NOTES ON MONEY CREATION

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ABSTRACT

Many texts which cover money creation regard the reserve requirement (RR) as being at the very centre of the process, and many still regard the process as starting with a bank receiving a new deposit (and placing the required reserves with the central bank, lending out the rest, which is reflected in the banking system as a new deposit; then the required reserves based on this deposit are placed with the central bank ... and so on until the process ends with the factor *new deposit x 1 / RR ratio)*. There are countries which do not have a RR, and money is still created in these countries, and this is so because money is bank deposits (in the main; the other, small part being notes and coins – N&C) and these are created when banks make new loans. The amount of required reserves is just one of the many factors which impact on bank liquidity, and the latter is manipulated by central banks in order to make the central bank's key lending rate to banks (repo rate, discount rate, base rate, bank rate ...) effective (or purposefully ineffective in exceptional circumstances such as under a quantitative easing policy). As regards money creation starting with a new deposit, this is not possible (there is one exception: N&C), because no bank can create central bank money; only the central bank is able to. Money (deposit) creation is the *outcome* of new bank loans (to the private sector or government; marketable or non-marketable) and/or net additions to foreign assets by banks. It is misleading to speak of a money "supply".

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1. INTRODUCTION

One of the great mysteries and elegant features of the financial system in general and of the banking sector in particular, is the creation of new money. The largest component of the money stock, bank deposits, is literally created by accounting entries, and the amount created or the growth rate "allowed" is the territory marked by the central bank whose main function is the implementation of a "policy on money", monetary policy.

Why must there be a "policy on money"? It is because there is a relationship between the growth rate in the money stock and price developments (the rate of inflation). This relationship is not even debated any longer (except by some

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diehards) and there is much evidence to support the strong relationship, the latest being the rate of inflation (a few quintillion million percent per annum, the highest in the history of the world) in a particular African country that resulted from the excessive creation of money (in this case government borrowing from the banking sector and the printing of bank notes). The highest denomination bank note in this country was ZWD 100 trillion (this was after 13 zero's had already been lopped off the currency!).

What are the consequences of inflation? The consequences are profound in terms of the destruction of economic growth and employment when inflation is high.

The consequences of even slight excesses in money growth (15 – 20%) can be severe, such as occurred in the developed world in 2005 - 2008. The cause (excessive money stock growth) took place for a number of years prior to the consequences being felt, and these consequences were inevitable to many who keep an eye on world money growth.

What is too high money stock growth? It is when money growth (which reflects additional demand for goods and services financed by bank loans) exceeds the country's ability to satisfy the additional demand in terms of production capacity (ie capacity, being "sticky", cannot keep up with rapidly rising demand). When this happens worldwide, balances of payments' become skewed, currencies become volatile and inflation occurs, as evidenced in the increasing costs of commodities, transport and food.

The reaction of the central banks of the world to this situation is to raise interest rates, and it is this that can trigger large-scale defaulting on loans (particularly in the case of sub-prime borrowers). This can lead to large-scale banking solvability issues and government bailouts (as happened in 2007 - 2009). The aftermath of the problem is still with us today.

What underlies money growth? In the main it is *bank loan growth*, and banks are able to create loans / credit at will to satisfy demand, assuming the borrower is creditworthy / the project funded is sound. This rests on the fact that the public generally accepts bank deposits as the main means of payments / medium of exchange.

The issue of creditworthiness / project-soundness is critical: because some banks evidence promiscuity in this regard, the banking system is inherently unstable. It is the job of the central bank ensure financial system stability and therefore to curb the growth rate in bank loans / credit (and its counterpart, money) and this they do via the manipulation of interest rates. These critical issues are the subject of this text, which we cover in the following sections:

- What is money?
- Measures of money.
- Monetary banking institutions.
- Money and its role.
- Uniqueness of banks.
- The cash reserve requirement.

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- Money creation does not start with a bank receiving a deposit.
- Money creation is not dependant on a cash reserve requirement.
- Is money “supply” a misnomer?
- The money identity and the creation of money.
- Role of the central bank in money creation.
- How does a central bank maintain a bank liquidity shortage?

2. WHAT IS MONEY?

What is money? Money is anything that complies with the following criteria:

- Medium of exchange.
- Store of value.
- Unit of account.
- Standard of deferred payment.

The best example of the total erosion of these criteria in a currency is the currency of the country referred to earlier (with the highest inflation rate ever recorded). In 2009 the stage was reached when the particular currency was no longer accepted as a medium of exchange, a store of value, a unit of account or a standard of deferred payment. The mediums of exchange in this country became the USD and the ZAR. Inflation fell to low numbers instantaneously.

It will be evident that of the four criteria, medium of exchange is paramount, and the other criteria are subordinated to it. Consequently, we can think of money being anything that is *generally accepted as a means of payments / medium of exchange*.

So what is the medium of exchange? It made up of two parts:

- Bank notes (usually issued by the central bank) and coins (usually issued by the central bank and in some cases by government) (N&C).
- Bank deposits (BD).

Bank notes and coins are well known as a medium of exchange; we use them every day to make purchases and to repay debts. However, bank deposits acting as a medium of exchange is often a little confusing. Consider how many payments are made by bank cheques (diminishing fast) and electronic funds transfers (EFTs). When an EFT payment is made (the best example is internet banking) the payer’s deposit account at the bank is debited (made less by the amount) and the payee’s deposit account at the bank is credited (added to). Similarly, a payment by cheque results in the cheque writer’s deposit account being debited and the cheque receiver’s account being credited (when s/he deposits the cheque of course).

Money is not the EFT or the cheque. They are merely instruments that lead to the shifting of a deposit amount from one bank account to another. The deposit is money, as is N&C. Thus the total stock of money (M3 – see below) at a point in time is the total amount of N&C and BD in the possession of individuals and companies:

M3 = N&C + BD.

