) means this. Its genesis is of course the convertibility of bank notes into gold.

Managing public awareness for fraud prevention is another function of the CB in this respect. It engages the public to be aware of the security features in bank notes and so prevent the spread of counterfeit bank notes.

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As regards *branch functions in respect of bank notes and coins*, most central banks have branches, and their main functions are to:

- Accept bulk deposits and withdrawals of bank notes and coins (but this mainly applies to bank notes). Bank notes and coins are non-interest-earning assets for banks. They therefore endeavour to keep their holdings to a minimum (in teller drawers and ATMs). Excess bank notes and coins are deposited at the CB (and their reserve accounts are credited), and withdrawals are made in anticipation of public demands (just before and during salary payment periods). These are paid for by debits to the banks' reserve accounts.
- Ensure that adequate bank notes and coins of acceptable quality are available.
- Inspect bank notes and coins and those not meeting the required quality standard are destroyed.

Although this is rarely used, members of the public have access to teller facilities at the branches for the replacement of soiled and mutilated bank notes and coins.

3.8 Bank supervision[22]

3.8.1 Introduction

The mission of central banks is the achievement and maintenance of financial stability. One of the foundations of financial stability is the regulation and supervision of the banking system with a view to attaining an efficient and sound banking system in the interest of depositors and the economy as a whole.

There are four elements to regulation / supervision:

- Institution of rules of conduct (regulation).
- Monitoring (observance of whether the regulations instituted are obeyed).
- Supervision (observance of the behaviour of participants).
- Enforcement (ensuring that the rules are adhered to).

This topic is so significant that it requires much attention, which we do not have space for here. Instead, we will cover in broad strokes:

- Rationale for regulation.
- Objectives of regulation.

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3.8.2 Rationale for regulation

The financial sector plays a pivotal role in the economy in that in its absence or partial failure the economic machine will be severely damaged. Imagine if the payments system failed or the banks are closed for extended periods (such as occurred in Argentina in 2001/2 – where segments of the economy were reduced to barter trade). The financial sector is also a major employer and is a major attractor of foreign exchange if soundly managed. This sector also carries the responsibility of allocating capital to the most productive uses.

The main rationale for government intervention is "market malfunction" which means that the financial system will produce a sub-optimal outcome in the absence of regulation. Thus, government intervention has welfare benefits. The consumer and the participants want regulation and are even prepared to pay for it.

The "rationale" for regulation amounts to "why regulation is necessary". There are a number of reasons:

- Systemic malfunction.
- Market imperfections.
- The moral hazard problem.
- Economies of scale.
- Consumer confidence and consumer demand for regulation.
- Supplier demand for regulation.



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We only touch upon the first-mentioned:

As we have mentioned, the financial *system* plays a vital role in the economy, and failure or malfunction of the system can disrupt economic activity severely. Banks are the only financial intermediaries that intermediate between all sectors of the economy (household, corporate, government and foreign) and all the other financial intermediaries. In addition, the banking system provides the payments and clearing systems for all transactions that take place in the economy. The failure of a major bank not only causes losses for depositors and shareholders, but also disrupts payments and the settlement of previously effected transactions immediately and possibly for some time.

3.8.3 Objectives of regulation

The ultimate objectives of regulation can be narrowly defined:

- Promotion of financial stability.
- Promotion of fair and healthy competition.
- Promotion of consumer protection.

The first two objectives may be rolled together under the heading "high degree of economic efficiency".

3.9 Management of foreign assets[23]

3.9.1 Introduction

Foreign assets are holdings of bank deposits in foreign banks and foreign securities such as USD treasury bills and GBP government bonds. The prudent management of the foreign asset reserves is an important function of the CB, and is covered under the following:

- Why do central banks hold foreign assets?
- The desired level of reserves.
- Foreign asset reserve management.
- The USD in foreign asset reserve management.

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3.9.2 Why do central banks hold foreign assets?

Central banks hold foreign assets / exchange for four main reasons:

- Central banks are the custodians of the foreign asset reserves of the country. Essentially they hold a stock of reserves on behalf of government and the public. In other words they are required by government to hold sufficient reserves
- To intervene, i.e. to sell or buy foreign exchange, in the foreign exchange market in order to influence the value of the currency. A stock of foreign exchange (forex) is required for this purpose.
- For transactions purposes. An example is to supply government with forex to enable it to repay a maturing foreign loan. Another is to be able to supply forex to the market if there is an unusually large demand for forex (for example if the airline needs to pay for the purchase of aircraft), in order to prevent a sudden fall in the exchange rate.
- Foreign (inward) investments tend to take place in countries that have large and stable forex reserves.

Foreign assets held by the CB are like a fund of assets, and all the portfolio management principles apply, including diversification. For this reason countries usually diversify their foreign asset portfolios into USD, EUR, GBP, JPY, CAD, and so on. Gold is usually also for diversification reasons.

3.9.3 The desired level of reserves

There is no fixed rule for the ideal level of forex reserves. The considerations in this regard are many, including:

- The extent of exchange rate volatility.
- A higher level of reserves enhances the credibility of the central bank's exchange rate policy.
- The level of reserves influences the image of the country in general.
- The "openness" of the economy, as measured by: foreign trade / GDP.
- The elasticity of the economy – its ability to adjust to changes in foreign capital flows and foreign trade.
- The cost of holding reserves; if local interest rates are higher than foreign rates, it is expensive to hold forex reserves.

While there is no fixed rule, there is a rule of thumb guideline: a level of forex reserves equal to the value of three months' imports.

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3.9.4 Foreign asset reserve management

As indicated earlier, the management of forex reserves of a country embraces all the principles expounded in portfolio management, except that here the main risk is currency risk. However, currency risk is largely "diversified away" (as in the case of asset-specific risk) by being invested in the major countries: the major currencies exhibit reciprocal fluctuations, so that the outcome is minimal risk if the CB invests in the major currencies in equal proportions. Figure 1 illustrates the tradition picture in risk / diversification space: as the number of securities held increases, risk (volatility) is reduced. In the case of foreign reserves, the number of currencies held does not have to be vast: assets denominated in USD, GBP, EUR, CAD, JPY and CNY are sufficient.

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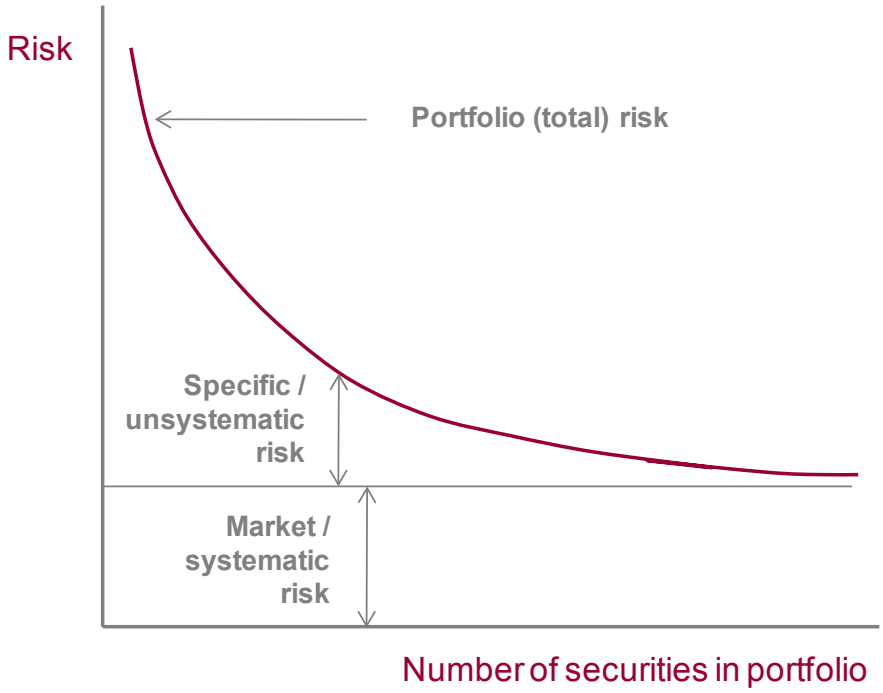


Figure 1: risk and diversification

Other considerations relating to foreign currency assets include:

- The type of instrument.
- The maturity profile (3-month GBP treasury bills or GBP 10-year treasury bonds).
- The establishment of limits for specific assets.
- The use of a management information system for:
  - measuring exposures to risks;
  - ensuring that these risks are managed; and
  - the measurement of performance.
- The use or not of external fund managers. Generally, central banks manage their own portfolios, for reasons of security, confidentiality, costs and image (central banks do not want it known that they do not have the expertise to manage their own portfolio).

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3.9.5 The USD in foreign asset reserve management

Despite the benefits of diversification, the USD remains the primary investment medium (deposits, treasury bills, bonds, etc.). The relative importance of the USD in foreign asset holdings can be attributed to a number of factors:

- The continuing role of the USD as the primary international reserve currency.
- The USD financial markets offer a wide range of instruments and liquid markets in which large transactions can be readily accomplished.
- A large proportion of countries' exports and imports are denominated in USD.
- USD-denominated debt forms a major proportion of most countries' external debt.
- The USD is used almost exclusively in spot and in forward transactions between the CB and the banks authorised to deal in foreign exchange.

3.10 Development of the debt market

Excluding derivatives (which do not represent borrowing and lending, but hedging), there are two financial markets: share market and debt market. The debt market is comprised of the:

- *Short-term debt market* (STDM), made up of ST marketable debt (ST-MD) and ST non-marketable debt (ST-NMD). This entire market is referred to as the *money market (*definitions do differ in this respect; we prefer this definition because price discovery takes place in the entire STDM.
- *Long-term debt market* (LTDM), made up LT marketable debt (LT-MD) and LT non-marketable debt (LT-NMD). The bond market is the LT-MD market, and it is isolated because price discovery primarily takes place in this market.

Central banks have an interest in all financial markets because this is where borrowing and lending takes place (we regard shares as evidences of LT and perpetual borrowing) and where money is created. However, the CB has a special interest in the debt market, because this is the market in which it operates, and the stability of which is an integral part of financial stability (in which central banks have a major input).

In developing countries, borrowing and lending starts with the banks. Initially the entire financial market is a ST-NMD market via the banks. The first ST-MD instrument to appear is the treasury bill, a debt obligation of government, usually followed by the central bank security (which we call CB bills). The latter are issued for the purpose of monetary policy and the backdrop to it is usually surplus liquidity created by the sale of donor funds (forex) by government to the central bank. Balance Sheets 22–25 show the steps to the creation of excess liquidity (ER) (r = 10%).

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BALANCE SHEET 22: GOVERNMENT (LCC BILLIONS)			
Assets		**Liabilities**	
Deposit at foreign bank (1) Deposit at foreign bank (2) Deposit at central bank (3) Deposit at central bank (4) Goods (5)	+100 -100 +100 -100 +100	Donation (1)	+100
Total	+100	Total	+100

BALANCE SHEET 23: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
Deposit at foreign bank (3)	+100	Government deposit (3) Government deposit (4) Reserve accounts (TR) (5) (RR = +10) (ER = +90)	+100 -100 +100
Total	+100	Total	+100

BALANCE SHEET 24: BANK A (LCC BILLIONS)			
Assets		**Liabilities**	
Reserve accounts (TR) (5) (RR = +10) (ER = +90)	+100	Deposits (NBPS) (5)	+100
Total	+100	Total	+100



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BALANCE SHEET 25: NPBS (LCC BILLIONS)			
Assets		Liabilities	
Goods (5) Deposits at bank (5)	-100 +100		
Total	0	Total	0

Assuming the banks were "balanced" at the outset (had no ER and no BR), they now have ER of LCC 90 billion (LCC10 billion was absorbed into RR). Interest rates will fall sharply and the CB can only prevent this by issuing CB bills. This is shown in Balance Sheets 26–27.

BALANCE SHEET 26: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		CB bills Reserve accounts (TR) (RR = +10) (ER = 0)	+90 +10
Total	+100	Total	+100

BALANCE SHEET 27: BANK A (LCC BILLIONS)			
Assets		Liabilities	
CB bills Reserve accounts (TR) (RR = 0) (ER = -90)	+90 -90		
Total	0	Total	0

To make this exercise more apparent, Balance Sheets 29–29 are presented – to illustrate the net effect. The expansionary effect of the donation has been neutralised.

BALANCE SHEET 28: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Deposit at foreign bank	+100	CB bills Reserve accounts (TR) (RR = +10) (ER = 0)	+90 +10
Total	+100	Total	+100

BALANCE SHEET 29: BANK A (LCC BILLIONS)			
Assets		Liabilities	
CB bills Reserve accounts (TR) (RR = +10) (ER = 0)	+90 +10	Deposits (NBPS)	+100
Total	+100	Total	+100

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In many developing countries an unusual intermediary, which has a history that goes back to the UK in the 17th century, was encouraged to enter the market: the *discount house*. They started off life as trade bill brokers and morphed into specialised banks, which took short-term deposits only from the banks (and other depositors in some cases), invested in STMD and made markets in these assets. The motivation is that it is not in banks' interest to make markets – because they thrive in inefficient markets in terms of wide margins. Discount houses are the bane of banks' lives because they successfully reduce bank margins through market making and education of the financial services sector. They also are instrumental in creating new assets in the form of CP, NCDs and bonds.