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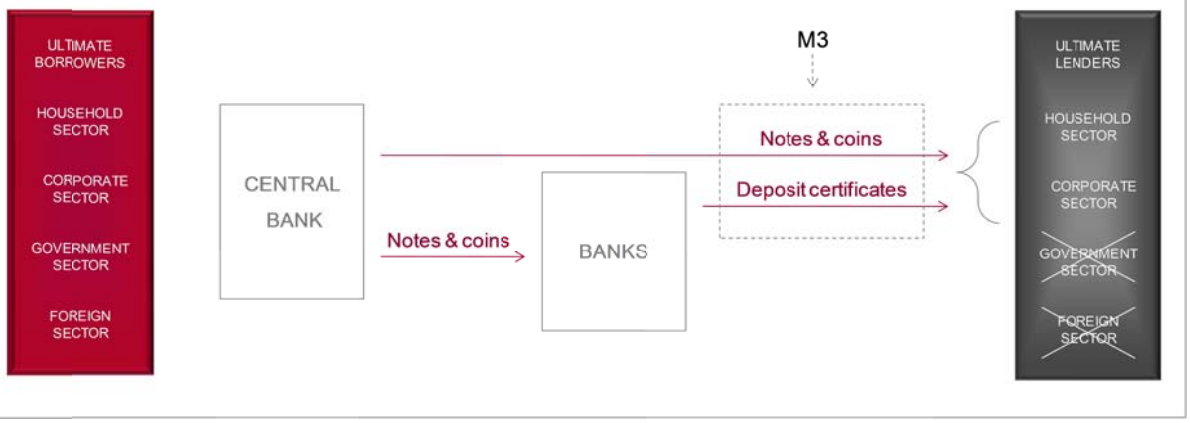
The individuals and companies can be called the "non-bank private sector" (NBPS[2]). This of course excludes money in the possession of banks (= N&C), the foreign sector and government deposits. Figure 1 endeavours to provide an image of "what is money?"

Figure 1: what is money?



3. MEASURES OF MONEY

We know that N&C can be used immediately for payments. We also know that current / cheque account (and some other) deposits can be used as such. We also know that other deposits can be used as money after a short notice period, and so on.

The central banks of the world have developed many definitions of money, ranging from M0 to M5. In the interests of sticking with principles and keeping the analysis uncomplicated we will use the M3 definition of money. This includes N&C all BD of the NBPS. We are not far off the mark in terms of liquidity because for the most part NBPS bank deposits are short-term.

It is notable that in most developed countries NBPS BD makes up 96-98% of M3 (and N&C the balance of course). In some developing countries this number can be quite low, indicating a low confidence level in respect of banks.

4. MONETARY BANKING INSTITUTIONS

Most countries have some or all of the following deposit intermediaries:

- Private sector banks
- Central bank.
- Land Bank.
- Rural banks.
- Mutual banks
- Building societies.

[2] Note that "domestic" applies as the deposits of the foreign sector (= small) are excluded.

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- Post Office Bank.

These intermediaries are usually also referred to as the *monetary banking institutions* (MBIs) and they are the intermediaries that make up the *monetary banking sector* (MBS). These intermediaries play a substantial role in the financial system as follows:

- As the custodians of the major part of the money stock of the country (ie NBPS deposits).
- As issuers of N&C (in some countries certain private banks issue bank notes).
- As the keepers of government's surplus balances.
- In providing loans to the public sector (usually lower tiers of government).
- In purchasing the debt securities of the central government (= loans which are marketable).
- In providing loans to the household and corporate sectors.
- In the creation of money.

Each central bank on a monthly basis consolidates the statements of liabilities and assets (ie the balance sheets) of these intermediaries (in the process netting out interbank claims) in order to arrive at the monetary aggregate number/s and their balance sheet counterparts (BSCs). As we have seen, there are various definitions of money, but the one usually given much attention is:

M3 = N&C (outside the banking sector) + BD (of NBPS with MBIs).

In this text we will refer to the balance sheets of the banks collectively (representing all non-central bank banks) and the central bank.

5. MONEY AND ITS ROLE

This topic leads to impassioned debating and views range from a passive role to a key role. However, we will not contaminate the core issues we are busy with here by engaging in what is often futile debate. We will simply state our view.

The importance of the availability of bank loans / credit (from here on referred to as *loans*) on demand cannot be overemphasised, in a negative and positive sense. In a negative sense, a too high growth rate in the stock of money can be devastating to economic growth because of its influence on inflation. When economic units pay too much attention to inflation (when it is rising at a fast pace) it affects their spending and investment decisions and economic output and employment suffer.

In a positive sense, money creation oils the wheels of industry: the availability of *new* loans / money is essential for economic growth to take place, but the proviso is that it should be monitored and "controlled" so as not to outpace the capacity of the economy to satisfy the increased demand (consumption – C – and investment – I) which underlies the increase in loans / money. (Note that loans make up the majority of the asset side of the MBS and money the liability side.)

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Scholars of economics will know that C + I (needed to increase production capacity) are the main components of GDE (Gross Domestic Expenditure = domestic demand) and that GDE + exports (X) less imports (M) (X – M = net external demand) = GDP (Gross Domestic Product – expenditure on). They will also know that new production capacity creation is a function of increased consumption demand, and that there is often a lag between increased demand and the increased capacity to supply. Thus if consumption demand is allowed to increase too rapidly, inflation will be the result (if not at first, because of imports satisfying the demand, then later when the poor balance of payments numbers prompt a restrictive monetary policy - in the form of higher interest rates).

As a conclusion to this section we repeat the essential elements of this discussion: to large degree underlying increased aggregate demand is new bank loan / money creation. Therefore money does play a significant role in the economy. As we shall see, underlying bank lending / money creation is the lending rate of banks (prime rate and rates related to this benchmark rate), and underlying this is the key interest (lending) rate of the central bank, which has to be "made effective" by ensuring the existence of a bank liquidity shortage. We will return to these issues in some detail later.

6. UNIQUENESS OF BANKS

The uniqueness of the banks lies therein that they are able to literally create money (NBPS BD) by responding to the demand for new loans by borrowers, ie the government, household and corporate sectors. "New loans" means *new* loans of non-marketable nature and buying *new* marketable evidences of debt - debt securities. It is notable that banks respond to the demand for loans without even knowing that they are creating money.

The reaction of many new readers to the above and the further elucidation below may be incredulous. How can banks be in such a unique situation? Surely this must mean that banks can create their own assets (= new loans) and liabilities (= new BD = money) to an unlimited extent?

The banks are in this unique situation for a simple reason: because *the public accepts their deposit as mone*y, ie a means of payments / medium of exchange. And this issue has a long history starting with the goldsmiths in London in the 17th century. However, we do not have the space to delve into this interesting history.

The answer to the second question is yes, they can and do so. However, they can only do so as long as there is an increased demand for loans. This is largely a function of the lending interest rate, as we said earlier. However, there exists a major difficulty in this regard and it manifested itself on a grand scale in 2007 - 2009: this is that the banks are *inherently unstable*. It is the job of the monetary authorities to see that this innate weakness is kept at bay (through bank supervision). As we now know, they failed in this function in a breathtaking fashion before and in this period.

The basic functions of banks and the creation of money may be depicted as in Figure 1. It is correct to say that banks take money on deposit and lend the money to borrowers. And, certainly, the individual banks operate in these terms in their daily

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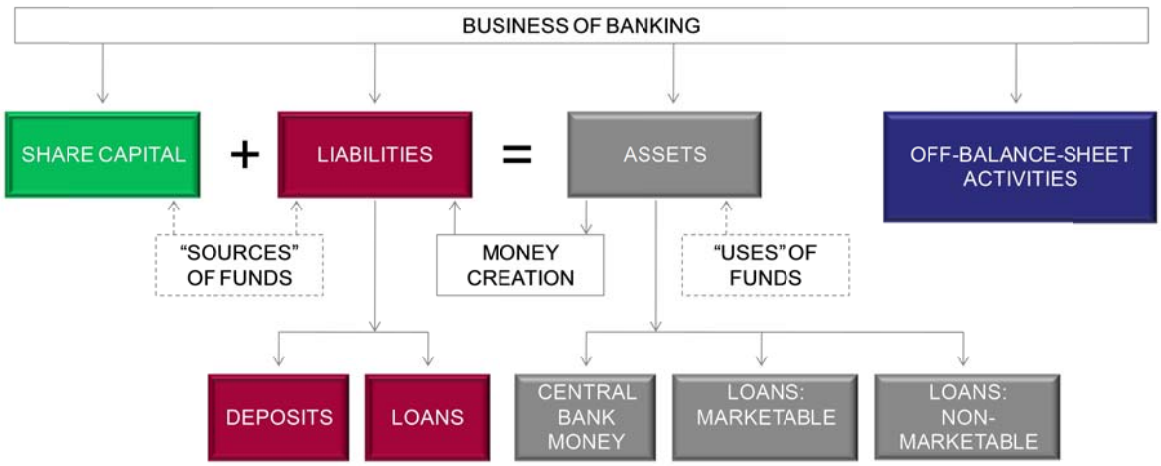
activities: they vie for deposits and the making of loans. However, this is an *ex post* situation / declaration. When *new* loans are made *new* deposits are created.

Figure 2: the business of banking:



A simple but real life example is required. Company L produces goods required by Company B and the latter approaches the bank (for the moment we assume there is only one bank) to borrow the funds required to purchase the goods (LCC[3] 100 million). The bank (after a viability study) agrees, opens a current account for Company B and provides it with a loan of LCC 100 million by crediting the account with LCC 100 million. The bank has increased its loans by LCC 100 million and has a new deposit of LCC 100 million, while Company B has a new deposit and incurred a liability (loan) of the same amount, as indicated in Boxes 1 and 2.

BOX 1: COMPANY B (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Bank deposits	+100	Loans from bank	+100
Total	**+100**	**Total**	**+100**

BOX 2: BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Loans (Company B)	+100	Deposits (Company B)	+100
Total	**+100**	**Total**	**+100**

Note that when we measure the money stock and changes therein we analyse the banks' balance sheets (we will add the central bank later). The money stock in the form of BD (= deposit securities) has increased by LCC 100 million, and the balance sheet counterpart (BSC) or balance sheet cause of change (BSCoC) is an increase in bank loans (= loan securities) (Δ denotes change):

[3] LCC is the currency code for fictitious country Local Country (LC); the monetary unit of LC is called Corona (C).

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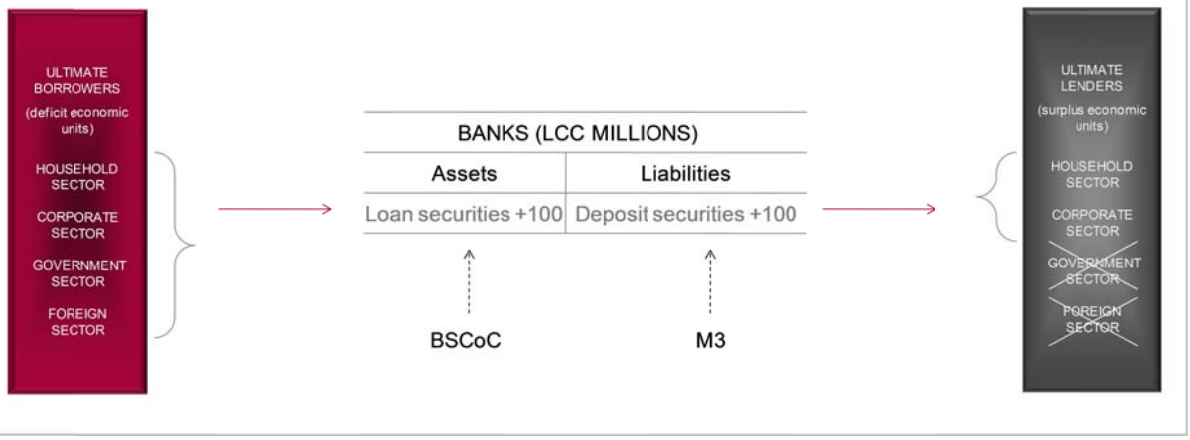
ΔM3		= +LCC 100 million
BSCoC	= Δbank loans	= +LCC 100 million.

Figure 3: money creation



This is illustrated in Figure 3. The actual real life cause is the additional demand for loans which was satisfied by the bank. The bank was able to create the new deposit (= M3) by an accounting entry, and rests on the fact that the public regards BD as the means of payment. Of course Company B undertook took the loan in order to pay Company L for the goods. When it does so, the balance sheets appear as indicated in Boxes 3 – 5.

While the above can and does happen, it is more likely that the bank will provide Company B with an overdraft facility of LCC 100 million (= opens a current account with a zero balance and provides Company B with the right to overdraw the account by LCC 100 million). When Company B makes an EFT payment to Company L, its account is debited by LCC 100 million and Company L's account is credited by this amount. When Company L gets confirmation of the transfer it delivers the goods to Company B. The changes in the balance sheets are the same as indicated in the simpler example above (and indicated in Boxes 3 – 5).