Countries that do not encourage discount houses endeavour to introduce a primary dealership method of issuing and market making – not always with success, because of the banks' reluctance to make markets.

After the development of the money market, there is usually impetus to develop the share market as a provider of long-term (preference shares) and perpetual (ordinary / common shares) capital. This follows because there is reluctance to invest in longer term bonds. The bond market is sometimes correctly initiated by the CB, in the form of creating and publishing a "pattern of rates" on government bonds. This is designed to stimulate interest from the banks and stockbroking community, and is often followed by the CB acting as a market maker in bonds, i.e. quoting buying (bid) and selling (offer) rates simultaneously on all exiting bonds.

This initiative stimulates activity in the market and leads to a secondary market made by the banks / stockbrokers. The corporate bond market follows because a risk-free yield curve is required as a benchmark. One of the principles of investments is that the return on government securities is the lowest rate acceptable because it delivers a risk-free rate (rfr), and that all other investments must deliver a return (called a required rate of return (rrr) equal to (rp = risk premium):

$$rrr = rfr + rp.$$

The obvious question is: why does a CB want active financial markets? The answer is straightforward:

- It needs to conduct open market operations (OMO) with the purpose influencing bank liquidity and it can only do so in liquid markets.
- Efficient price discovery, which is a product of liquid markets, is required so that interest rates can react immediately to changes in monetary policy stimuli.

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4 Money creation & framework of monetary policy

4.1 Learning outcomes

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

- Define the components of money and its measurement.
- Describe the sources of money creation.
- Define monetary policy and comprehend its statutory environment.
- Discuss the objectives of monetary policy.
- Describe the inflation targeting monetary policy framework.
- Deliberate on monetary policy accountability and transparency.
- Discuss the limitations of monetary policy.
- Describe the instruments and operation of monetary policy.
- Expound the significance of the independence of central banks.

4.2 Introduction

Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability)
Formulation of monetary policy framework
Influence on level of interest rates (through bank liquidity management)
Open market operations
Banker and advisor to government
Banker to government
Public debt management
Administration of exchange controls
Management of the money and banking system
Lender of last resort (note: not a monetary policy function)
Currency management (notes and coins)
Banker to private sector banks
Settlement of interbank claims
Bank supervision
Supervision of payments system
Management of gold and foreign exchange reserves
Development of debt market
Provision of economic and statistical services
Provision of internal corporate support services and systems

Table 1: Functions of central banks

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Table 1 presents our framework of the functions of central banks. We have left the most significant function to last: monetary policy. It is undisputed that excessive growth in the money stock is the cause of inflation. Because high inflation has a major negative impact on the economy, we need a policy in respect of money stock growth: a *monetary policy*. All countries have central banks and a monetary policy in place. However, the policies are not always well formulated, implemented and executed.

In Table 1 monetary policy is afforded three subsections; they are at the heart of monetary policy, but there is much more to discuss, such as measuring money, money creation, the framework of monetary policy and so on. This section is arranged as follows:

- Measuring money.
- Money identity: sources of money creation.
- Statutory environment.
- Objectives of monetary policy.
- Price stability.
- Inflation targeting monetary policy framework.
- Monetary policy accountability and transparency.
- Limitations of monetary policy.
- Instruments of monetary policy.
- Independence of central banks.



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4.3 Measuring money

You know that the stock of money is made up of bank notes and coins and bank deposits in possession of the NBPS. We have two questions in this regard: how do central banks calculate the money stock and what term of bank deposit qualifies as money?

As regards the latter, central banks across the world have various definitions of money, and they range from M1 to M5. They all include bank notes and coins held by the NBPS; where they differ is in the cut-off point of the term to maturity (ttm) of NBPS deposits, and the higher numbers add in other near-money assets. For the sake of simplicity we will use one of the measures: M3. It includes notes and coins (N&C) in the hands of the NBPS and all NBPS deposits with banks, and we justify this on the basis that the vast majority of deposits with banks are short-term in nature.

How does one calculate the NBPS's holdings of N&C? Take a look at the balance sheets of the central bank (called CB from now on) and the banks shown in Balance Sheets 1–2. You will see that the bank notes and coins held by the NBPS can be derived from the two balance sheets:

Total in issue (in the CB's balance sheet = item A)
Less: N&C held by the banks (item C in the banks' collective balance sheet).

Therefore the stock of N&C held by the NBPS:

N&C of NBPS = LCC 1 000 billion – LCC 100 billion
= LCC 900 billion.

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

BALANCE SHEET 2: BANKS (LCC BILLIONS)			
Assets		**Liabilities**	
C. Notes and coins	100	A. Deposits of NBPS	5 000
D. Reserves with CB (TR)	500		
F. Loans to government	1 000	B. Loans from CB (BR)	400
G. Loans to NBPS	3 800		
Total	5 400	Total	5 400

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You will also note that the banks have two types of liabilities (see Balance Sheet 2). Item A (BD of the NBPS) is money. Thus, M3 is made up of (see Figure 1):

M3 = N&C + BD of the domestic NBPS
= LCC 1 000 billion – LCC 100 billion + LCC 5 000 billion
= LCC 5 900 billion.

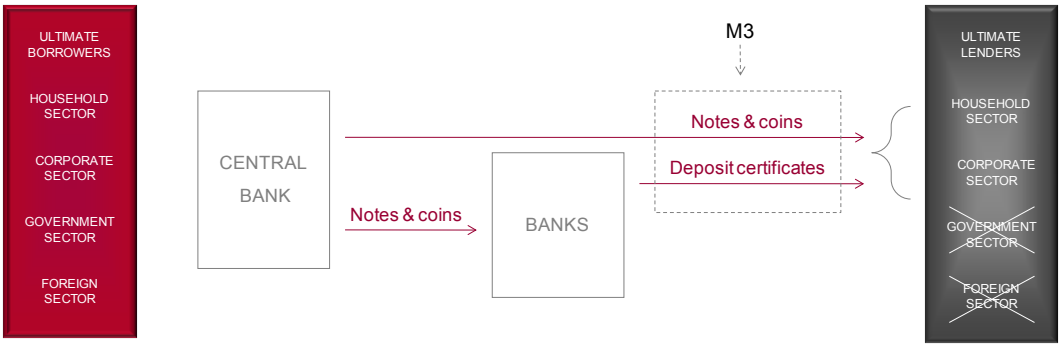


Figure 1: what is money?

Central banks calculate M3, as well as its counterparts (elucidated later), from the *consolidated balance sheet* of the banks and the CB. In most countries there are also other "monetary institutions" (such as rural banks, building societies, mutual banks, land banks and so on) ; they are also consolidated with the central bank's and the banks' balance sheets. The consolidated balance sheet appears as in Balance Sheet 3: called the consolidated balance sheet of the *monetary banking sector* (MBS).

BALANCE SHEET 3: MBS (LCC BILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 000	A. Notes and coins of NBPS	900
		B. Deposits	
E. Loans to government	2 100	1. Government	900
		2. NBPS	5 000
F. Loans to NBPS	3 800	C. Foreign loans	100
Total	6 900	Total	6 900

How is a consolidated balance sheet arrived at? It nets out all the interbank claims. For ease of understanding the relevant items have been highlighted in Balance Sheets 4–5. Note that:

- CB loans to banks (LCC 400 billion) in Balance Sheet 4 are netted off against CB loans (LCC 400 billion) in Balance Sheet 5.
- Bank reserves (LCC 500 billion, found in both balance sheets) are netted off.
- N&C: LCC 1 000 billion less LCC 100 billion = LCC 900 billion (see item A in the consolidated balance sheet.

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BALANCE SHEET 4: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets	1 000	A. Notes and coins	1 000
		B. Deposits	
E. Loans to government	1 100	1. Government	900
		2. Banks' reserve accounts (TR)	500
F. Loans to banks (borrowed reserves – BR) @ KIR	400	C. Foreign loans	100
Total	2 500	Total	2 500

BALANCE SHEET 5: BANKS (LCC BILLIONS)			
Assets		Liabilities	
C. Notes and coins	100	A. Deposits of NBPS	5 000
D. Reserves with CB (TR)	500		
F. Loans to government	1 000	B. Loans from CB (BR)	400
G. Loans to NBPS	3 800		
Total	5 400	Total	5 400



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From the consolidated balance sheet of the MBS (Balance Sheet 3), the money stock is easily identified (the items have been highlighted): item A and item B2:

M3 = A + B2
= LCC 900 billion + LCC 5 000 billion
= LCC 5 900 billion.

Of the two components of money we know that N&C is the minor party; in most countries the proportion of N&C in M3 is as low as 2%. We also know that central banks (as the sole issuers of notes and coins (in most cases) do not use N&C to create new money; they merely react to the demand for N&C, for which deposits are used as payment).

We also know that new money is created by bank lending (domestic and foreign). These sources of money creation are also found in the consolidated balance sheet (balance Sheet 3). Thus, we have the tools for an analysis of money creation. Note that what we are about to show is done by all central banks the world over on a monthly basis.

4.4 Money identity: sources of money creation

4.4.1 Introduction

We replicate the consolidated balance sheet here for ease of reference (see Balance Sheet 6).

BALANCE SHEET 6: MBS (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets	1 000	A. Notes and coins of NBPS	900
		B. Deposits	
E. Loans to government	2 100	1. Government	900
		2. NBPS	5 000
F. Loans to NBPS	3 800	C. Foreign loans	100
Total	6 900	Total	6 900

It is evident that, because the balance sheet balances, items A + B2 must be equal to all the asset items minus the remaining liability items. Therefore:

M3 = A + B2 = (D + E + F) – (B1 + C).

It will also be evident that we should combine the related asset and liability items, and they are:

- Foreign assets and foreign loans (D – C).
- Loans to government and government deposits (E – B1).

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Therefore,

$$M3 = A + B2 = (D - C) + (E - B1) + F.$$

In terms of the numbers in Balance Sheet 6 we have:

$$M3 = A + B2 = (D - C) + (E - B1) + F$$
$$M3 = 900 + 5\,000 = (1\,000 - 100) + (2\,100 - 900) + 3\,800$$
$$= 5\,900 = 900 + 1\,200 + 3\,800$$
$$= 5\,900.$$

In words:

Money stock (M3) = its "counterparts" = Net foreign assets
+ net loans to government
+ loans to NBPS.

This is the *money identity*: the "counterparts" of the money stock (the amount of money in circulation) are net foreign assets (NFA), net loans to government (NLG) and loans to the NBPS (LNBPS).

It will be evident that any change in the money stock must be equal to and therefore is "explained" by changes in NFA, NLG and LNBPS (the sources):

$$\Delta M3 = \Delta NFA + \Delta NLG + \Delta LNBPS.$$

This is the money identity: it provides an analysis of the balance sheet sources of changes (BSSoC) in M3. The actual sources are the transactions that underlie the BSSoC, and they are:

- Net foreign assets (NFA):
  - Bank and CB dealings in the foreign exchange market. If these institutions do nothing in the forex market, the market clears at a particular exchange rate. If they do, they alter the demand / supply equation of the forex market and create / destroy money, and the market will clear at a different exchange rate.

- Net loans to government (NLG):
  - Bank and CB purchases or sales of government securities.
  - The movement of NBPS deposits at banks to government (which we assume banks at the CB only), for example when taxes are paid; and the movement of government deposits to the NBPS, when government spends locally.

- Loans to the NBPS (LNBPS):
  - The demand for loans by the NBPS which is satisfied by the banks.

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In most countries the latter is the overriding source of money creation, whereas in developing countries the first two mentioned play the overriding role. The accompanying chart shows the year-on-year growth rates for M3 and LNBPS over a 40-year period for a particular country. It is quite evident that the overriding BSSoC in M3 was changes in LNBPS.