BOX 3: COMPANY L (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods Deposits at bank	-100 +100		
Total	0	Total	0

BOX 4: COMPANY B (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods	+100	Loans from bank	+100
Total	+100	Total	+100

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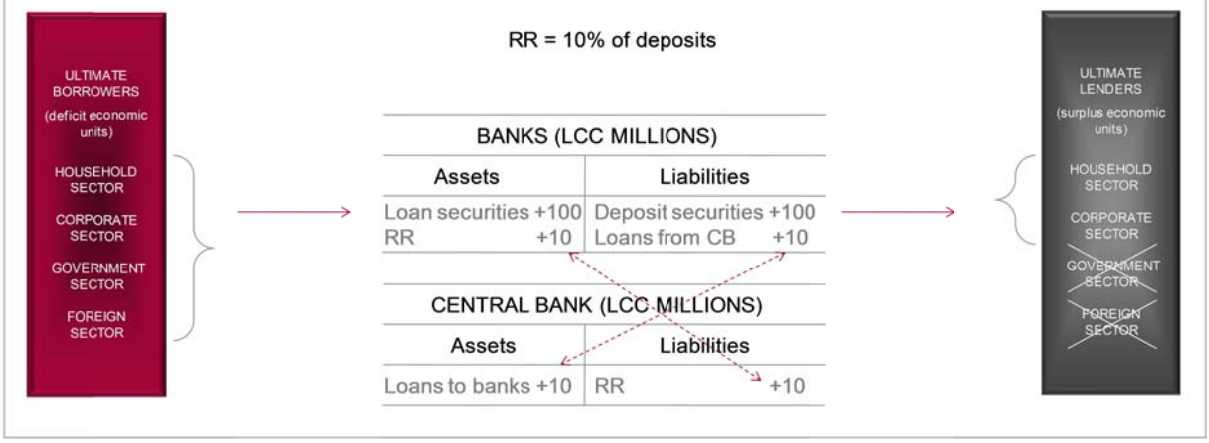
BOX 5: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Loans (Company B)	+100	Deposits (Company L)	+100
Total	+100	Total	+100

Note that the all the balance sheets are in balance.

7. THE CASH RESERVE REQUIREMENT

Before the next part of this story can be presented, we need to introduce the cash reserve requirement (RR; it also denotes the amount of required reserves). Most countries have a RR, but some do not, which divorces money creation from it – a tenet of this text which we shall return to. This is a statutory requirement in terms of which banks are required to hold on deposit with the central bank (CB) an amount of funds called cash reserves (R). The amount of RR is a proportion of the amount of deposits the banks have (we assume 10% for the sake of simplicity, and we denote this RR percentage as *r*). Thus, if the banks have LCC 100 billion in deposits they are obliged to have 10 billion on deposit with the CB. As we will see later, at times banks have excess reserves (ER) with the CB; we refer to RR plus ER as total reserves (TR).

Figure 4: money creation & RR



A number of essential notes are required here:

- As noted, although rare, there are some countries that do not have a RR.
- In some countries the banks have two accounts:
  - Reserve account (RA), in which the RR balances are held.
  - Settlement account (SA), over which interbank settlements take place.
- At times banks have reserves in excess of RR, denoted as ER. RR + ER = the total of reserves (denoted as TR).
- In some countries the banks have just one CB account: a SA in which all reserves are held and over which interbank settlement takes place.

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- Central banks do not pay interest on banks' reserves. This is usually the case, but there are exceptions)[4].
- Because of the latter, the banks have no reason to hold ER with the CB; ie they endeavour to hold the minimum amount of RR.
- In this discussion we assume there is one account: the SA and that interest is not paid on reserves.
- In many countries N&C rank as RR; therefore if the RR is LCC 100 million and the banks have N&C in portfolio (in ATMs, teller tills, etc) to the extent of LCC 10 million, only LCC 90 million is required to be held on the SA as RR.
- In some countries N&C cannot be used to satisfy the RR. We assume this in the text, in the interests of simplicity.
- Banks' N&C and their CB account balances are referred to as CB money (CBM).
- No bank can create CBM; only the CB can do so – by buying an asset from the bank or making a loan to the bank (against collateral of eligible assets = government securities usually).
- When the CB makes a loan to a bank (= provides borrowed reserves, denotes as BR) it does so at an "administratively" determined rate (set by the Monetary Policy Committee – the MPC): this rate is called by many names such as repo rate, base rate, discount rate, bank rate and so on. We will refer to it at the CB's key interest rate (KIR).

The above will become clearer as we progress. For the moment see figure 4: when banks make loans of LCC 100 million and create deposits of LCC 100 million they are obliged to have LCC 10 million in RR with the CB. This can only be supplied by the CB by making loans to the banks, and this is done at the KIR.

8. MONEY CREATION DOES NOT START WITH A BANK RECEIVING A DEPOSIT

9.1 Introduction

Many text books on money and banking lead the scholar astray with the starting point of money creation being a bank receiving a deposit. They postulate that if a bank receives a deposit of LCC 100 million, it is obliged to place LCC 10 million (r = 10%) with the CB. Once this is executed it can lend out LCC 90 million (see Boxes 6 - 7).

BOX 6: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
RR (1) Loans (1)	+10 +90	Deposits (1)	+100
Total	+100	Total	+100

[4] This is a separate and interesting issue, which will detract from the principles we are discussing; therefore it will not be discussed here.

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BOX 7: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		RR (1)	+10
Total	0	Total	+10

When the loan of LCC 90 million is made, this amount ends up as a deposit with the bank (again we assume there is one bank[5]). The bank places 10% (= LCC 9 million) with the CB and lends out the rest (= LCC 81 million) (see Boxes 8 - 9 = a continuation of Boxes 6 - 7).

BOX 8: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
RR (1) RR (2) Loans (1) Loans (2)	+10 +9 +90 +81	Deposits (1) Deposits (2)	+100 +90
Total	+190	Total	+190

BOX 9: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		RR (1) RR (2)	+10 +9
Total	0	Total	+19

This process continues until the full original deposit amount of LCC 100 million is "used up", ie equal to the RR amount, which may be expressed as:

New deposit creation = Original deposit of LCC 100 million / *r*
= LCC 100 million / 0.10
= LCC 1 000 million.