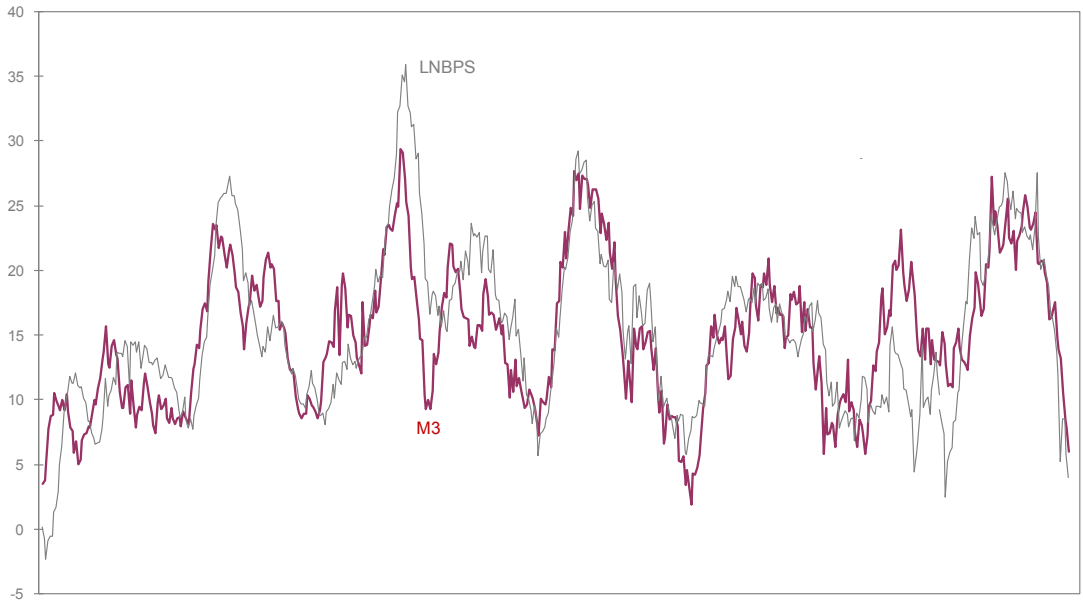
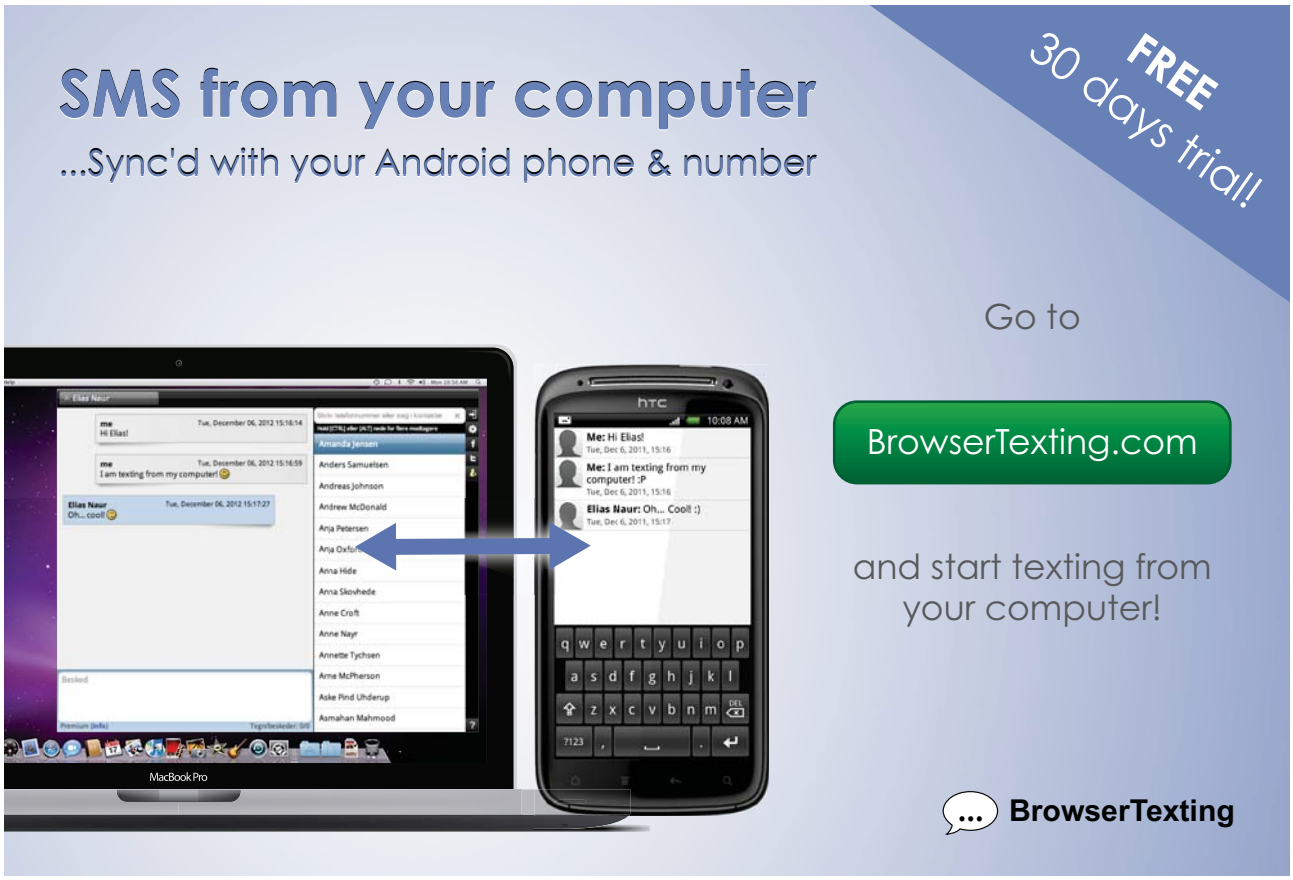


Figure 2: M3 & LNBPS (yoy%)



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4.4.2 Example: loan from bank

It will be useful to provide a few examples of the sources of changes in M3. It is to be noted that here that we do not indicate the effect of changes in bank deposits on the banks' reserve requirements. This is because we do not wish to divert attention from the principles of money creation. The effect of deposit changes on the reserve requirement is introduced at a later stage.

You will recall that when Company A sells goods to Company B and Company B acquires a loan facility from Bank A and utilises it for the purchase, the relevant balance sheets changes are as indicated in Balance Sheets 7–9 (amount = LCC 100 million).

BALANCE SHEET 7: COMPANY A (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Deposits at Bank A	-100 +100		
Total	0	Total	0

BALANCE SHEET 8: COMPANY B (LCC MILLIONS)			
Assets		**Liabilities**	
Goods	+100	Loan from Bank A	+100
Total	+100	Total	+100

BALANCE SHEET 9: BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
Loan to Company A	+100	Deposits of Company A	+100
Total	+100	Total	+100

Seen in the balance sheet of the MBS (see Balance Sheet 10) these transactions should be clearer. On this day (of the balance sheet construction) M3 increased by LCC 100 million and there was one BSSoC in M3: LNBPS increased by LCC 100 million. The real source was the demand for loans which was satisfied by the bank.

BALANCE SHEET 10: MBS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government F. Loans to NBPS	 +100	A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	 +100
Total	+100	Total	+100

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4.4.3 Example: Exports

Another example: a Local Country exporter, LC Exporter (= member of NBPS), exports goods to the value of LCC 100 million to a US Importer; the exchange rate is USD / LCC 10.0 (see Balance Sheets 11–13).

BALANCE SHEET 11: LC EXPORTER (NBPS) (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Deposits at US Bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 12: US IMPORTER (USD MILLIONS)			
Assets		**Liabilities**	
Goods US Bank deposits	+10 -10		
Total	0	Total	0

BALANCE SHEET 13: US BANK (USD MILLIONS)			
Assets		**Liabilities**	
		Deposits of US Importer Deposits of LC Exporter	-10 +10
Total	0	Total	0

There was no change in the money stock (i.e. there was no change to the local bank's (LC Bank) balance sheet. LC Exporter now sells the LCC 100 million foreign exchange earnings (USD) to LC Bank (see Balance Sheets 14–16).

BALANCE SHEET 14: LC EXPORTER (NBPS) (LCC MILLIONS)			
Assets		**Liabilities**	
Deposits at US Bank Deposits at LC Bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 15: LC BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Deposits at US Bank	+100	Deposits of LC Exporter	+100
Total	+100	Total	+100

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BALANCE SHEET 16: US BANK (USD MILLIONS)			
Assets		**Liabilities**	
		Deposits of LC Exporter Deposits of LC Bank	-10 +10
Total	0	Total	0

It will be clear that the balance sheet of LC Bank (i.e. the local bank) changed: LC Bank bought a foreign deposit of USD 10 million (= forex) and paid LC Exporter by crediting his account; this amounts to an increase in the local deposits of the NBPS = an increase in M3. In terms of the balance sheet of the MBS we have changes as indicated in Balance Sheet 17. M3 increased by LCC 100 million and the BSSoC is an increase in NFA (the increased foreign deposit). The real cause is the transaction, a portfolio decision – the purchase of forex – by LC Bank.



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BALANCE SHEET 17: MBS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government F. Loans to NBPS	+100	A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	 +100
Total	+100	Total	+100

Had LC Exporter sold the forex into the forex market the market would have cleared at a better exchange rate, say USD / LCC 9.99, than when the forex was withheld by LC Bank from the commercial supply / demand forces in the forex market.

4.4 Example: government issues bonds

Another example will be useful: the government issues LCC 1 000 million bonds and they are purchased by a number of the retirement funds (= members of the NBPS) (see Balance Sheets 18–21).

BALANCE SHEET 18: GOVERNMENT (LCC MILLIONS)			
Assets		**Liabilities**	
Deposits at CB	+1 000	Bonds	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 19: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to banks @ KIR	+1 000	Government deposits	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 20: RETIREMENT FUNDS (NBPS) (LCC MILLIONS)			
Assets		**Liabilities**	
Bonds Deposits at banks	+1 000 -1 000		
Total	0	Total	0

BALANCE SHEET 21: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
	0	Deposits of NBPS Loans from CB @ KIR	-1 000 +1 000
Total	0	Total	0

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This action of government drains liquidity from the banks and they have no option but to borrow from the CB (discussed later). When the balance sheets of the banks and the CB are consolidated (see Balance Sheet 22) it will be seen that M3 has fallen by LCC 100 million and the BSSoC is a decline in NLG (a result of the increase in government deposits). The real cause is the issue of bonds. When government spends the money, which is the purpose of the debt issue, the situation will be restored (M3 will increase again).

It is important to understand that if the banks had purchased the bonds, M3 would have increased, as indicated in Balance Sheets 23–24.

BALANCE SHEET 22: MBS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government F. Loans to NBPS		A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	 +100 -100
Total	0	Total	0

BALANCE SHEET 23: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Bonds	+1 000	Deposits of NBPS	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 24: MBS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government (bonds) F. Loans to NBPS	 +1 000 	A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	 +1 000
Total	0	Total	0

4.4.5 Example: bank notes

A final example: the public (members of the NBPS) pop off to the banks' ATMs and withdraw LCC 100 million in bank notes with their debit cards (= a direct debit to their current accounts) (see Balance Sheets 25–26).

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Balance Sheet 27 shows for the position of the MBS, which is the same as for the banks. You will recall that M3 = N&C + BD. The N&C holdings of the NBPS increased by LCC 100 million and their deposits decreased by the same amount. Thus, the money stock did not change, only the composition did. Recall that Item A in the MBS balance sheet = the CB's N&C liability less the N&C held by banks. The former was unchanged and the latter decreased by LCC 100 million.

BALANCE SHEET 25: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
N&C	-100	Deposits of NBPS	-100
Total	-100	Total	-100

BALANCE SHEET 26: NBPS (LCC MILLIONS)			
Assets		**Liabilities**	
N&C Deposits at banks	+100 -100		
Total	0	Total	0



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BALANCE SHEET 27: MBS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government F. Loans to NBPS		A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	+100 -100
Total	0	Total	0

4.4.6 Money destruction

When banks provide new loans (to the government sector or the NBPS), or buy forex, money is created. The overriding source of money creation is bank loans in a balance sheet sense, and the demand for loans that is satisfied by the banks, in a real life sense. Obviously, the money stock can also fall, but this is rare, as seen in Figure 2. In this particular country, and it applies to most countries, not in any month did the growth rate in M3 decrease.

However, it would be amiss if a fall in the money stock was not discussed. Take the example of Mrs A. She took a loan of LCC 50 000 from Bank A in the past. In order to repay the loan, she would accumulate a balance of LCC 50 000 on her bank account over time, and repay the bank on the due date of the loan. Balance Sheets 28–29 show this transaction.

BALANCE SHEET 28: MRS A (NBPS) (LCC)			
Assets		**Liabilities**	
Deposit at bank	-50 000	Bank loan	-50 000
Total	-50 000	Total	-50 000

BALANCE SHEET 29: BANK A (LCC)			
Assets		**Liabilities**	
Bank loans (NBPS)	-50 000	Deposits of NBPS (M3)	-50 000
Total	-50 000	Total	-50 000

The position of the MBS will be the same as that of Bank A (see Balance Sheet 30).

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BALANCE SHEET 30: MBS (LCC)			
Assets		**Liabilities**	
D. Foreign assets E. Loans to government F. Loans to NBPS	 -50 000	A. Notes and coins of NBPS B. Deposits 1. Government 2. NBPS C. Foreign loans	 -50 000
Total	-50 000	Total	-50 000

4.4.7 Bank deposits and the reserve requirement

As we have seen, by consolidating the balance sheets of the banks and the CB, all the cb2b IBM and the b2cb IBM claims were netted out. This obscures an aspect of the money market and monetary policy: the effect of changes in bank deposits on the banks' required reserves (RR). We introduce it here.

You will recall from the first example above that when Company A sells goods to Company B and Company B acquires a loan facility from Bank A and utilises it for the purchase, a new bank deposit (new money) is created. What we did not show is the effect on the RR. We now need to add the balance sheet of the CB (see Balance Sheets 31–34) (the amount of the bank loan = LCC 100 million; the RR ratio = 10% of deposits).

BALANCE SHEET 31: COMPANY A (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Deposits at Bank A	-100 +100		
Total	0	Total	0

BALANCE SHEET 32: COMPANY B (LCC MILLIONS)			
Assets		**Liabilities**	
Goods	+100	Loan from Bank A	+100
Total	+100	Total	+100

BALANCE SHEET 33: BANK A (LCC MILLIONS)			
Assets		**Liabilities**	
Loan to Company B Reserves with CB (TR) (RR +10)	+100 +10	Deposits of Company A Loan from CB @ KIR	+100 +10
Total	+110	Total	+110

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In this example the required reserves increase by LCC 10 million (increased deposit of LCC 100 million × 0.10). Because Bank A cannot create CB money, the CB will make to loan to the bank (BR). The TR of the banks increases by LCC 10 million (as a result of RR = +LCC 10 million).

BALANCE SHEET 34: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to banks (BR) @ KIR	+10	Bank reserves (TR) (RR +10)	+10
Total	+10	Total	+10

As will be seen later, the change in RR is just one of many factors that impact on bank liquidity, and that bank liquidity management is an essential ingredient in monetary policy.

4.5 Statutory environment

In many countries monetary policy is underpinned by law, which is confirmation of the significant role of monetary policy. Examples:

In the US, the responsibility for setting monetary policy is contained in the Federal Reserve Act of 1913[24].

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In the UK the Bank of England Act of 1998 formally gives the operational responsibility for setting monetary policy to the Bank of England[25]. The mandate for the European Central Bank[26] to conduct monetary policy is laid down in Article 105 (1) of the Treaty establishing the European Community.

In South African law, the responsibility for setting monetary policy is contained in the Constitution of the Republic of South Africa Third Amendment Act 26 of 1996 and the South African Reserve Bank Act 90 of 1989.

4.6 Objectives of monetary policy

Every student of monetary policy has a definition; ours is:

Monetary policy embodies the formulation and execution of policies by the central bank, in the form of open market operations to render its key interest rate effective, aimed at guiding bank lending rates to a level where loan demand and its counterpart, deposits (money) growth, are at a level consistent with the economy's supply elasticity, all of which are premeditated on the attainment of low inflation and high and sustainable economic output.

The Federal Reserve Board[27] defines monetary policy as follows:

> *"The term 'monetary policy' refers to the actions undertaken by a central bank, such as the Federal Reserve, to influence the availability and cost of money and credit to help promote national economic goals."*

Most central banks define monetary policy in terms of its objectives. Some examples follow:

Bank of England[28]:

> *"The objective of monetary policy is price stability – to maintain the value of money – or, to put it another way, to restrain inflation or the general increase in the prices of goods and services. Uncertainty about inflation – and thus about future price levels – is damaging to the proper functioning of the economy. With a stable general price level, individual price signals can be read more clearly, and more rational decisions taken about whether to save or to borrow, how much to invest and to consume, and what and when to produce. In this way, price stability can help to foster sustainable long-term economic growth."*

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Bank of Canada[29]:

> *"The goal of Canadian monetary policy is to contribute to rising living standards for all Canadians through low and stable inflation. Specifically, the Bank aims to keep the rate of inflation…inside a target range established jointly with the government. Since 1995, the target range has been 1 to 3 per cent."*

These views may be synthesised as follows:

- Central banks have two *objectives*: one that could be termed the *primary objective* (which is best defined as *low and stable inflation*) and one that could be termed the *ultimate objective* (which is best defined as *sustainable high economic growth*).
- The ultimate objective is the dependent variable. However, low and stable inflation is *not a sufficient condition* for attainment of this lofty ideal; it is one of many, but it is the one of the most significant.
- Uncertainty about inflation is harmful to the proper functioning of the economy. High inflation is associated with low real interest rates and highly volatile nominal rates of interest. High volatility means risk, and business does not like risk. Businesses do not do well in high risk environments because their efforts are redirected to hedging risk.
- A stable general price level and stable rates of interest means that the most important economic signals are transparent, leading to lower risk and easier decision-making. In this way price stability contributes to high and sustainable long-term economic growth.

In order to achieve the primary and ultimate objectives, central banks have *intermediate objectives*, and these are many, including sustainable growth in bank loans / money and stability in other indicators such as the exchange rate and asset prices. The discussion on monetary policy thusfar may be summarised as in Figure 3. The large gap is noticeable; it is "filled" with the *operational side of monetary policy* which is covered in detail later.

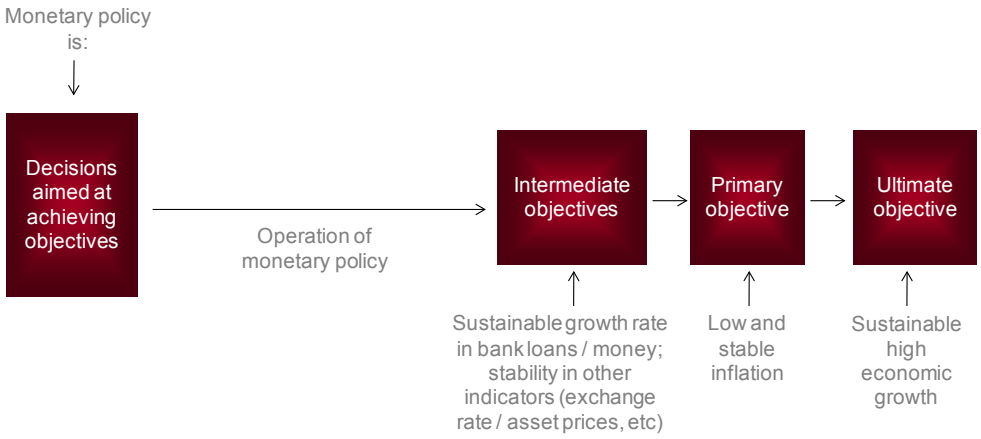


Figure 3: objectives of monetary policy

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4.7 Price stability

4.7.1 Introduction

We have described the *primary objective* of central banks as the achievement *of low and stable inflation*, and the ultimate objective as *sustainable high economic growth*, to which achievement of the primary objective contributes handsomely. It is opportune to express a view here on what price stability is and what the *benefits of price stability* are.

4.7.2 What Is Price Stability?

The ECB (see Box 1) defines price stability as "…a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%", and it adds that "Price stability is to be maintained over the medium term." Other central banks have similar definitions, for example, an inflation target range of 3–6%.

But what does this mean for the economy? It means that central banks want to achieve low inflation on a sustainable basis because this state of affairs brings about *low volatility in prices in general and in interest rates* which is an important input in business decisions. Put another way, the private sector is able to plan ahead in terms of expenditure and investment (C + I = GDE; GDE + TAB = GDP) decisions without being constrained by uncertainly.

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4.7.3 What are the benefits of price stability?

The benefits of price stability are immense. The ECB articulates the benefits in Box 1. In summary:

- In general it contributes to the achievement of a higher and sustainable level of economic output and employment.
- It improves the transparency of the price mechanism.
- It contributes to bringing about stability in interest rates, the most important price in the economy in terms of savings and investment decisions.
- It contributes to the avoidance of unproductive business activities – hedging against inflation or deflation.
- It assists in restoring the equal redistribution of income and wealth.
- It contributes towards reducing the distortionary effects on economic behaviour that results from the impact of inflation on the tax and social security systems.

BOX 1: BENEFITS OF PRICE STABILITY: ECB[1]

"The objective of price stability refers to the *general level of prices in the economy*. It implies *avoiding both prolonged inflation and d*eflation. *Price stability contributes to achieving high levels of economic activity and employment* by

- improving the transparency of the price mechanism. Under price stability people can recognise changes in relative prices (i.e. prices between different goods), without being confused by changes in the overall price level. This allows them to make well-informed consumption and investment decisions and to allocate resources more efficiently;
- reducing inflation risk premia in interest rates (i.e. compensation creditors ask for the risks associated with holding nominal assets). This reduces real interest rates and increases incentives to invest;
- avoiding unproductive activities to hedge against the negative impact of inflation or deflation;
- reducing distortions of inflation or deflation, which can exacerbate the distortionary impact on economic behaviour of tax and social security systems;
- preventing an arbitrary redistribution of wealth and income as a result of unexpected inflation or deflation.

"While the Treaty clearly establishes the maintenance of price stability as the primary objective of the ECB, it does not give a precise definition of what is meant by price stability…. The ECB's Governing Council has defined price stability as 'a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. Price stability is to be maintained over the medium term'."

It will be recalled that the other central banks quoted earlier expressed the same sentiment: generally that price stability *contributes to achieving high levels of economic activity*, i.e. the achievement of the ultimate objective.

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4.8 Inflation targeting monetary policy framework[30]

In order to achieve the primary objective of *price stability* many countries have in place an *inflation targeting monetary policy framework*. Under this framework, a numerical target or target range for the inflation rate that is intended to be achieved over a specified time period is publicly announced by government. Thus, it is a government target, and it is to be executed by the CB, because the CB has the operational tools to best achieve it.

An *inflation-targeting monetary policy framework* is not only about the target. The other elements / advantages of the framework are:

- It makes the objective of monetary policy crystal clear and thereby improves planning in the private and public sectors.
- It makes it clear that government is part of a formalised and co-ordinated effort to contain inflation in pursuit of the broader economic objective of sustainable high economic growth and employment creation.
- It focuses monetary policy and enhances the accountability of government and the central bank to the public.
- It provides an anchor for expectations of future inflation which has an influence on price and wage setting.
- It often contains the caveat of the target being flexible, as manifested in a target range (in some cases), and it is to be attained over a period (usually the medium term).

As regards the last point: some discretion is allowed because circumstances can arise which dictate that exclusive emphasis on inflation goals is not appropriate. Examples are: natural disasters, large and disruptive international capital flows, supply shocks such as a spike in the oil price, demand shocks such as a sharp fall in the demand for cocoa (Ghana) or copper (Zambia). In these circumstances a rigorously applied rule deprives the central bank of its ability to deal effectively with them. Some discretion must be applied in order to avoid costly losses in terms of output and jobs.

Although discretion is claimed as a right by most central banks, they are mindful of the importance of the *credibility* of the CB and of the target. One CB[31] articulates in this regard:

> *"It is…also important that the inherent discipline of inflation targeting is not foregone by applying discretion. The objective of the exercise is, after all, to achieve the target range. An inflation-targeting monetary policy framework can only be successful if the public is convinced that the central bank is serious about containing inflation. The benefits of inflation targeting depend on whether wage and price setting are responsive to the inflation target of the authorities. Public buy-in is essential to obtain low inflation and its consequent benefits for all. This requires a national effort, anchoring expectations around the inflation range."*

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Inflation targets replace money stock growth rate targets. The *inflation-targeting monetary policy framework* still regards money stock and bank loan extension as critically important, and they are monitored closely, but together with other economic indicators such as:

- The level of international interest rates.
- The shape and position of the yield curve.
- Changes in nominal and real salaries and wages.
- Changes in employment.
- Nominal unit labour costs.
- The gap between potential and actual national output.
- General money market conditions.
- Changes in asset prices.
- The overall balance of payments position.
- The terms of trade.
- Exchange rate developments.
- Public sector borrowing requirement.



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4.9 Monetary policy accountability and transparency[32]

In the previous section we mentioned the virtues of the *inflation-targeting monetary policy framework* in terms of monetary policy accountability and transparency. We take these issues further here. The following steps are taken by most central banks to enhance monetary policy accountability and transparency:

- The inflation target is announced openly to the public; in this way it indicates visibly that the central bank is accountable for the target and makes the application of the inflation targeting framework as transparent as possible.
- Announcement of the target makes the intent of monetary policy explicit; the corporate sector is therefore well-informed and better able to plan in terms of production and expansion of production.
- If the target is not met, the central bank has to explain the situation to the public (in Parliament).
- The governor of the central bank is obliged to report to the Minister of Finance (Parliament) twice per annum and report on the stance of monetary policy.
- The monetary policy stance of the central bank is communicated regularly to the public in various formats:
  - A *monetary policy statement* issued after each meeting of the Monetary Policy Committee (MPC).
  - In some cases central banks invite the public to *Monetary Policy Forums* held in the major centres of the country, where presentations are made and discussions are held in which the public participates.
  - In some cases central banks publish a *Monetary Policy Review*; it describes in more detail the decisions taken by the central bank and analyses the factors that could have an influence on future inflation.

These components of accountability and transparency are mostly common to the central banks that have adopted an inflation targeted monetary policy. With regard to the situation in the UK, the Bank of England[33] reports:

> *"Increased accountability to Parliament and the public is achieved through the publication of the minutes, and the continued publication of the Bank's Inflation Report, as well as through appearances by MPC members before the Treasury Select Committee of Parliament and through the Bank's Annual Report. The Governor is also obliged to write an open letter to the Chancellor if inflation deviates more than 1% on either side of the 2.5% target. Under certain circumstances, the Bank of England Act allows the Treasury to give instructions to the Bank in the field of monetary policy for a limited period of time. These powers can only be used if the Treasury is satisfied that they are required in the public interest and only by 'extreme economic circumstances'."*

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4.10 Limitations of monetary policy

It should be evident from the discussion above that there is a limit to what monetary policy can achieve. The ultimate objective of all governments is to improve the welfare of the nation. There are many factors that contribute to the welfare of people: education, work ethic, culture, mineral resources, technology, population growth, political stability, price stability, etc.