Thus, we have a so-called *money / loan multiplier* and it is expressed as the reciprocal of *r*; therefore:

Money / loan multiplier = 1 / *r.*

In this example the multiplier = 1 / 0.10 = 10. So, for every LCC 10 million increase in the original bank deposit the money stock increases by LCC 100 million. It will be evident that if *r* is 8%: the multiplier = 1 / 0.08 = 12.5, meaning that for every LCC 10 million increase in the original bank deposit the money stock increases by LCC 125 million (assuming a demand for loans exists).

This is misleading, and it is so for the following reasons:

[5] As we will show in a separate text, if there was another bank, the interbank market will make the market balance. We do not introduce this here in the interests of sticking to the principles.

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- Where does the original deposit come from? One cannot just suck a deposit out of the air. Someone's balance sheet would have changed in the direction of deposits + LCC 100 million, but what other balance sheet item changes compensate for this?
- Note that the CB's balance sheets do not balance (there is no counter-balancing entry).
- No bank can create CBM; only the CB can; therefore the transactions shown above cannot happen.

9.2 Notes and coins deposited

A condition under which the above is plausible is if the original deposit is made in N&C, assuming that N&C do rank as reserves (this is usually the case). Let us explore this. First of all, N&C are issued by the CB. Thus, if Mr A deposits LCC 100 million N&C (which he had in a tin under his bed) at the bank his balance sheet will change as indicated in Box 10.

BOX 10: MR A (LCC MILLIONS)			
Assets		Equity and liabilities	
Bank notes and coins Deposits at bank	-100 +100		
Total	0	Total	0

The bank's balance sheet in Box 11 shows the deposit of Mr A and an asset in the form of N&C. The bank now has a deposit on which it is paying interest and an asset that does not earn interest.

BOX 11: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
N&C	+100	Deposits (Mr A)	+100
Total	+100	Total	+100

Because N&C are liabilities of the CB, the bank will deposit them immediately with the CB; the results are shown in (continuous) boxes 12 and 13.

BOX 12: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
N&C (deposited by Mr A) N&C (sold to CB) TR – RR (+10) – ER (+90)	+100 -100 +100	Deposits (Mr A)	+100
Total	+100	Total	+100

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BOX 13: CENTRAL BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
		N&C TR – RR (+10) – ER (+90)	-100 +100
Total	**0**	**Total**	**0**

Because bank deposits increased by LCC 100 million, ΔRR = +LCC 10 million. The balance of +LCC 90 million are reserves that are in excess of RR, ie the bank now has LCC 90 million ER. Like in the case of holding LCC 100 million in non-interest-bearing N&C, it now also has an asset (ER) that bears no interest. If this bank liquidity state was permitted by the CB, interest rates will fall sharply and the bank will feverishly make loans in order to create a balance sheet that will produce an income.

How is this done? It is done by making new loans, which *creates* deposits (= money); and this can take place *up to the point where ER is absorbed into RR*. This level is reached when new loans and deposits created are equal to:

Maximum deposit increase = ER / *r*
= LCC 90 million / 0.10
= LCC 900 million.

The total deposit increase of course is LCC 1 000 million, made up of this LCC 900 million + the original LCC 100 million N&C deposited. It will be evident that the M3 creation of LCC 900 million was based on the *loans* made by the bank and this could take place up to the point where the ER = RR. The outcomes are shown in Boxes 14 and 15 (continuous).

BOX 14: BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
N&C (deposited by Mr A) N&C (sold to CB) TR (of bank) - RR (+10) (10% of the +100 deposit) - ER (+90) Loans (new) TR (of bank) - RR (+90) - ER (-90)	+100 -100 +100 +900 0	 Deposits (deposit of N&C) Deposits (new deposit = new money)	 +100 +900
Total	**+1 000**	**Total**	**+1 000**

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BOX 15: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		N&C (bought from bank) TR (of bank) - RR (+10) (10% of the +100 deposit) - ER (+90) TR (of bank) - RR (+90) (10% of the +900 deposit) - ER (-90)	-100 +100 0
Total	0	Total	0

As these boxes may not be easy to follow, and to properly elucidate this issue, we present the net changes to all the balance sheets in Boxes 16 - 19.

BOX 16: MR A (LCC MILLIONS)			
Assets		Equity and liabilities	
N&C Deposits at bank	-100 +100		
Total	0	Total	0

BOX 17: REST OF NBPS (LCC MILLIONS)			
Assets		Equity and liabilities	
Deposits at bank	+900	Loans from bank	+900
Total	+900	Total	+900

BOX 18: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
TR - RR (+100) - ER (0) Loans	+100 +900	Deposits	+1 000
Total	+1 000	Total	+1 000

BOX 19: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		N&C TR - RR (+100) - ER (0)	-100 +100
Total	0	Total	0

The above is just a pleasant and neat exercise, and it is presented in the interests of completeness and as an introduction to what follows. As we saw earlier, N&C make up a small part of M3, and while the above example is possible, it is unrealistic. However, it did demonstrate a critical point: that the banks can only “get rid of” ER in the manner shown. We will touch upon this later again.

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9.3 Government spending

It is often expounded that government spending (when government uses the CB as its banker) leads to money creation. In this example government spends LCC 100 million on goods bought from the NBPS (see Boxes 20 – 23).

BOX 20: GOVERNMENT (LCC MILLIONS)			
Assets		Equity and liabilities	
Government deposits Goods	-100 +100		
Total	0	Total	0

BOX 21: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		Government deposits TR - RR (+10) - ER (+90)	-100 +100
Total	0	Total	0

BOX 22: NBPS (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods Deposits at bank	-100 +100		
Total	0	Total	0

BOX 23: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
TR - RR (+10) - ER (+90)	+100	Deposits (NBPS)	+100
Total	+100	Total	+100

The banks have ER of LCC 90 million. They can now lend up to the point where ER is fully transmuted / absorbed into RR. The end point is the same as in the N&C example: M3 can increase up to ER / *r* = LCC 100 million / 0.10 = LCC 1 000 million.

As in the above N&C example, this exposition is nonsense, and it is so because the original transaction is omitted from the story. It is a critical part of the story. *The original transaction is that government either receives revenue from taxes or borrows the money*. We will explore the latter case: government borrows LCC 100 million by the issue of bonds (bought by the banks) and spends this on goods bought from the NBPS (see Boxes 24 – 27).

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BOX 24: GOVERNMENT (LCC MILLIONS)			
Assets		Equity and liabilities	
Government deposits (from bonds) Government deposits (paid for goods) Goods	+100 -100 +100	Bonds	+100
Total	+100	Total	+100

BOX 25: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
		Government deposits (from bonds) Government deposits (paid for goods)	+100 -100
Total	0	Total	0

BOX 26: NBPS (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods Deposits at bank	-100 +100		
Total	0	Total	0

BOX 27: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Bonds	+100	Deposits of NBPS	+100
Total	+100	Total	+100

Note the difference from the previous example where the original transaction was omitted: M3 (deposits of the NBPS) increased by LCC 100 million and the BSCoC is bank loans (buying new bonds = new loans extended). The previous example gives a starkly different picture: the creation of ER.

In fact the correct story is that the banks are actually *short of RR* – because bank deposits have increased (that carry an *r* of 10%). We omitted this issue in the interests of simplicity. We now correct the issue in Boxes 28 – 29.

BOX 28: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Loans to bank @ KIR	+10	Government deposits Government deposits TR - RR (+10) - ER (0)	+100 -100 +10
Total	+10	Total	+10

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BOX 29: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Bonds TR - RR (+10) - ER (0)	+100 +10	Deposits of NBPS Loans from CB @ KIR	+100 +10
Total	+110	Total	+110

As we have said before, the banks are not able to create CBM; only the CB itself can do this. The bank is therefore obliged to take a loan from the CB at the KIR.

9.3 Money creation starts with a bank loan

In real life the causation path on money creation runs from bank loans (= bank asset) to money (= bank liability). Note the following:

- All money creation takes place this way when N&C do not rank as reserves (as is the case in some countries).
- The vast majority of money creation takes place this way when N&C do rank as reserves. The latter is so small that it can be ignored.

The RR is often presented as a crucial factor in money creation. It only comes into play in that as NBPS bank deposits (= money) increase, as a result of *new bank loans or bank purchases of newly issued securities* (= loans in marketable form), the amount of RR increases. The banks can get the additional RR *only* by borrowing from the CB (remember the banks cannot create CBM).

The previous example of the government borrowing and spending is a true life example. Here we provide another (see Boxes 30 – 33). It is the same as the first one presented earlier but with the RR and the CB included.

BOX 30: COMPANY L (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods Deposits at bank	-100 +100		
Total	0	Total	0

BOX 31: COMPANY B (LCC MILLIONS)			
Assets		Equity and liabilities	
Goods	+100	Loans from bank	+100
Total	+100	Total	+100

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BOX 32: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Loan (Company B) TR - RR (+10) - ER (0)	+100 +10	Deposits (Company L) Loan from CB @ KIR	+100 +10
Total	+110	Total	+110

BOX 33: CENTRAL BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Loans to bank @ KIR	+10	TR - RR (+10) - ER (0)	+10
Total	+10	Total	+10

The introduction of the RR here does not indicate that the RR is an important element in money creation. *It is not; in fact it is a quantity that is a consequence of money creation and not a quantity that steers money creation*. It is just one of the many factors that affect bank liquidity, an issue that CBs deal with every day. We will return to this issue, which is part of monetary policy, but in a different form.

Essentially, monetary policy is about the item "CB loans to banks" and the KIR that is applied to these loans. The existence of CB loans to banks, the outstanding amount of which is also called the *money market shortage* (MMS) or 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 this the demand for loans.

It needs to be swiftly added that in exceptional times (as during the recessionary period of 2008/09), some CBs resort to creating ER for the banks, but buying large amounts of government bonds. This policy "encourages" interest rates down to very low levels and thereby an increased demand for loans (remember underlying an increase in bank loans / money is an increase in C + I = GDE). This vital issue is not discussed in detail here.

9. MONEY CREATION IS NOT DEPENDENT ON A CASH RESERVE REQUIREMENT

The next step in this discussion is to cement the fact that money creation is not dependent on the existence of a RR. Take a country that does not impose a RR on its banks (as noted, they do exist). The banks of this country still create new money (NBPS deposits) by making new loans. Omitting a RR in the previous example produces a balance sheet of the bank as indicated in Box 34.

BOX 34: BANK (LCC MILLIONS)			
Assets		Equity and liabilities	
Loans (Company B)	+100	Deposits (Company L)	+100
Total	+100	Total	+100

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In this example M3 increases by LCC 100 million and the BSCoC is bank loan extension by the same amount. The real cause of the change in M3 is the additional demand for loans that is satisfied by the banking sector. So the starting point is the demand for loans; if satisfied by the banking sector, it leads to an increase in M3. A RR had nothing to do with the creation of money.

However, scholars of money and banking will know that because of the relationship between the RR (where it exists) and bank deposits, a CB can "control" the creation of money quantatively. This is sometimes called the "strict-money-rule model"[6]. In text books it is known as the "monetary base model". According to this model (assuming that N&C do not rank as reserves – for the sake of simplicity) the money "supply", ie stock (see next section), cannot increase by more than the reciprocal of the ER supplied by the CB. An example will be useful: the CB creates LCC 100 million ER by purchasing treasury bills (TBs) from the bank (see Boxes 35 - 36). An assumption is required here: the bank has no outstanding borrowings from the CB.

BOX 35: CENTRAL BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Treasury bills	+100	TR - RR (0) - ER (+100)	+100
Total	**+100**	**Total**	**+100**

BOX 36: BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Treasury bills TR - RR (0) - ER (+100)	-100 +100		
Total	**0**	**Total**	**0**

The bank is now able to create new loans and money to the extent of:

$$(1 / r) \times ER = 1 / 0.1 \times LCC\ 100 = LCC\ 1\ 000$$

and the ER of the bank is transmuted into RR (see Boxes 37 - 38). The banking system cannot create any further loans and its counterpart, money.

As the scholars of money and banking will know, essentially this is a theoretical money "supply" (ie money stock creation) model. Some central banks flirted with this model in the past but rejected it because its sideshow was extremely volatile interest rates. The focus (in normal times) is to manipulate interest rates in order to influence the additional demand for loans (= money creation) to a level consistent with the economy's production elasticity.

[6] A term used by my supervisor, mentor and boss, Dr JH Meijer, when I was a junior employee and he the Head of the Money and Banking Division of the central bank. Dr Meijer went on to become Deputy Governor.