Price stability is just one of these factors, meaning that the central bank cannot achieve the lofty ideal of improving the welfare of the nation; it can merely make a contribution to this ideal. Price stability is the only factor that is firmly within the control of the central bank. The view of the ECB[34] is relevant:

> *"In the long run a central bank can only contribute to raising the growth potential of the economy by maintaining an environment of stable prices. It cannot enhance economic growth by expanding the money supply or keeping short-term interest rates at a level inconsistent with price stability. It can only influence the general level of prices.*
>
> *"Ultimately, inflation is a monetary phenomenon. Prolonged periods of high inflation are typically associated with high monetary growth. While other factors (such as variations in aggregate demand, technological changes or commodity price shocks) can influence price developments over shorter horizons, over time their effects can be offset by a change in monetary policy."*

The South African Reserve Bank[35] articulates in this regard:

> *"…the Bank…believe[s] that the best contribution that monetary policy can make to growth is to provide a low and stable inflation environment that is conducive to sustainable long-term growth."*

4.11 Instruments of monetary policy

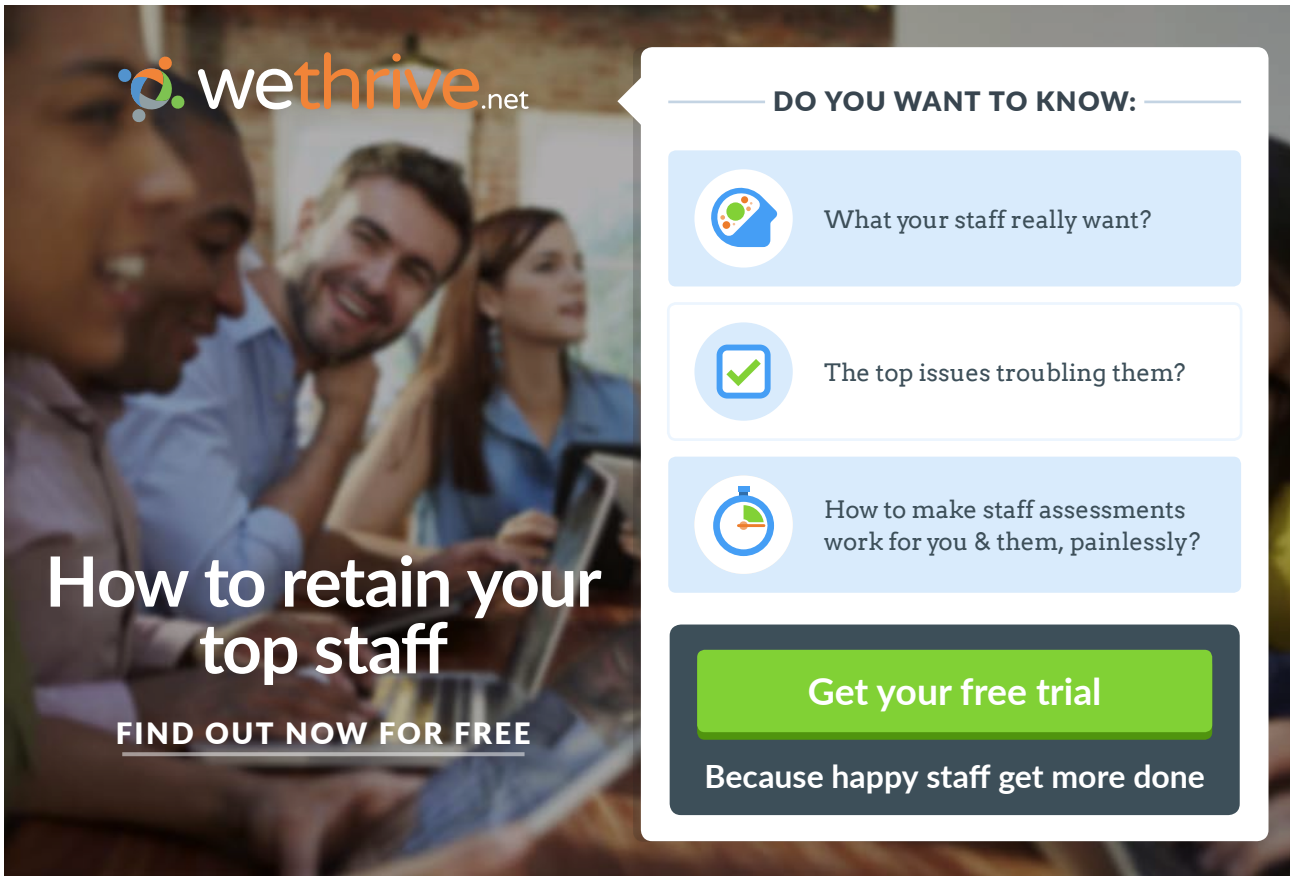
Monetary policy had a chequered career in most countries, and a look over the shoulder to the past reveals some instruments of policy that would make a young central banker cringe. In general, today there is little debate on the instruments of monetary policy; it is almost a case of the existence of a standard set of instruments, and the only differences that exist are nuance-like.

Why then dig up the old instruments of monetary policy? The first reason is completeness and the second is history. One needs to be reminded of the "dreadful" past in terms of instruments of monetary policy, in order to avoid them. We hasten to add that the present-day instruments, while effective, can also be harmful in the hands of a non-independent central bank coupled with a delinquent President / Prime Minister.

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Meijer[36] provides a comprehensive list of monetary policy instruments used in the past and presently:

- Management of the public debt.
- Open market operations.
- Central bank discount policy.
- Variations in the reserve requirements for banks or (more generally) in the prescriptions governing the portfolio compositions of banks and other financial institutions.
- Imposition and variation of quantitative restrictions on bank lending (credit "ceilings").
- Selective credit controls.
- Deposit and/or lending interest rate controls.
- Moral suasion.
- Variations in the terms and conditions of hire-purchase and instalment credit (consumer credit).
- Capital issues control.
- Import deposit schemes.
- Official foreign borrowing (under certain conditions).
- Changes in exchange control regulations (under certain conditions).
- Central bank intervention in the spot and forward foreign exchange markets (under certain conditions).



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The instruments of monetary policy can be classified into the new / indirect / market oriented, and old / direct / non-market oriented instruments. We begin with the latter.

The old / direct / non-market oriented instruments of monetary policy are those that are used to accomplish the aims of monetary policy by *prescription* of the conduct of banks. They do not rely on market forces to influence the behaviour of banks, and usually engage inflexible behaviour rules or the specification of certain quantitative rules. Usually, if the banks do not comply with the rules penalties or prosecution is possible. Examples include:

- Quantitative ceilings on bank lending.
- Specified interest rate ceilings and / or floors on loans and deposits.
- Exchange controls.
- Simultaneous quantitative control of bank reserves and interest rate control.

The new / indirect / market oriented (*new* in the sense of a few decades) instruments of monetary policy are those that are used to accomplish the aims of monetary policy by influencing the banks' and the public's conduct in respect of their lending and borrowing activities. The *influencing* arises from interest rate changes brought about by the central bank in its KIR which in turn influence rates in the financial markets (but they remain linked to the KIR).

An administered rate (KIR) change does not imply "market oriented". This is so, but it rests on the fact that the vast majority of the money stock is bank deposits of the NBPS. Because of this banks are able to create money (deposits) by mere lending, provided a demand for loans exists. Thus, normal supply and demand forces are absent, and some entity is required to generate the genesis interest rate. The CB provides this in the form of the KIR and this rate influences the b2b IBM rate and banks' deposit rates (bank liabilities) and, via the bank margin, bank lending rates, which in turn influences the public's demand for bank loans. Thus, the CB exercises a large measure of discretion.

As we have seen, the KIR is only effective if the banks are actually indebted to the CB, i.e. making use of BR. This means that the CB has to create and maintain a condition of a liquidity shortage (LS). This is where open market operations (OMO) enter the fray. The CB makes use of the *open market* for financial instruments to bring about a permanent LS:

- Buying and selling government securities (treasury bills and government bonds.
- Forex swaps with the banks.
- Issues and repurchases of CB securities.
- Shifting government funds between the Exchequer Account at the CB and the TLAs at the banks.

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A caveat: in abnormal times a liquidity surplus can prevail, also brought about by the CB through OMO. The motivation is to coerce banks to drop interest rates to the lowest level possible.

In summary: in normal times the instruments of monetary policy are:

- Creation of a LS condition to make KIR effective.
- Changing KIR when appropriate.
- Executing OMO in its various forms in order to ensure a LS condition.

Figure 4 completes Figure 3 by including these instruments of monetary policy; when combined they represent the *operation of monetary policy*.

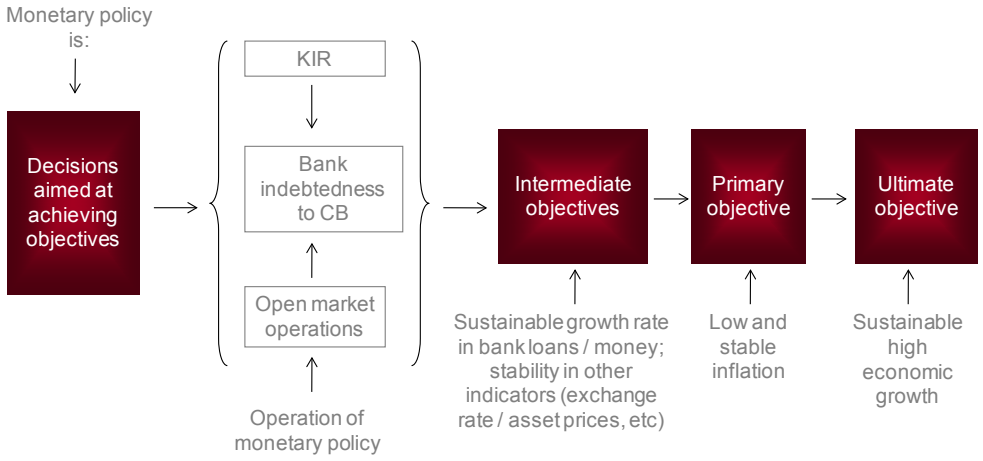


Figure 4: monetary policy

The effective application of these instruments is dependent on a developed financial system in which price discovery is efficient.

4.12 Independence of central banks

There is not much debate on the independence of central banks. It is generally accepted that total operational independence is the norm, and that consultation with the Treasury is required, and is acknowledged as not compromising monetary policy.

The independence of central banks is imbedded in statute in most countries. For example, in the case of the South African Reserve Bank its independence is imbedded in the Constitution. Subsection (2) of section 224 ("Primary object") states in this regard:

> *"The South African Reserve Bank, in pursuit of its primary object, must perform its functions independently and without fear, favour or prejudice, but there must be regular consultation between the Bank and the Cabinet member responsible for national financial matters."*

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5 Monetary policy: models & transmission

5.1 Learning outcomes

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

- Outline the models of monetary policy.
- Describe the cornerstones of monetary policy.
- Deliberate on the transmission of monetary policy.

5.2 Introduction

Formulation and implementation of monetary policy (aimed at achieving and maintaining price stability)
Formulation of monetary policy framework
Influence on level of interest rates (through bank liquidity management)
Open market operations
Banker and advisor to government
Banker to government
Public debt management
Administration of exchange controls
Management of the money and banking system
Lender of last resort (note: not a monetary policy function)
Currency management (notes and coins)
Banker to private sector banks
Settlement of interbank claims
Bank supervision
Supervision of payments system
Management of gold and foreign exchange reserves
Development of debt market
Provision of economic and statistical services
Provision of internal corporate support services and systems

Table 1: Functions of central banks

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Table 1 presents our framework of the functions of central banks. We have left the most significant function to last: monetary policy, and have presented it in two parts. The first (the previous section) covered the measurement of money, money creation, the framework of monetary policy and related issues. With these as background, this final section discusses the three models of monetary policy, followed by a brief discourse on the transmission of monetary policy from changes in the KIR to inflation.

In summary, this section covers:

- Models of monetary policy.
- Path of monetary policy: from interest to inflation.

5.3 Models of monetary policy

5.3.1 Introduction

In a previous section we presented the primary instruments of monetary policy (LS = liquidity shortage):

- Creation of a LS condition to make KIR effective.
- Changing KIR when appropriate.
- Executing OMO in its various forms in order to ensure a LS condition.

We also presented Figure 1 which illustrates these primary instruments within the context of the objectives of monetary policy. We also made the statement that the effective application of these instruments is dependent on a developed financial system in which price discovery is efficient.

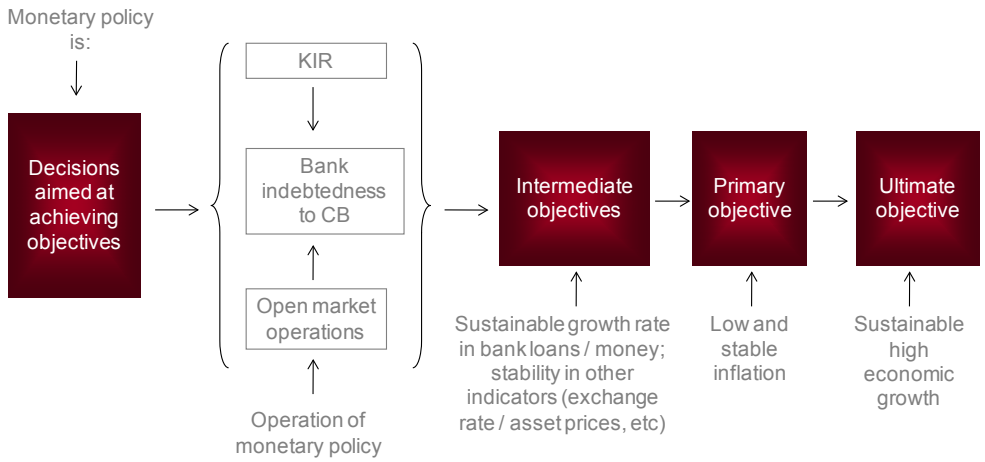


Figure 1: monetary policy

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There are three models of monetary policy; we discuss these, and related issues, under the following sections:

- Firm required reserves model.
- Firm borrowed reserves model.
- Interbank rate model.
- Quoins of monetary policy.

5.3.2 Firm required reserves model

Let's commence with the first model: the *firm-RR model*. Note here that we assume that N&C do not rank as reserves. Where N&C do rank as reserves (in text books it is called the "monetary base model") it is a minor part of the story, and its inclusion would only serve to mask the principles.

As you now know, in real life the causation path of money creation runs from bank loans (= bank asset) to money (= bank liability). The RR comes into play in that as deposits (= money) increase, as a result of *new bank loans extended or the purchase of newly issued securities* (= bank loans), the amount of RR to be held with the CB increases. But, the banks can get the additional reserves required only by borrowing from the CB.

The previous example of government borrowing and spending is a true life example. Here we provide another (see Balance Sheets 1–4); it is the same as the one presented earlier but with the RR and the CB included.

BALANCE SHEET 1: COMPANY A (NBPS) (LCC MILLIONS)			
Assets		**Liabilities**	
Goods Deposit at bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 2: COMPANY B (NBPS) (LCC MILLIONS)			
Assets		**Liabilities**	
Goods	+100	Loans from bank	+100
Total	+100	Total	+100

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BALANCE SHEET 3: BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to Company B Reserves at CB (TR) (RR = +10)	+100 +10	Deposits of Company A Loan from CB @ KIR	+100 +10
Total	+110	Total	+110

BALANCE SHEET 4: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Loans to banks (BR) @ KIR	+10	Bank reserves (TR) (RR = +10)	+10
Total	+10	Total	+10

We emphasise here again that no bank can create CBM (reserves); only the CB can. Therefore what happens in the above case? The simple answer is that it cannot, *unless the CB allows it to come about by providing the reserves* (note that +BR = +RR). You will recall that where a reserve requirement exists, which applies to bank deposits, there is a fixed relationship between RR and bank deposits (BD):

$$RR = BD \times r$$



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Thus if BD = LCC 100 million and r = 10%, we have:

$$\begin{aligned} RR &= \text{LCC } 100 \text{ million} \times 0.1 \\ &= \text{LCC } 10 \text{ million.} \end{aligned}$$

This means that the banks cannot supply any further loans unless the CB supplies BR. So, without the CB supplying BR, the banking system comes to a halt in terms of new loans, and therefore money creation. It will be evident that in such a system, assuming the existence of a demand for loans, interest rates (prime rate – PR) will rise up to a point where new projects are rendered non-viable. Recall that companies need to have an expected return on the project for which borrowing is required, which is higher the cost of borrowing (PR).

This model can be illustrated as in Figure 2. Once the banks have no excess reserves, they cannot make new loans. Therefore in the case of an upward shift in the demand for loans (from D_1 to D_2), interest rates will rise.

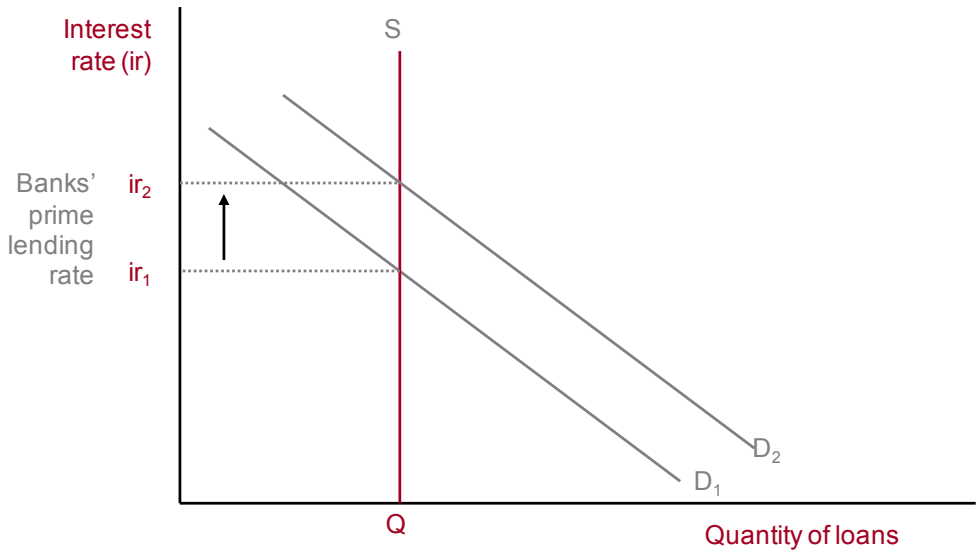


Figure 2: monetary base fixed; banks fully lent

Clearly this is the extreme case, which we present here to make a point. The central banks that operate this model (few[37] do) provide reserves to the extent that is consistent with their money growth target. The calculation is simple. If the banking system is in balance (= no BR and no ER) and the money stock in the form of BD is LCC 100 billion, and the CB would like the money stock in this form to grow by 12% over the next twelve months (to LCC 112 billion), it will supply additional reserves to the extent of LCC 1.2 billion, which will be used by the banking sector as the "backing" for money stock growth of LCC 12 billion.

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How does the CB achieve this? The answer is OMO purchases of government securities (bonds) to the extent of LCC 1.2 billion. We assume these are forthcoming from the banks (they will offer them at a tender). The CB will do this in stages, to avoid a sharp drop in interest rates that accompanies the creation of ER. For the sake of clear illustration we assume it is done in one go (see Balance Sheets 5–6).

BALANCE SHEET 5: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
Government bonds	+1 200	Bank reserves (TR) (RR = +0) (ER = +1 200)	+1 200
Total	+1 200	Total	+1 200

BALANCE SHEET 6: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Government bonds Reserves at CB (TR) (RR = +0) (ER = +1 200)	-1 200 +1 200		
Total	0	Total	0

As noted, the banks will over time be able to meet new demand or loans; the final outcome is presented in Balance Sheets 7–8.

BALANCE SHEET 7: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves (TR) (RR = +1 200) (ER = -1 200)	0
Total	0	Total	0

BALANCE SHEET 8: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
Reserves at CB (TR) (RR = +1 200) (ER = -1 200) Loans to NBPS	0 +12 000	Deposits of NBPS	+12 000
Total	+12 000	Total	+12 000

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The money stock has increased by LCC 12 billion and ER has shifted to RR. It will be quite evident by now that once the banking system has expanded to the point where all its ER shifted into RR, it cannot expand any further. Interest rates in this system are free to find their own levels, and will now reflect the quantitative constraint on money growth. The lending rate of the banks (PR) will increase sharply.

As the scholars of money and banking will know, essentially this is a theoretical money "supply" model. Some of the world's large central banks flirted with this model in the past but rejected it because the profound consequence of the quantitative control of bank reserves was extremely volatile interest rates. As noted, in some parts of the developing world this model is imposed on the central banks as part of developmental programmes that includes donor funds.

A final word: you will understand that the RR has replaced the gold coin / bullion holdings of the banks / central banks of old, which were held against deposits and bank notes issued. Because the deposits / bank notes were convertible to gold, the bankers could not afford to allow the gold reserves to drop too low in relation to deposits / notes. This represented the brake on the system.

4.3.3 Firm borrowed reserves model

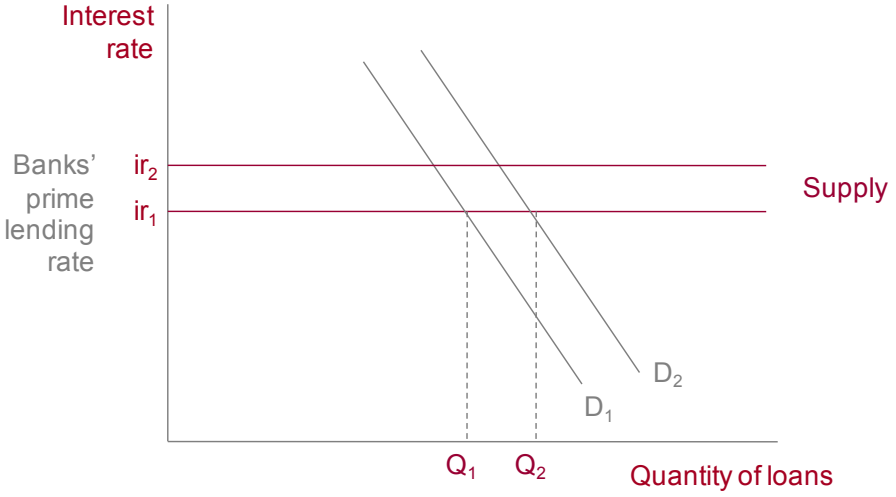


Figure 3: supply of & demand for bank loans

At the other extreme is the *firm-BR model* (see Figure 3). In this model the CB ensures that the banks are indebted to it (the CB) at all times, and whether the banks have a reserve requirement or not (which is the case in a few countries) is immaterial. The CB relies entirely on interest rates to allocate funds (new money in fact), and the CB has absolute control over interest rates. Therefore, in this system monetary policy is virtually all about the item in the central bank's books: "loans to banks" (BR) and the KIR that is applied to these loans. The existence of loans to banks, the outstanding amount of which is also called the liquidity shortage (LS), is what makes the KIR effective and influences the banks' interest rates on both sides of their balance sheets, and through their lending rate (PR) the demand for loans (and other economic variables / prices such as the exchange rate).

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The CB makes daily and longer forecasts of the items that influence bank liquidity, which impact on the net reserve balance of the banking system that will reflect on the reserve accounts at the end of the business days, and then undertake OMO to ensure that the banks are borrowing from the CB (or do nothing if the net amount remains negative). The KIR is applied to the CB loans to the banks.

There are a number of central banks that engage this model. The South African Reserve Bank follows this model; the banks are permanently indebted to the CB and it has been able to "control" the banks' lending rates in an almost exacting fashion, as indicated in Figure 4.