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BOX 37: CENTRAL BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Treasury bills	+100	TR - RR (0) - ER (+100) TR - RR (+100) - ER (-100)	+100 0
Total	**+100**	**Total**	**+100**

BOX 38: BANK (LCC MILLIONS)			
Assets		**Equity and liabilities**	
Treasury bills TR - RR (0) - ER (+100) Loans TR - RR (+100) - ER (-100)	-100 +100 +1 000 0	Deposits (money)	+1 000
Total	**+1 000**	**Total**	**+1 000**

10. IS MONEY "SUPPLY" A MISNOMER?

We know that money is NBPS BD (plus N&C) and we know that new money is created by new bank loans. When money is measured by CBs (see below for more detail) they consolidate the balance sheets of the members on the MBS and derive M3 from this (and the BSCoCs). Many economists call this magnitude the money *supply*.

Is this a useful term when ΔM3 it is the outcome of new bank loans (mainly – see below)? Does "supply" not fit better with the supply of loans, which is theoretically unlimited (subject to the demand for loans, which is a function of the level of interest rates as determined by the CB – specifically bank lending rates), as indicated in Figure 2.

Once new money is created, has the *stock* of money, ie the amount of money in circulation, not increased, rather than the *supply*? Is the amount measured hereafter (= held) not the outcome of portfolio decisions, rather than the *demand* (for transactions, speculative ... reasons) for money. Is it also not true to say that if some people want to hold more bonds instead of money when rates are high, that the money stock will not change – because the bond sellers will get bank deposits and the buyers of bonds will lose deposits?

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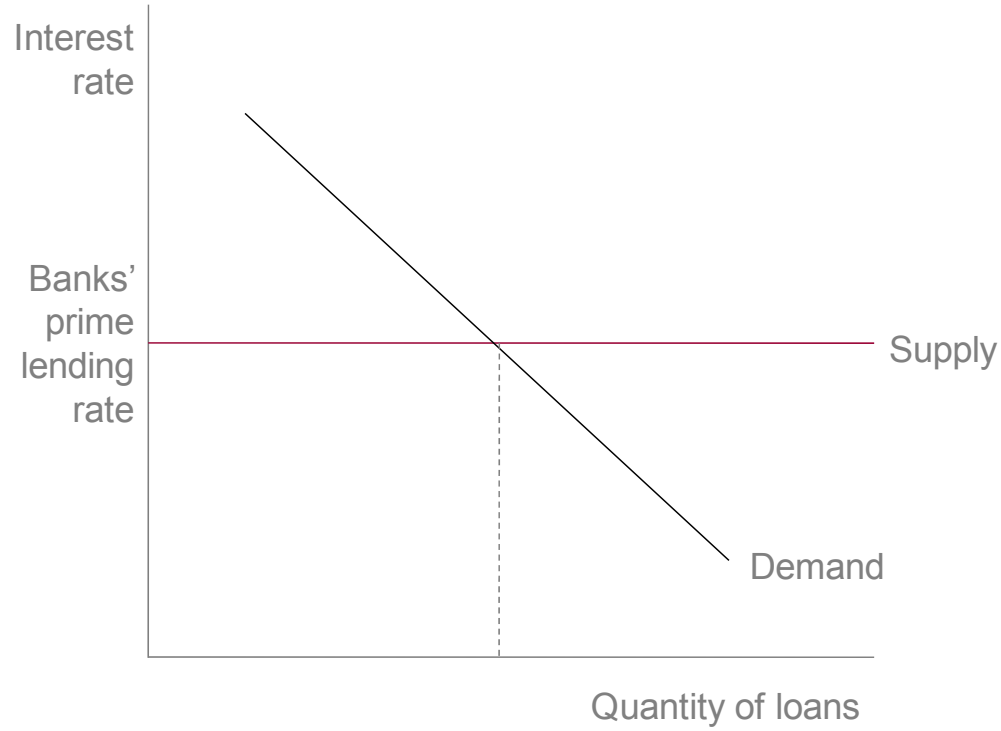
Figure 2: supply of and demand for bank loans



11. THE MONEY IDENTITY AND THE CREATION OF MONEY

BOX 39: CONSOLIDATED BALANCE SHEET OF MBIs (LCC MILLIONS)	
Assets	**Equity and liabilities**
D. Foreign assets E. Loans to government (TBs, bonds) F. Loans to private sector	A. Notes and coins B. Deposits 1. Private sector 2. Government sector C. Foreign loans

Bank loan extension is the main BSCoC of the addition to the money stock. There is another: certain activities in the foreign exchange market. In this section we present the money identity, which shows all the BSCoCs. It is derived from consolidated balance sheet of the MBIs (in a consolidation all interbank claims are netted out). The consolidated balance sheet of the MBIs is shown in simplified form in Box 39.

M3 was defined earlier as N&C in circulation (ie outside the banking sector) and all NBPS deposits with the MBIs. These are items A and B1 in the consolidated balance sheet. Clearly, because a balance sheet balances [liabilities (plus equity that we include here in liabilities) are equal to assets], items A and B1 = M3 must be equal to items:

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(D + E + F) – (B2 + C)

It will be evident that certain items are closely related, specifically:

- Item D (foreign assets) and item C (foreign loans).
- Item E (loans to government) and item B2 (government deposits).

If one is trying to "explain" changes in M3 it makes sense to deduct the liability items mentioned from their asset counterparts. Having done this, we now arrive at the *balance sheet identity*.

M3 = (D – C) + (E – B2) + F.

This can be verbalised as:

M3 = D – C = net foreign assets (NFA)
+ E – B2 = net loans to government (NLG)
+ F = loans to private sector (LPS).

We can make the identity even simpler by grouping NLG and LPS and calling it domestic loan extension (DLE - in the examples we presented earlier "Loans to ..." should be seen as DLE). Now:

M3 = NFA + DLE.

Thus the BSCoCs in M3 are changes in NFA and changes in DLE:

ΔM3 = ΔNFA + ΔDLE

As we have said before, the *actual causes* of changes are the dynamics that underlie the changes in NFA and DLE. This analysis requires more elaboration, but a space limits thwarts it.

12. ROLE OF THE CENTRAL BANK IN MONEY CREATION

The role of the CB in money creation also requires consideration; again we are limited. As a conclusion to this text we present a brief discussion on the role of the CB in money creation (in this and the next section). We touched upon this earlier and endeavour to cement it here.