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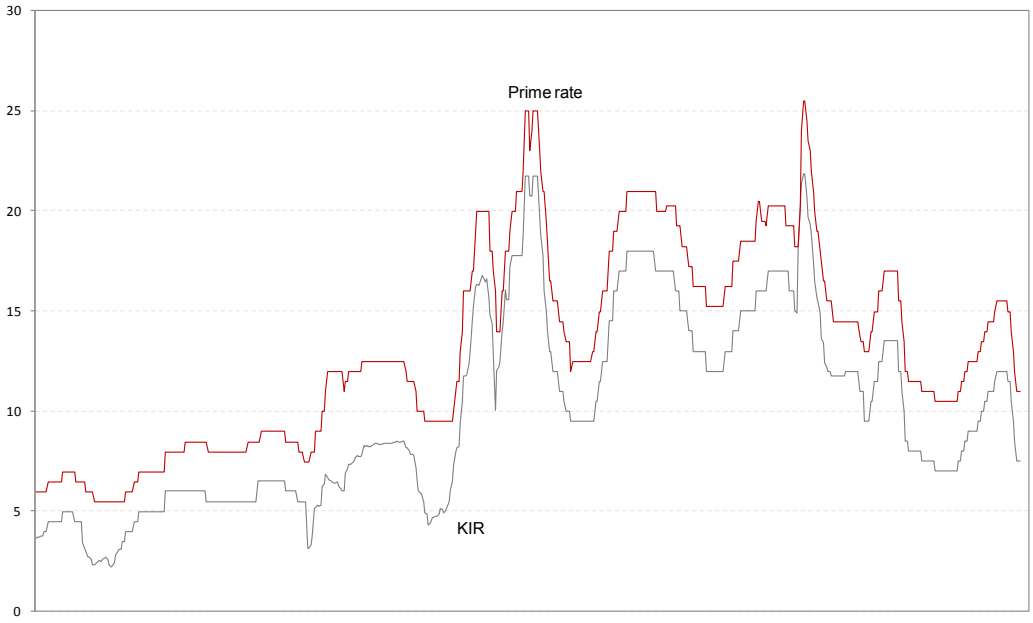


Figure 4: KIR & PR (month-ends over 50 years)

The Bank of England[38] also follows this model, as indicated in the following:

> *"In practice the pattern of Government and Bank operations usually results in a shortage of cash in the market each day. The Bank supplies the cash which the banking system as a whole needs to achieve balance by the end of each settlement day. Because the Bank is the final provider of cash to the system it can choose the interest rate at which it will provide these funds each day. The interest rate at which the Bank supplies these funds is quickly passed throughout the financial system, influencing interest rates for the whole economy. When the Bank changes its…rate, the commercial banks change their own base rates from which deposit and lending rates are calculated."*

We hasten to add that there are extraordinary times when drastic measures are taken – away from CB lending to the banks and toward creating a money market surplus (a +ER condition):

> *"In March 2009, the Monetary Policy Committee announced that, in addition to setting Bank Rate at 0.5%, it would start to inject money directly into the economy in order to meet the inflation target.[39] The instrument of monetary policy shifted towards the quantity of money provided rather than its price (Bank Rate). But the objective of policy is unchanged – to meet the inflation target of 2 per cent on the CPI measure of consumer prices. Influencing the quantity of money directly is essentially a different means of reaching the same end.*

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"Significant reductions in Bank Rate have provided a large stimulus to the economy but as Bank Rate approaches zero, further reductions are likely to be less effective in terms of the impact on market interest rates, demand and inflation. And interest rates cannot be less than zero. The MPC therefore needs to provide further stimulus to support demand in the wider economy. If spending on goods and services is too low, inflation will fall below its target.

"The MPC boosts the supply of money by purchasing assets like Government and corporate bonds – a policy often known as 'Quantitative Easing'. Instead of lowering Bank Rate to increase the amount of money in the economy, the Bank supplies extra money[40] directly. This does not involve printing more banknotes. Instead the Bank pays for these assets by creating money electronically and loaning the accounts of the companies it bought the assets from. This extra money supports more spending in the economy to bring future inflation back to the target."

Let us analyse this statement: the Bank of England buys securities (assume government bonds) from retirement funds to the extent of GBP 200 billion. The banking system was indebted to the Bank by GBP 100 million. [Note that we have ignored the reserve requirement here for the sake of simplicity.] The transaction has increased the money stock by GBP 200 billion and created GBP 100 in ER (the other GBP 100 was used to repay the banks' BR to the Bank of England). The banks' ER reinforces the lower Bank rate (i.e. KIR) and puts pressure on them to make loans to the NBPS at lower rates.

The reference to bringing inflation bank to the target (of 2%) is an allusion to the dangers of *deflation* (when prices decline) – which makes assets (like homes) worth less, while keeping debts (like mortgage debt) unchanged. Deflation has a major negative impact on C + I = GDE, because investors in assets are worse off.

BALANCE SHEET 9: RETIREMENT FUNDS (NBPS) (GBP BILLIONS)			
Assets		**Liabilities**	
Government bonds Deposits at banks	-200 +200		
Total	0	Total	0

BALANCE SHEET 10: BANKS (GBP BILLIONS)			
Assets		Liabilities	
Bank reserves (TR) (ER = +100)	+100	Deposits of NBPS Loans from CB (BR)	+200 -100
Total	+100	Total	+100

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BALANCE SHEET 11: BANK OF ENGLAND (GBP BILLIONS)			
Assets		**Liabilities**	
Government bonds Loans to banks (BR)	+200 -100	Bank reserves (TR) (ER = +100)	+100
Total	+100	Total	+100

The Reserve Bank of Australia[41] has a similar monetary policy execution style (note that "overnight loans" are loans from the CB to the banks, and the interbank rate is termed "cash rate"):

> *"Monetary policy decisions involve setting the interest rate on overnight loans in the money market. Other interest rates in the economy are influenced by this interest rate to varying degrees, so that the behaviour of borrowers and lenders in the financial markets is affected by monetary policy (though not only by monetary policy). Through these channels, monetary policy affects the economy in pursuit of the goals…*



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> *"From day to day, the Bank…has the task of maintaining conditions in the money market so as to keep the cash rate at or near an operating target decided by the Board. The cash rate is the rate charged on overnight loans between financial intermediaries. It has a powerful influence on other interest rates and forms the base on which the structure of interest rates in the economy is built…. Changes in monetary policy mean a change in the operating target for the cash rate, and hence a shift in the interest rate structure prevailing in the financial system."*

5.3.4 Interbank rate model

The *IBR model* is a variation of the *firm-BR model*. It is a model where a number of central banks position themselves in terms of monetary policy. They set a target range for the second stage of the monetary policy transmission mechanism (MPTM): the interbank rate. You will recall that this is the b2b IBM, which takes its cue from the KIR, *provided that the banks are indebted to the CB (have a +BR number in their balance sheets)*. The argument is that when the "short" banks in the interbank clearing are attempting to avoid borrowing from the CB they are willing to pay interbank rates that are a fraction below the KIR.

There is a proviso to this, and that is when the banking system is in balance (no surplus with the CB (no ER) and no borrowing from the CB (no BR) (= an unusual state because CB forecasts cannot be precise), just the mere threat of borrowing from the CB is sufficient to make the KIR effective. Furthermore, there are central banks that allow ERs to exist and make their interest rate policy effective by paying an interest rate on these amounts. The effective rate then becomes this rate [let's call this the KIR-D – for KIR for bank deposits (ER); while the CB lending rate becomes the KIR-L (i.e. for BR)]. Thus, through this mechanism the CB can create a "tunnel of KIRs" and this becomes the cue or the target for the b2b IBM rate. Clearly the KIR-L forms the upper level of the tunnel and the KIR-D the bottom level.

A good example of this method on monetary policy is Canada. The Bank of Canada states:[42]

> *"The Bank carries out monetary policy by influencing short-term interest rates. It does this by raising and lowering the* ***target for the overnight rate****.*
>
> *"The overnight rate is the interest rate at which major financial institutions borrow and lend one-day (or "overnight") funds among themselves; the Bank sets a target level for that rate. This target for the overnight rate is often referred to as the Bank's key interest rate or key policy rate.*
>
> *"Changes in the target for the overnight rate influence other interest rates, such as those for consumer loans and mortgages. They can also affect the exchange rate of the Canadian dollar.*
>
> *"The instrument that the Bank uses to ensure that inflation remains within this target range is the Bank Rate – the rate of interest that the Bank charges on short-term loans to financial institutions.*

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> *"More specifically, the Bank sets a target band for the market rate for overnight transactions. The upper end of the band is the Bank Rate, the rate charged on loans to financial institutions participating directly in the payments system. The bottom end of the band is the rate the Bank pays on settlement balances held by participating financial institutions."*

The essence of the European Central Bank's (ECB's) monetary policy style is to create a "corridor" of interest rates within which the "overnight market interest rate" (that is, the b2b IBM rate) is determined (i.e. same as explained earlier). It announces its "key interest rates" (it actually terms its rates as such) from time to time, thus broadcasting its monetary policy stance.

As in the case of Canada, it has two KIRs: the interest rate on the *marginal lending facility* (i.e. for overnight loans), which constitutes the ceiling rate for the overnight b2b IBM rate (as KIR-L above), and the interest rate on the *deposit facility* (for overnight deposits when the banking system has a surplus = ER), which constitutes a floor rate for the overnight b2b IBM rate (as KIR-D above). These transactions (lending and taking of deposits) are not undertaken by the ECB itself, but by the individual National Central Banks (NCBs).

The US monetary policy system operates in a similar fashion. The Federal Reserve targets the "Federal funds – Fedfunds – rate", which is a b2b IBM rate, and they steer the liquidity of the banking system such that they at most times utilise the lending facility (there are 3), called the discount window, at the "discount rate". Given a liquidity shortage, this rate has a powerful influence on the b2b IBM rate, and so influences the banking sector's deposit and lending rates (and the exchange rate)[43].

5.3.5 Quoins of monetary policy

The essence of monetary policy will now be clear to you. It is a *policy on money creation* and specifically on the *growth rate* in money creation. No CB would like to engineer negative money growth because this could lead to deflation, and deflation means a decline in asset values, which means a decline in wealth. And a decline in wealth means a fall in consumption and investment expenditure (GDE), the principal driver of economic growth (GDP). So the policy is aimed at sustainable economic growth which requires a stable and low inflation environment. Therefore, in terms of the identity DM × DV = DP × Dreal GDP (assuming V to be stable), DM3 should not exceed the economy's capacity to expand at a rate, Dreal GDP, that will deliver a DP of not more than the inflation target (which in most cases is 2% pa). Thus, monetary policy implementation must include a position on the economy's elasticity of supply.

You know that money is created by bank loans to the government and the NBPS and that bank purchases of forex also create money. So the drivers of money growth are the demand for loans by government and the NBPS and decisions by banks to purchase forex (= a minor factor usually). You know that central banks have tools at their disposal to control the creation of money and these are the reserve requirement (the *r* can also be changed but is rarely used), the KIR and OMO.

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Under the *firm-RR model* the reserve requirement is used to curb M3 growth in a quantitative manner via creating, through OMO purchases, a desired volume of reserves (ER). Interest rates are free to find their own levels (or should be because a CB cannot control both without creating unsustainable distortions).

Under the *firm-BR model* the main operational tool is the central bank's lending rate (KIR-L) to the banks which is made effective by ensuring through OMO a liquidity shortage (BR) at all times (i.e. the CB keeps the loans-to-banks window open at all times). The "effective-making" of the KIR filters through to the banks' prime rate (and to all other rates and the exchange rate), thus influencing the demand for loans (the main driver of money creation).

The *IBR model* is similar to the *firm-BR model* but focuses on the banks' interbank rate and influences it in conditions of both bank liquidity surpluses (ER) and bank liquidity shortages (BR). As in the former case this model also aims to ultimately bring to bear a major impact on the banks' lending rates (and the exchange rate and other rates), and so influence demand. It will be evident that under the latter two models the reserve requirement (if it exists; as we have seen, it does not in all cases) is an *unimportant* element in money creation; it is merely one of many factors that influence bank liquidity, as detailed earlier.



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A final word before we get to the more substantial (than the previous) monetary policy transmission mechanism (MPTM): the monetary authorities (CB and Treasury) do not always get it right. Banks are supposed to provide loans to creditworthy customers and for projects that are viable. Central banks have all the tools to curb excessive money growth. The system is an elegant one because money is always available, liberating economies from the stifling lack of money (gold coins and bullion) in earlier times, but there is much evidence that the authorities are not being responsible enough. The consequences are painful. Is a new implementation model required, one that takes due account of the elasticity of the economy? A model in terms of which bank borrowing by the governments of poor countries for developmental projects can take place to the extent that the borrowings create revenue to cover the borrowing interest rate, assuming that the domestic economy can produce the goods (for development) demanded?

5.4 Path of monetary policy: from interest to inflation

Visits to central banks' websites will reveal that all of them have an *objective of monetary policy* and it is that inflation should be subdued. The rationale underlying this objective is that a low inflation environment is conducive to sustainable economic growth. High inflation can be destructive for economic growth because the attention of the consumer and business is directed at safeguarding / hedging wealth as opposed to efficiency in production. Inflation feeds upon itself and it is difficult indeed to eradicate.

To give substance to the objective, most of the developed countries of the world have inflation targets in place, and they are either set at 2% pa or have a range of 2–3% pa (or have a flexible target as in the case of the US). The target is generally set by government and executed by the CB, which is in most cases operationally independent of government. This separation from government is generally accepted as crucial because the CB may need to take monetary policy actions that are counter-veiling to government financial (and other) activities. A country whose CB is not operationally independent of government is not taken to be part of the big league.

Inflation of 2–3% is considered acceptable because at this level economic growth and wealth creation prospects are optimal. At higher and lower levels the destructive effects of safeguarding / hedging wealth enter the equation. The principal cause of unacceptably high inflation is total demand [C + I + × – M = GDP (expenditure on)] outstripping the capacity of the economy to deliver (total supply). Underlying the *growth* in demand and supply is the capacity of the banking system to create money. The principal cause of deflation is stagnant or negative money creation.

Giving rise to money creation is the demand for loans by government, businesses and individuals, and underlying growth in the demand for loans is the banks' lending rate (PR and related). The corporate and household sectors are particularly interest rate sensitive. The lending rate of the banks is determined almost exactly by the CB through the operational tools it has at its disposal: the reserve requirement (in most cases), open market operations to influence bank liquidity, and the rate/s set by the CB for their loans to banks (BR) (KIR-L) or for excess reserves (ER) (KIR-D).

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Essentially the above is the path of monetary policy in reverse. We now present a brief description of the so-called monetary policy transmission mechanism (MPTM) which starts with the central bank's rates and ends with the inflation rate.