In much of the developed world monetary policy is conducted through an operational variable: interest rates. Following is a summary of the KIR's transmission path to the banks' lending rates [prime rate (PR) is the benchmark; all lending rates are related to PR], inflation and economic growth:

- The CB, through open market operations (OMO) creates a liquidity shortage (LS) and, in most countries in normal circumstances, maintains it permanently. This means it "forces" the banks to borrow from it at all times. The borrowing term is short (usually 1 day to 7 days).
- It levies its KIR on these borrowed reserves (BR).

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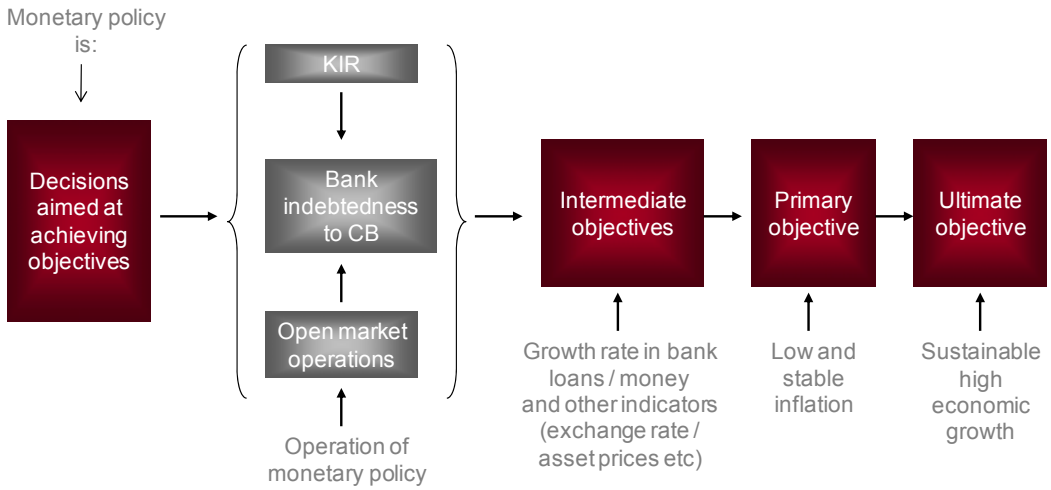
- The bank-to-bank interbank rate (b2b IBM, the market in which banks settle interbank claims on one another) takes its cue from the KIR.
- The b2b IBM rate has a major impact on the banks' deposit rates (wholesale call money rates in the first instance and other short-term deposit rates in the second, and so on).
- As the banks maintain a steady margin, deposit rates impact on bank lending rates.
- Thus the KIR impacts on the banks' PR (in at least one country the correlation coefficient between the KIR and PR for the period 1960 to the present = 0.99).
- The level of PR (especially in real terms) influences the NBPS's demand for bank loans (governments tend to be interest rate insensitive).
- Interest rate changes also have a major impact on asset prices which through the "wealth effect" influence consumption and investment (C + I = GDE) behaviour.
- ΔDLE is the main counterpart of ΔM3.
- The growth rate in demand (ΔGDE), financed to a large degree by ΔDLE and reflected in ΔM3, has a major impact on price developments (inflation).
- The inflation rate is a major input in business decisions
- Business decisions impact on economic growth and employment.

Figure 5: monetary policy



The above is a brief synopsis of monetary policy and of part of the so-called monetary policy transmission mechanism (MPTM). The MPTM may be depicted minimally as in Figure 5.

13. HOW DOES A CENTRAL BANK MAINTAIN A BANK LIQUIDITY SHORTAGE?

In the previous section we stated that "The CB, through open market operations (OMO) creates a LS and maintains it permanently." This is a significant and interesting topic and will be covered here in brief.

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Box 40 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 (as far as CBM is concerned). This is made up of the ER of the banking sector (item B2b)[7] less the extent of loans to the banking sector (at the KIR), ie the LS or BR (item F):

NER = B2b – F.

BOX 40: CENTRAL BANK (LCC MILLIONS)	
Assets	**Equity and liabilities**
D. Foreign assets E. Loans to government securities (TBs, bonds) F. Loans to banks (LS) (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 (the BSCs); thus:

NER = B2b – F = (D + E) – (A + B1 + B2a + C + D.

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

NER = B2b – F = (D – C) + (E – B1) – A – B2a – D.

It will also be evident that:

ΔNER = Δ(D – C) + Δ(E – B1) – ΔA – ΔB2a – ΔD.

Thus, a change in the NER (and the LS which is its main component) of the banking system is *caused* by changes in the remaining balance sheet items (ie the BSCoCs):

ΔNER =

Δ(D – C)	= net foreign assets (NFA)
+ Δ(E – B1)	= net loans to government (NLG)
– ΔA	= N&C in circulation
– ΔB2a	= RR

[7] 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.

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– ΔD = central bank securities (CBS).

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

The above illustrates that bank liquidity is firmly under the control of the CB, and that the RR is just one of the many factors that influences bank liquidity. Most countries' monetary policy approach rests on creating and maintaining a liquidity shortage (in normal circumstances) in order to make the KIR effective. Thus, to maintain that money creation revolves around the RR is misleading. In fact, because it takes time for banks to compile their statements of assets and liabilities, they, in most countries, are required to top up their RR up to 7 weeks after deposit increases[8].

This exposition does not ignore the existence of a loan / credit / money multiplier (maximum deposit increase = ER / *r*), ie the CB is able to create ER and force the multiplier on banks. However, this implies quantitative restriction and interest rate freedom, the consequence of which is extremely volatile interest rates. Central banks and the business sector do not like this state of affairs. Rather, they like stable interest rates and use them (the PR in particular – via making KIR effective) to manipulate the demand for loans. New bank loans create new bank deposits (money).

It is a fine system, provided new loan / money creation (which reflects $\Delta C + \Delta I$) is congruent with output elasticity.

14. BIBLIOGRAPHY

Faure, AP, 1977. **A money market analysis**. Pretoria: South African Reserve Bank Quarterly Bulletin. September.

Van Staden, B, 1966. **A new monetary analysis for South Africa**. Pretoria: South African Reserve Bank Quarterly Bulletin. March.

[8] An extreme example: if its deposits (as a result of new loans) increase by LCC 100 million on 1 June, a bank, on the basis of its 30 June asset and liability return (which is submitted on say 21 July), is required to increase its reserves by LCC 10 (assuming an *r* of 10%) on 21 July. By that time many other items in the CB's balance sheets will have changed (such as the bank notes issue). The CB's job is to maintain a level of bank illiquidity (ie the LS) it deems appropriate for making the KIR effective.

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