Another visit to central banks' websites will reveal that many of them have illustrations of their view of the MPTM, i.e. the path from CB rates to price developments (inflation or the dreaded deflation). Figure 5 is an amalgamation of some of them[44].

Before we begin with an elucidation of the MPTM we need to underscore the significant reality that the transmission of a change in monetary policy can take between one and two years to influence price developments. Therefore, monetary policy needs to be anticipatory in nature; for this reason central banks make use of extremely sophisticated econometric modelling, which is constantly under revision.

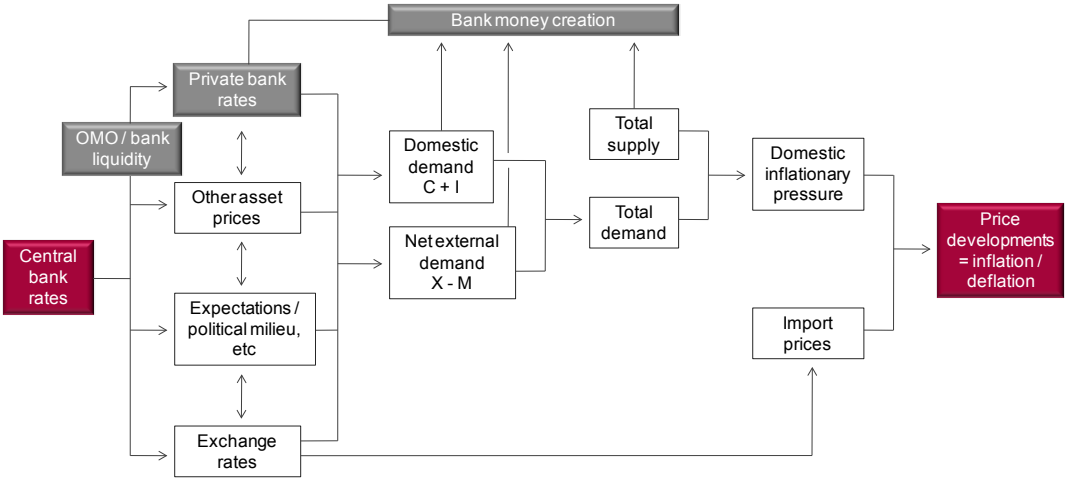


Figure 5: MPTM

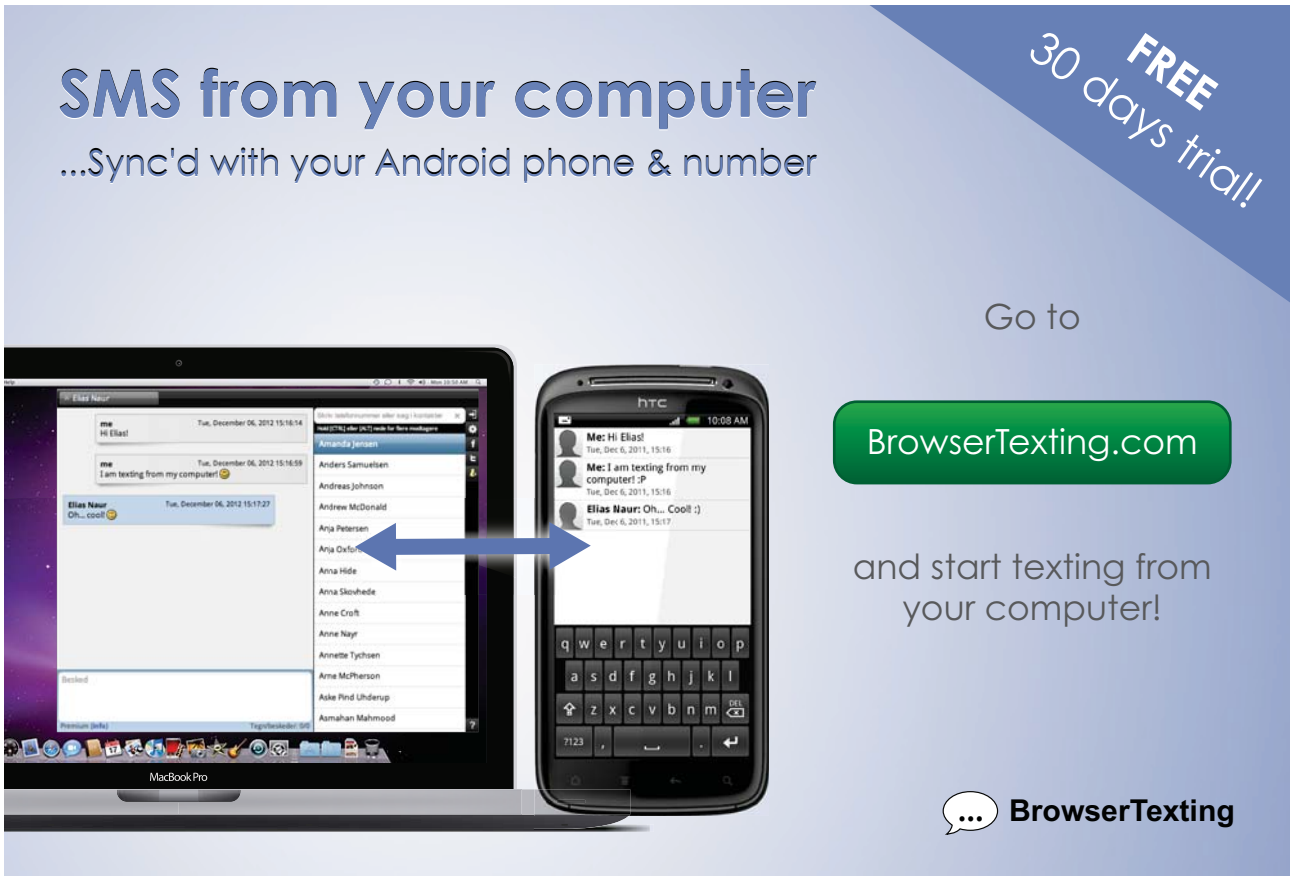
The genesis of interest rates is the administratively determined rates of the CB[45]. As we have seen, some central banks have one "official" rate – a KIR-L – which is applied to a liquidity shortage and some have two "official" rates: the aforementioned and a deposit rate for bank surpluses – KIR-D. Both models impact directly on the b2b IBM rate, which in turn impact significantly on the call money rates of the banks (especially the rate on wholesale one-day deposits). All other deposit rates of the banks are affected by this rate.

The banks, in their endeavours to maximise profits for shareholders, attempt to maintain a fixed margin between the cost of deposits / loans and earnings on assets. Therefore a change in the official rates impacts significantly on bank lending rates. The high profile loans extension rate of the banks is prime rate (PR); all lending rates of the banks for NMD are benchmarked on PR. The rates on marketable debt (MD – such as treasury bills and commercial paper) are also significantly influenced. In general, changes in the central banks' KIRs are matched by a change in bank lending rates.

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Bank lending rates are a major input in decisions to borrow. Individuals borrow from the banks and consume in anticipation of future income. Companies borrow for the purpose of expansion (on inventories and expansion to business infrastructure). The banking sector accommodates the demand for loans and creates money (deposits), provided individuals are creditworthy (employed and able to service the debt) and companies are borrowing for new projects on which the future cash flows / returns (FVs) exceed the cost of borrowing. A rise in rates will render more individuals un-creditworthy and more projects unviable, reducing the growth rate in bank loans, while a fall in rates will do the opposite. Borrowing / money creation is a major factor in changes in domestic demand (C + I).

Not every individual and company borrows from the banking sector. A large number of the public are lenders / savers, and interest rates to them are just as important as for borrowers. A lower interest rate makes saving less attractive and spending more attractive. The converse also applies.



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A change in the official rates has an immediate impact also on other asset prices. What are these? These are the prices of assets other than bank asset prices, and they are bonds, equities (shares), property, and commodities. With the exception of commodities, the assets mentioned (bonds, shares and property) all have cash flows in the future. You will recall that to value them (= PV) their future cash flows (FVs) are discounted by certain relevant interest rates to PV. Thus when rates rise asset values fall, and vice versa. Commodities don't have cash flows in the future, but higher rates make them less attractive and vice versa. Because individuals and companies are the owners of the assets of the financial system (directly or indirectly via the banks and investment vehicles) asset values have a major impact on domestic demand (C + I).

Changes in the central bank's official rates also impact on the expectations and the confidence levels of companies and individuals, which have an impact on domestic demand. They also impact on the foreign sector and therefore on the exchange rate. The exchange rate impacts significantly on net external demand (X – M) and on import prices.

Changes in domestic demand have an impact on employment. If there is pressure on the supply of skills, there is pressure on wages, which in turn impacts on consumer prices.

As seen, all of the above are significant factors in domestic demand, and the banking system assists demand through the provision of loans [loans satisfaction is the counterpart of new bank deposits (= money)]. The ability of the economy to supply new goods and services to satisfy increased demand is a critical factor. The wider the gap between aggregate (= total) demand and aggregate supply is the foremost factor in price developments. The change in the prices of imported goods, to a large degree a function of the exchange rate, is the other important factor, but this depends on the size of net external demand relative to domestic demand.

The circle is completed when one considers that price developments in turn impact on monetary policy decisions.

A final word: in 2007–08 we saw the ugly side of the monetary system. Money creation was excessive (prior to this period) and and we saw inflation rising worldwide, as reflected in rising international commodity prices such as oil, food, steel and so on. As you know, it was to a large extent (in the US) based on bank lending to un-creditworthy (non-prime) borrowers. This was a failure not only of the position of trust that banks occupy, given their ability to create money – because we the public generally accept bank deposits as our main means of payments – but also of the failure of some of the allied participants in the monetary system: the central banks in their ineffectual conduct of monetary policy, the bank regulators who did not supervise the banks effectively, and some of the large loans rating agencies which were blinded by the revenues emanating from rating the debt of special purpose vehicles / entities (SPVs / SPEs) and forgot about the significant conflict of interests they have. Obviously, this did not apply to all countries.

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But we must not forget the good times preceding this period when wealth creation was unprecedented. This was the elegant side of the monetary system, made possible by the miracle of money creation.

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6 Endnotes

1. www.reservebank.co.za.
2. www.federalreserveboard.gov.
3. www.bankofengland.co.uk.
4. The Bank of England was not a CB at that stage, but became the forerunner of central banks.
5. Here we ignore the term of deposits as it just complicates the story of money; in any case the vast majority of deposits are of a short-term maturity.
6. Or liabilities in some cases.
7. See www.reservebank.co.za.
8. The data span is almost 10 years, and is for a particular country which has a good record in terms of the conduct of monetary policy. The central bank's target is interest rates, and it manages rates via creating a permanent bank liquidity shortage (LS), which makes the KIR effective. This means, as seen in the figure, that the unfettered IBM rate is set by the banks with reference to the KIR. In normal times this is the style of policy adopted by most central banks.
9. In some countries the central bank does, but this takes place under extreme conditions of high bank liquidity when there is no other option. High liquidity renders monetary policy ineffective, and paying interest is an effort to make policy partially effective. This is a complicated story on which we will be silent in this book in the interests of our keeping the principles unfettered.



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10. The singular is applicable because the banks always have the same prime rate – certainly in the vast majority of countries.
11. This is so because the public accepts deposit money as a means of payment.
12. Except "self-imposed" creditworthiness-assessment in the case of individuals and scrutiny of viability in the case of the corporate sector.
13. At times banks do have excess reserves (usually as a result of an interbank settlement error). In certain developing countries banks have chronic ER (this is an interesting topic on its own). The concept NER accommodates this situation.
14. This draws on www.reservebank.co.za.
15. www.reservebank.co.za.
16. Domestic non-bank private sector.
17. Jevons, 1875:321.
18. Davies, 2002:261.
19. Jevons, 1875:264.
20. Jevons, 1875:267.
21. www.boe.gov.uk.
22. This section draws heavily on Falkena, et al, 2001, Pilbeam, 1998.
23. This section benefitted from www.reservebank.co.za.
24. Federal Reserve Board.
25. Bank of England.
26. European Central Bank.
27. Federal Reserve Board.
28. Bank of England.
29. Bank of Canada.
30. This section benefitted from www.reservebank.co.za.
31. www.reservebank.co.za.
32. This draws heavily on www.reservebank.co.za.
33. www.bankofengland.co.uk.
34. www.ecb.int.
35. www.reservebank.co.za.
36. Meijer,1992:302.
37. The author has come across this model in certain small countries. They are usually donor-receipt countries, and the model is forced upon them by multilateral international institutions in order to instil monetary discipline (in the severe absence thereof).
38. www.bankofengland.co.uk
39. In this case to avoid deflation.
40. Bank reserves.
41. www.rba.gov.au.
42. www.boc.co.ca.
43. http://www.federalreserve.gov/monetarypolicy/discountrate.htm.
44. It is based mainly on the illustration at www.bankofengland.co.uk/images. Amendments made by author.
45. Here we ignore the firm-RR model, which is essentially a theoretical model rarely applied today.

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